

O-Level Geography

Paper 2

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Preface

This book has been written specifically to match the latest Cambridge O level syllabus 2059/02 for Pakistan Studies (Geography). The purpose of writing this book is to present Pakistan's geography and economy in a comprehensive way to provoke interest of the students. The book deals with a detailed study of the physical, human and economic aspects of Pakistan with reference to the topographical features and other natural resources. The book also contains a glossary of more than 100 geographical terms. A key strength of this book is the amount of data in the form of maps, diagrams, tables, and photographs. This data supports, and is well integrated with, the text which is written in clear and simple language.

About the author

Muhammad Faisal Salman held an M. Phil degree from Beaconhouse National University, Lahore with distinction. He has a vast experience of teaching Pakistan Studies to O-level students at various renowned institutions of Lahore.

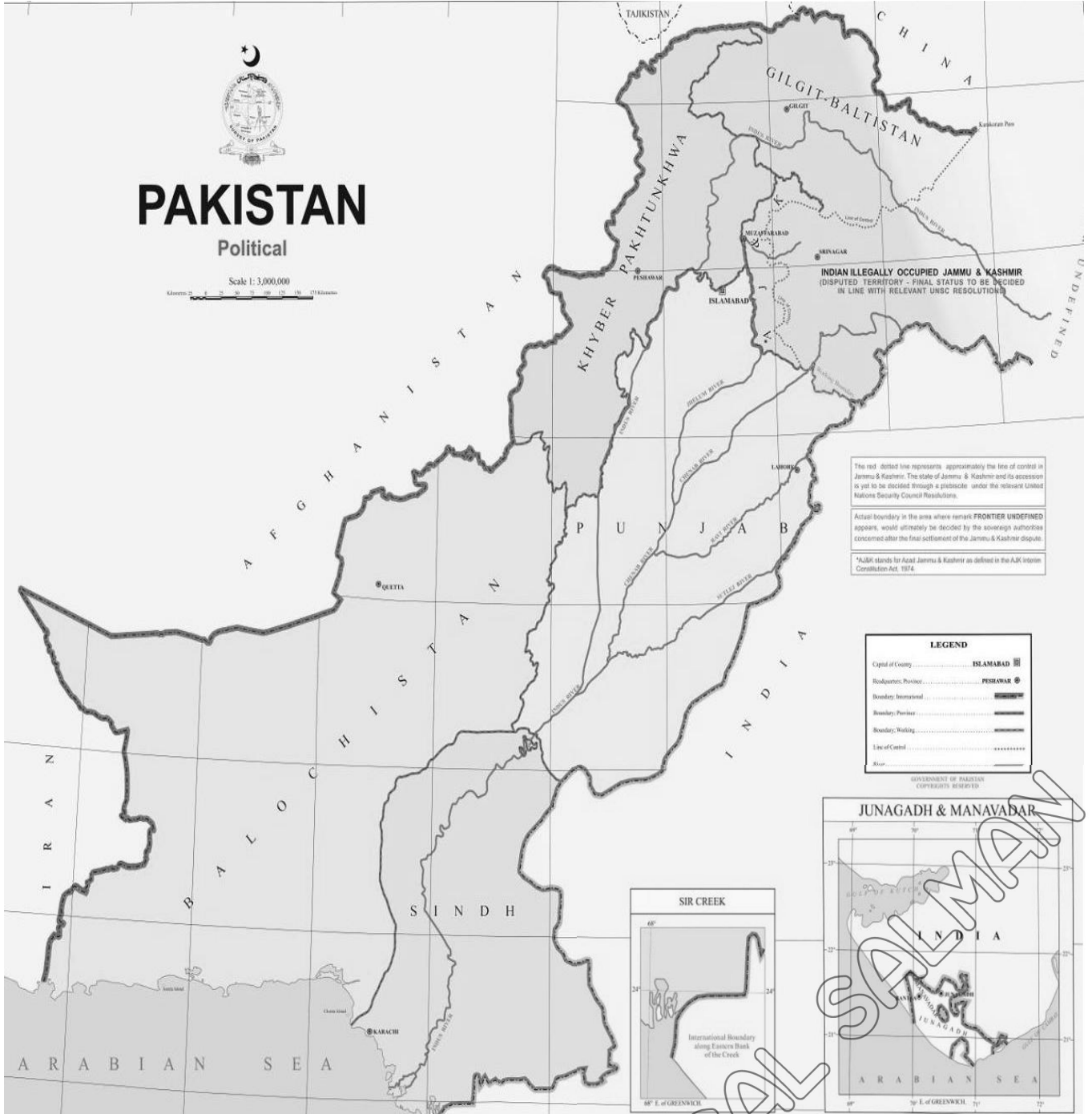
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Map of Pakistan



