MOJZA

O levels & IGCSE

PAKISTAN STUDIES

Paper 2 NOTES

2059/02 & 0448/02

BY TEAM MOJZA

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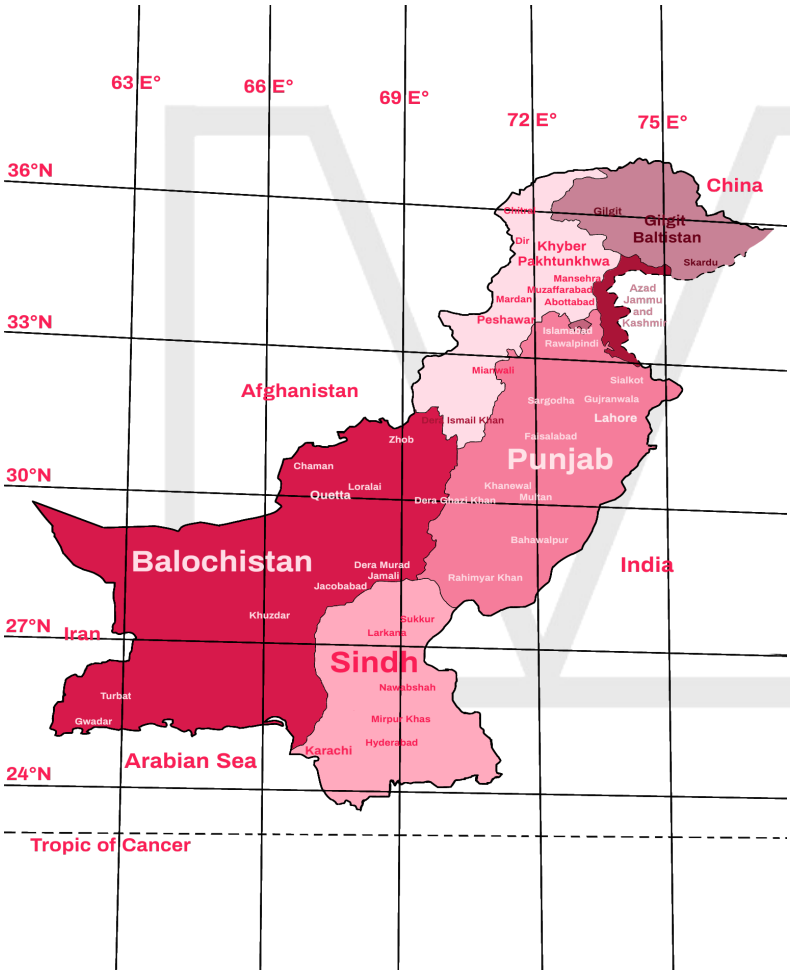
CONTENTS

The Land of Pakistan

Location of Pakistan

- Latitudes, Longitudes & Neighbouring Countries

- ➔ Total area of Pakistan consists of **796,096** sq. km
- ➔ It is located in between the latitude **23.5°N, 30°N** and **36°N**
- ➔ It is located between the longitude **64°E, 70°E** and **76°E**
- ➔ It shares a border with India in the East, China in the North West, Afghanistan in the North West, Iran in the South West and Arabian Sea in the South.



- Administrative areas of Pakistan

- ➔ **Named cities:** Islamabad, Murree, Rawalpindi, Gujranwala, Lahore, Faisalabad, Multan, Sialkot, Peshawar, Chitral, Gilgit, Hyderabad, Karachi, Quetta and Gwadar

- Rivers of Pakistan

➔ **Named rivers:** River Indus, Jhelum, Chenab, Ravi, Sutlej, Swat, Kabul, Hab, Hingol, Porali

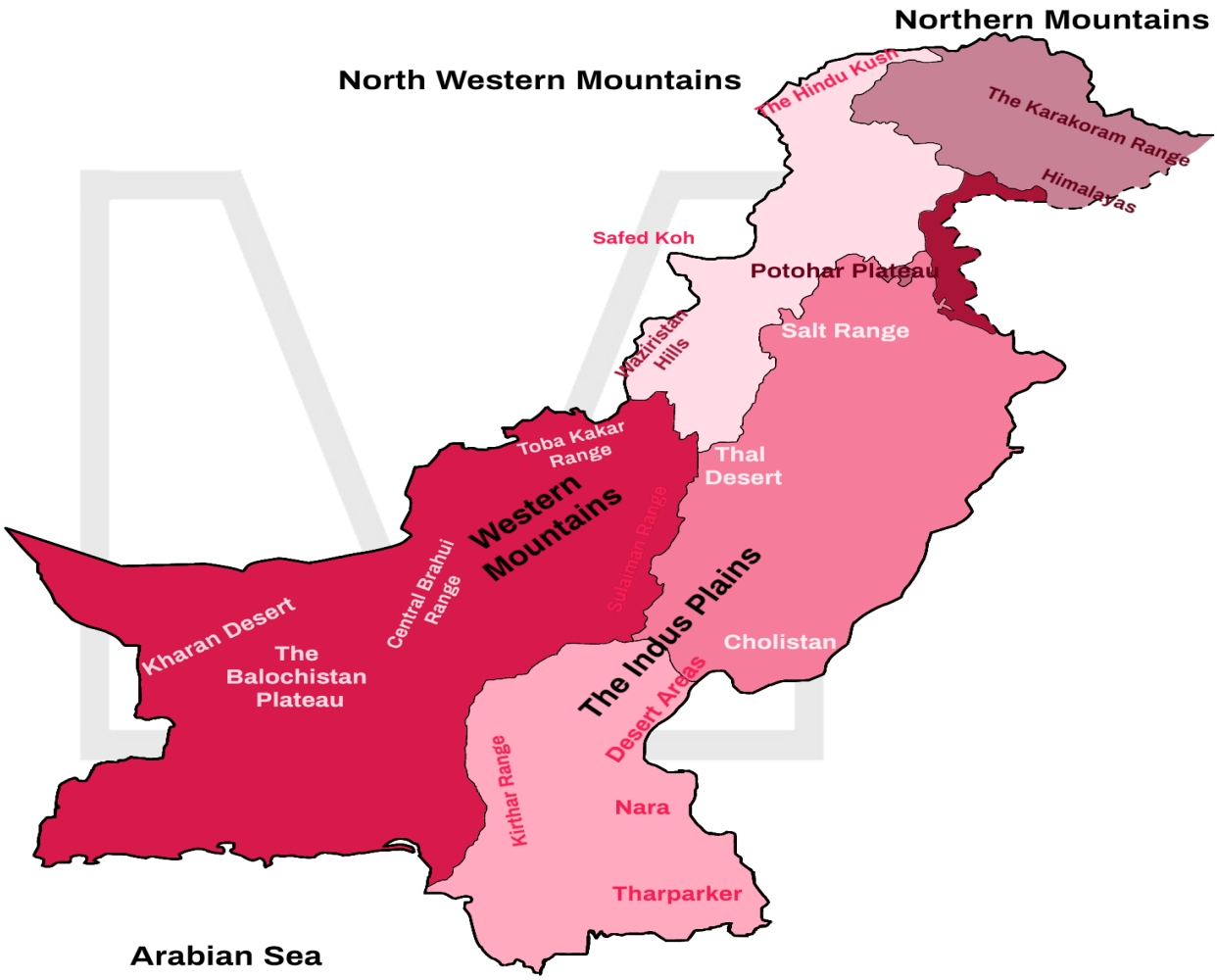
- Passes in Pakistan

Passes	Areas it connect
Karakoram	Kashmir with China
Khunjerab	Gilgit with China
Bolan	Quetta with Kachi Sibi Plain
Khyber	Peshawar with Kabul (Afghanistan)
Lowari	Dir with Chitral
Babusar	Himalayas with Mansehra
Shera Shing	Hindu Kush with Afghanistan in Wakhan Territory

Natural Topography-Including drainage

- ➔ **Topography** refers to the study of surface features of land
- ➔ Pakistan can be divided into six major topographical areas:

    - **The Northern and North-Western Mountains**
    - **The Western Mountains**
    - **Balochistan Plateau**
    - **Potwar Plateau & Salt Range**
    - **The Indus Plain**
    - **Deserts**



The Northern & North-Western Mountains

- ➔ Consists of **Three** dominant Ranges
- ➔ The **Northern** Mountains can divided into **two** main mountain ranges; the **Karakoram**, & the **Himalayas**
- ➔ The **North-Western** Mountain contains the **Hindu Kush** range

- The Karakoram range

- ➔ Karakoram is situated in the Northern Kashmir and the regions of Gilgit.
- ➔ Average height of the Karakoram Range is 6000 metres.
- ➔ It has deep, narrow valleys and sharp peaks covered with snow and glaciers.
- ➔ The highest peak of Pakistan, **K-2** is located here (8610 m high).
- ➔ Karakoram means "**black gravel**" which is a mass of rock & ice.
- ➔ Located at the extending for more than 400 km from Hunza to Shyok River, running in an east to west direction
- ➔ It has steep sided peaks and deep narrow valleys, gorges, cliffs and gullies.
- ➔ Alpine forests are located here
- ➔ Siachen (78 km), Biafo (62.5 km) and Baltoro (58 km) are famous glaciers found here
- ➔ Khunjerab and Karakoram Pass are located in the Karakoram Range

- The Himalayas

- ➔ Himalaya is surrounded by most of the part of Pakistan towards the North.
- ➔ Himalaya means "**the house of ice**".
- ➔ These mountains are spread up to Gilgit.
- ➔ Located at the South of Karakoram
- ➔ The Himalayas consists of:
    - The **Siwaliks** (600-1200m) located near Attock
    - The **Lesser or lower** Himalayas(1800 -4500 m) covering the area of Murree,Nathia Gali & Ghora Gali
    - **Central Himalayas** (5000-8126 m) are located between Pir Panjal Range and Karakoram range. The highest peak of this region is **Nanga Parbat** (8126 m)
- ➔ Steep sided mountains, deep narrow valleys with snow capped peaks are found here.
- ➔ Winters are cold & long while summers are mild & short
- ➔ Snowfall at higher altitude and rainfall at lower altitude is experienced during summers.
- ➔ Alpine and coniferous forests are found here.
- ➔ It serves as a main source of drainage for River Indus and River Chenab.

- The Hindu Kush

- ➔ The Hindu Kush range lies in the North West of Karakoram Range.
- ➔ Most of the mountains of this range are in Afghanistan.
- ➔ The highest peak of this range is **Tirich Mir** (7690 m high).
- ➔ Snow covered peaks with steep sided mountains and deep narrow valleys are located here.
- ➔ Winters are cold and long while summers are mild to hot & short.
- ➔ Extreme cold winds blow during winters, temperature falls below freezing point.
- ➔ Snowfall at higher altitude and rainfall at lower altitude is experienced during winters.
- ➔ Alpine and coniferous forests are found here.
- ➔ River Swat & river Kabul are drained by these rivers.
- ➔ Warsak Dam on river Kabul is the main source of irrigation & drainage.
- ➔ Chitral and Dir are situated here.
- ➔ It contains many passes including Khyber Pass, Lowari Pass, Shandur Pass etc.

- Lifestyle of people & Economy of Northern Mountains

- ➔ The people of the northern areas lead a very harsh life.
- ➔ The livestock farmers move to lowland areas during winters due to extreme cold and snow.
- ➔ They then return in the summer or spring season when the temperature becomes bearable for the animals.
- ➔ Such practice is known as "**Transhumance**" or seasonal migration.
- ➔ Some are nomads who move from one area to another in search of food, water and shelter.
- ➔ The people are engaged in cottage industries and herding, they rear animals. They keep farms where they are settled.
- ➔ Agriculture can only be practised in summers on terraces where wheat, barley, rice, maize, and vegetables are grown.
- ➔ The output of cottage industries are handicrafts, rugs, carpets, etc.
- ➔ Most areas lack transport facilities due to difficult terrain.
- ➔ Fruits like apricots, apples, peaches and pomegranates are grown in a great quantity.
- ➔ Gemstones are extracted from some areas.
- ➔ Northern areas are famous for Tourism.

The Western Mountains

- ➔ The Western Mountain comprises of the mountain ranges, namely; the **Waziristan hills**, the **Safed Koh range**, the **Sulaiman range** and the **Kirthar range**

- Safed Koh range

- ➔ Located at the South of Kabul River, where the height reaches up to 4712 m.
- ➔ They are called Safed Koh (White Mountains) because their peaks are often covered with snow.
- ➔ Steep sided mountains and deep narrow valleys are located here.
- ➔ Passes like Kurram pass are found there, providing a route to Afghanistan.
- ➔ River Kabul and River Kurram drain these areas.
- ➔ Warsak dam on river Kabul and Kurram dam on river Kurram are the main source of drainage, irrigation and power generation.
- ➔ Cities like Peshawar, Kohat are located there.
- ➔ Alpine and coniferous forests are located here.

- Waziristan Hills

- ➔ Waziristan hills are located between River Kurram and River Gomal.
- ➔ They reach up to a height of 3513 m.
- ➔ This hill ranges from a rampart between Afghanistan and Pakistan.
- ➔ Tochi and Gomal pass are located there.
- ➔ Snowfall at high altitude is experienced.
- ➔ Coniferous forests are found here.
- ➔ Dera Ismail Khan and Bannu Valley are the famous towns.
- ➔ These hills are highly mineralized.
- ➔ River Kurram and River Gomal drain this range.
- ➔ Kurram Dam on river Kurram provides irrigation, drainage and power generation.

- Sulaiman & Kirthar Range

- ➔ Sulaiman Range is located to the west of river Indus.
- ➔ **Takht-e-Sulaiman** (3500 m) is the highest peak
- ➔ Moving southward of Sulaiman Range is joined by Kirthar Range, which is later backed by the Pab range.
- ➔ Limestone and sandstone are the main minerals in these areas.
- ➔ Rivers Hub, Porali and Hingoli drain these rivers.
- ➔ Braided river channels drain the Sulaiman range.
- ➔ Hub dam on river Hub provides irrigation, drainage and power generation.

- Lifestyle of People & Economy of Western Mountains

- ➔ Life in Western Mountains is difficult because it has rugged topography.
- ➔ More Population density than the Northern Mountains, Peshawar being the most densely populated
- ➔ Except for Peshawar and Kohat, the rest of area is devoid of good communication system
- ➔ Limited transportation facilities are provided
- ➔ Nomadic lifestyle is common and sheep and goat rearing is the main occupation
- ➔ The Western mountains are mostly bare of vegetation.
- ➔ The relief and climate do not support farming and canal Irrigation.
- ➔ Sub-tropical scrub forests are found
- ➔ Some people grow important grains and cash crops like rice, wheat, sugarcane and tobacco.
- ➔ Millet and grams are also cultivated
- ➔ A number of cottage industries have long been established and the products include various handicrafts and the famous Kohat and Peshawari Chappals.
- ➔ Mineral deposits have not yet been explored and exploited due to the poor road network.

Balochistan Plateau

- ➔ Balochistan Plateau which is located at the south west of pakistan ranges altitudes from 600m to around 3000m.
- ➔ It has a number of irregular depressions such as Zhob and Lorelai basins situated between Toba Kakar Ranges and the Suleiman Ranges.
- ➔ South west of the Loralai Basin is the Quetta valley
- ➔ Alluvial fans on the piedmont plain are formed here when the deposits of alluvial material are brought by the river channels.
- ➔ It contains several parallel ranges running in an East to West direction such as the Chagai Hills, Raskoh Range, and Makran Coastal range.
- ➔ Area is devoid of vegetation and little rainfall.
- ➔ These basins have no outlet to the sea. So rainfall makes temporary rivers and streams which often soak into the ground.
- ➔ The temporary lakes are called **Hamuns** in the local language. Hamun-i-Mashkel is the largest Hamun of the region.
- ➔ There are Salt Lakes and when the water evaporates, a salty crust is left behind and it is then called Salt Pan.

- Coastal Areas of Balochistan

- ➔ The coastal areas of the Balochistan Plateau can be divided into eastern and western parts.
- ➔ The eastern part comprises the Lasbela Plain and the western part is known as the Makran coast.
- ➔ The region comprises the Rivers Hub, Porali, Hingol and Dasht which flows into the Arabian Sea.

Potwar Plateau

- ➔ It is situated between the River Indus and River Jhelum where the altitude varies from 300 to 600 m, which generally is referred to as bad land topography.
- ➔ Major cities covers Islamabad, Rawalpindi, Jhelum, Attock
- ➔ It is dominated by limestone ridges, salt, coal and oil mines and ravines.
- ➔ Kalar- Kahar Lake and Khabeki Lake are two salt lakes located here.
- ➔ **Kala-Chitta** and **Khairi–Murat** ranges are the two prominent hill ranges (1000 m).
- ➔ River Jhelum and River Soan are the two main sources of drainage.
- ➔ Mangla Dam on River Jhelum is the main source of irrigation, drainage, and power generation.

Salt Range

- ➔ Average altitude is 750 m to 900 m
- ➔ The highest point of the range is **Sakesar peak** (1527 m)
- ➔ It runs from east-west direction
- ➔ Areas such as Jhelum, Chakwal, Kalabagh and Mianwali districts are located here.
- ➔ Salt range consists of several parallel ranges which are folded and faulted. Sandstone and shale rocks are commonly found.
- ➔ It rich in rock salt, gypsum and limestone

- Lifestyle of Potwar Plateau & Salt Range

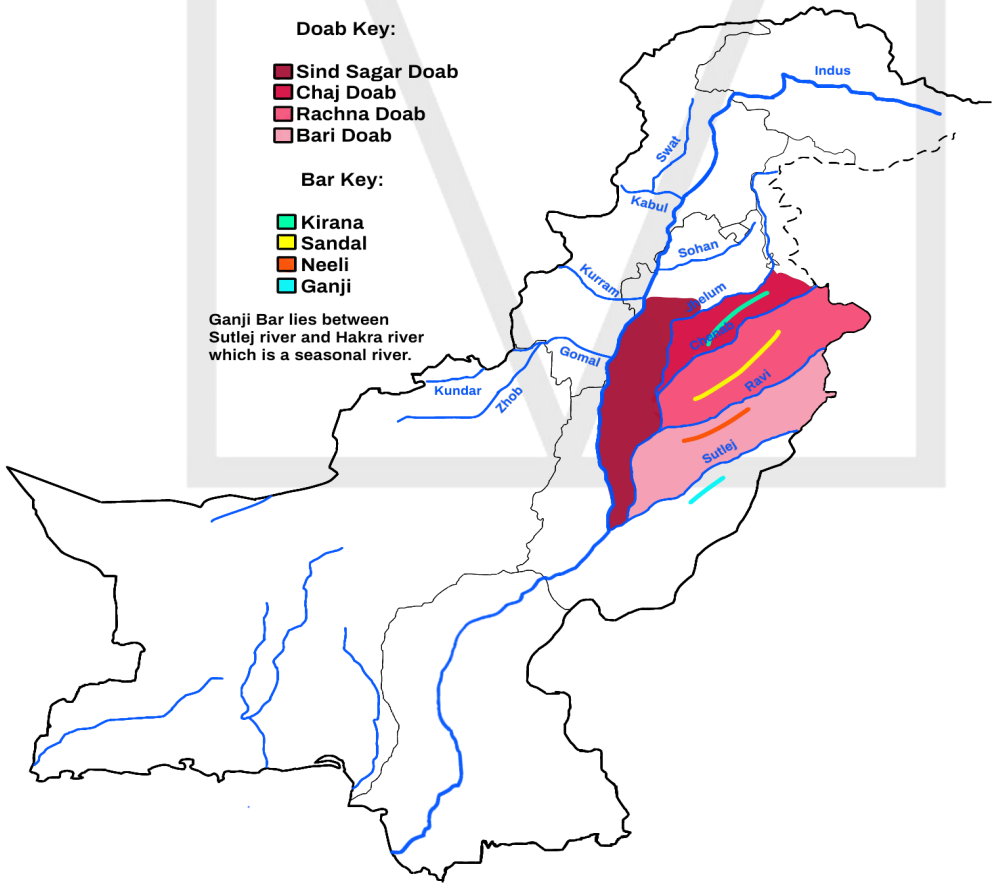
- ➔ The area is rich in mineral deposits for which manpower is employed, some people are employed in Attock Oil Refinery, others in cement factories.
- ➔ It is a Barani (rain-fed) land where canal irrigation is difficult to practise.
- ➔ Population density is high in major towns like Rawalpindi & low in villages like Chakwal & Attock
- ➔ There are technical training institutions for men & women, which will open gates of employment for them.
- ➔ Construction of the M-1 phase of the motorway has improved the local economy.
- ➔ The people in this region are modern. Barani lands are found to grow wheat. Primary, Secondary and Tertiary sectors are present.

The Indus Plain

- ➔ The Indus Plain is divided into **Upper Indus**, **Lower Indus** and **Deltaic plain.**
- ➔ It is located on the eastern side of Pakistan and covers the whole Punjab & most of Sindh.
- ➔ Northern part of the plain is called Upper Indus Plain, covering the area of Punjab.
- ➔ Southern part of the plain is called Lower Indus Plain, covering most of Sindh.

- The area of upper Indus plain is drained by river Indus and its tributaries; River Jhelum, Chenab, Ravi and Sutlej.
- The land is often flooded after the severe rainfall.
- Monsoons usually bring heavy rains in July - September months when Humidity is high.
- The four main tributaries of Indus are joined at **Panjand** which later joins Indus at **Mithankot.**
- **Doab** is the land between two rivers, e.g. the land between Ravi and Sutlej.
- Doabs are favoured as areas for a number of human activities such as farming, construction of settlements, buildings of transport, other industrial & business activities.
- Each Doab has leveès, Active Flood Plains, Old Flood Plain, Scarps, Alluvial terraces.

Doabs	Location
Sindh Sagar Doab	Between Indus and Jehlum
Chaj	Between Jhelum and Chenab
Rachna	Between Chenab and Ravi
Bari	Between Ravi and Sutlej

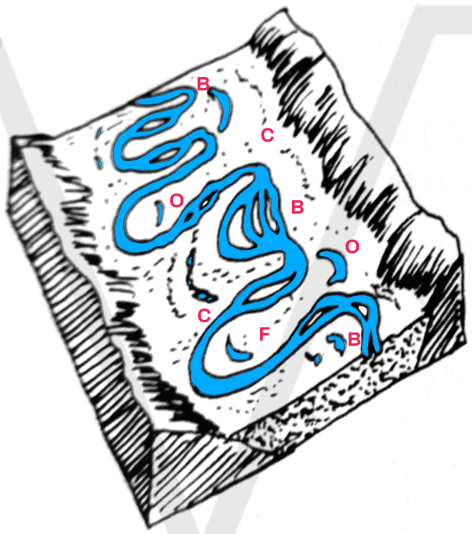


- Active Flood Plains

- ➔ It is a flat, narrow plain on both sides of a river.
- ➔ The area is around 2-3m above the level of a river.
- ➔ The area gets actively flooded **every year**, hence it is a suitable place for growing water intensive crops such as **Rice**, **Sugarcane**, etc.
- ➔ Towards the end of the rainy season, when the river changes its position Meanders, Oxbow lakes, Abandoned and braided channels become visible.
- ➔ The fast flow of the river brings alluvium in large quantities.

- Oxbow lake, Braided channels & Flood Plain

F - Flood Plain
O - Oxbow Lake
C - Former Channel
B - Braiding



- Old Flood Plain

- ➔ It is a flat area that comes after the Active flood plain.
- ➔ The area is around 5m above the level of a river.
- ➔ It is flooded every 7-8 years when there is heavy monsoon rainfall
- ➔ Old Alluvium deposits cover the plain, which makes it suitable for agriculture.
- ➔ It consists of Meanders, Oxbow Lakes, Braided Channels and Levees.

- Alluvial Terraces

- ➔ They are the areas higher than the ground, shaped like **bars.**
- ➔ Formed due to the deposition of old alluvium
- ➔ They are only found in the doabs of Upper Indus Plain.
- ➔ They are suited best for agriculture with the help of irrigation facilities.

Bars	Doabs they are located on
Sandal Bar	Rechna Doab
Ganji Bar	Bari Doab
Nili Bar	Bari & Kirana Doab

- Features of a river

- Piedmont Plains

- ➔ Located at the foothills of Sulaiman, Kirthar and Himalayan Mountains
- ➔ Most of the rivers or streams emerges from these foothills, here the river flow slowly due to which they deposit the alluvium, sand & gravel,and Piedmont Plains are formed
- ➔ Alluvial fans are the most dominant features of Piedmont plains

- Tidal Delta

- ➔ A fan or a triangular-shaped deposit of sand formed on the opening through which ocean water enters and leave
- ➔ When a river comes closer to the Arabian Sea, its speed decreases and alluvium is deposited on the seafloor , which divides the river into small channels.
- ➔ Two of the rivers of Pakistan form the Delta:
- ➔ Indus Delta is formed on River Indus;
- ➔ Hub Delta is formed on River Hub
- ➔ The Indus delta has mangrove swamps

- Rolling Sand Dunes

Most dominant characteristic of desert
It is a mound or a ridge of sand generated when a barrier blocks the course of rolling sand
Causing part of the sand to be deposited behind the barrier.
Direction of sand dunes is longitudinal, while latitudinal are also seen

- Lifestyle & Economy of Indus Plain

- ➔ The Upper and lower indus plains constitute the most active and important economic region in Pakistan.
- ➔ Due to fertile alluvium and flat land agricultural and industrial activities are performed.
- ➔ Tolerable climate conditions have attracted people to settle down.
- ➔ Cash Crops with many agro based industries have developed in this region.
- ➔ In the Indus Delta region, the sources of earning are fishing and agriculture.
- ➔ They also have some other primary industries.
- ➔ The Indus Plain has a dense network of railway lines and roads. All the modern facilities are provided over here.
- ➔ Thick population density in this region
- ➔ All employment sectors as primary, secondary and tertiary are present due to infrastructure.

The Desert Areas

- ➔ Rolling sand plains and sand dunes are found here
- ➔ There are alot of sand plains and pattis (strips of sand formed by the action of Wind)
- ➔ Gently undulating plain, longitudinal and latitudinal ridges are other important features
- ➔ There are rolling sand hills, wide interdunal valleys with slit and clayey sediments
- ➔ The rocks are barren due to lack of water
- ➔ Cracks appear in the rocks due to the effect of weathering
- ➔ These areas are bare of any drainage system
- ➔ No rivers or streams pass through the deserts
- ➔ River Indus is near Thal. Desert Sukkur barrage has provided irrigation facility in Thar desert
- ➔ If a water body is present then it turns into an oasis

Deserts	Location
Kharan	Balochistan
Thal	Punjab, Between Indus & Jhelum
Thar	• Tharparkar • Nara • Cholistan

- Lifestyle & Economy of Desert Areas

- ➔ Life in deserts is quite difficult because of hot climate, lack of water and vegetation and frequent dust storms
- ➔ The population density is very low and nomadic life is common. People move in search of fodder and water
- ➔ Milk, meat and butter are provided by the livestock
- ➔ After the construction of Sukkur Barrage, much of the Thar is converted to farmland
- ➔ Poverty is dominant and people suffer from diseases, mainly allergies and Hepatitis B
- ➔ The coal and power project, started with the Chinese Cooperation PSDP (Public Sector Development Project) is an example of this regard
- ➔ Cash crops are also grown eg. onion, garlic, chilies and brinjal

Climate

- ➔ **Climate:** Atmospheric condition of an area for a long period of time, e.g., 20-30 years
- ➔ **Weather:** Atmospheric condition of an area for a short period of time, e.g., day to day

Climatic Zones

- ➔ The four Climatic zones in Pakistan are:
  - **Highland climate**
  - **Lowland climate**
  - **Coastal climate**
  - **Arid climate**

- Highland Climate

- ➔ Includes northern, northwestern and western highlands.
- ➔ Winters are long, cold and snowy and the summers are short and mild.
- ➔ Rainfall is associated with altitude, highest in the northern mountain.
- ➔ Western mountains experience less rainfall.
- ➔ Temperature also varies depending on the altitude.
- ➔ Summers are short, mild & wet in the northern mountains but dry & warm in western mountains.
- ➔ Farming is not possible during winter.
- ➔ People practise indoor activities such as carpet weaving, pottery etc
- ➔ Transhumance is popular where people move from highland to lowland areas in winter and the opposite in summer.
- ➔ Mainly herdsmen keep sheep and goats.

