

UNIT 2

CLIMATE OF PAKISTAN

Climates encompasses the statistics of temperature, humidity, atmospheric pressure, wind, rainfall, and other meteorological elements in a given region over long periods of time. Climate is commonly defined as the weather averaged over a long period of time. The standard averaging period is 30 years. Climate can be contrasted to **weather**, which is the present condition of these same elements and their variations over periods up to two weeks.

The difference between climate and weather is usefully summarized by the popular phrase "***Climate is what you expect, weather is what you get.***" The climate of a location is affected by its latitude, terrain, and altitude, as well as nearby water bodies.

Rainfall

The major part of Pakistan experiences dry climate. Humid conditions prevail but over a small area in the north. The whole of Sindh, most of Baluchistan, the major part of the Punjab and central parts of Northern Areas receive less than 250 mm of rainfall in a year. There are two major sources of rainfall in Pakistan: the **Monsoon** and the **Western Depression**. The former takes place from July to September and the latter December to March.

KEY POINTS:

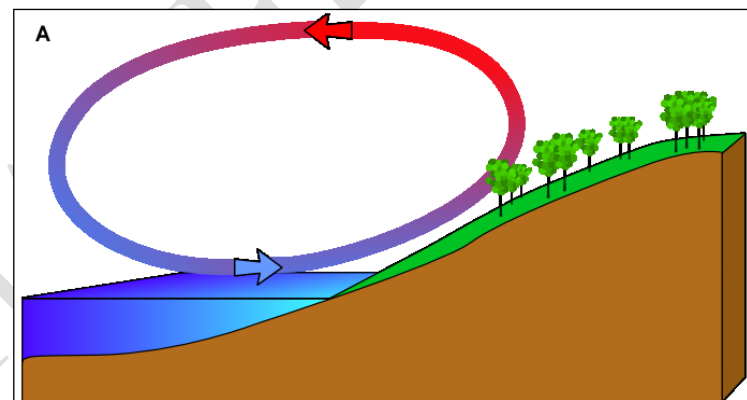
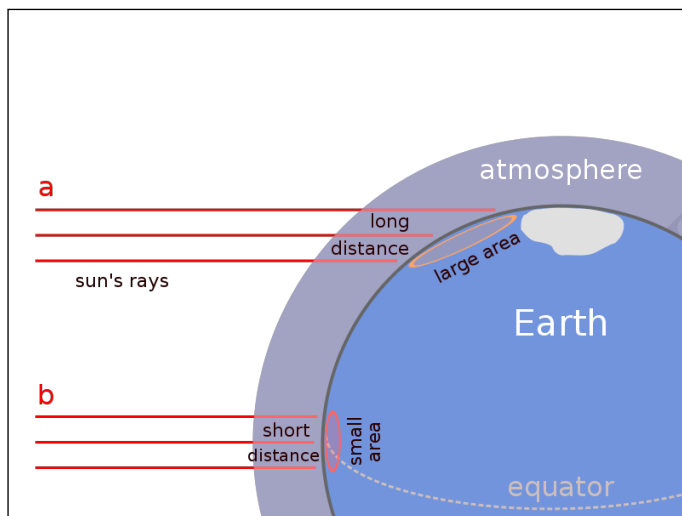
Climatic Elements:

- (a) **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.
- (b) **Atmospheric pressure**
AP is the force per unit area exerted on a surface by the weight of air above that surface in the atmosphere of earth.
- (c) **Precipitation**(rainfall)
- (d) **Humidity**
Humidity is the amount of water vapor in the air.
- (e) **Winds**
Wind is air in motion. It is produced by the uneven heating of the earth's surface by the sun. Since the earth's surface is made of various land and water formations, it absorbs

the sun's radiation unevenly. Two factors are necessary to specify wind: speed and direction.

Temperature:

- Diversity in temperature in various regions is due to the following factors
 - (i) Large spread of altitude from 24 degree south to 37 degree north.
 - (ii) Diversity of relief ranging from the every high mountain in the north to low lying coastal areas in the south.
 - (iii) High temperature in upper and lower Indus plain up to 45 degree in summer (Jacobabad is known as thermal pole).
 - (iv) Coastal areas have moderate temperature due to sea breezes (maritime effect).
 - (v) Angle of sun.