UNIT 2

Climate of Pakistan

Climate is a composite term referring to elements such as temperature, air pressure, wind, rainfall, and snowfall. Climate is an important subject as it has a direct impact on vegetation and soil, and also influences human life and livelihood. Agriculture is greatly influenced because it determines the type of crops and the need for irrigation. Natural hazards like storms, floods, and desertification are the results of climatic changes. Extreme temperatures, whether hot or cold, affect human, animal, and plant life.

Climatic Zones of Pakistan

Pakistan's topographical features range from lofty mountains in the north to the coastal plains in the south. The diversity of terrain leads to a variety of climates. The major climatic divisions of Pakistan are:

- Highland Climate
- Arid Climate
- Lowland Climate
- Coastal Climate

Climate and Weather

- *Weather is the atmospheric conditions (temperature, rainfall, humidity, pressure) of any place for a short period of time. It is often localized.*
- *Climate is generalization of the weather conditions of a place over a long period of time.*

A division into climatic zones does not imply exactly the same conditions throughout the zone. There are great variations in rainfall, temperature, humidity etc. in the same climatic zone e.g. northern highlands and western highlands fall in the same climatic zone but the amount and seasonal distribution of rainfall is different. Murree experiences more than 1500 mm average annual rainfall mostly during the summer season, whereas in the western highlands Quetta receives 250 - 500 mm average annual rainfall mostly during the winter season.

Highland Climate

This region includes northern, north-western and western highlands. The major characteristics of this climatic zone and its impact on human activities are:

- Winters are long, cold and snowy. Summers are short and mild. Temperature falls below freezing point ($< 0^{\circ}\text{C}$) in winters that makes outdoor life difficult for the people.
- Heavy snowfall in winters hampers the growth of trees and makes farming difficult.

- Transhumance is practiced in which livestock is moved from highland areas to the foothills in winters.
- Heavy snowfall in winters blocks the roads and passes which hampers transport links and makes it difficult for the people to move from one place to another.
- Job opportunities become limited as outdoor life stops. People get involved in indoor activities e.g. carpet weaving, handicrafts etc.
- People, living in highland areas, suffer from diseases such as frostbite, asthma, lung infection etc. due to extremely low temperatures.

Arid Climate

An arid climate is experienced in the desert areas of Pakistan. The major characteristics of this climatic zone and its impact on human activities are:

- Low annual rainfall (*less than 125 mm*).
- Low humidity level.
- Hot summers; cool-mild winters.
- Average monthly temperatures in summer exceeds 40 °C which makes outdoor life difficult for the people.
- Dust storms blow in summers that leads to soil erosion and causes damage to crops.
- Shortage of water due to low annual rainfall and high rate of evaporation.
- Undeveloped infrastructure e.g. roads.
- Vast sandy area with infertile soil and sand dunes.
- Unpleasant working conditions.
- Most of the people live a nomadic life and move with their animals in search of food and water.
- Agriculture can't be practiced on large scale and is only practiced near oasis or where water is available from Karez or perennial canals.

Lowland Climate

This region includes the whole of the Indus Plain except the coastal areas. The major characteristics of this climatic zone are:

- Hot summer and cool winter season with temperature conditions ranging from 25 °C to 35 °C.
- Most of the rainfall takes place due to Monsoon winds in summer (July – September).
- Climate supports agriculture and other economic activities.