- Lowland Climate

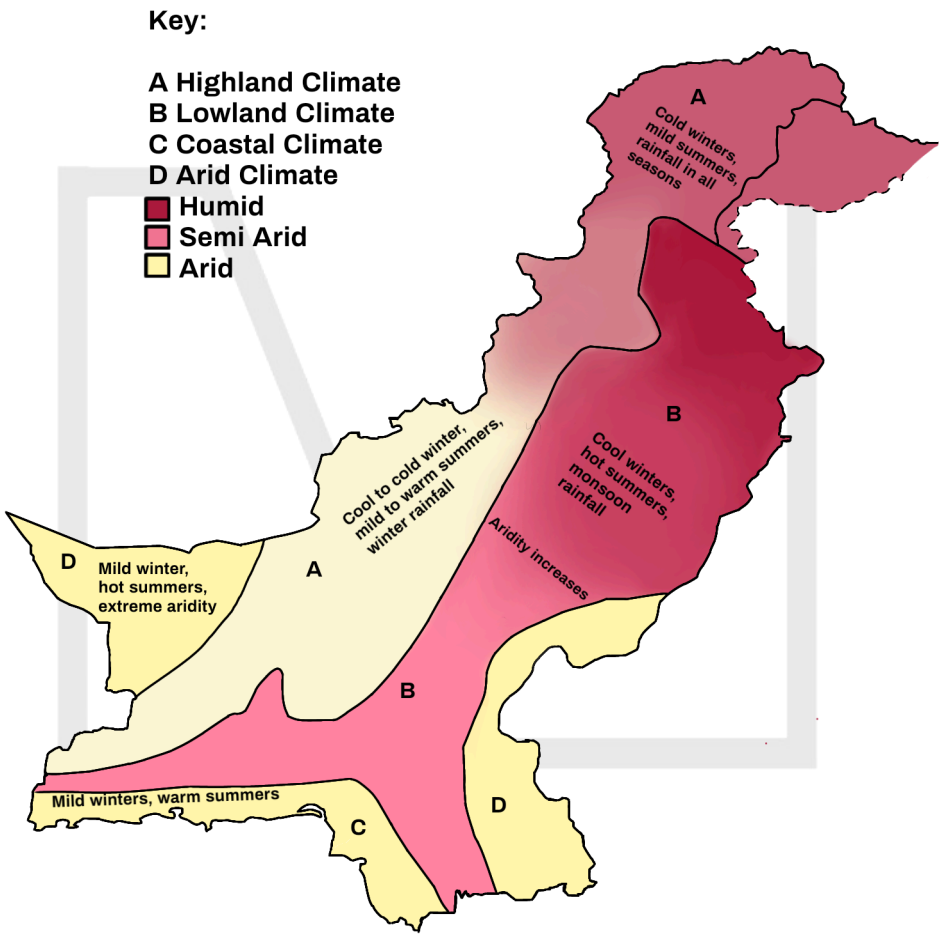
- ➔ Includes the whole Indus plain except coastal areas.
- ➔ Arid and extreme climate, hot summers and cool winters with summer monsoon.
- ➔ Rainfall differs from north to west.
- ➔ The North has a lot more rainfall whereas the west has less and higher temperature.
- ➔ Fertile plains and river Indus with its tributaries make it popular for agriculture.
- ➔ Have well developed canal systems

- Coastal Climate

- ➔ Includes southern coastal strip
- ➔ The maritime influence keeps the temperature low
- ➔ In summer the land heats up while the ocean is cool
- ➔ In winter the land loses heat quickly and becomes cold while the ocean is much warmer
- ➔ Average humidity level is more than 50% and the mean temperature is 32°C
- ➔ Farming is possible throughout the year
- ➔ Seaports are used for trading and fishing
- ➔ Many large-scale industries
- ➔ People face floods and tropical cyclones

- Arid Climate

- ➔ Includes south-western Balochistan and the west-eastern desert
- ➔ Dry and hot with less rainfall
- ➔ Extreme heat, dryness and dust storms are experienced
- ➔ Not ideal for farming
- ➔ There are mostly nomads here travelling around for food and water with their herds
- ➔ There is less rainfall so people use the Karez system
- ➔ Some areas have been reclaimed for farming using perennial canals



- The four seasons in Pakistan

- ➔ **Winter:** From December to March
- ➔ **Early summer:** From April to June
- ➔ **Late summer** (monsoon season): From July to September
- ➔ **Post-monsoon:** From October to December

Climatic Elements

- ➔ Temperature
- ➔ Rainfall
- ➔ Pressure & Wind

1. Temperature

- ➔ Temperature is a degree of hotness or coldness that can be measured using a thermometer.
- ➔ Temperature is generally measured in degrees on Celsius scale.
- ➔ Jacobabad is known as the thermal pool where the max temperature reaches 53 **°C** and the mean temperature in the summer is 43**°C.**

- Factors Affecting Temperature

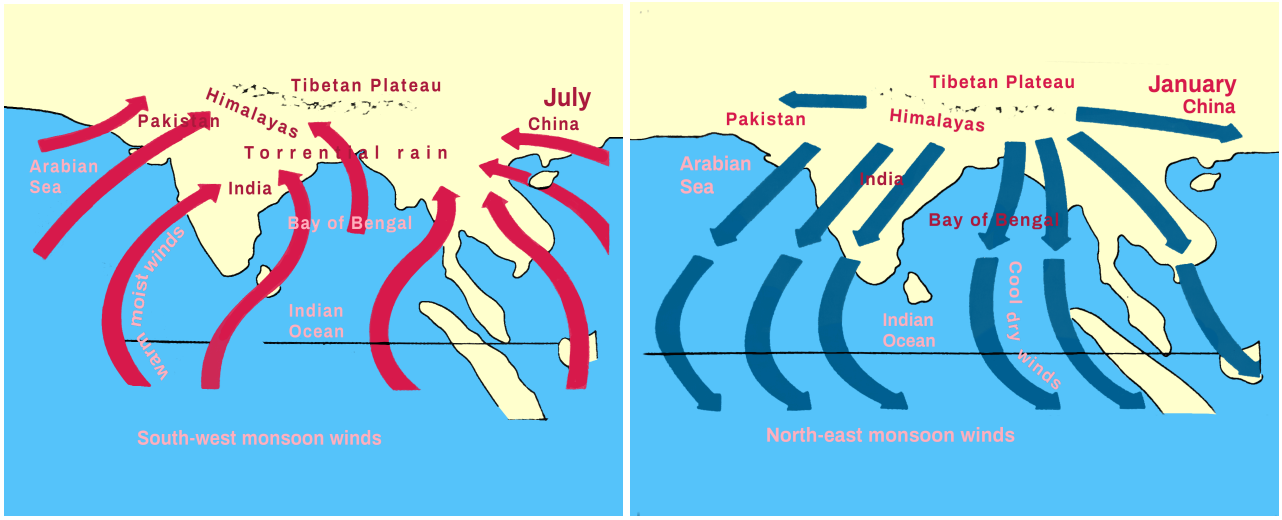
- ➔ **Latitudinal Effect:** The areas closer to the equator receive direct/latitudinal rays from the sun and get higher temperature.
- ➔ **Continental Effect:** Along coastal areas ocean currents and wind affect the temperature.
- ➔ **Altitude:** The air is densest at sea level and less dense at high altitude. The less density of air to absorb heat at higher altitude causes lower temperature.
- ➔ **Cloud Cover:** Cloud reduces solar radiation by reflecting it back into outer space during the day and at night it traps the heat going to outer space.
- ➔ **Latitude and Angle of Sun:** During summer the northern hemisphere is tilted toward the sun causing higher temperature. In winter it's the opposite.

2. Rainfall

- ➔ The main sources of rainfall in Pakistan are:
  - **Monsoon Wind**
  - **Western depression**
  - **Convectional current**
  - **Relief rainfall**
  - **Tropical Cyclone**

- Monsoon Winds

- ➔ Seasonal winds occurring during summers and winters
- ➔ Summer winds are known as south-west monsoons, while winter winds are known as north-east monsoons.
- ➔ Rains begin when the summer sun heats up tropical continents faster than the ocean.
- ➔ Warm air rising overland creates low pressure, attracting cool, moist air from the sea.
- ➔ Main monsoon winds blow from the Bay of Bengal, crossing Bangladesh and North India before entering northern Pakistan.
- ➔ Monsoon winds start in June and cause heavy rainfall in northern Punjab in July.
- ➔ Seasonal reversal of monsoon winds; blowing towards the land in summer and towards the sea in winter.



- Western Depression

- ➔ Winds originating in the Mediterranean Sea
- ➔ Travel across Afghanistan and Iran before reaching the western areas
- ➔ These winds bring rainfall from December to March.

- Convectional Currents

- ➔ Hot air rises at the beginning of summer, carrying high moisture content
- ➔ Condensation occurs when the air reaches higher layers of the atmosphere, leading to rainfall, especially in northern and north-western areas.

- Relief Rainfall

- ➔ Related to the height of the land
- ➔ Occurs when moist, unstable air moves up and experiences condensation and precipitation through wind
- ➔ Leeward slopes tend to receive sinking, warming air, creating dry rain shadow areas.

- Tropical Cyclones

- ➔ May bring a few hours of heavy rainfall and destructive winds to coastal areas
- ➔ Originates over the Arabian Sea, but rarely reaches the coast of Pakistan
- ➔ Source of rainfall from tropical cyclones is unpredictable and unreliable.

3. Pressure & Wind

- ➔ In summer the temperature is high on land which causes the hot air to rise up and form a low pressure zone.
- ➔ At the same time the ocean & seas have low temperatures creating a high pressure zone.
- ➔ This causes the movement of summer monsoon wind causing heavy rainfall.
- ➔ In winter it is the complete opposite as the pressure over land increases and the pressure over oceans and seas decreases.
- ➔ This causes the movement of winter monsoon wind.

Storms

- ➔ Strong winds occur from April to June in summer and September to October in the post-monsoon season,reaching speeds of 60-80 km per hour.
- ➔ Stormy rainfall and hail are possible
- ➔ Fruits are destroyed and crops are damaged
- ➔ Electricity infrastructure is disrupted
- ➔ Communication systems, including telephone lines and internet connections, can be damaged
- ➔ Transportation becomes difficult.

Causes

- Natural cause

- ➔ Unreliability of rainfall by monsoon
- ➔ Dry, hot winds
- ➔ Sandy soils lacking moisture
- ➔ Arid lands
- ➔ Global climate is changing

- Human cause

- ➔ Mismanagement of water resources due to seepage of unlined canals
- ➔ Dispute on water distribution among provinces overgrazing of land leading to soil erosion reduces the soil fertility
- ➔ Deforestation on foothills of mountains in areas with solid erosion

Effects

- ➔ Economy is destructed
- ➔ Animals cannot get fodder
- ➔ Human beings can die due to shortage of food crops
- ➔ Cattle can die

Floods

- Advantages

- ➔ Increased alluvium flow leading to soil fertility
- ➔ Greater water discharge in rivers for hydroelectric power generation
- ➔ Enhanced irrigation opportunities for agriculture
- ➔ Increased fish migration to river deltas
- ➔ Improved reproduction and breeding of fish in freshwater areas
- ➔ Replenishment of groundwater reserves
- ➔ Nutrient enrichment of the land
- ➔ Promotion of wetland expansion and health

- Disadvantages

- ➔ Disruption of residential areas from essential services and shops
- ➔ Destruction of crops and crop fields
- ➔ Damage to houses and infrastructure
- ➔ Outbreak of epidemics, resulting in illness
- ➔ Damage and isolation of roads and railway tracks
- ➔ Risk of drowning for humans and animals

- Effective Measures for Flood Control

- ➔ Implement afforestation programs in the foothills of mountains to promote tree growth
- ➔ Construct cemented embankments on both sides to prevent flood water overflow
- ➔ Build more reservoirs, barrages, and dams to store water for electricity generation and local water supply
- ➔ Initiate flood warning programs through various media platforms
- ➔ Develop comprehensive rehabilitation programs for flood victims and affected regions
- ➔ Expand river channels to accommodate larger volumes of water

Droughts

-The Four types of Droughts

- ➔ Permanent Drought: Stays forever
- ➔ Seasonal Drought: Stays for a dry season
- ➔ Invisible Drought: Result of less water causing lower crop yield
- ➔ Unpredictable Drought: Caused by an abnormally low amount of rainfall

-Causes of Drought

- ➔ Unreliable rain source
- ➔ Climate Change
- ➔ Deforestation
- ➔ Mismanagement of water resources
- ➔ Overgrazing
- ➔ Global Warming

Chapter 2: Natural Resources

Water Resources - an Issue of sustainability

Sources of Water

- ➔ **Ground water:** Water present below the soil OR Water brought up to surface by various methods such as tube wells and karez system
- ➔ Water bodies: Water present in water bodies on the surface of earth such as Lakes, Oceans, Rivers) OR Water transported by canals

The Rivers of Pakistan

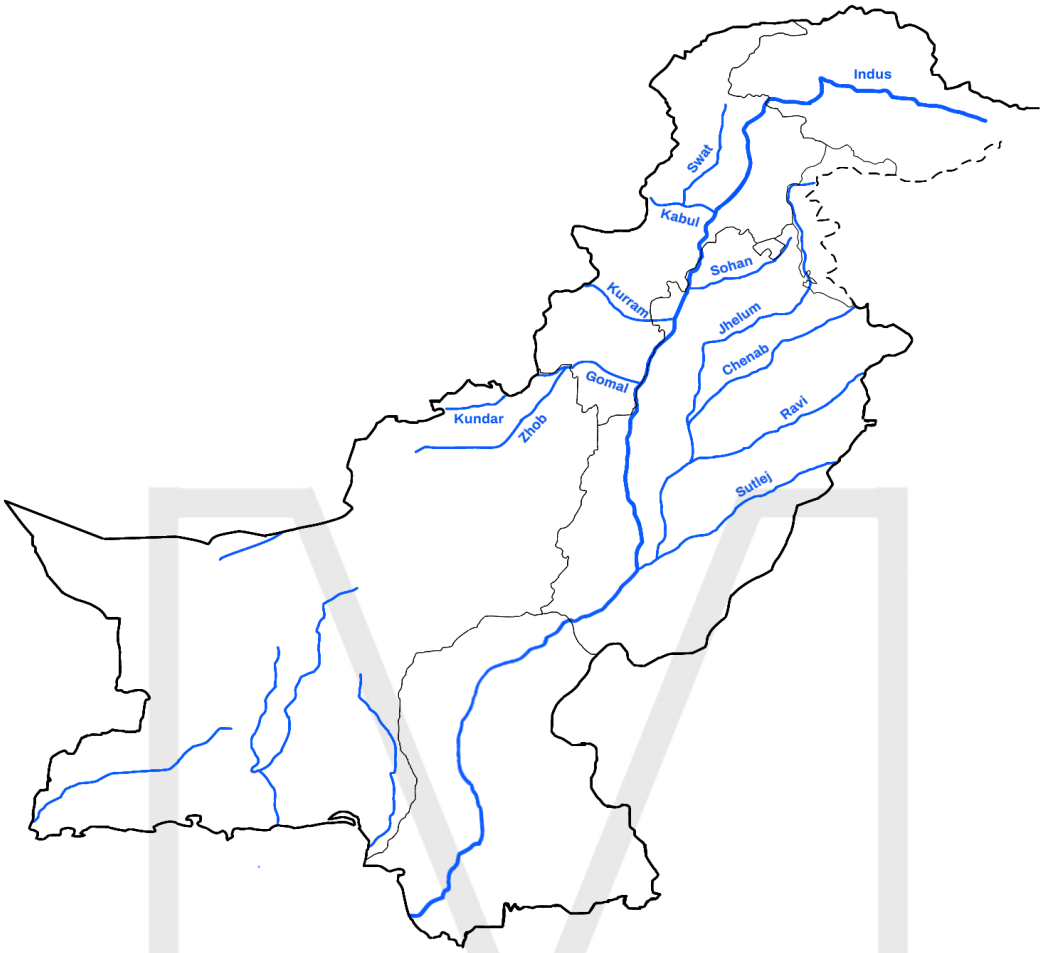
- Rivers of Balochistan

- ➔ River Zhob, Khandhar and Kalaichi drain into River Indus
- ➔ The rivers Loralai, Chakar, Bolan and Mula flow into Kachi Sibi Plain
- ➔ Rivers Hub, Porali, Hingol and Mashkel drain into Arabian Sea

- The Indus Rivers System

- ➔ **Eastern Tributaries:** River Indus, Jhelum, Chenab, Ravi, Sutlej
- ➔ **Western Rivers:** River Kabul, Khurram, Tochi, Gomal, Swat

Map showing Rivers of Pakistan



Uses of Water

- Domestic Use

- ➔ Drinking, cooking, washing, sanitation

- Industrial Use

- ➔ For hydroelectric power (HEP)
- ➔ For pharmaceuticals e.g., syrups, drips, injections
- ➔ Tanning industry for washing leather
- ➔ Food processing industry for juices, squashes, beverages, etc
- ➔ Chemical industries for making acids, liquids bleach, and solutions
- ➔ In textile industries for washing bleaching, blueing, dying, printing
- ➔ In iron and steel industry for cooling down of furnaces
- ➔ Thermal power stations for making steam

- ➔ Mineral water industry uses water as raw material

Irrigation

- ➔ Irrigation refers to the artificial supply of water usually used for crops in farming
- ➔ 75% of cultivated area is under irrigation in pakistan
- ➔ Utilises water which would otherwise flow into the sea
- ➔ Allows barren lands such as deserts to be made productive

- The Need of Irrigation

- ➔ Increasing aridity in lands
- ➔ It is needed in arid or arid areas
- ➔ Spells of high temperature increase the rate of evapo-transpiration
- ➔ Unreliable rainfall especially monsoons
- ➔ Low amount of rainfall
- ➔ Small rainy days
- ➔ High variability in distribution
- ➔ Rainfall in heavy showers increases surface run-off

- Canal Irrigation

- ➔ By canal irrigation millions of gallons of water are utilised that would flow into Arabian Sea
- ➔ Cheap labor and availability of cement reduces the cost of canal construction
- ➔ Canal system irrigates a vast area. Even the deserts have been made productive
- ➔ Irregular supply of water in the river is then regulated by construction of dams and barrages
- ➔ Huge quantities of water from monsoon rainfall and melting snow can be stored in reservoirs during summer season
- ➔ Soft soil and level land of the Indus Plain makes digging of canals easier than in the rugged lands of Balochistan
- ➔ Southward slope of rivers makes construction of canals easier because water flows southwards naturally

Methods of Irrigation

Modern Methods

- ➔ Irrigates a vast area
- ➔ Less time consuming
- ➔ Usually easier to build and maintain
- ➔ Usually doesn't require manual labour
- ➔ Costly compared to traditional methods
- ➔ High Maintenance cost
- ➔ Needs fuel, diesel, electricity etc
- ➔ Reduces groundwater or lowers the water table

- Tubewells

- ➔ Chemically or electrically operated machines
- ➔ Can raise water from the depth of 100 metres

- ➔ Can be used to irrigate a area of 1000 hectares

- Perennial Canals

- ➔ Canals which are taken out from dams and barrages
- ➔ It has water all the year round which provides an ease for agriculture
- ➔ Irrigates a vast area

- Sprinkles

- ➔ Connected to a water supply
- ➔ Mainly used in orchids and market gardening
- ➔ Placed in fields and shoot water around watering the fields
- ➔ It is an expensive method
- ➔ There is less wastage of water in this method than others

- Tankers

- ➔ They collect water from lakes and ponds to provide it to fields and houses in case of emergency
- ➔ Very expensive
- ➔ Rarely used

Conventional Methods

- ➔ Also known as Traditional methods
- ➔ It irrigates a small area usually used for subsistence farming
- ➔ Time consuming and harder to build and maintain
- ➔ Requires manual labour
- ➔ Less costly compared to modern methods
- ➔ Less efficient and slower as compared to modern methods
- ➔ Contains unhygienic water
- ➔ Causes waterlogging and salinity

- Shaduf

- ➔ Well, river or canal is attached to the pole by a bucket on one side and weight on other side
- ➔ A small area can only be irrigated
- ➔ Animal power is also used as labour
- ➔ It is not used now

- Persian Wells

- ➔ Persian water wheel is a device used to raise water out of well or river
- ➔ It is a system of a chain of buckets slung round a vertical wheel, which is turned by a system of another interlocking vertical and horizontal wheels powered by a bull driven in a circle
- ➔ With the passage of time the wooden wheel is replaced by metal

- Charsa

- ➔ Charsa is an irrigation method in animal power is used to pull out water from a water source

➔ In this the small area irrigates and lots of time is wasted in this system of irrigation

- Karez

➔ Underground horizontal tunnel system that are dug in the foothills that brings underground water to the surface
➔ Vertical shafts are also dug to maintain the tunnel and clear incase of any blockage
➔ Usually dug by a group of people who share the water
➔ These are only found in Balochistan to stop evapotranspiration

- Inundation canals

➔ Long canals taken off from rivers
➔ receives water when water table is high or in flood

Link Canals

➔ Link Canals transfer water from western rivers for eastern rivers
➔ The water lost to India from eastern river is compensated by these canals
➔ The link canals in Pakistan are:
- Marala-Ravi
- Bombanwala-Ravi-Badian–Depalpur
- Rasul–Qadirabad
- Qadirabad-Balloki
- Balloki-Sulaiman 1
- Balloki-Sulaiman 2
- Chashma-Jhelum
- Trimmu-Sidhnai
- Taunsa-Panjnad
- Sidhnai-Mailsi Bahawal

Dams

➔ They are huge barriers built on water routes such as rivers to store water and to generate hydroelectric power (HEP)
➔ Tarbela dam is built on river indus
➔ It is the largest earth filled dam of pakistan
➔ It is 143 m high and covers an area of 243 sq. km
➔ Mangla dam is built on river Jhelum
➔ Dams can either be large or small and can be used to exploit their advantages

Small Dams	Large Dams
Store water for irrigation	Store water for irrigation
Irrigates local areas only	Irrigates a vast area
It is easier to solve silting problems	It is difficult to solve silting problem
Low initial investment is required	High initial Investment is required
Low maintenance cost	High maintenance cost
Less constructing time is required	Mor constructing time is required
Less Labour required	Labours are required on large-scale
Little impact on rivers, watersheds and aquatic ecosystems	Extensive impact on river, watersheds and aquatic ecosystems
Water is used for Industrial and domestic use	Water is used for Industrial and domestic use
Little or no electricity is generated	Major source for electricity generation
Less important for flood control	More important for flood control

- Requirements

- ➔ Low temperature
- ➔ High altitude
- ➔ Mountainous area with steep slope at the fall and gentle at bottom
- ➔ Snowfall area
- ➔ Area with more rainfall
- ➔ Flow of fast river to move the turbine

- Functions

- ➔ Produce HEP (HydroElectric Power)
- ➔ Scenic Beauty
- ➔ Attract tourists for foreign exchange
- ➔ Fishing in reservoirs
- ➔ Storage of water in reservoirs
- ➔ Store water for irrigation
- ➔ Canals can be taken out from dams

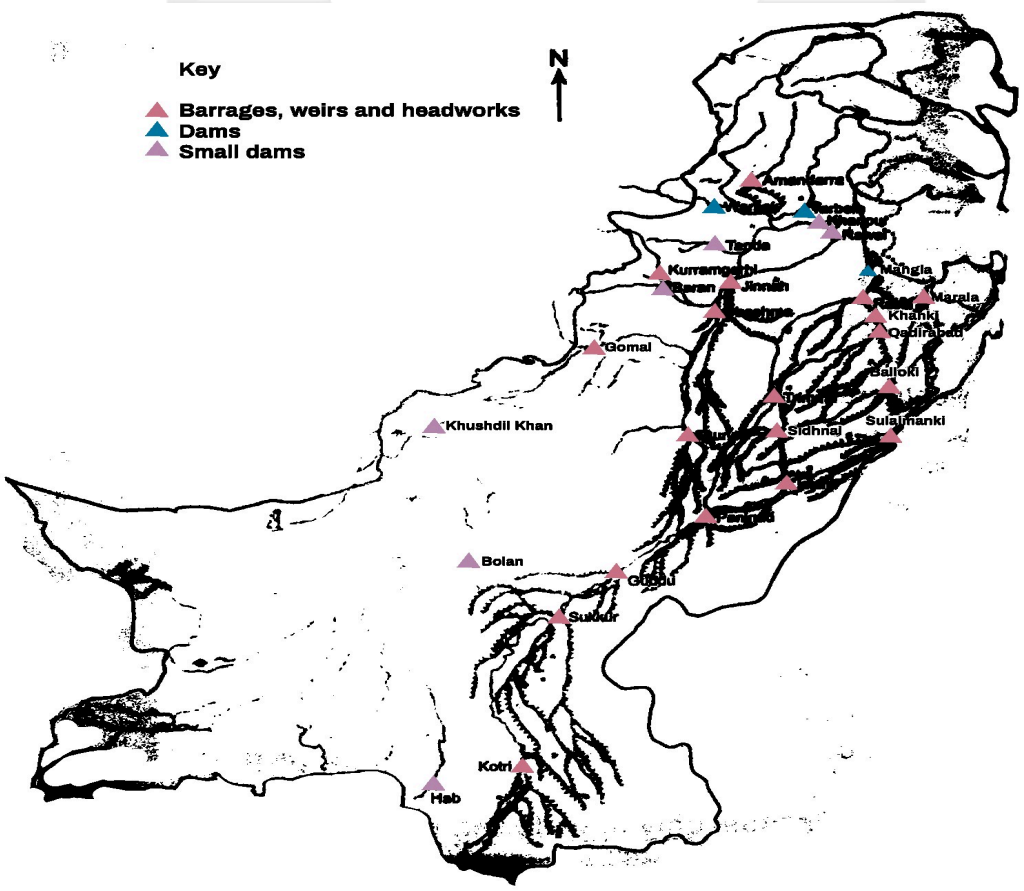
Barrages

- ➔ Large structure used for irrigation and flood control
- ➔ Not involved in the generation of electricity or hep
- ➔ Construction cost is less than that of dam
- ➔ Can be made even in flat areas

➔ Properties such as size and capacity depends on width of river

- Examples of barrages

Barrages	Location	Area under irrigation
Sukkur Barrage	River Indus	Nawabshah, Larkana
Guddu Barrage	River Indus	Jacobad, Ghotki
Kotri Barrage	River Indus	Hyderabad, Badin, Thatta
Marala Barrage	River Chenab	Sialkot, Gujranwala
Rasul Barrage	River Jhelum	Sargodha, Gujrat
Chashma Barrage	River Indus	Punjab & KPK



↑ Map showing Dams & Barrage of Pakistan

Water logging & Salinity

➔ **Water logging** is the rise of water table to the surface level

- ➔ Excess water in land causes water logging
- ➔ When the excess water dries up and salt is spread, **Salinity** is observed

- Solution

- ➔ Lining of canals
- ➔ Canal closure when the water is not needed
- ➔ Installing tubewells to pump out water to lower the water level
- ➔ Planting eucalyptus trees
- ➔ Draining of water from lands
- ➔ Treating the land with chemical or limestone

- Organisations

- ➔ SCARP (Salinity Control and Reclamation Project) is working for treatment of waterlogged and saline areas
- ➔ WAPDA (Water and Power Development Authority)
- ➔ IRSA (Indus River System Authority) is working to eradicate the problem
- ➔ SDO (Small Dams Organization) is working to build new small dams

Siltation

- ➔ Material brought by riverflow that deposits in water reservoirs such as dams is called silt
- ➔ It Leads to decreased capacity in reservoirs

- Causes

- ➔ Silt is eroded from the mountains with the help of river flow of river
- ➔ Eroded material from narrow and deep valleys causes siltation
- ➔ Due to deforestation, a fast flow of silt accumulates

- Effects

- ➔ Weaken the foundation of dams
- ➔ Blockage of canals
- ➔ Reduction in storing capacity of water in Dams
- ➔ It can result in floods
- ➔ Fluctuation of electricity due to silt in turbines

- Solutions

- ➔ Afforestation programmes be made
- ➔ Cemented embankments be made
- ➔ Silt traps be installed before flow of water in dam
- ➔ Raising the height of dam to increase the capacity of reservoir
- ➔ Operating the water level at low pace when flood flows

Indus Water Treaty

- ➔ Water distribution treaty between Pakistan and India
- ➔ Arranged and negotiated by world bank in 1960

- ➔ This treaty gave full flow control of three eastern rivers named Beas, Ravi and Sutlej to India
- ➔ Pakistan was given full flow of Rivers Indus, Chenab and Jhelum
- ➔ Treaty included construction of Tarbela and Mangla dams, construction of 5 barrages, remodelling of existing canals and head works and construction of eight link canals
- ➔ The treaty ensured that India wouldn't cut off Pakistan's water supply and Pakistan's water supply is maintained and its agricultural production is unharmed

- Causes

- ➔ Pakistan's climatic condition is mostly dry and hot which results in low and unreliable rainfall rate
- ➔ Pakistan's population is increasing, resulting in more demand for food which can only be provided by use of irrigation due to the climate condition of pakistan
- ➔ As india cut off the water supply famine,droughts and starvation became a rising problem for Pakistan due to shortage of water for irrigation
- ➔ Pakistan decided to take the matter into International court

Water Pollution

- Causes of Water Pollution

- ➔ Sewage discharged into rivers
- ➔ Domestic garbage thrown into rivers
- ➔ Fertilisers runoff from agricultural fields
- ➔ Industrial waste discharged into rivers
- ➔ Waste from ship discharged into rivers
- ➔ Leakage of oil from ship enters water sources

- Consequences

- ➔ Contaminates water and remains no longer drinkable
- ➔ Cost of treatment of water is high
- ➔ Causes disease such as diarrhoea and cholera
- ➔ Unpleasant smell and destroys scenic beauty
- ➔ Harmful chemical substances kill aquatic life resulting in decreased fish catch
- ➔ Can damage machinery
- ➔ Blocks ditches, canals and causes flooding
- ➔ Provides breeding ground for mosquito larvae

- Solution

- ➔ Treatment of sewage water
- ➔ Improving sanitation facilities in poor quality housing
- ➔ Proper waste management and dumping of domestic and industrial waste
- ➔ Organic farming (Alternative to chemical fertilisers/pesticides) or selective use of fertiliser
- ➔ Fines charged on Water polluters
- ➔ Maintenance of oil ships

Management of Water resources

- ➔ Ways to increase water supply
- ➔ Small dams and large dams should be developed to store surplus water during rainy seasons such as monsoon
- ➔ Canals should be lined to save runoff of water into the soil
- ➔ Prevention of water pollution to avoid contaminated water
- ➔ Desalination of salt water (conversion of salt water to fresh)
- ➔ Public awareness to the disadvantages of loss of water

Water as a resource for development

- ➔ Used for irrigation which improves yield significantly in agricultural sector
- ➔ Used in number of industries (tanning,food,water based consumables)
- ➔ Universal access to safe drinking water provides better hygiene, sanitation and safe drinking water overall raises living standards
- ➔ Used to produce steam and turbines in power producing stations such as nuclear, thermal, geothermal power stations and HEPs (dams)

Forest – An Issue of Sustainability

- ➔ Forest is a complex ecological system of land dominated by trees covering 4.8% of the land of Pakistan.
- ➔ There are two types of forests; Productive forests or natural forest and Protection forests or man-made plantation.