Main sources of Rainfall in Pakistan:

- Rainfall through **Monsoon winds** (July –September)
- Rainfall through the **western depression** also called winter monsoon.(November – March)
- Rainfall through the thunderstorm also called **convectonal** rainfall.(October – November, April –June)
- **Relief** Rainfall.
- Tropical **cyclones**

Rainfall through Monsoon Winds (July – September)

- Word monsoon means season.
- The monsoon winds causing rainfall from July to September originate from **the Bay of Bengal in the Indian Ocean**.
- After originating from the Bay of Bengal, monsoon winds which are giant sea breezes start moving from east to west.

Geography Handouts prepared by USMAN HAMEED 03224557967

- The heat on the land creates a low pressure which attracts the cooler, moist wind of the sea.
- On their way to Pakistan monsoon winds cause rainfall over Bangladesh and India and then these winds reach Pakistan.
- By the time these winds reach Pakistan most of their moisture is utilized by these two countries.
- Only tail end of the monsoon is received by Pakistan.
- Hence the amount of rainfalls is not only little but is variable as well.
- Mean rainfall in both July and August is 125 mm; September is the end of the monsoon season.
- Northern, North Western & Eastern sides of Pakistan received their summer rainfall through the monsoon winds.
- Murree, Abbottabad, Peshawar, Swat, Islamabad, Gujrat, Gujranwala, Sialkot, Lahore, Faisalabad are some of the places where monsoon rainfall is experienced.
- Some monsoon winds also originate in the **Arabian Sea**, but they are usually very weak so as to bring rainfall to the region except for times when they are very active, and cause widespread rainfall in the coastal regions which damages the infrastructure badly.



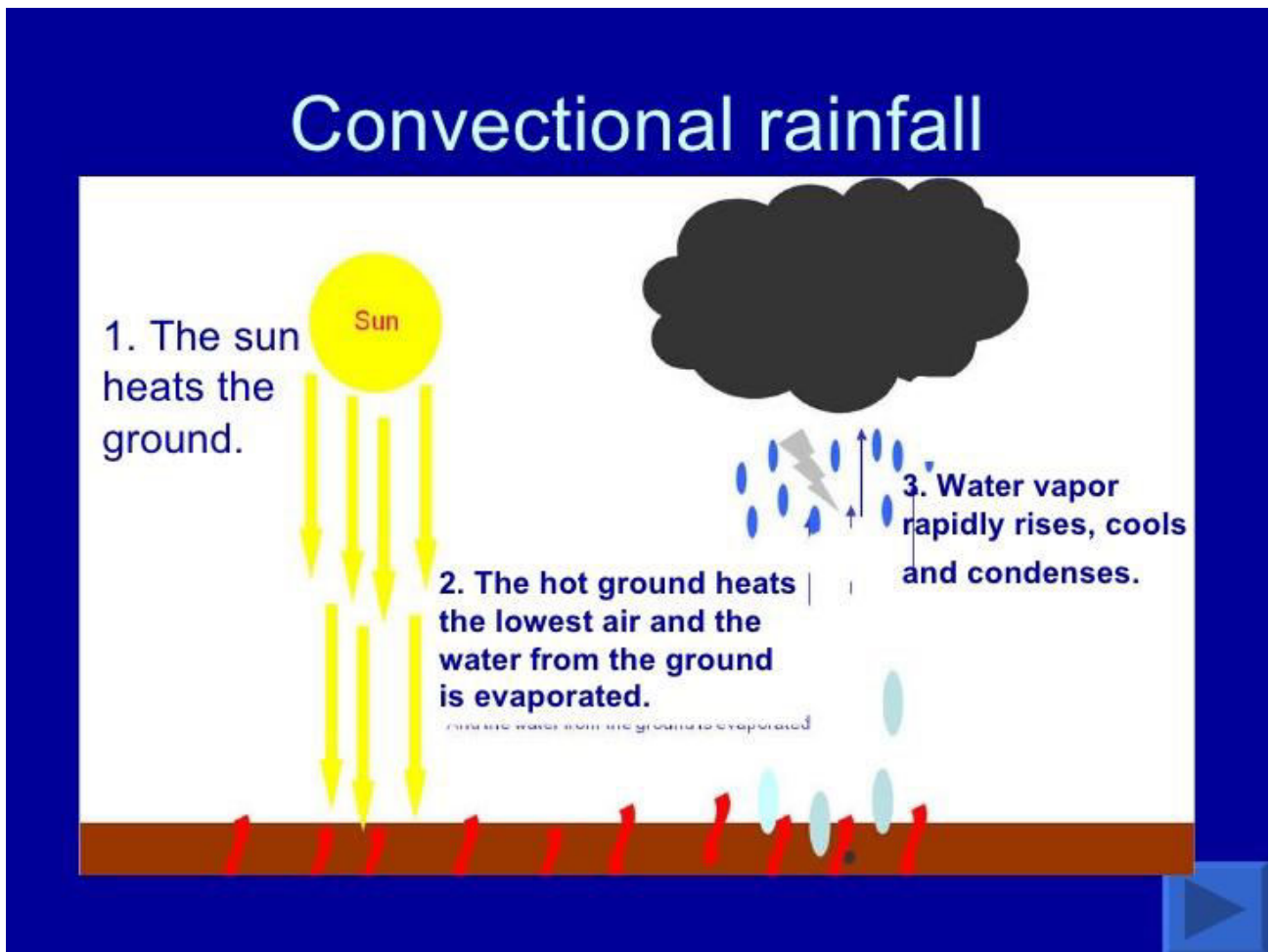
Rainfall through the western depression (November –March)