Coastal Climate

This region includes the coastal strip located on the Sindh coast and the Makran coast. The major characteristics of this climatic zone are:

- Sea breeze throughout the year.
- Maritime influence keeps the daily range of temperature low.
- High humidity level (60 – 70%) due to proximity to the sea.
- Winters are mild and summers are hot.
- Mean monthly temperature is 32 °C.
- Rainfall is scanty throughout the year (up to 250 mm).
- Rainfall on the Sindh coast is during the summer season due to Monsoon winds, while on the Makran coast rain falls during winter season due to Western Depression winds.
- Sea ports remain operative throughout the year due to moderate temperatures.
- During summer, tropical cyclones sometimes cause coastal flooding in low-lying areas causing damage to infrastructure, shanty homes and farming areas of the Indus Delta. Fishing is nearly impossible when the sea is wild. Thus, fishing communities suffer economic losses due to tropical cyclones.

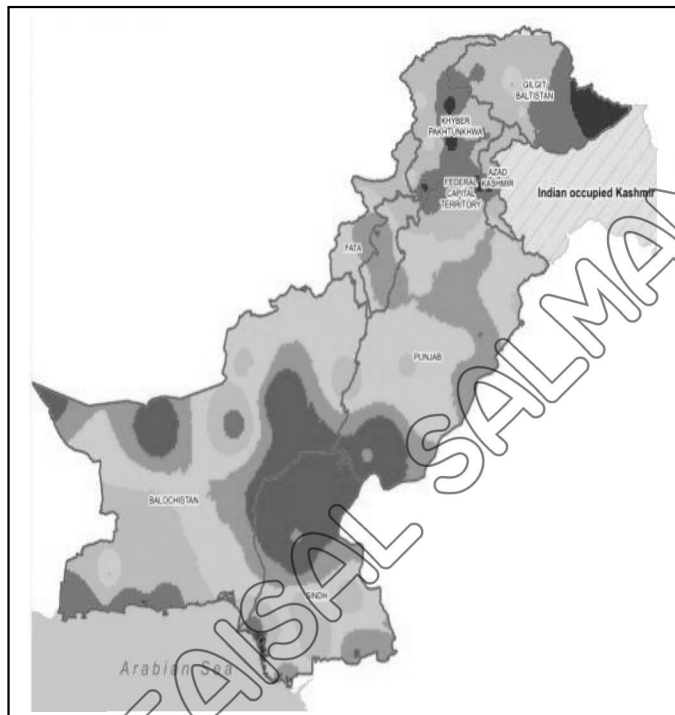
Factors affecting temperature of Pakistan

Latitudinal Effect

The areas located at lower latitudes receive relatively direct sunrays which are more intense and hot and results in high temperature. Southern Pakistan is closer to the Equator than Northern Pakistan and therefore experiences higher temperature.

Altitude Effect

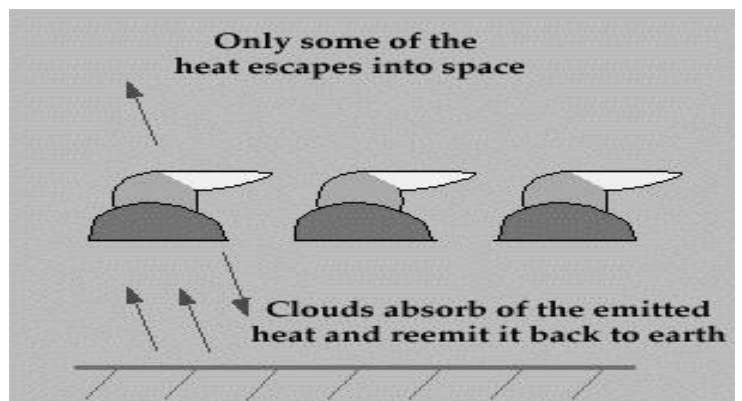
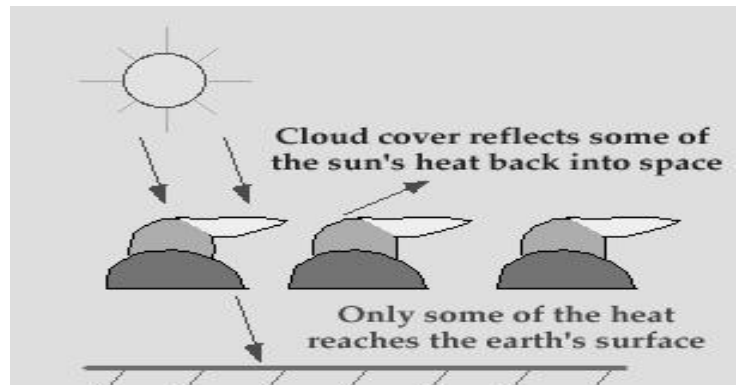
Air is denser at sea level i.e. at lower altitude, where it absorbs most water vapour, dust particles and solar radiations. Air is least dense at high altitude because less solar radiation is absorbed at that level.