Productive Forests	Protective Forests
Natural Forests	Artificial or man-made Forests
Alpine, coniferous, etc are incorporated here	It includes vegetation planted by man like riverain
High density of trees	Tree density is moderate
They are highly valuable to businesses	They don't have much commercial value
Greater biodiversity	Less biodiversity
It advances tourism Industry	It promotes tourism
The vegetation grows in a random manner	The vegetations grown are linear
They safeguard the environment by forestalling soil erosion & by going about as carbon sinks it cleans the environment	They protect the environment by preventing from soil erosion and by acting as carbon sinks it cleans the environment

- Importance of Forests

- ➔ Fuel wood
- ➔ Provide Shade, Natural habitat for animals
- ➔ Prevent soil erosion & Increase soil fertility
- ➔ Reduce pollution
- ➔ Timber is extracted from trees for the construction and transport industry
- ➔ Rainwater for wood based industry
- ➔ Ensures supply of Fruits
- ➔ Herbs for medicines and pharmaceuticals
- ➔ Wood pulp for paper
- ➔ Attract tourists, Provide scenic beauty and a source of foreign exchange for the local people
- ➔ Controls flood
- ➔ Brings rainfall, Lowers the temperature and makes the weather pleasant
- ➔ Regulate the supply of water
- ➔ A medical herb, Ephemera is obtained
- ➔ Resin is obtained for turpentine oil and gum
- ➔ Mazri is obtained for making mats and cap

Types of Forests

Type	Area	Description	Importance
Alpine	Northern Areas	Stunted growth due to low temperature and sunlight	Fuel wood
Coniferous	Northern Areas, KPK, Balochistan Mountains	Evergreen forests with conical shape	Timber, environmental protection
Tropical Thorn (Rakh)	Sindh Plain, Sindh Plain, Punjab Plain, Balochistan	Low height forest with thorny hardwood	Firewood
Sub-Tropical Srub	Foothills of Lower Himalayas, Western Mountains	Subtropical broad-leaved and thorny	Watershed protection, supplying firewood, grazing purposes
Riverain or Bela	River Indus & its tributaries	Linear plantation along the banks of rivers	Provide Shishum & Babul for making furniture, agricultural implements
Mangrove	Coastal Areas of Sindh and Balochistan	Low trees and shrubs on tidal mud flats	Firewood, breeding grounds, coastal protection
Irrigated	Changa Manga, Wan Bachran, Chichawatni, Ghulam Mohammad, Guddu Barrages	Economically important species planted in large blocks	Timber, firewood, shade

- Factors determining the type of Forest

- ➔ Areas with different altitudes have different types of forests
- ➔ Aridity is another factor for e.g Aridity in Balochistan favours the growth of thorny bushes and shrubs
- ➔ Higher Precipitation in Northern Mountain encourages the growth of Coniferous Forest
- ➔ Edaphic Factors(types of soil) also determine the type and density of Forest in Pakistan
- ➔ In the Hub and Indus Delta, the deposition of alluvium encourages the growth of Mangrove Forest

Deforestation

- ➔ Excess cutting of trees in a land is called deforestation

- Causes

- ➔ For fuel wood as well as timber for industries
- ➔ Urbanisation, e.g building roads and railways
- ➔ Clearing lands for farming (growing of crops)
- ➔ Overgrazing by animals

- ➔ Clear land for mining

- Effects

- ➔ Exposure of soil leads to erosion and Upper topsoil humus layer is eroded
- ➔ Leads to infertility of land and increases surface runoff
- ➔ Results in flood, since there are no trees to reduce the flow of river
- ➔ Results in Siltation of Dams (Reduction of capacity of water in dams)
- ➔ Loss of habitat for animals
- ➔ Increase in temperature, while lack of oxygen
- ➔ Increases pollution
- ➔ Brings less rainfall
- ➔ Disrupts generation of electricity HEP in dams due to siltation, since there are no trees to hold the silt being deposited in the dams

- Solutions

- ➔ Afforestation programs (AKRSP, Rachna Doab Project)
- ➔ Provide substitute areas for growing forest, if the land is being used for crop farming
- ➔ Substitute for furniture
- ➔ Supply of CNG, LPG for fuel wood species
- ➔ Reserve land to grow fuel wood species
- ➔ NGOs may provide awareness among people
- ➔ Improve techniques for raising nurseries
- ➔ Strict forest laws be imposed to stop bulldozing in forests by logging companies
- ➔ Selective cutting methods be used
- ➔ Strip Farming

- Sustainable Forestry

- ➔ **Sustainable Forestry** refers to the use of forests and forests lands in such a way that meets the needs of the present without compromising the ability of future generations to meet their demands
- ➔ Hence, Forests should be used in such a way and at a rate that maintains their biodiversity, productivity, regeneration capacity and their potential to fulfil now and in the future relevant ecological, economic and social functions, at local, national and global levels and that does not cause damage to other ecosystems

- Ways to Sustain Forests

- ➔ Community Forestry and AgroForestry
- ➔ Planting trees to fill, replace gaps in forests especially in vulnerable areas such as on slopes
- ➔ Use dead branches for firewood rather than chopping trees down
- ➔ Educate and train local people into sustainable ways of use
- ➔ Plant fast growing agricultural trees like oil palms, eucalyptus
- ➔ Maintain a complete forest cover to prevent soil damage
- ➔ The tree crops can be used to shelter smaller food crops
- ➔ Wood needed for other purposes such as fuel can be provided by planting patching of fast growing eucalyptus trees
- ➔ Harvesting of HardWoods

- ➔ Selective logging of trees of greatest commercial value
- ➔ Taking out only mature trees and leaving the rest to grow to full size
- ➔ Keep forest clearances small so that rapid generation is possible
- ➔ Do a preliminary survey to find the most suitable logging areas
- ➔ Check cutting of timber and ensure a long gap before next cutting

Mineral Resources – an Issue of Sustainability

Formation of Minerals

- ➔ Due to sediment deposits, sedimentary rocks are formed
- ➔ When lava from the volcanoes cools down, igneous rocks are formed in crystals form
- ➔ The mixture of igneous and sedimentary rocks makes the metamorphic rocks

Methods of Mining

1. Open Cast Mining

- ➔ Applied when a seam of mineral is observed on the surface
- ➔ Blasting and digging takes place for getting the mineral

2. Underground Mining

- Adit Mining

- ➔ Applied when mineral seam is found along the slope or hill of mountain
- ➔ Horizontal tunnels are dug to enter and then extraction takes place

- Shaft Mining

- ➔ Vertical shafts are dug deep, then horizontal digging takes place to extract the mineral
- ➔ Underground mining is a dangerous process
- ➔ Many poisonous gases can help in suffocation and death of the miners
- ➔ Rock blasting can block the miners inside the mine
- ➔ Elevators are also used

- Quarrying

- ➔ Open excavation method, when a seam of the rock is observed on the surface especially soft rock, limestone
- ➔ It can be extracted with the help of power shovels, hammers, wedges and spades

- Hand Panning Method

- ➔ The rock is broken from the mountain
- ➔ A huge pan is placed at the bottom of the mountain
- ➔ The rock which falls is shaken in the huge pan, the gold and sand separated like that, then the mineral is collected

Problems Faced by Mining Sector

- ➔ Lack of capital
- ➔ Lack of experts
- ➔ Lack of skilled labour
- ➔ Lack of machinery
- ➔ Lack of interest by the government for the sector
- ➔ Institutional mismanagement
- ➔ Inaccessible areas due to lack of infrastructure such as roads, electricity etc

Metallic Minerals

- ➔ They resemble metals and have characteristics of metals e.g. they are shiny, hard and smooth
- ➔ They are good conductors of heat and electricity
- ➔ They can be moulded into different shape
- ➔ Economically valuable
- ➔ Generally hard, tough and shiny
- ➔ Can be stretched and compressed
- ➔ More reactive with water and acid

- Chromite

- ➔ Chromite gives hardness and electrical resistance to steel
- ➔ It is used for bridges and railway carriages
- ➔ It is also used as a lining in metallurgical furnaces and for making engineering tools and stainless steel etc

- Iron Ore

- ➔ Steel making, construction and transport industry

- Copper

- ➔ Making electrical wires and other electrical appliances, especially switches that carry current, also used in making alloys, water pipes

- Manganese

- ➔ Used in making dry batteries, paints. It is a vital alloy in steel making, flares and flashbulbs

- Bauxite

- ➔ Aluminium is mainly obtained from bauxite and is a valuable metal. Uses: utensils, tins, cans, etc. and many other products

- Celestite

- ➔ Found in the cavities of sedimentary rocks. Uses: tracer bullets, fireworks, ceramics, paints and plastics

Non-Metallic Materials

- ➔ They are softer, rougher and less shiny
- ➔ They break away when their shape is changed
- ➔ They cannot be stretched or compressed

- ➔ They are poor thermal and electrical conductors
- ➔ Economically less valuable
- ➔ Less reactive with water and acid

- Rock Salt

- ➔ Seams of rock salt vary in thickness from between 20 to 100 metres thick
- ➔ The rocks are white or pink in colour
- ➔ The salt is overlain by gypsum and clay
- ➔ Rock salt is used for cooking and preservative purposes and for the manufacture of soda ash, bicarbonate of soda, caustic soda and other sodas for laundry, textiles, and tanning

- Brine

- ➔ Used in the chemical and fertiliser industry

- Limestone

- ➔ Limestone is a major sedimentary deposit and is widespread in Pakistan
- ➔ It is the main raw material for cement
- ➔ It is also used in the manufacture of bleaching powder, glass, soap, paper, paints and lime
- ➔ It is used to treat sugarcane waste to produce alcohol fuel
- ➔ It is painted on the barks of trees to counter pests and termite attacks
- ➔ It is also used to aerate soil and treat salinity

- Coal

- ➔ Pakistan has low-quality coal
- ➔ Coal is mainly used in brick kilns, some is used to make coke and coal briquettes and a small percentage is used for power generation
- ➔ It is planned to build a thermal power station to use coal from a new coalfield in Thar District

- Natural Gas

- ➔ Domestic and industrial uses

-Mineral Oil

- ➔ It is used as a power source, as a lubricant for machines, and as motor fuel

-Gypsum

- ➔ Found in grey, white and pink colour
- ➔ It is used in the manufacture of paints, fertilisers and prefabricated boards
- ➔ White gypsum is used for making cement and Plaster of Paris. Spread on Saline soil to help land reclamation for farming

-Marble

- ➔ Found in bands of white, grey, yellow and brown
- ➔ It is used in buildings and for making chips for flooring and decorative pieces

-Clay

- ➔ Clays are fine-grained minerals
- ➔ In Pakistan, the most important industrial clays are China Clay, Fire Clay and Fuller's Earth

-Magnesium

- ➔ It has a high percentage of magnesia, (about 50%)
- ➔ It is used in the manufacture of cement, fertilisers, rayon, paper pulp, chemicals and pharmaceuticals

-Sulphur

- ➔ Sulphur is used in chemical industries to manufacture sulphuric acid, paints, explosive materials, dyes, rayon and fertilisers

Minerals and their locations

Minerals	Location	Minerals	Location	Minerals	Location
Iron Ore	Kalabagh Langrail Kohat Muzaffargarh	Limestone	Khewra Dandot Dandkhel D.G Khan	Rock Salt	Warcha Khewra Karak Kalabagh
Bauxite	Loralai Salt Range	Sulphur	Quetta Koh-i-sultan	Barite	Kohala Faqir Muhammad
Chromite	Chaghi Kharan Zhob	Gypsum	Salt Range Potwar Plateau Margalla Hills	China Clay	Kot Diji-Sukkur Thano Bula Khan Salt-range
Copper	Zhob Waziristan	Antimony	NWFP	Magnetite	Balochistan
Manganese	Zhob Lasbela	Coal	Sor range Lakhra Mach	Celestite	Daud Khel Thanobula Khan
Marble	Thano Bulla Khan Mullagori Maneri Gunjo Takar	Mineral Oil	Potwar Lower Sindh Badin	Natural Gas	SUI Pirkoh Khandkot

Importance of Mining Industry

- ➔ They contribute to the GDP (Gross Domestic Product) and the GNP (Gross National Product)
- ➔ They provide raw material for different industries
- ➔ They can be exported to foreign countries e.g. marble, rock salt
- ➔ They earn foreign exchange for the country by their export
- ➔ Through mining domestic requirements are fulfilled which prevents import thereby saving foreign exchange
- ➔ They improve Balance of Trade and Payment
- ➔ Reduces rural-urban migration as they are found in remote areas
- ➔ people get jobs in mines which prevents migration
- ➔ It provides employment for the people

- ➔ They attract foreign investment for exploration and exploitation

Effects on Environment

- ➔ Pollution (air, water, land, noise)
- ➔ Vegetation is cut down
- ➔ Dust, smoke are observed
- ➔ Blasting causes noise and vibration
- ➔ Depressions are caused which result in soil exposure
- ➔ Rock blasting causes great trouble
- ➔ Deformation of landscape

Measures to take

- Measures for Miners

- ➔ Special precautions as land shall be levelled
- ➔ Mining waste and fumes be disposed of off
- ➔ Miners are provided proper clothing, masks,masks, etc. Trees will be planted
- ➔ Alongside the mining area, housing, medical, schools, parks be provided

- Make Mining Sustainable

- ➔ Discharge of toxic substances and the release of heat which is harmful to the environment should be checked
- ➔ The application of science and technology to enhance the industry's competitiveness and environmental protection
- ➔ Government should consider the concept of sustainable development when making policies which affect minerals and metals industry

Fishing Industry - an Issue of Sustainability

- Uses Of Fish

- ➔ Adds 0.9% to GDP
- ➔ Nutritious white meat and delicious food
- ➔ Oil extracted provides vitamin A and D
- ➔ Fish waste is used to make fertiliser and poultry feed
- ➔ Pakistan earns about 6% of foreign exchange over fish

Types Of Fishing

1. Marine Fishing

- ➔ Marine Fishing is practised alongside seawater of Sindh and Balochistan
- ➔ Sindh coast covers 30% of the coastline, while the Makran coast covers 70% of the total seaside
- ➔ It is mostly Practised in sea and ports and 68% of fisherman are involved in marine fishing
- ➔ It is classified into Subsistence and Commercial Fishing
- ➔ Types of Fish catch are: Sharks, Croakers, Skates, Drums, Catfish, Rays

- Subsistence Fishing

- ➔ Catching fish for personal usage is referred as subsistence fishing
- ➔ Conventional techniques and methods are used, such as traditional net, a small wooden boat which travels 3-5 km deep
- ➔ They get a nominal catch and use baskets to collect the fish
- ➔ A fish farmer cannot rely on permanent source of income

- Commercial Fishing

- ➔ Fisherman make huge profits and sell it to the market
- ➔ Modern methods are used such as Mechanised boats, gill-netters, ships which can go 50-60 km deep etc
- ➔ It is for the sole purpose of income
- ➔ Refrigeration facilities are available, storage is easily and effectively done

- Main Fishing Centres

- ➔ Sindh Coast:
  - Karachi Keamari
- ➔ Balochistan Coast:
  - Jiwani
  - Gwadar
  - Pasni
  - Ormara
  - Sonmiani
  - Gidani

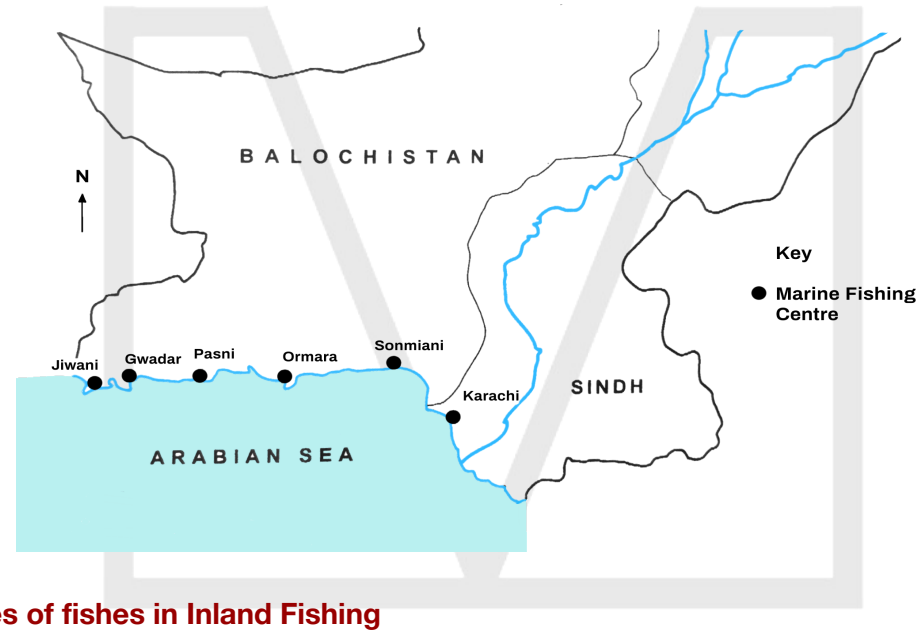
2. Inland Fishing

- ➔ It is a type of fishing practised inland such as in lakes, reservoirs of dams and small ponds
- ➔ 32 % of fisherman are involved in this

- Main Fishing Centers

- ➔ Manchar Lake in Dadu District
- ➔ Kairi, Keenjhar lake, North of Thatta
- ➔ Haleji Lake, west of Thatta
- ➔ Reservoirs of Mangla and Tarbela Dam
- ➔ River Indus at Sukkur, Kotri and Thatta

- Main Fishing Centres



- Types of fishes in Inland Fishing

- ➔ Mahseer
- ➔ Palla
- ➔ Thalla
- ➔ Rahu
- ➔ Tront
- ➔ Grass carp
- ➔ Silverfish

Fish Farming

- ➔ Fish Farming refers to the rearing or farming of fish, it is also known as Aquaculture
- ➔ Ponds are made by humans with a cemented base to avoid water loss
- ➔ The side of the pond is solidified mud and trees are planted for oxygen to be given to marine life

Developing the Fishing Industry

- ➔ Processing facilities must be increased
- ➔ Modern methods should be considered
- ➔ Provide loans to fisherman
- ➔ Increase storage facilities for fisherman
- ➔ Modern machinery must be provided to fisherman

- Benefits

- ➔ Huge income for fisherman
- ➔ Production of fishes would increase in the market
- ➔ Increase in employment
- ➔ More foreign exchange

- Obstacles for fishing Industry

- ➔ Spillage of oil from ships and domestic and industrial waste is causing harm to fishing industry
- ➔ Mostly Karachi fishing labour is affected by pollutants
- ➔ **Numerous chemicals** as carcinogenic qualities, toxic materials and heavy metals including cadmium, aluminium and nickel have been found in marine life. They also enter the food chain of people whose diet includes fish/seafood
- ➔ **Extensive use of chemical fertilisers and pesticides** in agriculture is another source of water pollution
- ➔ **Overfishing** of shrimps throughout the year even in breeding season leads to by catch which results in wastage
- ➔ **Threat to Mangroves**, They are a barrier to protect the coastline. These are best breeding grounds for fish and shrimps but due to decrease in mangroves, there has also been a decrease in the breeding of fish

- Sustainable Fisheries

- ➔ The government should take these factors into consideration when developing fisheries/ fish industry
- ➔ Banning the use of illegal nets having small holes for catching small, growing fish
- ➔ Not allow foreign deep sea trawlers to operate in the Arabian Sea area under Pakistan control
- ➔ Maintain ecological balance by strict enforcement of laws against cutting of Mangrove forests and water pollution

Chapter 3: Power Resources

Renewable & Non-Renewable Energy

- ➔ **Renewable energy** comes from natural resources such as sunlight, wind, rain, tides, and geothermal heat, which are renewable (naturally replenished)
- ➔ A **Non-renewable energy** is a natural resource which cannot be produced, grown, generated, or used on a scale which can sustain its consumption rate
    - These resources often exist in a fixed amount, or are consumed much faster than nature can create them
    - Fossil fuels (such as coal, petroleum and natural gas) and nuclear power (uranium) are examples

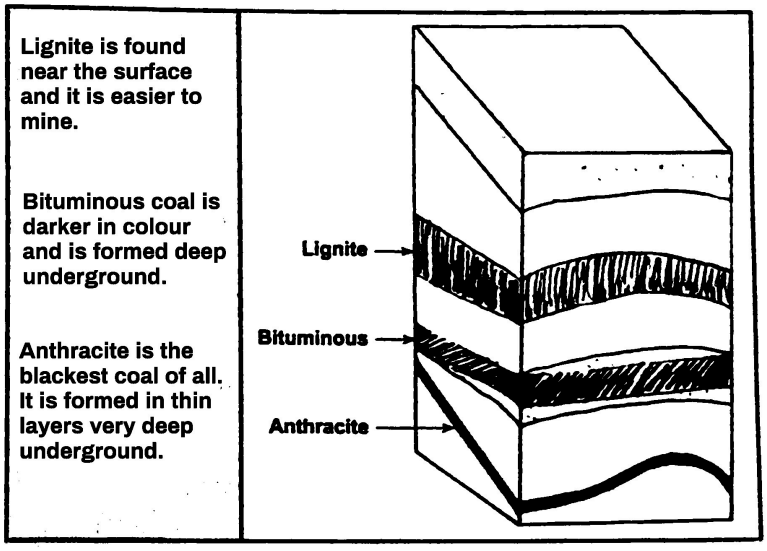
Non-Renewable Sources of Power

Coal

- ➔ It is mined by shaft or adit mining
- ➔ Coal is transported outside from the mine on the back of miners. donkey backs or trolley
- ➔ It is then loaded on trucks, trolleys and railways carriages to be taken to the industries

- Types of Coal

- ➔ **Anthracite:** Best quality coal with the most carbon content
- ➔ **Bituminous:** Hard coal which is easily burned
- ➔ **Lignite:** Lower quality and with high moisture and ash content. It has a low heating value
- ➔ **Peat:** Least quality coal having high vegetative matter,difficult to burn



-Uses of Coal

- ➔ Thermal power generation for brick making process
- ➔ Making cement
- ➔ Steel Making
- ➔ Used in steam engines
- ➔ Cooking purposes
- ➔ Source of energy

- Why is Coal used in Pakistan?

- ➔ Cheap source of energy
- ➔ Found abundantly
- ➔ Oil is not affordable due to its increasing prices
- ➔ A substitute for energy

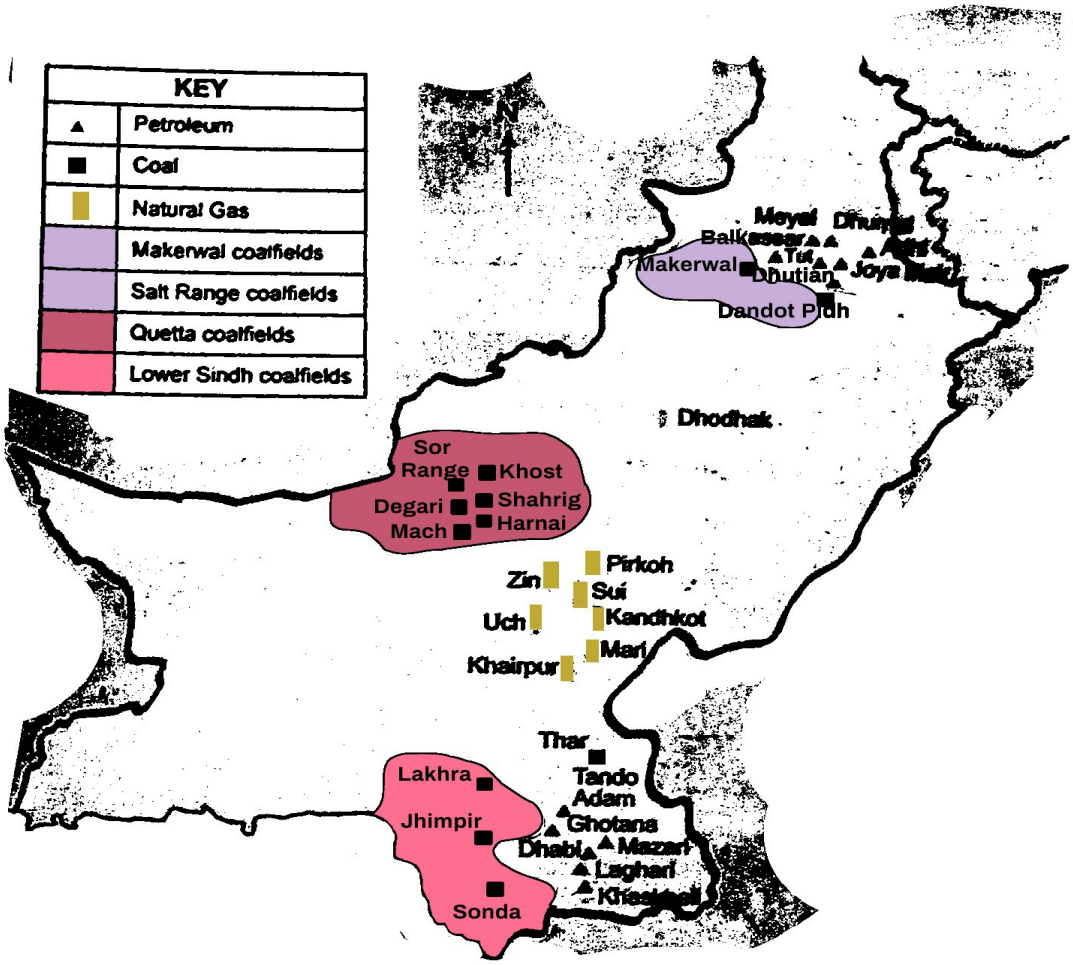
- The Need to import Coal

- ➔ High Demand
- ➔ Coal found in Pakistan is of poor quality
- ➔ The production coal in Pakistan is too low, as coal seams are thin and mineral layers have a lot of faults
- ➔ Pakistan lacks technology, capital,and skilled labours to extract coal

- Provinces where coal is found/extracted

- ➔ **Balochistan:**
  - PMDC has opened three coal mines: Shahrig, Sor-range and Degas
  - Coal is also found in Quetta Coal fields
  - Coking coal is found
- ➔ **Sindh:**
  - PMDC and Lakhra Coal Development company are engaged in coal mining and production
  - Coal is found in lower Sindh coal fields
  - It is of lower quality lignite
- ➔ **Punjab:**
  - PMDC is engaged in mining coal in the Salt Range and Kalabagh areas
  - Sub-Bituminous to lignite highly volatile coal is found
  - deteriorates badly during storage
- ➔ **NWFP:**
  - Private companies are working
  - Sub-bituminous coal is found, which is a better quality coal
  - Coal is also found in Khost, Mach, Jhimpur, Sonda, Dandot, and Harnai

Location of Petroleum, Natural Gas, Coal & Respective Coalfields

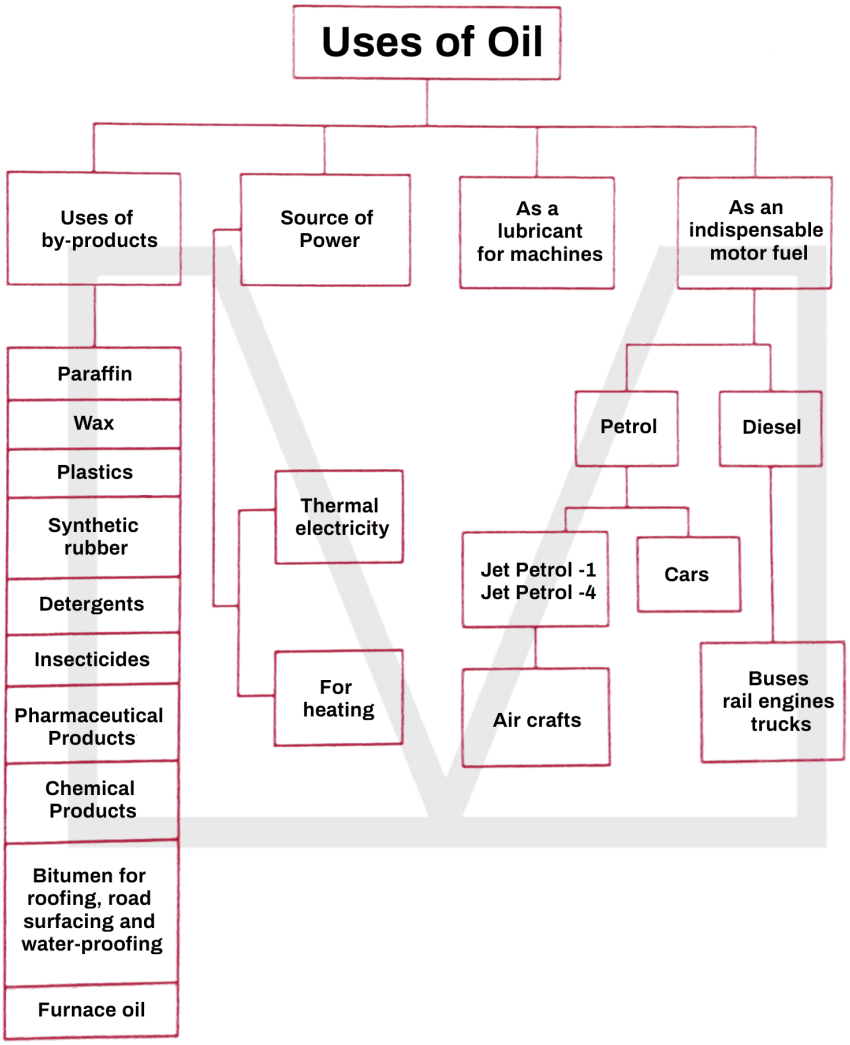


Mineral Oil

- ➔ It is a fossil fuel known as "**Black gold**"
- ➔ It is trapped in dome shaped anticlines between two layers of non-porous rocks
- ➔ Once the drilling site is chosen, a derrick or drilling rip is setup
- ➔ The derrick is a steel structure that holds the drilling pipes and other equipment
- ➔ The oil is pumped up and flown by the pipelines to the refinery
- ➔ **Crude Oil:** Oil with impurities and so 36.15% is extracted
- ➔ **Refined Oil:** Oil without impurities and so 63.85% is imported

- Uses of Oil

- ➔ By products such as paraffin, wax, plastics, synthetic rubber, detergents, insecticides, pharmaceutical products, chemical products
- ➔ Bitumen for roofing and furnace oil
- ➔ Source of thermal power generation
- ➔ Used as a lubricant for machines
- ➔ Diesel, petrol, kerosene oil for vehicles and burning



- The need to import Oil.