- The winds causing rainfall during winters originate from the **Mediterranean Sea**.
- After originating from the Mediterranean Sea they move to the east.
- On their way to Pakistan the western depressions cause rainfall over Turkey, Middle East countries, Iraq, Iran Afghanistan and then Pakistan.
- Most of their moistures are utilized by these countries and Pakistan receives very little rainfall during winters.
- The amount of rainfall during winters is lower than the amount of rainfall during summer.

- The western depression causes rainfall at lower altitude and snow fall at higher altitude areas.
- Northern, North western and western side of Pakistan receive their winter rainfall through the western depression.
- Murree, Swat, Gilgit, Hunza, Mardan, Peshawar, Quetta, Ziarat etc are some of the areas those receive winter rainfall through the western depression.

Convictional Rainfall or Rainfall through Thunderstorm :(April – June, Oct-Nov)

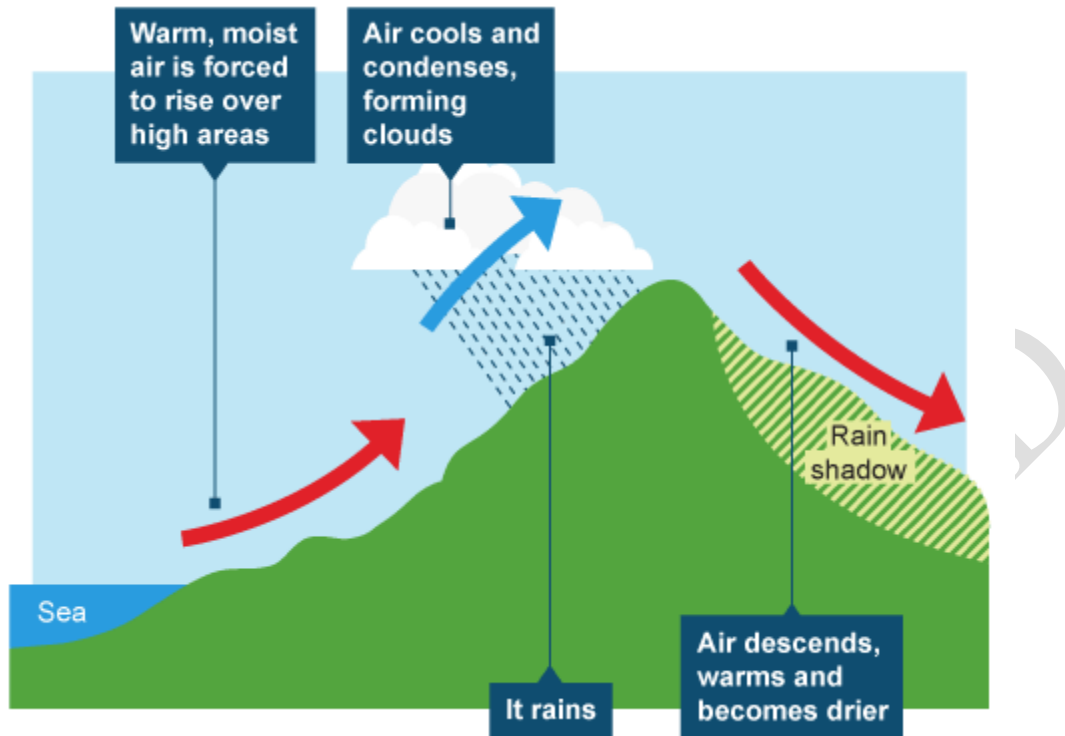
- Unlike monsoon and western depression, convictional rainfall is experienced by the locally evaporated winds.
- Through local **evaporation & transpiration** the water molecules go up to the atmosphere and after condensation, these molecules get the form of clouds and these clouds cause rainfall at the nearby places.
- Convictional rainfall is associated with the windstorm or thunderstorm and cause uprooting of trees and destruction as well.
- Convictional rainfall can be experienced at any place in Pakistan, particularly North and North western areas of Pakistan.
- Rawalpindi and Peshawar receive some rainfall in early summer caused convictional currents.
- It is not as plenty source of rainfall as monsoon or depression but it is an important source of rainfall that fills the gap.