Hence, there is an average drop of 6.5°C in temperature for each 1000 m increase in altitude.

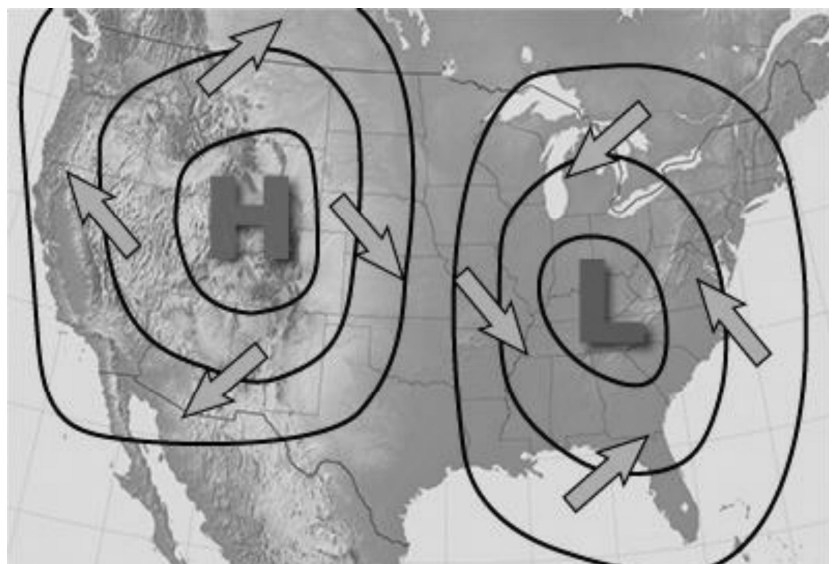
Cloud Cover

In the day time, cloud cover reduces the amount of incoming solar radiation by reflecting it back into the outer space, resulting in a drop in day temperatures. However, at night, the cloud cover acts as a blanket and traps the outgoing heat resulting in higher temperature on cloudy nights as compared to the temperatures on clear nights.



Pressure and Winds

Winds move from a high pressure area to a low pressure area. Low pressure is developed in areas that experiences high temperatures whereas high pressure is developed in areas that experiences low temperature. Thus, in summer season, the temperature in Central Pakistan is high, that creates a low pressure zone. The air pressure over the oceans and seas is higher than over the land during summer. This leads to the movement of

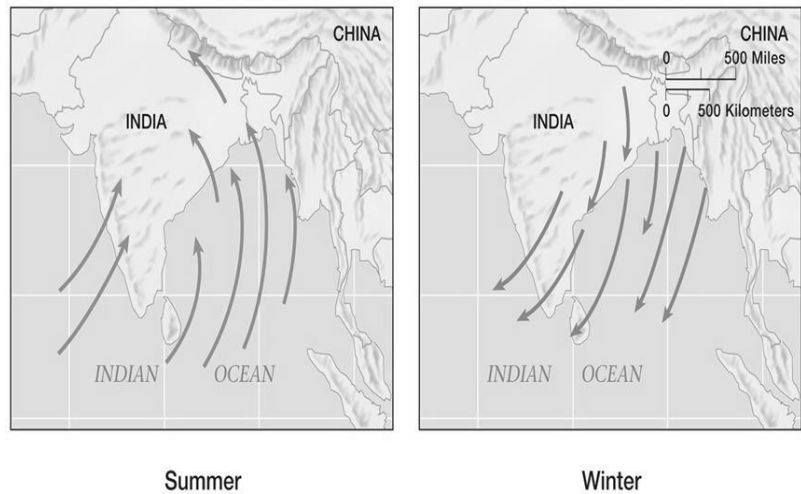


monsoon winds from sea to land, which brings heavy rainfall to the Upper and Lower Indus Plain from July till September. During winters, the situation is reversed because the pressure over the land increases and a high pressure area is created which causes winds blowing out from the high pressure area. These winds are called the winter monsoon or the north-east monsoon. These winds are generally light and dry.