- ➔ The Oil required is 400, 000 barrels per day, while Pakistan produces 55,000 barrels per day
- ➔ The production of Oil in Pakistan is low, which cannot satisfy its needs
- ➔ With more Industrialisation and mechanisation,the demand for oil is increasing

- Transportation of Oil

- ➔ By land through road and rail tankers
- ➔ Costly and time consuming
- ➔ Inefficient compared to transmission by pipelines
- ➔ Can cause accidents and explosions
- ➔ Pipeline transport is more effective and environmentally friendly
- ➔ Oil is transported in special ships by oil ship tankers from UAE at Karachi, Keamari and Port Bin Qasim
- ➔ The pier helps to flow oil to upland countries and oil refineries. The PAK ARAB REFINERY COMPANY (PARCO) is located at Mehmood Kot for refining of oil
- ➔ WOPP (White Oil Pipeline Project) is helping to transport oil there and later the refined oil is flown to the upland areas to Caltex, Shell, Parco, Total, PSO, etc

- Fields from where Oil is extracted:

- ➔ Punjab:
  - Meyal
  - Dhurnal
  - Adhi
  - Joya Mir
  - Balkassar
  - Tut
- ➔ Sindh:
  - Tando Adam
  - Ghotana
  - Mazari
  - Dhabi
  - Leghari
  - Khaskheli

- Oil Refineries

- ➔ **PRL** – Pakistan Refinery Limited (Korangi, Karachi)
- ➔ **NRL** – National Refinery Limited Korangi, Karachi)
- ➔ **Parco Refinery** – Pak Arab Cooperation (Multan, Mehmood Kot)
- ➔ **Hub Refinery** – (Hub, Balochistan)
- ➔ **Attock Refinery** – Potwar Plateau

Natural Gas

- ➔ An important fossil fuel
- ➔ A Cheap fuel
- ➔ Trapped in anticline underground
- ➔ It is made up of methane, ethane, propane and butane
- ➔ Pumped and transported mostly by pipelines
- ➔ Was discovered at Sui in 1952 by PPL
- ➔ Oil and Gas Development Corporation, established in 1961, is working on its extraction and exploration

- Transportation

- ➔ Transported by pipelines
- ➔ Cheapest and Safest way
- ➔ Disadvantage is that when it leaks, it causes accidents or explosions
- ➔ Pipeline extends to Multan, Faisalabad, Lahore, Rawalpindi and Islamabad
- ➔ Natural Gas is cooled at a very low temperature to turn it into liquid (LPG). LPG stands for Liquefied Petroleum Gas
- ➔ This can be moved from place to place in special cylinders especially in northern areas. Natural Gas can also be compressed to become CNG

- Uses of Gas

- ➔ Domestic use: Cooking and heating
- ➔ Used in fertilisers
- ➔ Cement industry
- ➔ CNG for vehicles

- Areas

- ➔ Sui, Zin, UCH, Pirkoh, Khandkot, Khanpur, Mari, Dodhak

- Organisations

- ➔ These organisations are working for exploration and extraction of Gas and Oil
  - **SS NGPL:** Sui Northern Gas Pipeline Limited
  - **SSGCL**: Sui Southern Gas Pipeline Limited
  - **PARCO:** Pak Arab Refinery Corporation Limited
  - **PSO**: Pakistan State Oil Company Limited
  - **HDI:** Hydrocarbon Development Institution of Pakistan
  - **OGDCL:** Oil and Gas Development Company Limited
  - **GSP:** Geological Survey of Pakistan

Nuclear Energy

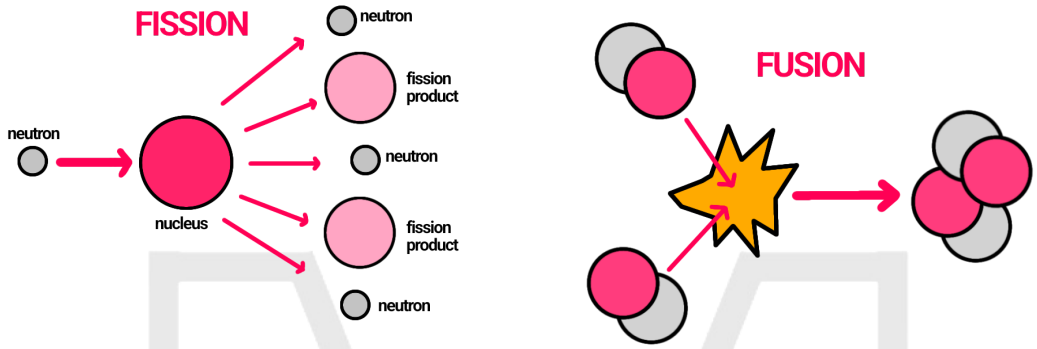
- ➔ In atomic fission, energy is released when atoms split into their constituent part
- ➔ In atomic fusion, energy is released when atoms fuse together
- ➔ Nuclear plants are based on atomic fusion
- ➔ Usage of heat to make steam which turns the turbines for generation of electricity
- ➔ Uranium is used for this purpose and is found in large amount in Pakistan
- ➔ KANUPP (Karachi Nuclear Power Project) in 1971 started working with the capacity of 137 MW
- ➔ Chashma Nuclear Plant was made at Chashma in 1999 with the help of China

- Advantages

- ➔ Produces more energy than all other sources
- ➔ Chances of Accidents are rare
- ➔ Contributes less to pollution compared to fuels
- ➔ The cost of running a Plant is cheap

- Disadvantage

- ➔ The rays that are produced in the reactors can cause cancer or deformation in new-born babies.
- ➔ Problems of reprocessing and nuclear waste
- ➔ Plants are very expensive to build
- ➔ Explosions are very dangerous and can make the neighbouring area inhabitable



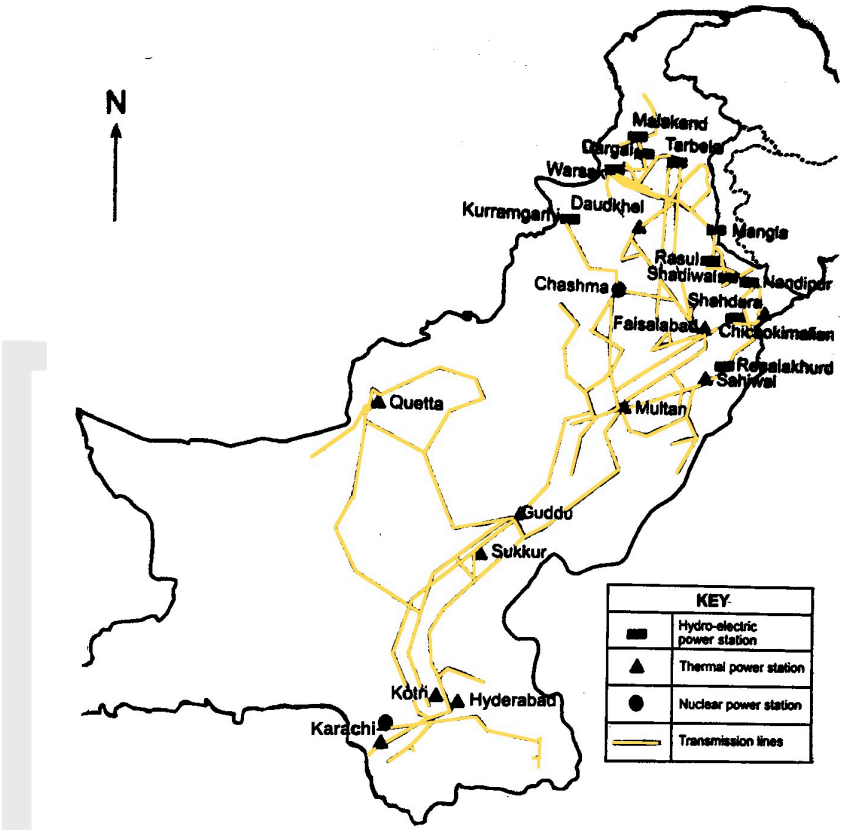
Thermal Energy

- ➔ Electricity produced by fossil fuels such as Gas, Oil, coal and nuclear energy
- ➔ Used in the generation of electricity by the turning of turbines
- ➔ Construction costs of Thermal plants are low
- ➔ Running costs are high
- ➔ Many accidents can occur

Hydroelectric Power (HEP)

- ➔ Stations/Plants use the force of flowing water to move turbines
- ➔ It is best developed in Mountainous areas with high precipitation, melting of snow and low temperature
- ➔ The slope should be steep but low gradient
- ➔ Water is a renewable source
- ➔ HEP is known as "**White Coal**"
- ➔ Produces energy without the burning of anything
- ➔ Construction cost is high but running cost is low
- ➔ HEP is environmentally friendly
- ➔ Major HEP plants are Tarbela, Warsak and Mangla

Location of Thermal, Nuclear & HEP Power station



- Organisations

- ➔ **WAPDA:** Water and Power Development Authority
- ➔ **KESC:** Karachi Electricity Supply Corporation
- ➔ **IPP:** Independent Private Producers

Solar Energy

- ➔ Produced by collecting sun rays in photovoltaic cells
- ➔ Solar furnaces are giant mirrors to focus sun rays on a boiler
- ➔ Steam from the boiler is used to make electricity

- ➔ Solar panels help to collect heat energy
- ➔ Supply power through transmission lines
- ➔ Used for electrification, water heating, pumping water from wells and for cooking
- ➔ It is safe, and environmentally friendly
- ➔ Limitless supply as Pakistan has 250-300 sunny days
- ➔ Though building costs are high, running costs are low

Biogas

- ➔ Produced on the fermentation of cow dung when it gives off methane gas
- ➔ Used for cooking, heating, etc
- ➔ Cheapest source for energy
- ➔ Increases air pollution and causes diseases
- ➔ Gives energy to 40-80 houses
- ➔ Usage leads to less natural manure in fields

Geothermal Power

- ➔ Energy is taken from the heat of Earth's core
- ➔ Produced from hot springs
- ➔ Drilling is done into the land to pump out hot water
- ➔ This hot water/steam is used to drive the turbines to produce energy

- Advantages

- ➔ Renewable
- ➔ Provides constant supply
- ➔ Pollution Free
- ➔ Offers sustainable energy

- Disadvantages

- ➔ High cost of construction
- ➔ Limitation due to natural disasters such as earthquakes or eruptions
- ➔ Pakistan has the potential of commercially exploitable sources of Geo-thermal energy in Himalayan regions and Chaghi area in Balochistan Plateau

Tidal Power

- ➔ Production energy by the movement of tides
- ➔ Tide comes in and out once and usually twice in 24 hours. This is due to the gravitational pull of the moon
- ➔ Indus Deltaic creek is a great option for energy supply in Sindh

- Advantages

- ➔ Renewable source of energy
- ➔ Constant supply
- ➔ Being relatively non-pollutant

- Disadvantages

- ➔ Very expensive to build
- ➔ Can destroy wildlife habitats
- ➔ Could disrupt local supply if arrangements are made for it

Wave Power

- ➔ Wave motion is used to compress air to drive a turbine to generate electricity
- ➔ Makran coast has a strong wave energy
- ➔ Coastal cities like Gwadar, Pasni, Ormara, Gidani are being developed and can help in future energy production
- ➔ Building costs are high

Biomass

- ➔ Refers to organic material, plants and vegetable matter, both living and decaying are used as a fuel
- ➔ Produces biofuel
- ➔ Gasification and fermentation are some processes used
- ➔ Inefficient use leads to air pollution indoors and it leads to infections like chest and lung

Wind Power

- ➔ Use of wind to generate energy
- ➔ Windmills and wind pumps convert the kinetic energy in the wind into mechanical pumps
- ➔ A wind turbine has a generator which converts the mechanical power into electricity
- ➔ Used on large scale farms
- ➔ A Wind Turbine is used to generate wind power
- ➔ A wind turbine is a three bladed wind turbine with a generator

- Advantages

- ➔ Environmentally friendly
- ➔ Renewable source
- ➔ Are an attraction for tourism
- ➔ Wind turbines are available in different sizes according to requirement
- ➔ Can help reduce energy issues in Pakistan

- Disadvantages

- ➔ Expensive to build
- ➔ Doesn't produce a constant supply of energy
- ➔ Wind turbines can kill birds
- ➔ Increases burden on land
- ➔ Can only be developed in mountainous and coastal areas
- ➔ 7500 turbines are needed to produce the same amount of energy as that of a nuclear plant

Load Shedding

- ➔ Load shedding occurs when the demand is more but the energy produced and supply is less
- ➔ Results in great economic damages

- Load shedding occurs when:

- ➔ Many power plants are working to their full capacity
- ➔ During winter, the HEP decreases with reduced flow of water rivers
- ➔ Long transmission lines cause loss of electricity
- ➔ Siltation in reservoirs can cause disruption in movement of turbines
- ➔ Power theft on a large scale
- ➔ High price of fossil fuels increases the cost of electricity generation
- ➔ Industrialization, urbanisation and rural electrification has increased the damage

- Rural Electrification

- ➔ To provide electricity to rural areas in rural electrification
- ➔ It can help in social and economic development
- ➔ Small scale industries are developed
- ➔ Standard of living will increase

Sustainable Development of Power Resources

- ➔ Use of advanced technology can help develop renewable resources
- ➔ Public awareness program through media, government and private sector
- ➔ Avoid non-productive uses
- ➔ Replacement of faculty and damaged transmission lines
- ➔ Check strictly for power theft and wastage
- ➔ Preservation and conservation of non-renewable resources

Chapter 4: Agricultural Development

Agriculture

- ➔ Agriculture is a combination of two words i.e. Agri and culture. Agri means farming and culture means practice, it means practice of farming is called agriculture
- ➔ Agriculture is a primary industry concerned with obtaining raw material from the ground for immediate consumption or for further processing
- ➔ There are three types of agriculture practised in Pakistan: Small-scale subsistence farming, cash crop farming and livestock farming
- ➔ All of these different types of farming operate as systems with inputs, processes and outputs

Natural Inputs

- Flat lands

- ➔ Easy use of machines
- ➔ Equal Distribution of water with less drainage
- ➔ Easy to cultivate

- Soil

- ➔ Contains sufficient minerals for crop growth
- ➔ Has sufficient pore spacing
- ➔ The soil must be deep and must contain nitrates and phosphates

- Rainfall

- ➔ For germination
- ➔ Soften the soil for ploughing \ sowing
- ➔ Planting seeds

- Temperature

- ➔ For growing
- ➔ Warmth
- ➔ Ripening

Human inputs

- Capital

- ➔ To buy land and machinery

- ➔ To buy seeds and chemical fertiliser

- Machinery

- ➔ It reduces the need of labour and time consumed
- ➔ Efficient processes with increased output

- Fertilisers

- ➔ Increases yield and rate of growth of plants
- ➔ Extension of farm

- Pesticides and insecticides

- ➔ Kill insects, pests, and viruses
- ➔ Increases the output and income

- Labour

- ➔ Carry out processes of crop cultivation like ploughing, sowing, threshing and harvesting
- ➔ Maintain machinery

- Desi or high yielding varieties of seed

- ➔ Desi varieties are cheap and locally available
- ➔ HYV's are pest resistant and increase yield

- Irrigational facilities

- ➔ Meet rain shortages and reduce salinity
- ➔ Better water supply

- Traditional or modern skills

- ➔ Avoid crop failure with modern methods
- ➔ Can do machine repairing

Processes

- ➔ **Ploughing:** Farming equipment powered by bull or tractor used to turn, dig and mix the soil before planting seeds
- ➔ **Sowing:** Spreading seeds on soil by traditional or modern methods
- ➔ **Irrigating:** To supply water to farmland through tube well / channels so that crops will grow
- ➔ **Fertilising:** Adding chemicals to soil to provide nutrients to soil for promoting plant growth
- ➔ **Weeding:** Cutting of wild plants growing where they are not wanted especially among crops
- ➔ **Threshing:** To separate grains of wheat or rice from the chaff
- ➔ **Harvesting:** Cutting the crops

Outputs

- ➔ Crops such as rice, wheat, tobacco, maize, barley, millet, pulses, cotton, sugarcane
- ➔ Fruits and Vegetables
- ➔ Milk, meats, ghee, butter, eggs, cheese, hides, wool

- Problems associated with farming

- ➔ Use of sprays can contaminate subsoil water
- ➔ Chemicals of fertilisers when it is drained out of field can cause pollution
- ➔ Seepage of water from canals causes water logging and salinity
- ➔ Water from dams in canals can be deposited
- ➔ Silt in fields making them less reproductive

Types of farming

Subsistence/ Small Scale Farming

- ➔ It is small scale farming
- ➔ Most of the inputs are natural so output varies depending on climatic conditions
- ➔ A farmer works with his family, sometimes labour is hired at low wages
- ➔ Traditional methods are used due to lack of capital to invest
- ➔ He uses desi seeds, natural manure, old methods of irrigation and sometimes depends on rain
- ➔ The output is low which is consumed by farmer and his family
- ➔ Any surplus is a bonus not an expectation, sold to small shops in village
- ➔ He then buys some animals such as goats, sheep, etc; or repairs his house
- ➔ Sometimes he buys fertilisers, sprays, high yield seeds or a machine
- ➔ Many farms in all provinces are subsistence farms
- ➔ 34% of these farms are less than 5 hectares so farmer needs to supplement his income from other sources e.g. carpenter, blacksmith, cobbler

- Processes

- ➔ Ploughing by Bullocks
- ➔ Sowing by Labor
- ➔ Irrigation by Traditional methods
- ➔ Fertilising by Natural Manure
- ➔ Weeding by Labor
- ➔ Threshing by Labor

- Problems of small size of farm

- ➔ Problems for inheritance to be divided among sons
- ➔ No research work can take place
- ➔ More capital is not present, No machine can be used
- ➔ Output is very low, Sometimes it leads to unemployment

Livestock/ Pastoral Farming

- ➔ It is the farming in which animals are kept on a small scale or large scale

- ➔ Such as goats, sheep, cattle, camels, mules, etc
- ➔ Every village have its grazing field shamilat where animals graze
- ➔ It constitutes an important part of rural life
- ➔ In subsistence farms animals are consumed by owners
- ➔ In commercial farms animals are reared for sale or obtaining of goods
- ➔ Livestock contribution to the national GDP is higher than that of the crops
- ➔ Pakistan is world's fifth largest producer of milk

- Importance of livestock farming

- ➔ Animals act as draught power in farming processes and transportation of material
- ➔ Livestock is a food source providing with milk, egg, chicken, meat etc
- ➔ Livestock products act as raw materials for domestic industries
- ➔ Livestock product forms 13% of our exports
- ➔ They contribute to 10% of our GDP

Large Scale/ Cash Crop Farming

- ➔ Agricultural crops are grown for sale
- ➔ Crops are selected on basis of demand, yield and favourable government policies to maximise their profit
- ➔ To achieve it he uses more capital, practices on a large area of land, has machines, modern facilities, fertilisers, high yield seeds, sprays and extra labour is employed
- ➔ Output is large and stored in large warehouses
- ➔ It is then sold in market to earn profit which is reinvested in crops

- Processes

- ➔ Ploughing by Tractors
- ➔ Sowing by Machines
- ➔ Irrigation by Modern Methods
- ➔ Fertilising by Chemical Fertilisers
- ➔ Weeding by Labour
- ➔ Threshing by Thresher
- ➔ Harvesting by Harvester

- Types of crops

Rabi crops	Kharif crops
Known as winter crops	Known as summer crops
Sown in early winters from October-November	Sown in early summers from April-May
Harvested in early summer from April-May	Harvested in early winters from October-November
Such as wheat, barley, grams, oilseeds and pulses	Such as rice, sugar cane, millets, maize and cotton

Main Crops

Wheat

- ➔ Wheat is a rabi crop
- ➔ It is used in manufacture of bread and a variety of baked products
- ➔ Canal irrigated areas of sindh and punjab are major region of growth
- ➔ Government have taken measures to increase wheat production such as support price, improved irrigation but still pakistan is not self sufficient in wheat because:
- Population is increasing rapidly
- Cultivable land is decreasing due to water logging and salinity

- Geographical Requirements

- ➔ Moderate rainfall, about 1000 mm
- ➔ Temperature 10°C - 20°C at the time of growing and warm 25°C -35°C for ripening
- ➔ A little rain before the harvest swells the grain
- ➔ Irrigation bridges the rainfall gap
- ➔ It is also grown in Barani lands. (Rainfed regions, Potwar and NWFP areas)
- ➔ Stiff loamy or clayey soil rich in alluvium
- ➔ Flat and undulating land is required

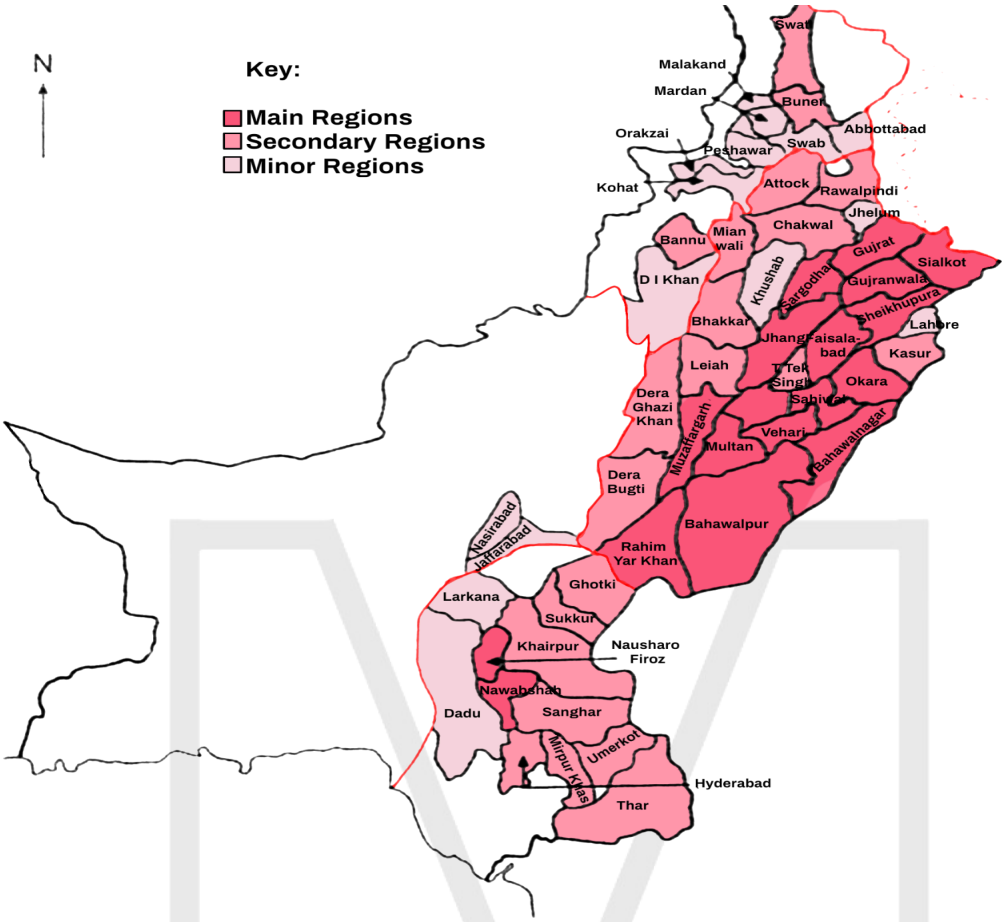
- HYV Seeds

- ➔ Maxipak, Kohson 95, Shahkhan 95 , Wadnak 95

- Areas

- ➔ Punjab: Multan, Gujrat, Sialkot, Bahawalpur, Okara
- ➔ Sindh: Larkhana, Thar, Sukkur
- ➔ NWFP: Peshawar, Kohat, Mardan, Bannu
- ➔ Not grown in Balochistan

Area of Wheat Cultivation



- Cultivation

- ➔ In Oct-Dec after ploughing the field, wheat seeds are sown directly into the ground
- ➔ Most of the farmers irrigate land twice
- ➔ First irrigation, one month after sowing
- ➔ Second irrigation one month before harvesting
- ➔ Harvested after three months, which is labour intensive
- ➔ Chaff is separated from grain, which is used for feed and mix it with mud to make storage hut
- ➔ Grain is stored for family consumption or sale

- Importance

- ➔ Wheat is a staple food. Its demand is increasing with the increasing population
- ➔ Low grade by-products of flour are used as feed for livestock
- ➔ Wheat, when growth in surplus is exported to earn foreign exchange

- Problems

- ➔ When the crop output is low, it is imported

➔ Most parts of Pakistan where wheat is grown, are facing water logging and salinity crisis

- Barani farming

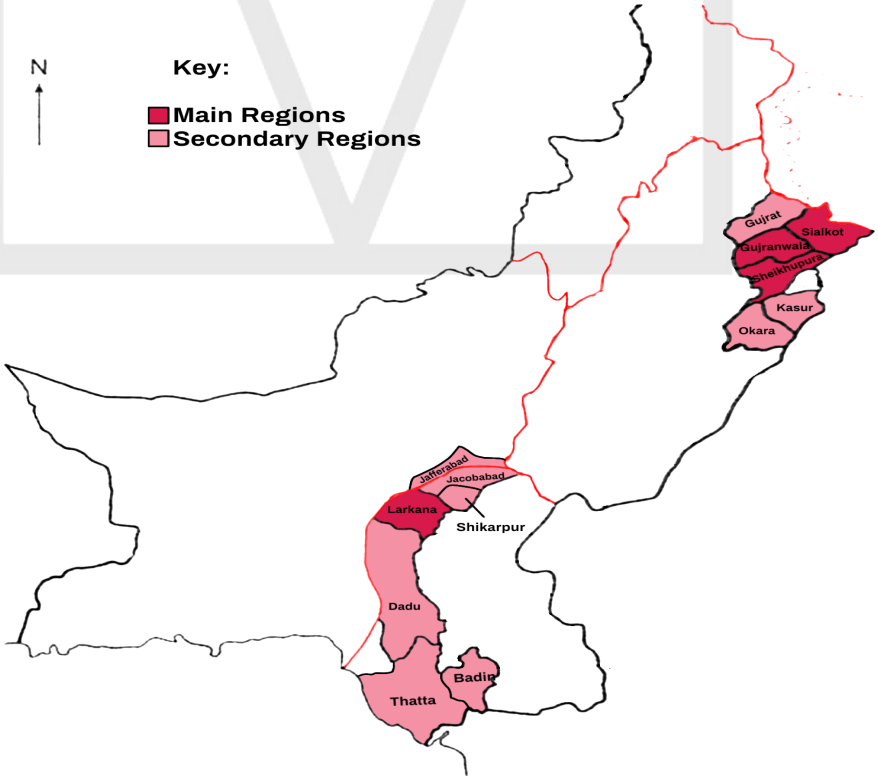
➔ Wheat is cultivated in subsistence barani farms of Potwar plateau and KPK
➔ Due to lack of irrigation facilities the process is adjusted according to seasonal rainfall
➔ When the rains arrive or are about to arrive, the land is ploughed so it becomes soft
➔ Immediately after the rain, the seeds are sown and the periodic cycle of sunny weather in between light rainy days continues till the harvest
➔ Within the growing period ploughing is done (to remove weeds), if pesticides and fertilisers are available then they are added otherwise cow dung is used
➔ Lastly the harvest season must be sunny and dry

Rice

➔ It is a kharif crop
➔ It is used with wheat as a major food product
➔ Rice is a major export of Pakistan therefore grown on large scale in sindh and punjab
➔ Subsistence farming of rice is practised in northern areas on terraced field
➔ Development of irrigational facilities have increased the area under rice cultivation
➔ Pakistan is emerging as major exporter of high quality basmati rice over years