A **temperature inversion layer** at a low elevation of about 1,500 m in the south during the summer does not allow the moisture-laden air to rise and condensation to take place.

Relief rainfall:

- RR is mainly confined to the northern mountainous areas, where there is the largest forest domination.
- Due to excessive rate of evapotranspiration more and more water molecules go up into the atmosphere and more and more water gets back to the ground in the form of rainfall.
- The windward side of the mountains receives more relief rainfall than the leeward side of the mountain.
- Further northern areas of Pakistan like Gilgit does not receive rainfall and forms Rain shadow area.



Tropical Cyclones:

- TC brings a few hours of very heavy rainfall with destructive winds to the coastal areas.
- They originate over the Arabian Sea quite often.
- This source of rainfall is totally unreliable.

Climatic Zones

(a) High land Zone , Climatic Characteristics & Lifestyle of the people:

- North western and the western mountains areas comprise of high land zone.
- Winters are extremely cold and long while summers are from mild to hot and short.
- During winters temperature falls and persists below freezing point while during summer the temperature goes to 20 degree Celsius.
- Monsoon winds cause rainfall during summers while the western depressions cause rainfall at lower altitude and snowfall at higher at higher altitude during winters.
- Convictional currents also cause rainfall.
- Relief rainfall also experienced here.
- From alpine forest at higher altitude to coniferous forests at relatively lower altitude are found.

- Extreme cold winters makes the life of the local people very difficult.
- **Nomadic** and semi nomadic lifestyle is common at higher altitude.
- **Animal rearing** is the main profession of the nomadic people.
- **Transhumance** is practiced along the higher altitude areas.
- **Terrace farming** is practiced at higher areas.
- During the extreme cold winters the local people remain in their houses & in house cottage industry of carpet making becomes the dominant profession.
- Agriculture is also practiced on limited scale.
- **Mineral** deposits are also found along the western mountains areas of this division.
- Swat, Abbottabad, Peshawar, Quetta, Kaghan are some of the places.

(b) Low land Zone and Lifestyle of the people:

- Eastern & south eastern sides of Pakistan (whole of the Indus Plain) are classified in the lowland zone.
- Summers are hot and long while winters are from cool to cold and short.
- Summer temperature goes into 30 to 40 degree Celsius while winter temperature at some places falls down to 10 to 5 degree Celsius and sometimes even below.
- Monsoon winds cause rainfall in the upper Indus plain during summers while depressions cause rainfall in the northern Punjab during winters.
- Convectional currents also cause rainfall at different times of the year in different areas of the low land zone.
- Large agricultural plains are found and huge **agricultural products are produced**.
- This climate zone is fully developed & all the facilities including transport. Power generation, communication are fully developed.
- Lahore, Gujranwala, Sialkot, Faisalabad, Multan, Bahawalpur, Sukkur, Rohri etc, is some of the places of the low land zone.