Sources of Rainfall in Pakistan

Monsoon Rainfall

In summer, due to excessive heat of Sun, a low-pressure region is created over the land of Pakistan, which attracts cool, moist winds from the southern hemisphere which experiences high pressure due to winter season. These winds,



while moving over the Indian Ocean, absorbs moisture. After crossing the Bay of Bengal, tail end of these moisture laden winds enters Pakistan from north-eastern side where moisture condenses to form clouds and causes heavy rainfall to the Upper and Lower Indus Plain from July till September. These summer winds are called south-west monsoons.

Due to pressure difference, primary monsoon winds move from north-east to the south of Pakistan till Karachi and causes rainfall at Karachi. During overactive monsoon time period, some of the moisture laden winds directly enters Karachi, after crossing the Arabian Sea, where moisture in the winds condenses to form clouds and causes rainfall at Karachi.

Route of main monsoon winds across Pakistan

The main monsoon winds enter Pakistan from north-eastern side. Primary monsoon winds move to the south of Pakistan till coastal area of Sindh whereas secondary monsoon winds, from north-eastern side, moves to the west of Pakistan till KPK. As these winds start moving away from the north-eastern side of Pakistan towards south or west, they get robbed of its moisture.

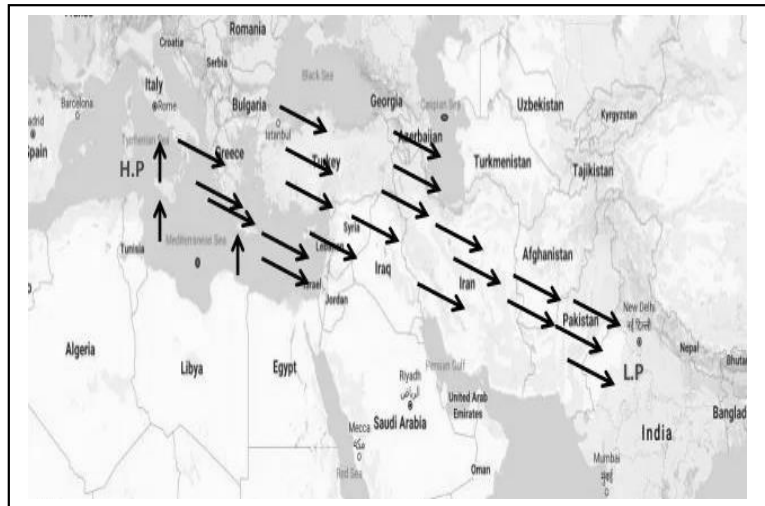
Importance of Monsoon winds

- Provides water supply to Kharif crops / barani crops.
- Inundation canals gets a supply of water that can be used for irrigation.
- Recharges underground water table and fills in the reservoirs and dams.
- Reduces air pollution and helps to purify the air.

- Reduces the effect of scorching heat of sun in summer by lowering the temperature.
- Provides water to the linear plantation along the sides of roads and parks.
- However, large scale monsoon rainfall may cause flooding in the area and makes it difficult for the people to travel from one place to another.

Western Depressions

Western Depressions are the cyclones that originate in the Mediterranean Sea, travel across Afghanistan, Iran and reaches the western areas of Pakistan. After striking the north-western areas such as Peshawar, the winds move towards south-western parts of Pakistan. By the time they reach the south-western



Balochistan they get robbed of their moisture. These winds causes rainfall, mostly in western areas of Pakistan, from December till March.

Effectiveness of winter rainfall in Pakistan

Advantages

- Provides water to rivers and reservoirs that can be used for irrigation.
- Supplies water for HEP generation.
- Source of water supply for Rabi crops / barani crops such as wheat, barley and pulses.
- Provides water in the northern areas in winters when everything else is frozen.
- Snowfall in northern areas attracts tourists.
- Rainfall in light showers is absorbed by the soil that increases moisture content of the soil and helps to prevent soil erosion.

Disadvantages

- Snowfall lowers the temperature in northern areas making outdoor life difficult for the people.
- Causes damage to the environment in the form of landslides, floods etc.
- Transport links e.g. roads gets blocked due to accumulation of snow.