- Areas

➔ Punjab: Sialkot, Kasur, Okara, Gujrat
➔ Sindh: Badin, Larkana, Dadu, Thatta



- Geographical Requirements

- ➔ Levelled land for easy irrigation
- ➔ Loamy and clayey (impervious soil) for retention of water
- ➔ 20°C to 30°C with no cold season
- ➔ Warm dry period for harvesting
- ➔ Humid Season
- ➔ Rainfall - 2000mm
- ➔ Heavy shower (Monsoonal rain)
- ➔ Dry sunny weather at harvesting time

- HYV Seeds

- ➔ Irri pak
- ➔ Basmati
- ➔ Pajhal
- ➔ Super
- ➔ Rachna

- Cultivation

- ➔ Seeds are sown in nurseries
- ➔ When it is 9 inches high, it is transplanted into a prepared field
- ➔ Then it is flooded with 30-37 cm of water
- ➔ Water is kept for growing
- ➔ It is drained before harvesting and threshing is done in Oct-Nov
- ➔ Rice is polished and packed in rice mills

- By-products

- ➔ Rice husks are used for making cardboards or covering roofs of houses after mixing it with mud
- ➔ For livestock

Cotton

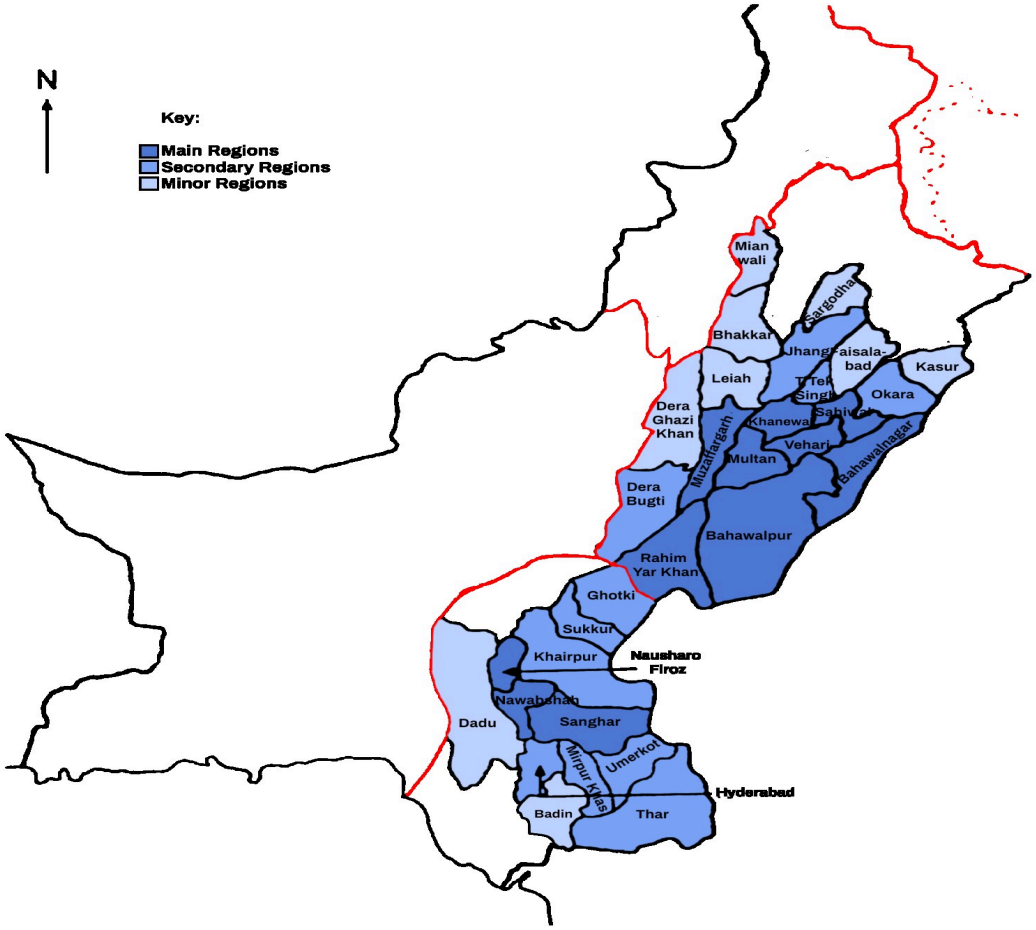
- ➔ It is a kharif crop
- ➔ King of Fibre
- ➔ Most widely used textile fibre in Pakistan

- Geographical Requirements

- ➔ Level Land
- ➔ Temperature - 25°C to 35°C. Mild at night.
- ➔ Harvested during summer days and dry weather
- ➔ It is sensitive to frost
- ➔ Rainfall - 1000mm. Irrigation usually bridges the gap
- ➔ Rain at picking spoils the balls but high showers before harvesting swells the bolls
- ➔ Medium loamy soil with Natural fertilisers or manure are used

- Areas

- ➔ **Punjab:** Bahawalpur, Rahim Yar Khan, D.G Khan, Multan, Kasur
- ➔ **Sindh:** Nawabshah, Sanghar, Sukkur, Hyderabad, Badin
- ➔ Not grown in NWFP and Balochistan but Lasbela of Balochistan is being prepared for cotton cultivation



- HYV Seeds

- ➔ Nayyab 76
- ➔ Sarmart Qalandari
- ➔ B-557
- ➔ 149-F

- Cultivation

- ➔ Sown at a distance apart of 30 cm to 45 cm in April-May

- ➔ One month later fields are irrigated
- ➔ Second irrigation takes place after a further two months
- ➔ Cotton ball ripen in dry months of Oct and Nov
- ➔ Plant reaches a height of up to 135 cm-150 cm
- ➔ After picking cotton balls are loaded onto trucks

- What harms the cotton crop

- ➔ Greatly affected by rise in day and night temperature changes
- ➔ Leaf curl virus
- ➔ Fruit shedding

- By-products

- ➔ Cotton seeds, separated from lint, a fluffy mass of fibres inside cotton balls
- ➔ Cotton seeds are used as animal feed and for the extraction of oil

Sugar Cane

- ➔ It is a kharif crop
- ➔ Used to make sugar, brown sugar and gur

- Geographical Requirements

- ➔ Soil should be Loamy, Clayey with silt, nitrogen, phosphorus/ potash fertiliser
- ➔ 1520mm of rain, irrigation bridges the rainfall gap
- ➔ Requires temperature from 25°C -35°C
- ➔ Tolerant to frost for a short period

- HYV Seeds

- ➔ JN-88
- ➔ Thatta-10

- Cultivation

- ➔ 30cm stalks are planted in April - May
- ➔ Distance is 30 cm between the stalks, a good plant yield size is 6 to 7.3 feet
- ➔ Crop can be ratooned and harvested for 2-3 consecutive years
- ➔ A ratoon is left when it is cut. It is cut by manual labour
- ➔ Sugar cane is immediately transported as it loses the sugar content after harvesting. It is bulky and expensive to transport
- ➔ Sugar cane is first scrubbed (cleaned) with chalk to remove the dirt which forms the compost (fertiliser)
- ➔ The cane is crushed and juice is processed to make gur, sugar etc

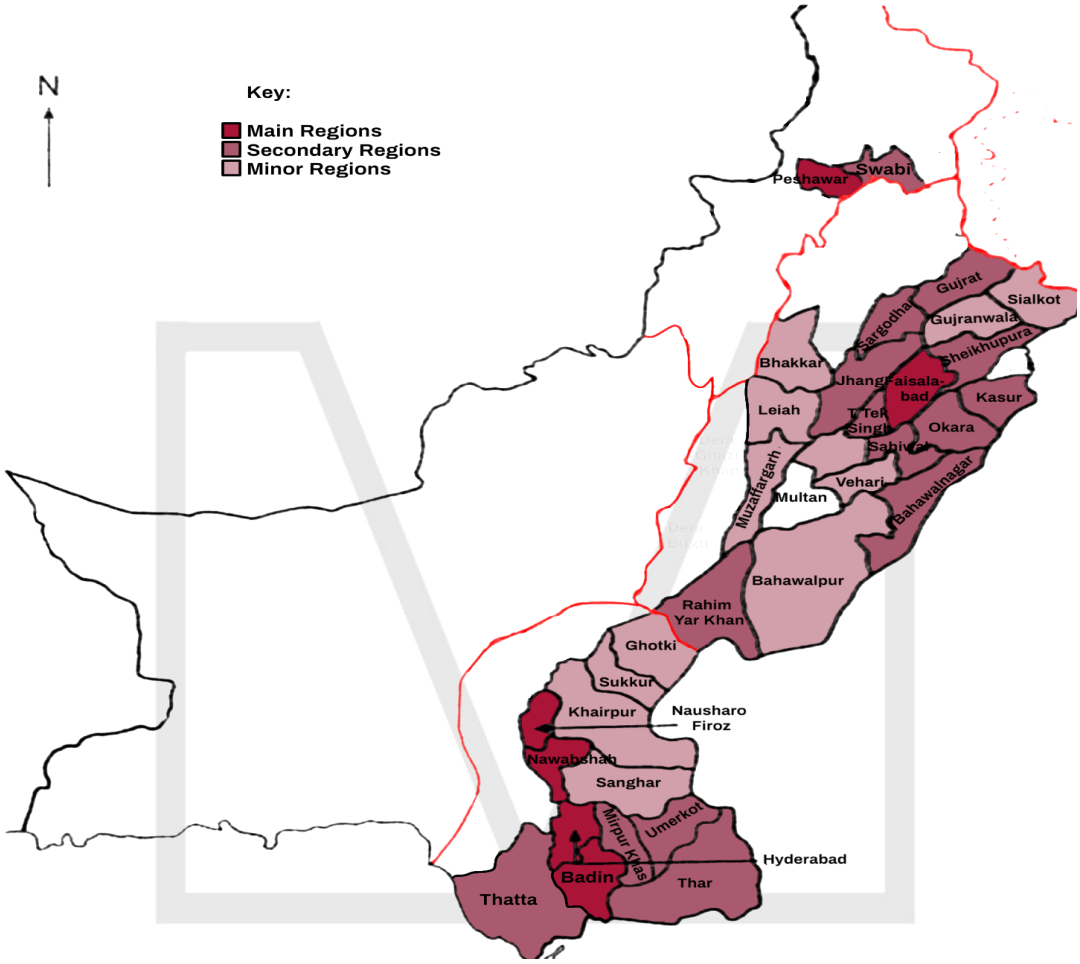
- By-products

- ➔ Molasses is used to make chemicals. It is used for citric acid, cattle food, baker's yeast, synthetic rubber

- ➔ Bagasse is a fibre used to make paper, chipboard, and animal feed.
- ➔ It is also used as a fuel to generate electricity in sugar-mills

- Areas

- ➔ Punjab: Vehari, Bahawalpur, Sargodha, Gujrat, Khanewal
- ➔ NWFP: Swabi, Peshawar, Charsadda
- ➔ Sindh: Thar, Badin, Thatta, Naushero Firoz



Tobacco

- ➔ It is a kharif crop
- ➔ KPK accounts for 60% of the production
- ➔ Export varieties are grown in fertile soil with irrigational facilities

- Areas

- ➔ **Punjab:** Multan, Jhang, Sialkot, Lahore, Kasur
- ➔ **NWFP**: Charsadda, Mardan, Swabi, Nowshera
- ➔ **Balochistan**: Zhob, Pishin, Qilla Saifullah
- ➔ **Sindh**: Khairpur, Ghotki, Shikarpur, Naushero Firoz

- Geographical Requirements

- ➔ Light and sandy soil, rich in potash, Lime, magnesium and Humus / Level land
- ➔ Frost is unbearable
- ➔ Warm days and cool nights
- ➔ Temperature: 10°C - 26°C
- ➔ Rainfall: 20-30 inches

- HYV Seeds

- ➔ Virginia
- ➔ Nicotiana Tabacum
- ➔ Nicotiana Rustica

- Cultivation

- ➔ It is grown in nursery until 4-5 leaves are grown
- ➔ It is transplanted in furrows 3 - 3.5 feet apart
- ➔ 7 - 10 days interval irrigation is practised

Maize

- ➔ It is a kharif crop
- ➔ It is a food grain used for edible oil
- ➔ Corn flour, custard powder is made from it
- ➔ Waste for animal fodder
- ➔ It is grown in central Punjab and central parts of Khyber-Pakhtunkhwa

- Geographical Requirements

- ➔ 35°C temperature
- ➔ Level Land
- ➔ It needs well drained deep alluvial and porous soils
- ➔ It is very intolerant to frost and needs moderate rainfall about 500 mm well distributed throughout growth

Pulses

- ➔ It is a kharif crop
- ➔ They are Low value crops so very less care is taken
- ➔ Pulses fix nitrogen in the soil
- ➔ Important pulses are: mung, mash, gram, masoor

- Areas

- ➔ Punjab: Bannu - Bhakkar, Jhang, Rawalpindi, Bahawalpur, Gujrat, Leiah, Dera, Bugti, Rahimyaar Khan, Sialkot
- ➔ Sindh: Larkana, Dadu, Sukkur, Jacobabad, Shikarpur

- Geographical Requirements

- ➔ Require high temperatures at 35°C but are highly susceptible to frost
- ➔ 50-500mm rainfall
- ➔ Grown on Salty Soil

Millets

- ➔ It is a kharif crop
- ➔ Coarse Cereals
- ➔ Jowar and Bajra are two millets
- ➔ Fodder for Animals
- ➔ Food crop

- Geographical Requirements

- ➔ 30°C - 35°C Temperature
- ➔ Drought resistant
- ➔ Sandy Soil
- ➔ Sensitive to frost

- Areas

- ➔ Tharparkar, Kohat, Attock, Rawalpindi, Jhelum, Sargodha, Dera Ghazi Khan and Bahawalpur

Fruits

- ➔ Within 20 years the fruit production has increased
- ➔ Grown in many parts of Pakistan
- ➔ Sold at market and as export
- ➔ Peaches and Pears in Quetta, Kalat, Mardan, Kasur, Khushab
- ➔ Grapes and Pomegranate in Balochistan
- ➔ Plums and Almonds in Balochistan

- Citrus fruits

- ➔ Grown in:
  - **Punjab:** Sargodha, Faisalabad, Y.T Singh, Okara, Sahiwal, Khanewal
  - **Sindh:** Naushero Firoz, Khairpur
  - **Balochistan:** Turbat, Nasirabad
  - **NWFP:** Nowshera, Haripur, Swat, Dir, Malakand
- ➔ They grow in tropical or subtropical climate with hot summers and moderate rainfall
- ➔ They are also sensitive to frost and strong winds

- Mango

- ➔ Grown in:
  - **Punjab:** Bahawalpur, Okara, Vehari, Faisalabad, Jhang
  - **Sindh:** Khairpur, Nawabshah, Sanghar, Badir, Hyderabad

- ➔ Mango requires a wet hot summer season with rainfall around 250mm
- ➔ This needs to be followed by a long dry winter
- ➔ Dry winter means that the plant is less susceptible to attacks by fungus etc
- ➔ It needs deep well drained loamy soil

- Banana

- ➔ Grown in:
  - **Punjab:** Sahiwal, Pakpattan, Faisalabad, RYK
  - **Sindh:** Khairpur, Nawabshah, Badin Thatta, Hyderabad
  - **Balochistan:** Lasbela
  - **NWFP:** Bannu
- ➔ They require a hot dry season lasting for around 2-3 months, with a mean rainfall of around 10 cm
- ➔ Bananas are very sensitive to frosts, which can suspend maturity or even kill the plant
- ➔ They are also very vulnerable to strong winds, which damage the fruit etc
- ➔ They require well drained alluvial soils

- Apples

- ➔ Grown in:
  - **Punjab:** Rawalpindi
  - **NWFP:** Mansehra, Abbottabad, Swat, Dir, Chitral
  - **Balochistan:** Quetta, Pishin, Loralai, Sibi, Ziarat, Kalat, Kharan
- ➔ Apples are solely grown in northern Balochistan
- ➔ They have the highest requirement of chilling units in fruits
- ➔ Winters must be cold to allow for proper dormancy
- ➔ These must be followed by rains during the growing season

- Apricots

- ➔ Apricots are grown mainly in areas of mid-northern Balochistan
- ➔ Pakistan is the 4th largest producer of Apricots
- ➔ The apricots need to fulfil chilling units, meaning that they must be exposed to cold for a certain period of time
- ➔ Winters must be cold (but not colder than -30°C) to allow for proper dormancy
- ➔ Dry weather must exist at the time of maturity/harvest
- ➔ It is important that there should be no sudden and dramatic change in temperatures in spring which kills the flowers
- ➔ Apricots grown in well drained soils with PH around 6.5

- Dates

- ➔ Dates are grown in parts of Balochistan and in parts of Tharparkar desert (southern Punjab and eastern Sindh)
- ➔ It needs long hot summers with high day and night temperatures
- ➔ It can tolerate fluctuations in temperature whether cold or hot
- ➔ Mild winters and a dry sunny time for harvest is also required
- ➔ They can grow in salty soils but they must be well drained

- Vegetables

- ➔ Pakistan produces almost all of the Rabi and Kharif Vegetables at a Large Amount
- ➔ Potatoes and tomatoes are produced at the largest amount
- ➔ Punjab is the Largest Vegetable producing province, followed by NWPF, Balochistan and lastly Sindh
- ➔ The major condiments and spices grown in Pakistan are onions, garlic, chillies, coriander, ginger, turmeric
- ➔ Onions and Coriander are grown in winter (Rabi crops) while the rest of them are grown in summers (Kharif crop)

- Fodder crops

- ➔ Livestock is a main sector of agriculture and a source of income for farmers
- ➔ For the fodder requirements of animals various fodder crops are grown within irrigated area of all provinces during Rabi and Kharif seasons
- ➔ The most important fodder crops include Maize, Bajra, Jowar, Sorghum, Berseem, Increrne, Shaftal and oats
- ➔ Most of these oats are useful in improving the texture of oil and increasing nitrogen content

- Oil seeds

- ➔ 32% of the demand for edible oil is met through local productions while 68% is imported
- ➔ Sunflower, soya been, rapeseed, mustard, sarson, sai, sesame, linseed and castor oil seeds are used to extract edible oil
- ➔ Fat is an essential need of the human body and its requirement is met with the help of animal fat and oil seeds. Pakistan is deficient in both sources
- ➔ In Pakistan, there are two types of Oil Seed crops:
- ➔ Traditional Oil Seeds: Like rapeseed, mustard, groundnut, sesame, linseed, cotton seed and castor seed
- ➔ Non-traditional Oil Seeds: Like Sunflower, Soya bean, Sesame
- ➔ Sunflower is grown in both spring and autumn, while cotton is grown during the winters and harvest in summers
- ➔ Coconut and oil palm are grown on the coastal belt of Karachi, while olives grow in Qilla Safiullah (Balochistan), Parachinar in NWFP and Potwar in Punjab
- ➔ Among imported oils, palm oil and soyabean are currently the largest imports. Linseed and castor oil seeds are not edible oil seeds and thus are used in Industries
- ➔ Government has increased the support prices of oil seed crops in order to encourage the farmers to increase their production
- ➔ Oilseeds usually require average temperatures varying from 20-30°C
- ➔ It must also be noted that high temperatures can hamper or delay growth and that frost kills the plants
- ➔ Oilseeds are tolerant to drought for some periods and require well drained deep alluvial soils
- ➔ They are grown in southern parts of Punjab and eastern parts of Sindh, along with some northern parts of Punjab

Livestock Farming

- ➔ It is a rising sector in Pakistan
- ➔ They contribute to 36% to our economy and 9% to the GDP
- ➔ Livestock constitutes an important part of rural life because:
    - Cows and Buffaloes are a source of milk and meat
    - Sheep and goats are reared for meat, wool and skin
    - Hens provide meat and eggs
    - Camels, mules are used for transport
    - Bullocks are used for animal power, especially drought power in Persian wheel
    - OX for ploughing of fields
    - Bullocks, OX to carry the bulk on the cart
    - The hides, skins and wool are a source of agro based industries
    - Cow dung or other animal waste is helpful for natural manure
    - Biogas is produced by cow dung
- ➔ **Cattle:** found in Balochistan and Thal deserts
- ➔ **Buffaloes:** Nilibar, Kundi and Ravi. Found mostly in Punjab and Sindh
- ➔ **Sheep and goats:** found in NWFP, Northern Areas, Balochistan, Thal, Thar, and Cholistan deserts.
- ➔ **Poultry:** found in every province of Pakistan

- Problems faced by Livestock Farming

- ➔ Grazing unirrigated fields causes soil erosion
- ➔ Lack of grazing grounds lead to overgrazing
- ➔ Few veterinary hospitals and vaccination facilities
- ➔ Unhygienic conditions in animal husbandry lead to unhealthy animals
- ➔ Primitive breeding methods result in low quality animals
- ➔ Insufficient breeding for quality
- ➔ Inadequate facilities for storage of meat
- ➔ Gap in price of livestock products in rural and urban areas
- ➔ High prices of animal feed. Difficult to keep in cities near their market
- ➔ Insufficient marketing system of milk and other products leads to less profit and low investment in inputs

- Development ideas

- ➔ Selective breeding and crossbreeding for better quality animals
- ➔ Programs to fatten cows for milk and meat
- ➔ Control of disease and better animal husbandry practices
- ➔ Improvement in vaccination facilities
- ➔ Improvement in livestock research farms
- ➔ Cultivation of fodder crops to turn agricultural land into grazing fields

- Government Measures

- ➔ Develop a plant protection program
- ➔ Distribution of improved seeds

- ➔ Provide financial support
- ➔ Provide service and advice
- ➔ Loans for farm machinery on easy instalments
- ➔ Irrigational water to be provided
- ➔ Increase the use of fertilisers
- ➔ Awareness of modern methods and technology

Types of Livestock Farming

- Nomadic

- ➔ The farmers moves from one place to another with his animals in search of fodder, water and shelter
- ➔ Once they find these resources and settle over there and utilise their resources
- ➔ They move to another place so that's why they keep on moving in search of new pastures
- ➔ They hardly return to the old pastures unless rainfall takes place for new pastures to grow
- ➔ The area in which they graze have very poor pastures because of extreme arid conditions
- ➔ They keep sheep, camels and goats because they can survive in arid conditions and survive in poor pastures

- Settled

- ➔ It is mostly practised in the villages of Punjab and Sindh
- ➔ Proper farms are made where fodder rooms are present, milking, packing and breeding takes place
- ➔ Excess milk is converted to ghee, butter and cheese
- ➔ Hens are also kept to get eggs

- Semi Nomadic/ Transhumance

- ➔ Animals are kept on pastures high up in the mountains in summers
- ➔ They are brought down to the lower pastures in lowlands during the winter season
- ➔ When the season is feasible for animals, the farmers return back to their highlands
- ➔ In winter highland pastures are covered with snow and water sources also freezes so that's why they move to valleys where temperatures are suitable for them to survive and water pastures are available
- ➔ Sometimes they move to the village market to sell their surplus such as animals, wools, skin and milk
- ➔ They are mainly found in Northern mountain and western highlands
- ➔ They keep sheep, goat, cattle, yak as these animals can adapt in highland climate and mountainous topography

Subsistence Livestock Farming

- Inputs

- ➔ Natural grazing fields for Fodder
- ➔ Open land
- ➔ Labour is family

- ➔ Water from ponds or lakes for drinking

- Processes

- ➔ Natural breeding
- ➔ Feeding
- ➔ Milking Manually
- ➔ Shearing of Wool
- ➔ Gathering Hides

- Output

- ➔ Milk
- ➔ Meat
- ➔ Wool
- ➔ Eggs
- ➔ Consumed by the family

Commercial Livestock Farming

- Inputs

- ➔ Farms with animal sheds, ponds and fodder rooms
- ➔ Specialised labour
- ➔ Storage and processing facilities
- ➔ Veterinary facilities
- ➔ Processed fodder with important nutrients

- Processes

- ➔ Feeding
- ➔ Breeding
- ➔ Milking by Machines
- ➔ Extracting hides and wool
- ➔ Preserving with refrigerating facilities
- ➔ Packing

- Outputs

- ➔ Milk
- ➔ Eggs
- ➔ Meat
- ➔ Hides
- ➔ The profit earned is then invested back into inputs.

Livestock Animals

- Buffaloes

- ➔ Buffaloes are found mostly in canal fed areas of Pakistan, especially the doab between Ravi and Sutlej
- ➔ The Nilli-Ravi breed is found in Punjab, which is known for its high milk production
- ➔ In Sindh, Kundi breed is found along both banks of Indus but mostly in Northern and central Sindh.
- ➔ Other breeds are found in areas of Khyber-Pakhtunkhwa
- ➔ Presence of water is very important as this animal needs to cool itself by smearing mud on its body.
- ➔ Water is also used for drinking and for cleaning the farm etc
- ➔ A lot of fodder is also required (which becomes expensive to buy in nonagricultural areas) and thus buffaloes are not found in Balochistan as this would be too uneconomical
- ➔ Buffaloes are considered to be black gold of Pakistan because the milk they produce has a higher fat content than that of cows and goats etc
- ➔ At present, buffaloes provide almost 70% of the milk produced in Pakistan
- ➔ Their meat is white and desirable due to the low cholesterol level as compared to cow's meat

- Cattles

- ➔ Important cattle breeds are Red Sindhi and Sahiwali, which are internationally recognized for their milk production
- ➔ Another important Breeds are bhagnari (Imp for draft power found in Punjab and sindh), Dhani (Important for draft power found in N.Areas)
- ➔ Cattle are spread in Northern, central and Southern Punjab
- ➔ In Sindh mainly in areas of Tharparkar desert
- ➔ In Balochistan they are found in the district of Hab and in North Central parts of Khyber-Pakhtunkhwa
- ➔ The yield of dairy animals in Pakistan is around 1/5 to 1/7 as to what yields are achieved in Europe and the United States of America
- ➔ If our yields can be improved this can save us from import of milk and related products, which costs around 20 million dollars annually

- Sheeps

- ➔ Sheep are mostly found in rugged areas of Northern Balochistan, GilgitBaltistan, Khyber-Pakhtunkhwa and parts of Southern Punjab
- ➔ Sheep can survive both hot and cold seasons, and feed on shrubs and grasses
- ➔ These adaptabilities make them vital for people living in these areas for meat, milk, wool, bones etc

- Goats

- ➔ Goats have a much wider distribution than sheep in Pakistan
- ➔ They are found in almost all of Punjab, Eastern and Southern Sindh, Makran coast and central Balochistan and districts of Peshawar and Mardan in Khyber-Pakhtunkhwa

- ➔ Goats are also very adaptable like sheep but since their meat and milk is preferred over sheep; to satisfy this demand they are reared in larger numbers as compared to sheep

- Poultry Farming

- ➔ Poultry farming is the practice of raising poultry, such as chickens, turkeys, ducks, and geese, as a subcategory of animal husbandry, for the purpose of farming meat or eggs for food
- ➔ In Pakistan, most poultry farming consists of chicken
- ➔ Poultry farms are mostly found around dense centres of population (Karachi, Quetta, and Lahore) and cooler areas (Murree, Abbottabad)
- ➔ Nearness to population centres reduces cost of transportation and cooler areas are preferred for optimal growth of chickens

Land Reforms

- ➔ Introduced in 1959, 1972 and 1977
- ➔ It could not be properly achieved as the landlords did not show their actual holdings but the land that was under full government control was given to tenants and the production increased thrice

- Aims

- ➔ Breaking the hold of landlords
- ➔ Equitable distribution of land
- ➔ Protection of rights and women
- ➔ Consolidation of holidays

Sustainable Development With Agriculture

- ➔ The problems of water logging and salinity must be addressed properly to protect the cultivable land through various schemes
- ➔ Government and private institutions must develop new, highly productive and environmentally sustainable production technologies as a system
- ➔ Soil management through afforestation projects is another measure to maintain the fertility of soil by improving its organic contents
- ➔ Over-cropping or multi-cropping should not be allowed
- ➔ To avoid soil erosion, forests should not be cut
- ➔ Organic farming which stimulates bacteria in the soil act as natural nutrients for the fertilisation of soil. It improves fertility and productivity
- ➔ Irrigational technologies must be used to reclaim the defects
- ➔ Avoid poor farming methods

Chapter 5: Industrial Development

- ➔ **RAW MATERIAL:** Raw materials are the basic commodity from which finished goods are made
- ➔ **REFINED:** The goods from which unwanted elements or materials have been removed by processing
- ➔ **PROCESSED:** Goods on which series of mechanical or chemical operations have been performed in order to change or preserve them
- ➔ **MANUFACTURED:** Goods produced on a large scale by the use of machinery
- ➔ **VALUE ADDED:** Basic Goods that have features added for which the buyer is prepared to pay extra
- ➔ **INFRASTRUCTURE:** The basic physical and organisational structures and facilities (e.g. buildings, roads, power supplies) needed for the operation of a society or enterprise
- ➔ **SERVICES:** The action of helping or doing work for someone

Industry

- ➔ An industry refers to a specific sector of economic activity that involves the production of goods or the provision of services
- ➔ It forms the backbone of a country's economy
- ➔ Industries can be classified into three main types: **Primary** industry, **Secondary** industry and **Tertiary** industry

- Primary Industry

- ➔ Primary industry involves collecting or extracting raw materials provided by nature through fishing,agriculture,forestry,mining and drilling
- ➔ For example, mining industry acquiring metallic and non metallic minerals from ground and wood industry logging timber

- Secondary Industry

- ➔ It is concerned with transforming materials provided by the primary industry into products more directly useful to people
- ➔ It is mainly based on two activities: processing and manufacturing
- ➔ Ginning of cotton to form raw cotton is processing while production of thread from raw cotton is manufacturing
- ➔ On the basis of size secondary industries can be further classified into: cottage, small scale and large scale industry

- Cottage Industry

- ➔ Small industrial units in which owner and family members are employed

- ➔ They are labour intensive with no hired labour and little or no use of machinery or modern technology
- ➔ Fixed assets does not exceed the value of 1-2 lakh
- ➔ Local skills along with locally available raw materials are utilised
- ➔ Electricity may or may not be used as a source of power
- ➔ They include handicrafts, handmade leather goods, carpentry, pottery, embroidery, hand-woven rugs and shawls etc

- Small Scale Industry

- ➔ They are organised into firms or companies which may operate factories, workshops or plants
- ➔ Their fixed assets don't exceed 10 million rupees, excluding land, loan and building
- ➔ Apart from family 10-50 hired workers can also be employed
- ➔ They are labour intensive with limited use of machinery and modern technology
- ➔ Some of the raw materials may be brought from nearby cities
- ➔ Products of small scale industries in Pakistan include sport goods, surgical instruments and carpets

- Large Scale Industry

- ➔ They have no limit of investment made or workers employed
- ➔ They have high capital investment that usually exceeds 100 million rupees
- ➔ These industries ideally employ more than 300 works
- ➔ Large areas of land are required
- ➔ They use many machines and the products are produced in large amounts
- ➔ Through automation and standardised mass production they have much higher output per work

- Tertiary Industry

- ➔ It is based on provision of services
- ➔ Such as storage or warehousing, health, education, banking, transport and communications etc
- ➔ Tourism have become the world's fastest growing service industry

Factors affecting Industrial location & development site requirements

- Land

- ➔ The land should be cheap to attract investors
- ➔ It should be of larger than the required size to allow expansion of business
- ➔ It should be levelled and well drained to avoid flooding in heavy rainfalls

- Raw Material

- ➔ Large amount of cheap raw materials should be available near the factory to reduce transportation costs which adds to increased profits
- ➔ The supply of raw material should be stable to allow provision of raw material during high demands, this builds up the image of company as a reliable source and increases sales

- Labour

- ➔ Industries need skilled labour for operating machines and managerial work while unskilled labour for labour intensive tasks
- ➔ Huge amount of labour with necessary skills should be available nearby to remove costs of housing and transportation
- ➔ This also reduce wages of labour for minimum manufacturing cost and maximum profit

- Transport & Communication

- ➔ Natural routes of sea or road or infrastructure facilities should be present for quick and easy transportation of raw materials and products
- ➔ Transportation charges are also minimised to increase profit
- ➔ Cheap communication services must be available. These link the customer and the producer, which is essential to the success of a business

- Power supply

- ➔ Industries should be near power sources such as thermal power stations or solar or windmill fields to reduce wastage of electricity and per unit cost of making products for more profit
- ➔ Source of power should be reliable to avoid wastage of working hours and damage of machines so that more product is manufactured

- Capital

- ➔ Capital is the wealth or funds invested for development of an industry
- ➔ Cheap (interest free loans are the best) sources of capital are available from either the state or private banks. This will allow the business to invest in fixed assets etc
- ➔ These include land, telecommunications, power/gas/water supply (cleaning, cooling, drinking etc) and machinery (cheaper than labour, more accurate, quick and study)

- Market access

- ➔ A market with huge demand should be present nearby the site for sale of manufactured goods
- ➔ Nearby market allows cheapest mode of transport for edible, bulky and perishable goods which reduces the cost of transportation
- ➔ If a large market is present, then the company can make bigger profits due to economies of scale

- Government policies

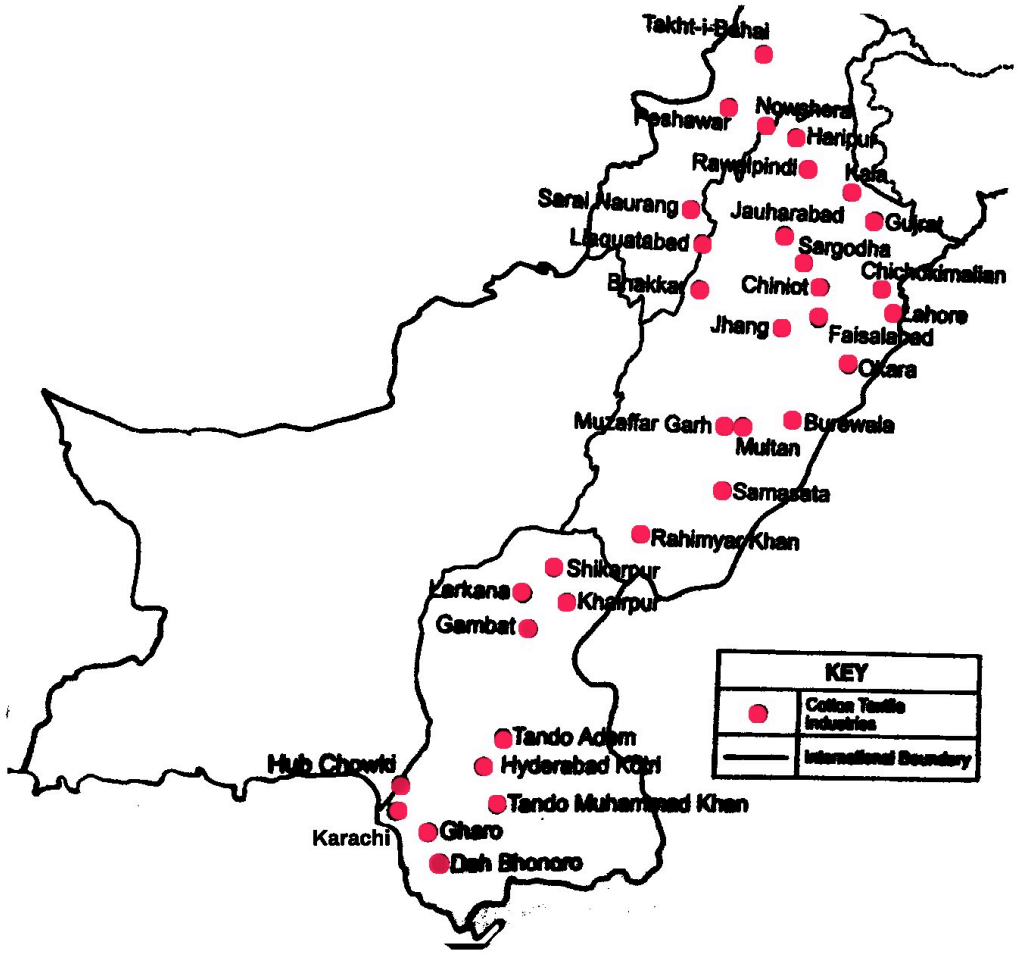
- ➔ The government have an important role in development of industries, it forms industrial laws and taxation policies
- ➔ The government offers incentives and infrastructural facilities which attract industrialists to set up industries
- ➔ It also builds industrial states and export processing zones to build industries on a larger scale

Principal Factory Industries in Pakistan

- ➔ In the past 50 years Pakistan has transformed from agrarian economy to semi industrial state with several industries producing consumer goods

Cotton Textile Industry

- ➔ It is pakistan's largest industry
- ➔ It provides employment to 50% of industrial force and 40% of country's labour force
- ➔ Pakistan is world's fourth largest producer of cotton and third largest consumer
- ➔ It is third largest exporter of raw cotton and second largest of cotton yarn
- ➔ Cotton and cotton products contribute to 10% to GDP and 55% to foreign exchange earnings of Pakistan
- ➔ Karachi, Hyderabad and Faisalabad are the main centres of cotton textile industry
- ➔ Raw cotton and cotton products are all exported to many countries as well as being consumed domestically
- ➔ Main products of the industry are cotton yarn, towels, hosiery, canvas and apparels
- ➔ Most of the cotton cloth is exported as it's sufficient to meet local demand
- ➔ The government has introduced various incentives to enhance the supply of raw cotton and competitiveness of textile industry



- Why cotton is the most demanding fabric

- ➔ Controls moisture by absorbing liquids and removing from skin
- ➔ Provides insulation to body
- ➔ It is hypoallergenic preventing skin allergies

- ➔ Cotton has high tensile strength making it strong and durable
- ➔ Cotton clothing is strong and stretchable making it comfortable

- Processing of cotton

- ➔ The cotton crop is harvested
- ➔ The cotton seed is sent of ginning mills where it is dried and cleaned
- ➔ Ginning occurs that is separation of lint from seed by rotating saws
- ➔ The lint is packed into bales, quality of lint determine its price
- ➔ The bales are sent to textile mills
- ➔ Spinning occurs where fibres from different bales are twisted and turned together by computer controlled machines to achieve uniform thickness of fibre etc. This produces yarn
- ➔ Weaving takes place as different yarns are interlaced to make cloth which is also automated
- ➔ The cloth is then cleaned, immersed in chemicals to enhance finishing and increase its price. Loose threads are also removed
- ➔ Sheets, pillow cases, shirts, bed lining etc all are made from this finished cotton cloth

- By products

- ➔ Cotton seeds are the by-products sent to the Vegetable and Ghee industry
- ➔ pakistan is third largest producer of cotton seed
- ➔ They are washed and then passed through rollers. Thus, cotton seed oil is expelled leaving behind the cotton seed cake
- ➔ The oil is used to make cooking oil or margarine etc
- ➔ The cake is used for dairy animal feed or even as fertiliser for crops

- Reasons for most cotton textile Industries to be located at:

- ➔ <u>Karachi:</u>
  - It is near port so facilitates cheap transport of imported machinery and cotton goods for exporting
  - Power supplied by karachi nuclear power plant, korangi and bin qasim thermal power station
  - All type of labour is available at cheap wages due to competition
  - Linked to the rest of the country by efficient transport system
  - Large domestic market for cotton clothes as it is comfortable to wear in hot and humid climate of karachi
  - Karachi have EPZ to attract investors
- ➔ <u>Faisalabad:</u>
  - It is located near to the cotton belt of pakistan
  - Large labour force available in thickly populated province of Punjab
  - Huge local market due to high population density of pakistan
  - Development of infrastructure such as dry port for cotton industries
  - Sufficient water supply from river Jhelum
- ➔ <u>Hyderabad:</u>
  - It is located near the cotton growing regions of lower sindh
  - It is connected to port city Karachi by M-9 for cheap transport of machines and cotton goods

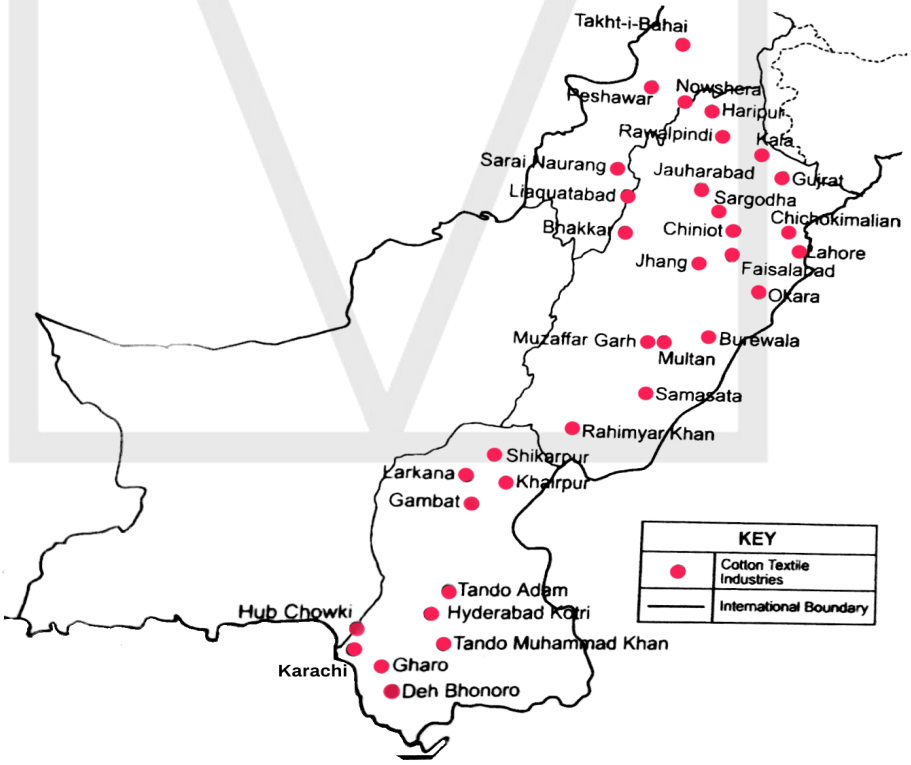
- It has well-developed infrastructure and large labour force
- Large local market for cotton goods in sindh

- Importance of Cotton textile Industry in Pakistan

➔ Textile products form 60% of total exports
➔ Cotton textiles are value added products earning more than raw cotton
➔ It makes use of local raw materials reducing the dependency on imports
➔ Cheap skilled and unskilled labour is available for work in factories
➔ Cotton products are produced on large scale that reduces the cost per unit

- Problems of Cotton Textile Industry

➔ Strong competition from south korea, egypt, taiwan, hong kong, thailand
➔ Restriction in international markets due to child labour and environmental issues which reduce exports
➔ It needs further modernization to sustain it in international market
➔ Shortage of raw materials due to diseases like leaf curl virus or environmental changes like frequent rains and flooding
➔ Frequent changes in government policies lower the confidence of investors



Sugar Industry

➔ Sugar industry is one of the vital industries
➔ Sugar production is the second biggest agro-based industry

- ➔ It provides employment to around 1.20 million people especially in rural areas
- ➔ Sugar cane is a cash crop and raw material for not only sugar but other by-products too
- ➔ Pakistan is fifth largest sugar producer in world
- ➔ The products of sugar mills are Gur, brown sugar and white sugar
- ➔ Most of the sugar mills are located near the sugarcane belt in Sindh, Punjab with some in Khyber Pakhtunkhwa
- ➔ There are no sugar mills in balochistan because it have no sugarcane fields
- ➔ Sugar mills should be near to the sugarcane fields because:
    - Sugarcane start losing its sugar content as soon as it is harvested so it needs to be crushed immediately
    - Sugar cane s bulky and heavy so it's transportation is expensive
- ➔ The processed food sector such as candy,ice cream and soft drink manufacture account for 60% consumption of domestic sugar
- ➔ Despite growth in industry pakistan is still not self sufficient in sugar

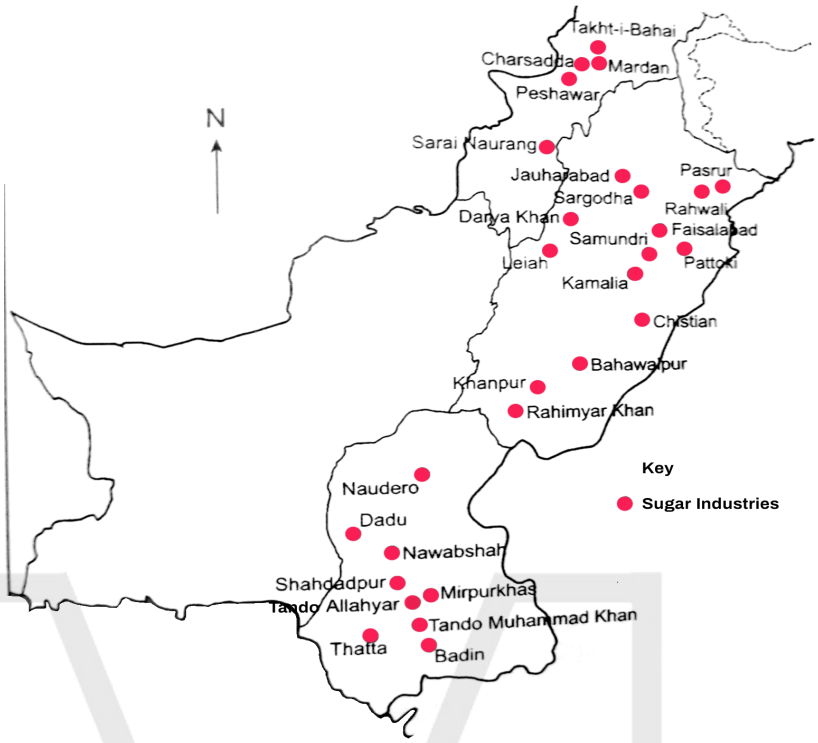
- Stages of Sugar production

- ➔ Sugarcane is harvested. The cane is cut and tied in bundles and is quickly transported to sugar mills
- ➔ Then the cane is washed and rocks etc are removed. Chalk is scrubbed to remove dirt and smell
- ➔ It is crushed by passing through rollers to extract juice
- ➔ The fibrous thing left behind is known as bagasse
- ➔ The juice is refined in which any scum that collects on top is removed and impurities filtered from a fine mesh
- ➔ The juice (excluding impurities) is heated to 70°C to evaporate water and increase sugar percentage. This process is repeated until colour changes from thin yellow to dark brown to form sugar syrup
- ➔ On cooling, more sugar crystallised from the syrup
- ➔ This thick liquid is spun in a centrifuge to separate the white sugar crystals from the brown syrup
- ➔ The syrup is returned to the boiling station and boiled again until there is no more sugar left to extract
- ➔ The remaining product is called molasses. It has a low sugar content and further extraction of sugar from it is uneconomic
- ➔ The crystals are dried and packed for distribution and sale

- By Products

- ➔ Bagasse is used as fuel in sugar mills. It produces sufficient heat energy to supply all the needs of a typical sugar mill, with energy to spare which is sold
- ➔ It is used to make chipboard, paper and animal feed whereby mixed with molasses
- ➔ Molasses is also used for making yeast and spirits

➔ It is also used to manufacture various types of acids in chemical industries



Fertilisers Industry

➔ A fertiliser is a chemical or natural substance added to soil or land to increase its fertility
➔ Fertilisers are very important for increasing agricultural production, thus Fertiliser industry is vital to pakistan's agro-based economy
➔ Large commercial farms need chemical fertilisers to increase their yield for production of more raw materials to earn more profit
➔ After green revolution in 1960s chemical fertilisers have considerably increased
➔ Although production of fertilisers have increased it is still short of demand and large quantity needs to be imported from middle east which is a burden on our foreign reserves
➔ Major fertiliser industries are at Faisalabad, Daud khel, Haripur and Dharki
➔ Most of the factories are located in Punjab to meet the demands of the growing population there
➔ A gas pipeline network exists in Punjab
➔ Different type of fertilisers require different raw materials such as nitrogen, hydrogen, phosphorous, gypsum etc but natural gas is the main raw material as after discovery of it in Pakistan it is used as a source of fuel
➔ Fertiliser industry is second largest consumer of natural gas in pakistan
➔ Nitrogenous fertilisers make up 92% of total production as soil is deficient in organic matter
➔ Pakistan needs to set up more fertiliser industries because local production results in cheaper fertilisers as costs of transport are far lower, import bill would be reduced and that employment is generated in local factories
➔ Following are the fertiliser companies: Engro fertilisers company, Fauji fertiliser company, Pak Arab fertiliser company, Fatima fertilisers company

- Why Pakistan need Fertilisers

- ➔ The use of HYV seeds has meant that to fulfil the increased nutrient requirement of these crops fertilisers must be applied
- ➔ The flow of the Indus River in the Indus Plains has decreased a lot recently due to dam construction
- ➔ So the river doesn't flood its banks much often and fresh alluvium is not laid much around its banks. Thus, fertilisers are required to fill the deficiency of minerals in the soil
- ➔ Desert soils are now being used for growing crops (Thal desert), where the sand dunes have been flattened and canals made
- ➔ But these desert soils are very porous, so the minerals are quickly leached out of the topsoil. Thus more and more fertilisers are required

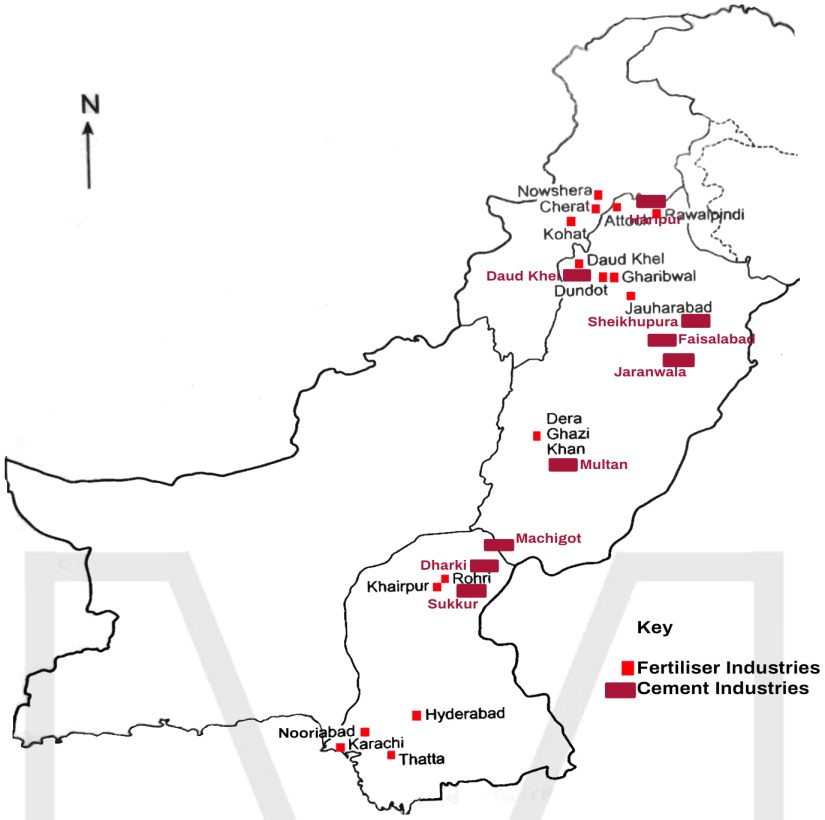
Cement Industry

- ➔ Cement is a binding material used in construction
- ➔ Cement is used to make factory walls, build walls of dams, line canals, build homes etc
- ➔ Structures made from cement and bricks are much more robust than structures made from wood etc
- ➔ Cement is produced in large amounts in Pakistan because the raw materials required for cement making are found in Pakistan in abundance at a cheap price
- ➔ Raw materials for making cement are **limestone, clay** and **sand**
- ➔ All of these are present in pakistan and the domestic market is also sufficiently large
- ➔ These factories are located near to limestone sources as to limestone is bulky and expensive to carry over long distances
- ➔ Pakistan utilises 70-75% of its production capacity
- ➔ Lucky cement industry set up the margin of exporting quality of cement
- ➔ UAE, Kuwait, Iraq are main focus for exports
- ➔ Pakistan is today among the top 20 producers and the top 5 exporters of cement

- Process of cement making

- ➔ Limestone, clay and sand enter a crusher, where they are compressed to the size of a small rock
- ➔ Then this mixture is analysed in the labs and adjusted for proper percentage of different components
- ➔ It is then grinded even finer into powdered form by wheel rollers
- ➔ It is then sent to the preheater tower and then kiln
- ➔ The kiln is a rotating drum which is attached to the preheating tower and slopes gently towards the ground. At the end of kiln we have a heat source such as coal or natural gas
- ➔ 1700°C temperatures change the powder into a new substance called clinker, which is in the form of pellets etc
- ➔ The clinker is then broken down into cement powder

➔ A small amount of gypsum is added to control the rate of setting of cement



Iron & Steel Industry

➔ Establishment of steel industry is considered to be a milestone on the road to industrialisation
➔ After partition of east and west pakistan, there was a shortage of metal products for production of consumer goods which were expensive to import
➔ Establishment of steel industry was now clearly essential for industrial development
➔ Thus, Pakistan Steel Mill Corporation with technical and financial assistance from USSR built **Pakistan Steel Mills** at **Pippri** in 1973, which is 40 km east of Karachi on Gharo Creek near Port Qasim
➔ Raw materials for steel industry are coke,manganese,iron ore, limestone and water
➔ They produce coke, pig iron, hot metal, rolled and cast billets, galvanised products and raw steel
➔ Engineering and construction industries depend on Pakistan Steel's products and by-products as inputs
➔ It is the largest industrial unit in pakistan with two blast furnaces
➔ A large market for pakistan steel's products is at karachi and at Taxila near Rawalpindi as it have **Heavy Mechanical Complex**
➔ Heavy Mechanical Complex is the major heavy engineering centre of Pakistan which has the capability for the designing and manufacturing of industrial plants and machinery, which conform to international standards
➔ Pakistan is still not self-sufficient in iron and steel production and still imports heavily from other countries.

- Developing Steel Industry in Pakistan

Advantages	Disadvantages
Provides raw materials for a number of industries	Requires imported raw material causing burden on foreign exchange resources
Locally manufactured steel is cheaper than imported steel	Requires infrastructure for setting up creating burden on economy
Provides employment for industrial labour force	Lack of technical experts and skilled labour
Encourages industrialisation leading to economic development	Requires Ample electricity so lack of power supply affects steel production
Reduces burden on foreign exchange resources	Industrial waste causes environmental pollution

- Reasons for Pakistan Steel Mill at Pippri

- ➔ Flat, cheap and unused land was available at Gharo Creek
- ➔ It is near to karachi-kotri railway, connected to main road system by metalled roads and near Port Qasim which facilitate cheap transport
- ➔ Constant supply of energy as port qasim and Karachi have the highest energy generating capacity of Pakistan
- ➔ Many industries that use steel products are located at Karachi
- ➔ Iron ore, manganese and coking coal is imported from Port Qasim
- ➔ Limestone is brought by road from Murli Hills near Thatta
- ➔ Large quantities of water is brought from Lake Haleji
- ➔ Skilled and unskilled labour is available locally from Karachi

- Process of Steel Making

- ➔ Coke, limestone and iron ore are put into a blast furnace
- ➔ Here the intense heat causes decomposition of the limestone
- ➔ The carbon monoxide gas is produced which reduces iron ore into molten pig iron around 96% pure
- ➔ After further purification of the iron, carbon and other metals are added to form different types of steel
- ➔ Steel solidifies and is ready to be used

Oil Refining Industry

- ➔ Fats and oils are important ingredients of our food
- ➔ In pakistan more than a dozen oil seed crops are grown to extract oil
- ➔ Oilseed production is on rise in Pakistan but it meets only 30% of local demand
- ➔ Edible oil is also imported besides oil seed for oil extraction
- ➔ Pakistan have very less natural reserves of crude oil

- ➔ Most of crude oil is imported, while very low quantities of refined oil is imported
- ➔ Pakistan imports the majority of its oil requirements
- ➔ They are refined at coastal refineries and sent inland for further processing
- ➔ Pakistan has 5 major Oil refineries
    - Two are located at Karachi (Indus Refinery and Pakistan Refinery)
    - One in Hab district of Balochistan (Khalifa Coastal Refinery)
    - One in Attock (Attock Oil Refinery)
    - And Mid-Country Oil refinery at Mehmood Kot

Formal & Informal Sectors of Pakistan

- Informal Sector of Industry

- ➔ Cottage industries hold an important position in rural setup making villages self sufficient in basic necessities of life
- ➔ Many families depend on cottage industries for their income
- ➔ Cottage industries have emerged as demands for hand woven carpets, embroidered work, brassware and traditional bangles increase
- ➔ They also have good demand in international market

Advantages	Disadvantages
Meet local demand by supplying low priced industrial goods	It is not registered with government so n revenue to government in term of taxes
Women can be employed which increase active labour force	It produces sub-standards goods
Industrial waste can be utilised to produce more industrial goods	Marketing of goods is expensive and is a huge burden on poor cottage industrialist
When rural people are self employed rural to urban migration reduces	Encourages child labour so children are deprived of education
They make use of local raw materials so no burden on imports	Low wages are paid to workers
They don't require much capital & high technology, so it is suited to traditional economic set-up	A skilled cottage industry worker takes years to master the art of making a specific object
Provides door to door supply of everyday use item by street vendors	Uncertain and unreliable employment
It helps decrease regional disparity of income allowing development of these districts	Health problems for labour as labour laws are not followed
They also help fill the gap between the supply & demand in the market	Has little potential for growth due to limited capital and unskilled labour
Goods that are produced from these industries may also be exported like Pakistani carpets	Producers purchase goods in small quantities, cannot benefit from the economies of scale

- Importance of Formal & Informal sectors

- ➔ Formal sector includes many local and multinational companies which are registered with the government.
- ➔ Informal sector includes only local industrial units which are not registered with the government
- ➔ They provide industrial goods to meet requirements of domestic market
- ➔ They generate employment opportunities in industrial sector
- ➔ The formal sector follow international standards and form standardised goods, which favour industrial expansion in pakistan
- ➔ The informal sector utilise domestic raw materials thus no burden on imports
- ➔ Products of these sectors are imported to generate capital
- ➔ Informal sector don't require imported machinery and modern technology so it saves foreign exchange reserves
- ➔ Informal sector provides low priced goods to people

- Difference between formal & Informal Sector of Industry

Formal Sector	Informal Sector
Employed by organisation	Self employed
Fixed working hours and wages	Working hours and wages are not fixed
Employees work from offices	Work is done in home or on streets
Legal and registered	Often non registered

Sporting Goods Industry

- ➔ Sialkot is the major focus of sporting goods production in the world
- ➔ It accounts for around 40% of world football production accounting for some $200 million exports annual
- ➔ In the sporting goods industry all products are made with first class design and perfect quality according to international standards
- ➔ Raw materials are rubber, wood pulp, stitching thread and leather which could be local or imported
- ➔ These enterprises are mostly financed through family savings
- ➔ Things like bats, hockeys etc all are made. These require wood, nails and polish/paint
- ➔ The sewing is mainly done in small workshops and final stages are completed in factories working for foreign firms
- ➔ Due to the problem of child labour many European and American sports brands have stopped orders to Sialkot and Pakistan in general
- ➔ Problems like loadshedding, many businesses have failed to meet their orders and thus their reputation has been tarnished. This has caused huge financial losses to the industry
- ➔ Still most of sporting goods are exported due to modest local demand and high international demand

Surgical Instruments Industry

- ➔ Surgical instruments manufacturing is located in the cities of Sialkot, Lahore and ancillary areas
- ➔ These instruments are made mainly in small workshops which employ many thousands of people
- ➔ The raw materials required for making surgical instruments are titanium, iron, chromium and nickel
- ➔ The industry has transformed from a very small level and low technological base to a highly sophisticated level
- ➔ Currently more than 95% of the instruments manufactured in sialkot are exported to other countries
- ➔ The quality of these instruments is strictly monitored as pakistan enjoy meagre share of 1% of world exports of medical and and dental instruments
- ➔ Most of production is exported to countries like UK and Germany
- ➔ However, it must be noted that in western societies there has been a growing concern about the use of child labour (unethical), exploited labour (low wage) and poor worker conditions (poor sanitary conditions, hot environment) in which these instruments are made
- ➔ This has forced some firms to stop orders from contractors in Pakistan

The Brick Kilns industry

- ➔ It is a crucial small-scale industry of Pakistan, it provides employment to people in rural areas where agriculture is not enough to sustain all the people
- ➔ It is generally situated in desolate places away from the main cities and towns
- ➔ Bricks are still the preferred house construction material in most countries
- ➔ There are 6000 (estimated) brick kilns in Pakistan, its share in GDP is approximately 1.5 %. In kilns the working days are hardly 240 – 260 in a year. On rainy days there is no work
- ➔ Raw materials for brick kiln is clay and water with coal as source of power
- ➔ Suitable clay for bricks exist mainly in punjab and process is done by manual methods

- Process of brick making

- ➔ Raw clay along with 30% sand and water is manually mixed and put into rectangular steel moulds, drying in sunlight
- ➔ They are compressed and then put into a brick kiln (in which raw bricks are baked or burned) at around 900 degree celsius to give strength and to turn soft sticky clay into permanent hard material
- ➔ After being moulded the bricks are left to dry
- ➔ Majority of bricks made are used locally for construction, canal lining etc
- ➔ They rely on intensive labour consisting of males, women and children.
- ➔ They get a very small amount to make 1000 katcha bricks

- Environmental Problems

- ➔ Brick industry is one of the pollutants hazardous for global environment and health of people who inhabit areas near to brick kilns
- ➔ The trees are cut down in order to obtain wood required to burn bricks. This results in heavy deforestation and it makes the soil infertile

- ➔ The waste is being dumped into rivers and it has lead to water pollution with many marine species in danger
- ➔ Burning of organic matter release CO2, SO2, smoke, dust, nitrogen oxide and other harmful gases which degrade air quality
- ➔ Agricultural land is reducing in the areas near brick kiln fields due to water logging and salinity

- Solution

- ➔ Strict implementation of environmental and child labour laws
- ➔ The chimney of these Kilns should be high so that it reduces the degree of pollution, and reduces the vulnerability of harmful diseases such as asthma and Lung Cancer
- ➔ Clean and efficient coal technologies should be used where coal is pretreated for complete combustion
- ➔ People should use masks while working in Brick Kilns to avoid inhaling dangerous chemicals
- ➔ Smoke should be filtered before it leaves the chimney

Government works to attract Investors

- ➔ Industrial estates Example eg. Sindh Trading Estate Ltd. (SITE)
- ➔ Tax exemptions on imported machinery
- ➔ Less foreign exchange control
- ➔ Tax holidays
- ➔ Simplified procedures
- ➔ Private power stations Example Hub
- ➔ Better roads/railways/airports
- ➔ Dry ports for better security
- ➔ Agencies to help investors provide infrastructure e.g. water, electricity, telephone, roads to estates
- ➔ Land available for housing, commercial, social facilities near industrial zones
- ➔ Consistent policies/stable government

Industries and Environment

- ➔ Industrial expansion is causing damage to environment
- ➔ There is virtually no check of 8000 industrial units which cause high rate of environmental pollution
- ➔ Untreated sewage, industrial effluents and unprocessed garbage are sources of pollution
- ➔ 90% of industrial units are operating without any garbage treatment
- ➔ Bribing by companies of corrupt officers in civic agencies have led to dumping of industrial waste in Arabian Sea
- ➔ State and multinational fuel companies are marketing gasoline that contain high levels of lead which can result to stunt growth in children

- Effects of Industrial Pollution on Seawater

- ➔ Polluted groundwater seeps into the Arabian sea
- ➔ Toxic industrial waste enters into food chain through contaminated food disturbing the balance of ecosystem
- ➔ Threat to mangrove vegetation which decrease biodiversity as mangroves are habitat for fish, birds and reptiles

- ➔ It decrease fertility of soil mangrove leaf litter fertilises the soil
- ➔ Leakage or spills of oil containing ships can lead to eutrophication in water bodies

- Effects of Industrial Pollution on People

- ➔ Atmospheric pollution due to emissions from industries cause respiratory disorders like asthma and lung cancer along with skin, throat and chest diseases
- ➔ Usage of contaminated subsoil water may cause serious stomach and intestinal problems
- ➔ Industrial waste water is used for crop irrigation which is harmful for them
- ➔ In karachi marine life is contaminated with lead due to disposal of waste from Korangi industrial area, which when consumed can cause kidney and brain damage
- ➔ Solid waste on land is burned which spreads over a large area affecting thousands of residents

- Measures for controlling Industrial Pollution

- ➔ The government should facilitate import of machinery for treating industrial waste
- ➔ Industries should not be allowed to operate in congested localities and only in areas away from residential areas
- ➔ Environmental protection agencies should educate people about the hazards of pollution
- ➔ Laws to check industrial pollution should be strictly enforced
- ➔ Intensive cultivation of green, shady plants should occur to protect people from poisonous gases

Industrial Estates

- ➔ Industrial states are specific areas reserved for industries only
- ➔ They may be considered as Colonies for Industries
- ➔ They are established to help and encourage entrepreneurs
- ➔ The government actually buys the land and plans the estate
- ➔ The government builds facilities like railways, roads, electricity, communications etc
- ➔ A residential area for families of workers is also planned along with schools and hospitals etc
- ➔ Access to a dry port may also be provided
- ➔ Cheap loans are also provided for people to invest
- ➔ For this very purpose the government invites people to invest through advertisements etc
- ➔ Investors then make 20-30% payment of plots etc (getting control of land in return)
- ➔ The government then starts construction of the industrial estate
- ➔ This procedure can take around 2-4 years
- ➔ Pakistan's first industrial state was Sindh Industrial Trading Estate
- ➔ Most of the industrial states are located in Karachi due to port city
- ➔ The government also encourage private sector to setup industrial estates
- ➔ In pakistan industrial estates are at Karachi, Lahore, Gujranwala, Jhelum, Gujrat, Hyderabad, Peshawar

- Advantages

- ➔ The concentration of high pressure gas pipelines, sewage lines, water pipes etc; which satisfy demands of industry reduces the overall cost of laying down infrastructure
- ➔ Tax holidays and concessions are granted by the government which tremendously help industries as they have more money to re-invest in their businesses

- ➔ They provide employment and generally raise the standard of living of people there. Thus regional disparity is reduced
- ➔ Also, separate areas are assigned for industries
- ➔ These don't overlap with residential areas, thus, environmental impact of pollution from these industries is reduced

Industrial Estates in Sindh

-Karachi Industrial Estate

- ➔ Largest in Pakistan
- ➔ SITE in north of city
- ➔ Korangi industrial estate in south

- Noorabad Industrial Estate

- ➔ Located at superhighway 90 km north of karachi
- ➔ Water shortage and security issues have hindered its development

- Hub Industrial Estate

- ➔ It is 40 km west to Karachi
- ➔ It had plan of 1200 industries in which only 170 were setup
- ➔ Some of these are closed due to problems such as inadequate supply of water

Export Processing Zones

- ➔ A scheme of export processing zones(EPZ) was planned and developed to manufacture goods primarily for purpose of export monitored by Export Processing Zones Authority (EPZA)
- ➔ Purpose of setting up EPZs is:
  - To boost industrialisation
  - To attract foreign and local investors
  - To produce standardised quality goods for export
  - To transfer HI-TECH from developed countries to pakistan
  - To create job opportunities
  - Several incentives are provided to attract business and investment
  - Advantages are that these zones have security, duty free import of capital goods , no sales tax on gas and electricity bills
  - First EPZ was set up at Port Qasim, Karachi in 1981

- EPZs in Pakistan

Punjab	KPK	Balochistan
Sialkot	Risalpur	Saindak
Faisalabad	-	Duddar
Gujranwala	-	Gwadar

TOURISM INDUSTRY

- ➔ Tourism is a phenomenon whereby people move temporarily to places away from home, primarily for relaxation and pleasure. Tourism is a tertiary industry
- ➔ The tourism industry is associated with the business of providing accommodation and recreational facilities for people who are travelling and visiting or staying in a place for relatively limited period of time
- ➔ It has become world's fastest growing industry
- ➔ Domestic and foreign tourism occurs on a small scale in pakistan
- ➔ Tourism is an industry which contributes significantly to the economy:
    - It generates employment opportunities for the locals in the sector of hotels,transport, tourist companies etc
    - This allows them to generate revenue which increases our GDP and GNP.
    - It also promotes local development of infrastructure as hotels, restaurants, metalled roads are constructed for the feasibility of tourists

Advantages	Disadvantages
More capital is earned which correct balance of payment	Tourism often destroys local culture and traditions
It encourages growth of cottage industries as the foreign tourists buy their products	Pakistan have unreliable political and economic conditions, this results in decline of the number of tourists visiting
Production of food increases due to creation of local market	In tourist season prices of basic necessities rise above affordability of locals
Locals can use tourist facilities	The natural environment is affected as tourists contribute to pollution
It is a sustainable industry,as tourist attractions will continue to exist	It generates seasonal employment especially in northern areas

- Feasibility of Developing Tourism in Pakistan

- ➔ Tourism depends on presence of tourist destinations with easy travelling distances in between them to encourage foreign visitors
- ➔ Amount of security for tourists, recently amount of tourists have decreased due to increased terrorist attacks
- ➔ Availability of capital to develop infrastructural facilities for the feasibility of tourists
- ➔ Infrastructural facilities such as hotels, all weather roads hospitals, water supply are needed to encourage foreign tourists
- ➔ Management and maintenance of tourist places to retain their attractiveness
- ➔ Marketing of tourist places which have recently shown some improvement
- ➔ Transport by road and air to tourist spots, which is very less developed and most of the areas are remote due to no transport facilities
- ➔ Government policies to encourage development of tourism and for this purpose Pakistan's tourism development corporation was set-up

- Why People visit Pakistan

- ➔ The UK has remained the main source of visitors. Other sources were India, Germany, Japan, Russia, China, Canada, Netherland, France, Sri Lanka, Australia, Saudi Arabia, UAE, Italy, Norway, Denmark, Malaysia and Turkey
- ➔ Most of the visitors from overseas visited main cities like Karachi, Rawalpindi, Islamabad and Lahore
- ➔ Many Pakistanis work abroad mainly in K.S.A, Kuwait, U.A.E, UK and U.S.A. They are not tourists but when on holidays, they come to visit their families, friends in Pakistan almost every year
- ➔ To attend trade delegations
- ➔ As staff of multinational companies such as oil companies, Foreign Banks
- ➔ Historic Interests (Places)
- ➔ Religious Faith
- ➔ For educational activities e.g. some educational institutions have hired foreign staff e.g. Principal and teachers
- ➔ Visiting Northern areas and beautiful lakes and gullies
- ➔ Different culture to their own

Natural Attraction of Pakistan

- Northern Areas

- ➔ Towering snow capped peaks
- ➔ Valleys with unique flora and fauna
- ➔ Paradise for mountaineers, trackers, hikers, photographers
- ➔ Unique and interesting cultural patterns with typical costumes and folk dances

-Kaghan Valley

- ➔ One of most splendid tourist area in Pakistan, located near Hazara district of KPK
- ➔ Spot of Shogran with spectacular view and scenery, surrounded by peaks and forests
- ➔ Fishing of mahasheer and brown trout in water between Naran and Kaghan
- ➔ Saiful Maluk lake as a spot for picnic

- Gilgit Valley

- ➔ Season of visit is from May to mid-October
- ➔ Significant scenic beauty
- ➔ Matches of their own originated sport polo at festive occasions

- Swat Valley

- ➔ Rushing torrents and lakes
- ➔ Fruit laden orchids
- ➔ Flower bedecked slopes

- Skardu

- ➔ Capital of Baltistan with season from April to October
- ➔ Starting point for expedition to K2 and other giant peaks

-Hunza Valley

- ➔ Rugged charm, fragrant breeze, meadows and white fields
- ➔ The fairy tale fort of Baltit
- ➔ Cultural attraction of local Ismailis with their traditional clothes

- Chitral

- ➔ Kalash valleys of Bumburet, Ranbir and Birir
- ➔ The pagan tribes of Kalasha with unique customs and traditions
- ➔ Polo festival at Shandur

Cultural Attraction of Pakistan

- ➔ Pakistan is famous for its cultural heritage which attract tourists interested in history, cultural and archaeological research

- Archaeological Sites

- ➔ Moen-Jo-Daro
- ➔ Harappa
- ➔ Taxila

- Historical & Religious Sites

- ➔ Forts (Baltit),Lahore
- ➔ Mosques (Badshahi Lahore, Mahabat in Peshawar)
- ➔ Tombs (Chaukhandi near Karachi, Makli in Thatta, Allam Iqbal and Ranjit Sings in Lahore)
- ➔ Sharines (Uch sharif)
- ➔ Khyber Pass
- ➔ Shalimar Garden

- Modern Buildings

- ➔ Faisal Mosque
- ➔ Parliament Building
- ➔ President House
- ➔ Minar-e-Pakistan
- ➔ Jinnah Mausoleum
- ➔ Dams and Barrages

- Salt Mine at Khewra

- Traditional Crafts & Bazaars

CALL CENTRES

- ➔ A call centre is the office of an organisation which handles telephone calls to and from one or more companies
- ➔ It has the ability to control considerable volume of calls at one time with its computer system
- ➔ The calls are filtered and transferred to agents to transfer to relevant companies
- ➔ They handle calls effectively and cheaply than companies themself
- ➔ They are used for telemarketing companies and large organisations

- ➔ In pakistan they are established by government for providing service to offshore and domestic companies
- ➔ This service requires quick response, high quality communication links and efficient handling
- ➔ Ptcl provides connectivity for call centres
- ➔ This business has high growth chances due to growth in the industrial sector
- ➔ It provides employment to computer skilled workers especially in pakistan where employment rate is low, also serves as a part time job for students

However employment in call centres in Pakistan is limited because:

- It caters urban businesses but 67% population live in rural areas
- Most of the work is done on computer and large scale employment is not needed
- Only computer skilled labour meet employment criteria
- Growth of call centre is demanded on growth of business and industry

Chapter 6: Trade

- Trade is the exchange of goods and services.
- It establishes a link in different activities that depend on each other.
- It helps the regions to specialise in the production of different commodities.
- It provides employment as part of the tertiary sector.
- **Primary Goods**: The raw materials or natural products are the primary goods such as crops.
- **Capital Goods:** The machinery which helps to manufacture other goods.
- **Consumer Goods:** The goods which are used up or consumed in whatever form they are.

- Benefits or Advantages of Trade

- It is for the specialisation of goods and services.
- Demand for exports increases and domestic resources are used to provide them.
- Flow of capital and information technology from developed to developing countries increase the rate of development.
- Foreign exchange earned through trade can be spent on import of capital goods for industrialization.
- Developing countries shift their concentration on producing value-added products.
- Through foreign trade, a country increases its national income.
- Foreign trade stimulates economic activities thus creating employment.
- Export goods are produced on a large scale which helps to achieve economies of scale.

Problems of Trade for Pakistan

- Pakistan faces major hurdles which include:
- Dependence of major exports on a few commodities.
- Most of Pakistan's exports are agro-based and when yields are low due to floods etc. (or attacks by leaf curl virus on cotton crop); exports plummet.
- Power cuts are back breaking to industries as they halt production, thus orders can't be fulfilled leading to loss of market share in other countries.
- Foreign customers as well as local customers are lost.
- Less people willing to invest in Pakistan due to economic and social instability which means that there is no influx of technology or foreign reserves in the country.
- Devaluation of the currency makes importing of machines etc. difficult.
- The problem of child labour has led to decrease in orders from Europe and USA for sports goods and surgical instruments.
- Import tariffs by EU countries on Pakistani textiles to protect their own cotton industry, which means that Pakistani cotton is expensive to buy there.
- Exports are not very profitable thus exports have decreased.
- Remittances haven't increased a lot in the last 2-3 years meaning that it is difficult to find foreign exchange to pay for increased imports.
- Fish related industry is also suffering due to lack of quality control procedures during processing of fish, which means it can't be exported to the West.
- Fruit related industries can't export fruits far off places due to poor methods of preservation used. Most of the fruit becomes unfit for human consumption and is thus wasted.

- ➔ All of this results in a **negative balance of trade**, thus Pakistan has less money to spend on education, health services or in development of oil/gas fields or industries etc.
- ➔ Taxes are increased and thus goods are expensive, so people buy less and GDP falls

Exports

- ➔ Goods we sell to other countries

- Major exports

- ➔ Primary goods as raw cotton, fruits, vegetables, fish and leather
- ➔ Processed goods as cotton yarn
- ➔ Manufactured goods like ready-made garments, carpets, rugs, sports goods, leather products and surgical instruments.

- Major Countries

Main Trading Partners	Major Exports
United Kingdom	Cotton
United States of America	Spices, Rice, Ready-made garments
Middle East	Carpets, Surgical and Sports goods
Japan	Fish and its Products
China	Cotton Yarn
Eastern Europe	Cotton, Cloth

Imports

- ➔ Goods we buy from other countries

Main Trading Partners	Major Imports
United Kingdom	Machinery, Electrical appliances
United States of America	Machinery, Vegetable Oil and Wheat
China	Machinery, Electrical appliances, Plastic Products, Stationary
Middle East	Mineral Oil
Eastern Europe	Machinery, Electrical appliances
Japan	Machinery, Electrical appliances
Malaysia	Edible Oil
Sri Lanka	Tea

Negative balance of payment

- ➔ Reasons for Negative balance of payment are:
- ➔ In order to speed up the process of industrialization, the imports of capital goods have increased.
- ➔ Pakistani goods cannot compete in a highly competitive market in the world due to lack of standardisation.
- ➔ The effects of the rise in the oil process in the 1970's and 1980's are still felt.
- ➔ Due to unfavourable weather conditions the output is low.
- ➔ Our society is a consumption-oriented one, the import of consumer goods is about 10% of total imports.
- ➔ Pakistan is heavily dependent on the exports of a few items like cotton.
- ➔ Sometimes wheat and other food items have to be imported.
- ➔ Exports of non-cotton products have increasingly faced trade barriers.
- ➔ Pakistan does not belong to any other major regional organisations.

- Causes of Negative Balance of Payment

- ➔ Importing capital goods
- ➔ Importing luxury items
- ➔ Exporting poor standard and quality products
- ➔ International restrictions
- ➔ Hard Competition in International markets

- Effects of Negative balance of payment

- ➔ Results in lessening development projects
- ➔ Increases the risk of foreign dependency
- ➔ Loans are taken to fill the gap, which increases debt
- ➔ Trade embargo may be imposed in case the loans are not payed
- ➔ In order to reimburse the loans, the resources of the country might be sold to unfamiliar foreign companies
- ➔ Government has to impose higher taxes, which brings burden on people
- ➔ Minimises the purchasing power of the consumer, resulting in lower demand and less production
- ➔ Slows down business and commercial activities of Pakistan, hence harming them too.

- Solution of Balance of Payment

- ➔ By increasing exports:
- To have higher value added elements
- Develop the cottage industries
- Increase the variety of cotton items
- Strict quality control for high standards
- Exports agencies such as export promotion bureau to organise export activities
- Reduce taxes to provide incentives for exports
- EPZ is being set up in different parts of the country to promote export goods
- ➔ By restricting imports:

- As consumer goods account for 12% of the total import bill. Most of the consumer goods are luxury items and can be made in Pakistan, it can reduce the deficit gap
- By reducing the imports related to the tertiary sector as this is an extra burden to imports
- The services of skilled people from other countries. The solution lies in training our own people according to the standards.

World Trade Organisation

➔ Established in 1995, formally the General Agreement on Tariffs and Trade (GATT).
➔ It is an international organisation to allow free trade between its member countries by reducing or abolishing certain restrictions imposed by governments of other countries on exports and imports.
➔ After December 2004, Pakistan became a member of WTO

- Challenges Pakistan face

➔ Textile industry requires modernization by replacement of industrial machinery.
➔ In agriculture, we can face problems as it may reduce our exports and government revenue as WTO is highly subsidised and not fully modernised
➔ The service sector will make quite a few adjustments as it is already competing with international players.
➔ Pakistan has to reduce import duties.
➔ The small scale and medium sized industries had to face the competition due to imported goods because of the high cost of production.
➔ Structures and regulations have been implemented by the government.
➔ A strategy calls for measures to make our industry comply with international standards.
➔ We need to modernise the production process, training and education.
➔ Proper infrastructure is also required and a flood of information between government and exporters can help to face the challenge.

- Exchange Rates

➔ Refers to the price of one currency in terms of another currency e.g. 1 US dollar = 100 Rs.
➔ Important in determining the cost of imports, exports.and returns from overseas investment.
➔ An exchange rate is said to depreciate when one unit of the currency buys fewer and fewer units of another country's currency.
➔ Currency depreciation makes imports expensive in terms of domestic currency and exports cheaper in terms of foreign currency.
➔ Appreciation of the exchange rate takes place when one unit of a currency can buy a greater value of another currency.
➔ Appreciation of the exchange rate makes imports cheaper and exports more expensive.

Trade barriers

- Advantages

➔ Protect local industries and create employment opportunities
➔ Creates domestic demand that leads to greater exploitation of local resources
➔ Give rise to greater self sufficiency thereby reducing foreign dependency

- ➔ Improves the balance of payments position
- ➔ Protect local industries and create employment opportunities

- Disadvantages

- ➔ Local industries become complacent due to lack of international competition and thus loose efficiency
- ➔ Consumer choice is limited to domestically produced goods
- ➔ Even those goods which the country produces inefficiently and at high cost would need to be produced.

Trading Blocs

- ➔ Refers to regional groupings of countries to allow trading between all participating countries for greater economic co-operation and facilitation of trade
- ➔ Involves lower or zero trade restrictions between members and strong trade barriers against non-members
- ➔ Pakistan is a member of SAARC (South Asian Association for Regional Cooperation) and of ECO (Economic cooperation Organization) but they have not been so effective due to differences in political situations

Chapter 7: Transport & Telecommunication

Means of Transportation

- **Roads**
- **Railway**
- **Air**
- **Water**

Road Transport

- Most popular means of transport. Includes vehicles like bus, car, bike, etc.
- It carries 82% of total passenger traffic and 54%of freight traffic.
- There are two types of Roads: **Kutcha** and **Pucca** Roads.
- Kutcha road is an unmetalled road or rugged, broken road that is not convenient.
- Pucca road is metal, smooth and cemented, it's convenient.
- Roads are easy to build in plain areas but it is expensive to build in difficult terrain.
- It is maintained by the National Highway Authority (NHA).

- Importance

- It has door to door service and is available in rural areas as well, unlike railways and air transport.
- Quick access for short distances.
- It is a cheap source of transportation.
- Available 24/7, no time wastage
- Plays an important role in mountainous and hilly areas as well
- Roads facilitate areas that cannot be reached by rail or air transport.

- Advantages

- Provides door to door service
- Flexible system
- Supportive for daily travelling
- Cost effective source of transportation

- Disadvantages

- Expensive for long distance travelling
- Slow in urban areas due to dense population
- Increases air pollution
- Cannot carry heavy loads
- High cost of maintenance

Road Network in Pakistan

- The N5: National Highway-Grand Trunk Road

- ➔ Starts From Karachi to Lahore and then Lahore to Peshawar
- ➔ From Karachi to Lahore it is called National Highway
- ➔ From Lahore , its name is changed to Grand Trunk Road
- ➔ It is 1260 km long
- ➔ Holds historical importance
- ➔ The route was used by invaders, pilgrims

- The Indus Highway

- ➔ 1204 km long
- ➔ Stretches from Karachi to Peshawar, providing a shorter route than N5
- ➔ The Highway runs on the west of River Indus, crossing Dadu, Larkana, Shikarpur, DG Khan and DI Khan reaches Peshawar via Kohat Pass

- The RCD Highway

- ➔ 600 km long, linking Turkey and Iran with Pakistan
- ➔ Starts from Karachi and connects Lasbela, Khuzdar, Quetta, Nushki and Nok Kundi and joins Iran and Turkey

- Sukkur - Quetta

- ➔ Connects Quetta with Sukkur via Bolan Pass and Kachi Sibi Plain
- ➔ From there it joins Indus Highway

- Lahore - Quetta

- ➔ Connects Quetta with Lahore via Zhob, Sulaiman Range, Derajat, DI khan and Faisalabad

- Karakoram Highway

- ➔ Trade route connecting Pakistan with China

- Karachi - Gwadar

- ➔ It is a coastal road starting fromKarachi joins all the coastal areas to reach Gwadar

The Pakistan Motorway

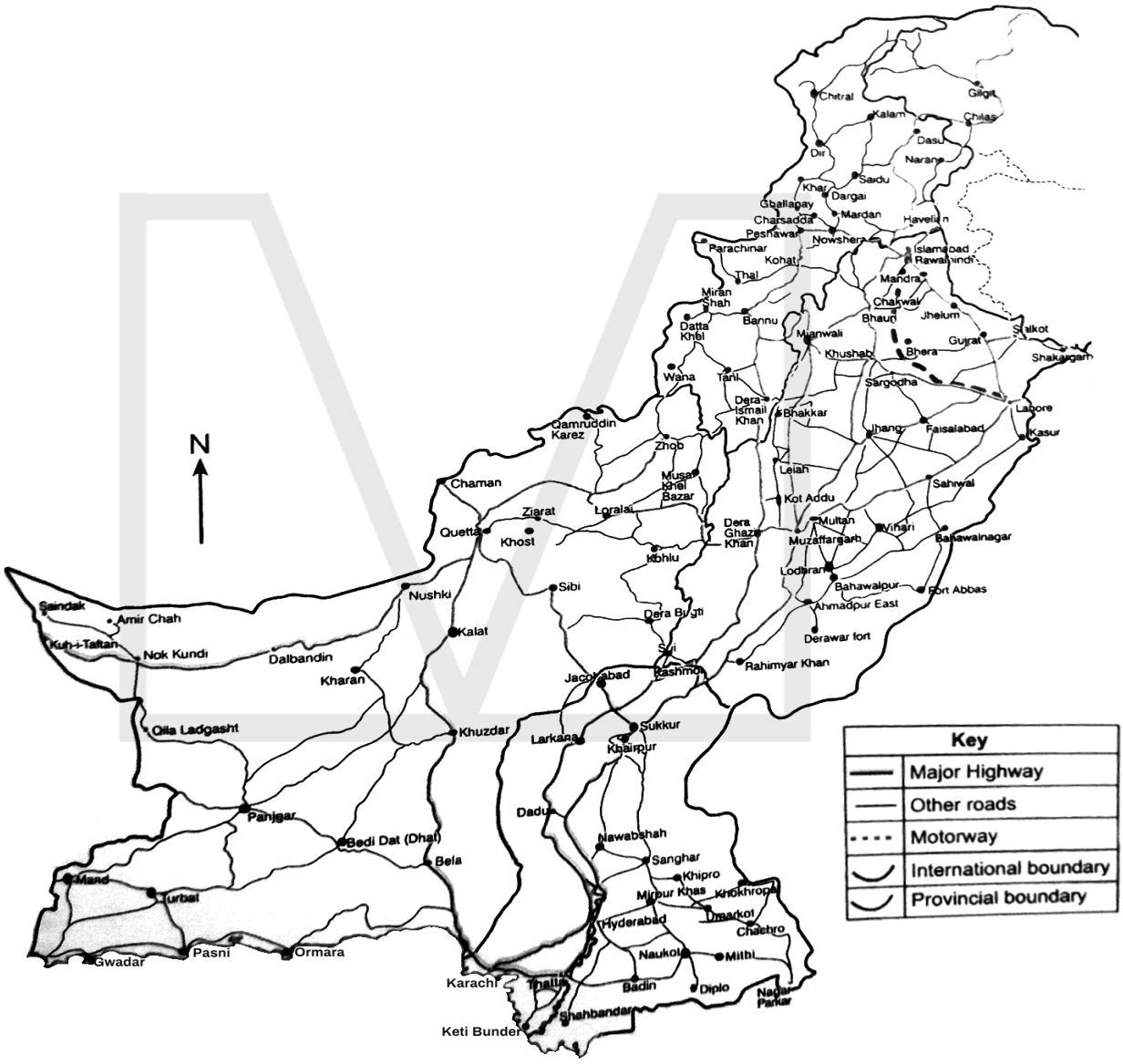
- Benefits of Motorways

- ➔ Quicker and efficient
- ➔ Estates development on its route
- ➔ Promotes industrial growth and increases jobs

- ➔ Easier supplying of raw materials and manufactured goods
- ➔ Connection with other countries.

- Major Motorways

- ➔ Islamabad - Peshawar motorway, 154 km154 km, **M-1**
- ➔ Islamabad - Lahore Motorway, 339 km, **M-2**
- ➔ Pindi Bhattian - Faisalabad motorway, 52 km, **M-3**
- ➔ Multan - Faisalabad Motorway 229.8 km, **M4**
- ➔ Karachi - Hyderabad Motorway**,** 135 km, **M-9**

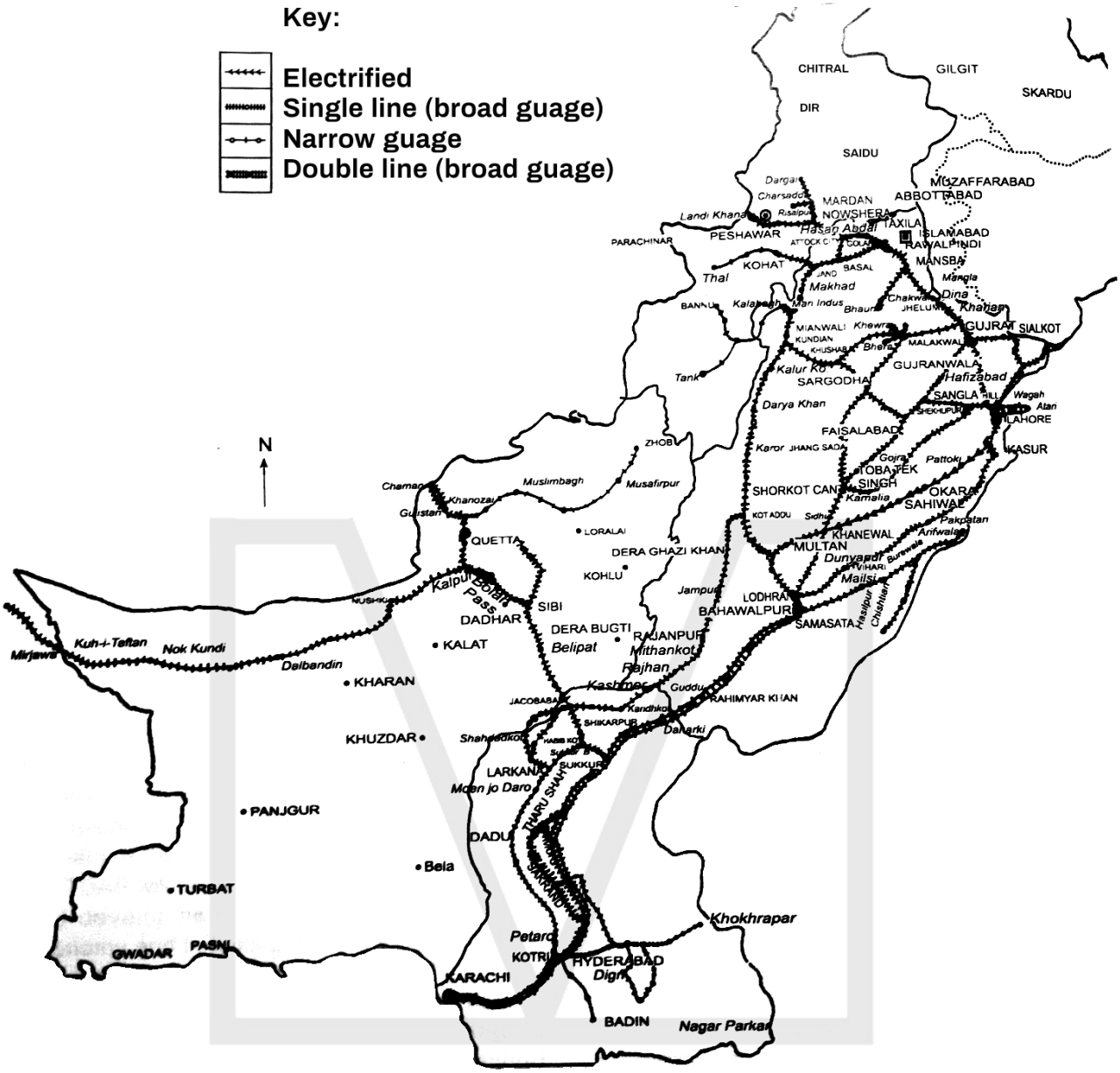


Railways

- ➔ Railways are a quick and efficient means of transport and convenient for longer routes
- ➔ They transport cargo, especially heavy items, for a long distance.
- ➔ Pakistan railway is under the control of the Ministry of Pakistan Railway, but at the present time some tracks have been given to the private sector.
- ➔ The route of Pakistan railway was 8554 km long in 1947 while in 2000 it was 8857 km long.
- ➔ Railway needs a specific station, and there are long term returns on investment
- ➔ They do not encourage the industrial estates
- ➔ The railway network in Punjab and Sindh is dense because they are flat lands and demand is present
- ➔ In high mountains there are no railway tracks e.g., Gilgit, Murree, Chitral etc.
- ➔ The foothills of the mountains like Kohat, Bannu and Peshawar have rail tracks as they are found in the lower areas.
- ➔ It is more expensive to build rail tracks than roads.
- ➔ The railway engines, sleepers and wagons are expensive, and the tracks are difficult to build and maintain
- ➔ **Karachi Magno Train:**
    - Project cost 1.2 billion dollars
    - High tech light rail and an economical transport system
    - Will have elevated rail tracks leading to destinations
    - An elevated high corridor of about 120 km would serve all areas of the city and the system would be linked with the Karachi Circular Railway
- ➔ **Karakoram Express:**
    - Launched in 2003 by China , running on Karachi Lahore route
    - Total project of $200 million was financed by Exim Bank of China which met 87.5% of total finance
    - It has 14 Coaches air conditioned and designed on International Standards, Each having 9 compartments with 6 berths
    - It has an address system for stations.
- ➔ **Karachi Circular Railway (KCR):**
    - Will provide a good means of transport for the suburbs of the city
    - There will be improvement in timetable, ticketing arrangements and the stations
    - There will be new roads, flyovers and bridges to the new stations to establish an effective railroad link
    - It would reduce pressure on the road transport.

- Major Railway Routes

- ➔ Karachi to Lahore
- ➔ Quetta to Chaman
- ➔ Rawalpindi to Peshawar
- ➔ Peshawar to Karachi
- ➔ Karachi to Quetta



- Gauges

- ➔ A railway track is known as gauge
- ➔ There are 3 types of gauge
  - **Broad gauge**
  - **Meter gauge**
  - **Narrow gauge**

- Advantages

- ➔ Efficient and convenient means of transport
- ➔ Cheap and faster
- ➔ Safe, comfortable and reliable

- ➔ Far flung distances can be covered
- ➔ Not affected by traffic
- ➔ Carries bulk of goods which can't carried out on roads or air transport

Disadvantages

- ➔ It is not flexible
- ➔ Door to door facility is not provided
- ➔ Threat of loss and safety
- ➔ They are expensive and long term return to government
- ➔ They are difficult to build and maintain in rugged areas
- ➔ Industrial estates cannot be build

Deterioration in Railway Department

- Problems

- ➔ Poor reservation system
- ➔ Overstaffing and corruption
- ➔ Uneconomic stations
- ➔ Worn out rails and sleepers
- ➔ Lack of investment
- ➔ Operational inefficiencies in timings
- ➔ Presence of single track on short segment of main dual line.

- Consequences

- ➔ Losing passengers
- ➔ Losing freight
- ➔ Railway has outdated locomotives

Dry Ports

- ➔ The inland cities which are far from seaport have dry ports to promote foreign trade.
- ➔ These speed up export and import procedures e.g, by clearance from customs authorities, by checking processes.
- ➔ Famous dry ports are Quetta, Lahore, Multan, Sambrial and Peshawar.

- Infrastructure Facilities

- ➔ A high efficient rail transport is required with a container service to carry bulky cargo.
- ➔ Efficient managerial staff, huge storage sheds and open areas are required.
- ➔ Refrigeration facilities for perishable items such as fruits and vegetables.

- Functions

- ➔ Helps to reduce the workload at Karachi Port and Port Bin Qasim
- ➔ Helps to collect revenue
- ➔ Helps to stimulate foreign trade activities in those cities which are far away from the seaport

- ➔ Helps to reduce the pressure on exports and imports by providing hassle free transportation of cargo from their production point to the seaport directly

- Dry ports runned by Pakistan Railways

- ➔ Karachi Dry Port was developed in 1974
- ➔ Quetta Dry Port was developed in 1984
- ➔ Peshawar Dry Port was developed in 1986
- ➔ Lahore Dry Port was developed in 1973
- ➔ Rawalpindi Dry Port was developed in 1990
- ➔ Multan Dry Port was developed in 1988

- Dry ports runned by Private sectors

- ➔ Sialkot Dry Port was developed in 1986.
- ➔ Faisalabad Dry Port Established in 1994
- ➔ NLC Dry Port at Quetta
- ➔ NLC Dry Port at Thokar Niaz Beg Lahore
- ➔ Pak-China Sust Dry Port

Air Transport

- ➔ The use of air transport has increased because it is the faster mode of transport for high value light weight goods.
- ➔ People who can afford higher costs prefer air trains.
- ➔ Some northern areas such as Gilgit, Skardu have air routes which are easier than roads.
- ➔ Due to business activities and more industrialization, air travel has increased.
- ➔ People also value time, they therefore travel by air.

- International Airports

- ➔ Quaid-e-Azam International - Karachi
- ➔ Allama Iqbal International - Lahore
- ➔ Benazir International - Islamabad
- ➔ Quetta International - Quetta
- ➔ Faisalabad International - Faisalabad

- Requirements of International Airport

- ➔ Civil aviation, huge cargo setup
- ➔ Open vast land, not far from the city
- ➔ There shall be no skyscrapers
- ➔ 20 planes can stand at one time
- ➔ A long runway
- ➔ Access to the transport system
- ➔ Proper communication setup and demand for air travel
- ➔ A huge international level waiting area

- Regional Airports

- ➔ They are found in many cities as Sargodha, Chitral, Gujranwala, Peshawar, Gwadar, Skardu, Gilgit, Zhob, Jacobabad, Skardu, Kohat, Mianwali, Nawabshah, Sukkur etc.
- ➔ In 1947 the Orient Airways operated in Pakistan
- ➔ By 1949 there were three small air companies, Pakistan Airways, Orient Airways and Crescent Airways, Later in 1955, one of these closed.
- ➔ Orient and Pakistan Airways merged to form Pakistan International Airlines.
- ➔ It provides efficient links to domestic and international routes
- ➔ The Civil Aviation department is present for check and Cargo management along with the security system.

Requirements of Regional Airport:

- ➔ A huge area with a normal runway
- ➔ Civil Aviation, cargo system
- ➔ Not far from the city
- ➔ No skyscrapers nearby
- ➔ 5 planes can land at one time
- ➔ Access to transport system and link through great communication - Small waiting area

Air Travel Companies

- ➔ PIA (Pakistan International Airlines
- ➔ Air Blue
- ➔ Aero Asia
- ➔ Shaheen Airlines
- ➔ Bhoja Airlines (closed)

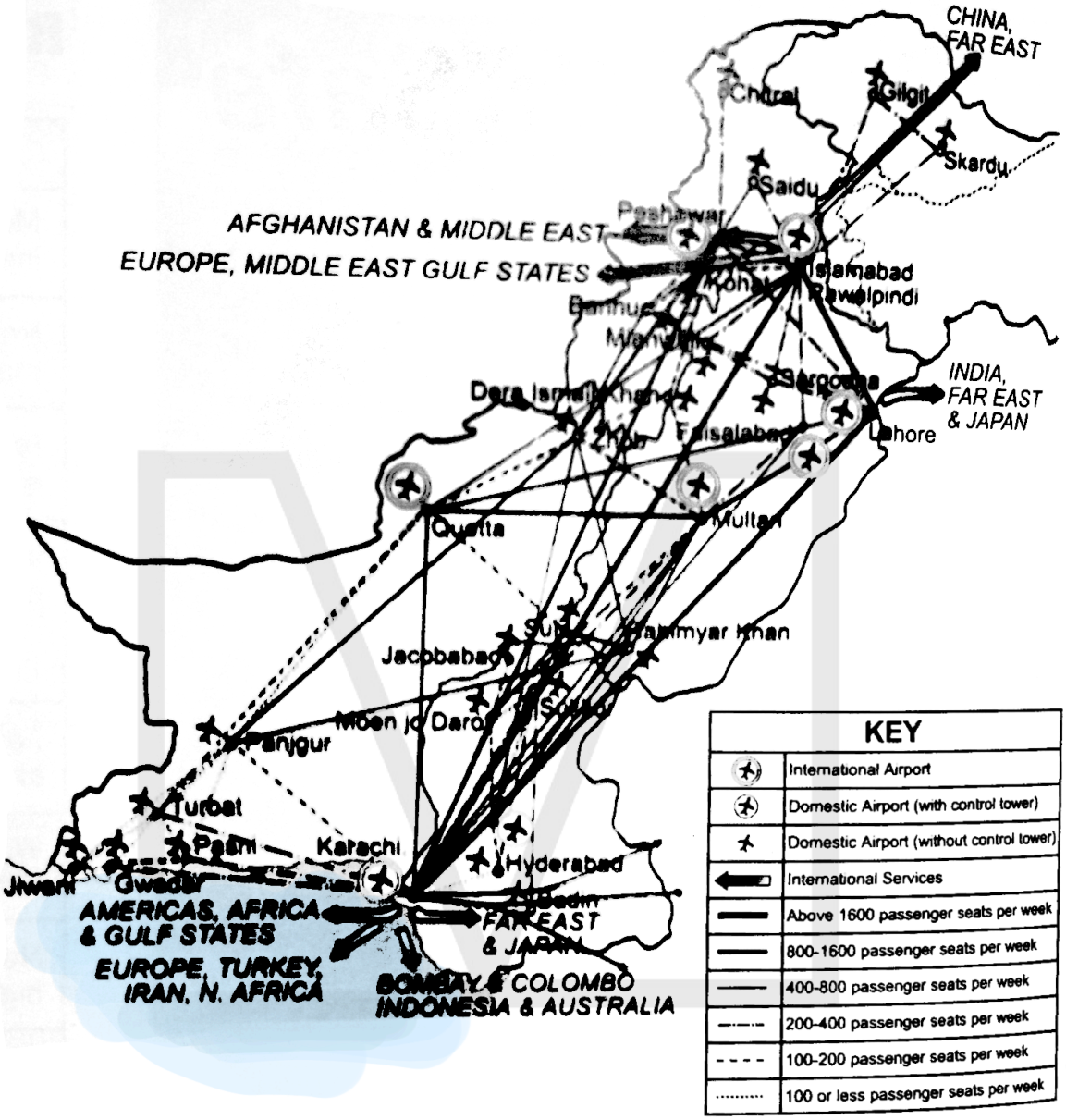
- Internal Factors for the development of Air Transport

- ➔ Air transport is the fastest and most effective mode of transport for high-value and lightweight goods compared to rail and road.
- ➔ People who value time and can afford the higher cost prefer to go by air
- ➔ The rail and road network is concentrated in plains, however, in mountainous regions like northern areas not all the roads are metalled and frequent landslides hamper the traffic
- ➔ PIA's air routes to Gilgit and Skardu make these areas accessible
- ➔ There is a rise in the general living standard of people due to industrialization and urbanisation.
- ➔ More people can afford to travel by air.

- External Factors

- ➔ Transport has increased to the middle east and consists mainly of perishable items, like fruits and vegetables
- ➔ Improvement in communication has turned the world into a global village with more passengers from all walks of life using air travel. Migration has also increased.
- ➔ During recent years air transport facilities have improved greatly with the provision of the latest international quality equipment.

Air routes



Water Seaports

➔ Seaports in Pakistan provide access to the cities in the world. Trade lines are easy to develop.

Advantages:

- ➔ Heavy and bulky goods can be transported for long distances
- ➔ Raw materials, products can easily be transported. All of these are required for the proper functioning of a factory.
- ➔ It may lead to building of Export Processing Zones and Industrial Estates, which will attract foreign as well as local investment into the industrial sector.
- ➔ Cheaper than air transport

- Disadvantages

- ➔ It involves long term return on investment.
- ➔ It is time consuming
- ➔ Every country doesn't have a port
- ➔ Perishable items cannot be transported
- ➔ Maintenance of ships is very costly

- Major Sea Ports

- ➔ **Keamari Karachi - Port Bin Qasim**
- ➔ **Gwadar - Pasni - Ormara - Gidani - Jiwani - Sonmiani**

- Facilities at Keamari Port

- ➔ Liquid products terminal with ancillaries are provided
- ➔ Construction of flyover bridges connecting and by passing the port area have been built to cause traffic congestion in the port area
- ➔ Reconstruction or Rehabilitation of berths to handle increasing volume of cargo
- ➔ Provision of navigational system and radars
- ➔ Environmental protection equipment to keep port sea water clean from pollutants and seepage of oil from ships
- ➔ Improvement and expansion of storage facilities at both east and west wharves, container terminals at west wharf to modernise cargo handling.

- Importance of Port Bin Qasim

- ➔ It is the second deep seaport and was built in 1980
- ➔ It has modern machinery to relieve the pressure at Karachi port and for handling raw material for Pakistan steel
- ➔ It is the first integrated port of Pakistan that combined the function of multipurpose deep seaport and a designated industrial zone
- ➔ It also offers transport and other infrastructural facilities for industrial development
- ➔ Main categories of cargo handled at Port Bin Qasim includes iron ore, coal, grin furnace oil, edible oil, rice, LPG containers, jute and fertiliser.

- Importance of Gwadar Port

- ➔ It has a large sea port, facilitating export of fruit crops
- ➔ For minerals output the Chinese has provided financial assistance

- ➔ It can serve as an entre-port for Central Asia
- ➔ This can generate revenue by collecting large sums as transit fees
- ➔ Gwadar can be a substitute port
- ➔ Warehouses could also open for exports of goods and for storing imported goods
- ➔ It is a flourishing port and has a fish harbour.

Telecommunication

- ➔ The devices which provide rapid long distance communication, convert sounds and images into signals which are then transmitted along wires or radio waves in worldwide systems are telecommunications

- Means of Communication

- ➔ Internet
- ➔ Telephone
- ➔ Mobile Phones
- ➔ Computer
- ➔ E-mail
- ➔ Radio
- ➔ Video Calls
- ➔ Television
- ➔ Facsimile (Fax machines)

- Importance of Internet

- ➔ It is a recent development that has created a worldwide network, connecting computers through telephone and satellite infrastructure.
- ➔ It allows people to send messages, emails and create websites along with access to them

- Institutions for Development of Telecommunication

- ➔ Pakistan Telecommunication Company Limited (PTCL)
- ➔ Pakistan Telecommunication Authority (PTA)
- ➔ National Telecommunication Corporation (NTC)
- ➔ Pakistan Broadcasting Corporation (PEC)
- ➔ Pakistan Television Corporation (PTC)
- ➔ Pakistan Post Office (PPO)

- Promotion of Education:

- ➔ Promoted by making distant learning possible
- ➔ More information available
- ➔ Accessibility to videos and lectures
- ➔ Helps in the preparation of projects
- ➔ Encourages the people to learn a skill

- Role of Telecommunication in Industry

- ➔ Advertisement and marketing

- ➔ Quality control
- ➔ Government plans
- ➔ E-Commerce is helpful for online banking
- ➔ Management of branches through phones and websites

- Government Plans

- ➔ To provide infrastructure needed for telecommunication
- ➔ Encourage educational channels on TV and Radio
- ➔ Establishment of internet centres such as cyber cafes
- ➔ Encouragement of software industry in Urdu and regional languages
- ➔ Encouragement of the use of software in education and business
- ➔ Investment in educational and training of IT Professionals
- ➔ Government is keen to encourage the software industry as a small scale industry by providing incentives promoting the use of software in Pakistan and promoting the export of software.

Chapter 8: Population & Employment

Population

- **Population**: Number of people living in an area
- **Overpopulation:** When the resources do not meet the requirement of the population.
- **Population Density:** Number of people living per unit area
- **Total Density:** Total Population/Total Area
- **Birth rate:** Number of babies/infants born per thousands or per hundred in one year
- **Death Rate:** Number of people dying per thousand or per hundred in one year
- **Growth Rate:** Birth Rate – Death Rate
- **Life expectancy:** No. of years a person is supposed to live unless killed by an unnatural way
- **Sustainable Population Growth:** Population size that can be supported by available resources

Birth Rate

- Reasons for high Birth Rate

- Low death rate
- Desire to have more sons
- High illiteracy rate
- No family planning
- Lack of knowledge about artificial means to prevent pregnancy, i.e. use contraceptives
- Lack of availability of contraceptives
- Many people need children for
- Help on farms
- A source of income
- Support in old age
- Lack of education to women
- Early marriages
- Lacks of awareness to problems of overpopulation
- Religious belief that Allah will provide rizk
- Status of large families
- High infant mortality rate

- Outcomes of overpopulation

- Unemployment
- Child labor
- Poor living standards
- Lack of resources

- Ways to overcome these problems

- Rise in literacy rate
- Family planning schemes

- ➔ Increase in living standards
- ➔ Education for women in urban areas

Death Rate

- Reasons for High Death Rate

- ➔ Lack of effective medicines
- ➔ Medicines are expensive
- ➔ Lack of clinics, hospitals
- ➔ Lack of trained doctors and staff
- ➔ Lack of vaccinations
- ➔ Poor hygiene
- ➔ No access or supply of clean water
- ➔ Lack of food production and supply
- ➔ Poor lifestyle
- ➔ No exercise
- ➔ Lack of medical infrastructure
- ➔ Improper diet
- ➔ Famine

- Measures to control High Death Rate

- ➔ Access to education of contraceptives
- ➔ Use and allowance of contraception methods/ contraceptives
- ➔ Family Planning
- ➔ Ban child labour and child marriages
- ➔ Religious support for birth control
- ➔ More clinics and hospitals to reduce infant mortality rate
- ➔ Trained doctors and staff
- ➔ Education and Job opportunities for women
- ➔ Late marriages
- ➔ Awareness about overpopulation
- ➔ Better and cheap medicines
- ➔ More widespread vaccinations
- ➔ Prevention of diseases
- ➔ Clean drinking water
- ➔ Proper sewage
- ➔ Improvement in food production and supply
- ➔ Healthy lifestyle and exercise and diet

The Demographic Transition Model

- ➔ A simplest way suggesting sequence of how population is changing globally over a period of time

Stage 1: 1905 - 1935

- ➔ Low total population
- ➔ Birth rate and Death rate remain high

Stage 2: 1936 - 1970

- ➔ Increase in total population

- ➔ High birth rate
- ➔ Rapid decrease in death rate

Stage 3: 1971 - 2013

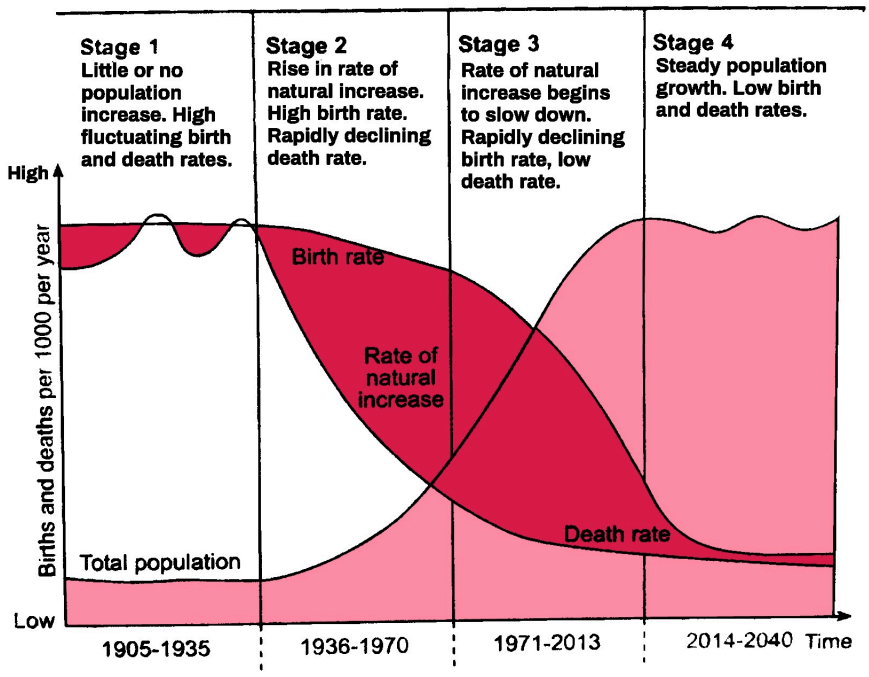
- ➔ Further increase in total population
- ➔ Massive reduction in Birth rate
- ➔ Death rate remained low

Stage 4: 2014 - 2040

- ➔ Constant high total population
- ➔ Low birth and death rate

- High Birth rates were due to:

- ➔ So birth control or family planning
- ➔ Pride of Large families
- ➔ Children were needed to work on family, since farming was the main occupation



Migration

- Rural Push Factors

- ➔ Lack of study opportunities
- ➔ Lack of job opportunities
- ➔ Social discrimination
- ➔ Large Families
- ➔ Not enough land for heirs
- ➔ Unemployment
- ➔ Poor quality of life

- ➔ Poor infrastructure
- ➔ Lack of services
- ➔ Threat of natural disasters
- ➔ Political instability
- ➔ Lawlessness

- Urban Pull Factors

- ➔ Job opportunities
- ➔ Higher salaries
- ➔ Better quality of life
- ➔ Reliable sources of food
- ➔ Better opportunities
- ➔ Recreational activities
- ➔ Better infrastructure
- ➔ Availability of services
- ➔ Law and order
- ➔ Social equality

Employment

- ➔ Employment is divided into three categories:
  - 45% in Primary industry
  - 14% in Secondary industry
  - 41% in Tertiary industry

- Reasons for Unemployment

- ➔ Overpopulation
- ➔ Unstable government policies
- ➔ No developmental works or projects and Lack of industrialization
- ➔ Jobs opportunities are less, population is high
- ➔ People are hired on merit, and the literacy rate is low
- ➔ Mechanization, leading to no more demand of working hands
- ➔ Rural-Urban migration, burdens the urban areas
- ➔ Society is a consumption-oriented one

- Effects of Unemployment

- ➔ Lack of modern facilities
- ➔ Lack of health facilities
- ➔ Lack of education
- ➔ Less GDP
- ➔ No skilled labour

- Reasons of High population in Pakistan

- ➔ Want for sons
- ➔ Low death and high birth rates
- ➔ More hands needed to work on farms
- ➔ No family planning due to lack of awareness
- ➔ Early marriages
- ➔ Afghan refugees and their generations.
- ➔ Polygamy relations
- ➔ The concept of Ulema that Allah gives Rizq to everyone

- ➔ Illiteracy among the people

- Effects of Rural-Urban Migration

- ➔ Pollution increases
- ➔ Pressure on resources in urban areas
- ➔ Unemployment increases
- ➔ Burden on infrastructure
- ➔ Lack of shelter
- ➔ Problems of sanitation
- ➔ Lack of institutions
- ➔ Lack and pressure on hospitals and medicines
- ➔ Living standards go down, poverty and Crisis increase

The Population Structures

- ➔ A population structure is the percentage of male & female in different age groups which are generally represented by a population pyramid.

- Population Pyramid Shows

- ➔ Age distribution of a population
- ➔ Bar graph displaying the relative percentage of individuals in different age groups
- ➔ Reflects the pyramid shape due to varying bar sizes
- ➔ Provides insights into birth rates, mortality rates, and population growth
- ➔ Represents the male on the left side and female on the right side

- Population Distribution

- ➔ Population distribution refers to how people are spread out across a specific area
- ➔ The distribution is uneven and changes from time to time

- Population Density

- ➔ Number of people living per unit area
- ➔ Population Density = Total Population / Total Land Area

Sustainable Population Growth

- ➔ Sustainable population means a size that matches available resources
- ➔ Development in resources should match population growth for sustainability
- ➔ Pakistan's population growth rate dropped from 3% to 2% in the last decade, and further to 1.8% in 2008
- ➔ A growth rate below 0.5% is sustainable for Pakistan, while above 1.5% is not
- ➔ Pakistan's population is increasing more than its economic growth, which causes burden on resources

- How to manage sustainable population growth

- ➔ Increase awareness of population growth
- ➔ Balancing the resources and population by utilising most resources
- ➔ Promoting family plans to reduce birth rate

A Note from Mojza

These notes for Geography (2059/02 & 0448/02) have been prepared by Team Mojza, covering the content for GCE O levels and IGCSE 2023-25 syllabus. The content of these notes has been prepared with utmost care. We apologise for any issues overlooked; factual, grammatical or otherwise. We hope that you benefit from these and find them useful towards achieving your goals for your Cambridge examinations.

If you find any issues within these notes or have any feedback, please contact us at support@mojza.org.

Acknowledgements

Authors:
Abdul Haleem
Amna Faisal
Syed Ammar
Hassan Jamshaid
Muhammad Ibrahim Chaudry
Fasiha Raza
Parena Maheshwari

Proof-readers:
Abdul Haleem
Syed Ammar
Aroosham Mujahid
Hadia Ieman
Miraal Omer

Designers:
Arham Hassan
Jawairia Shaikh