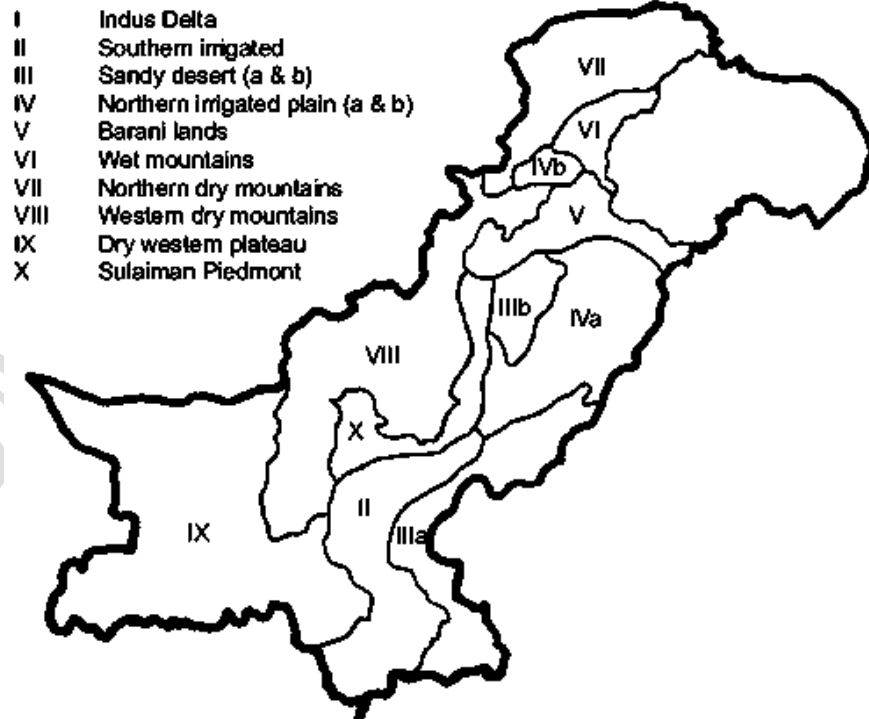
(c) Arid Climate (Desert Areas) & Lifestyle of the people:

- There are three deserts in Pakistan, **Thal, Kharan and Tharparkar** which experienced arid climate.
- Summers are extremely hot and long while winters are mild and short.
- Hot dusty winds prevail almost continuously from May to September.
- Temperature goes into 40 to 50 degrees Celsius during summers.
- It comes down to 30 to 20s in winters.
- Hardly any rainfall is experienced that is why aridity prevails there.
- Rate of evaporation is much higher than the rate of precipitation.
- Days are very hot in the deserts and nights are very cold.
- Dust storms and wind storms are common in the desert.
- **Nomadic** lifestyle is common.
- **Animal** rearing is the main profession.
- People wear thick course to protect themselves from extreme heat during day and very low temperature during night.
- Agriculture is practiced on very small scale.

- Only cactus types of plants are found here.

(d) Coastal Climate (Maritime Climate):

- Pakistan has about 1000 km long coastal line of which about 750 km are long with Baluchistan while 250 km long with Sindh.
- The climate is dominated by sea breezes.
- Most of the coastal areas experience the climate called maritime or moderate climate.
- Summers are hot humid and long while winters are mild, humid and short.
- Relative humidity is always higher due to the presence of sea.
- It rains very low quantity in the coastal areas as the relative humidity in coastal areas is very high.
- **Fishery** is main profession.
- Mangroves are found here.
- Mangroves are the shelters, breeding ground, and supply food to fish and also provide wood to people.
- **Gwadar** is in a rapid pace of development.



Causes of floods:

- Melting of snow during winter.
- Heavy monsoon rainfall.
- Cutting of trees on the foothills increase surface run-off.
- Failure to strengthen or heighten embankments alongside rivers.

Drought



- **Drought** is an extended period when a region notes a deficiency in its water supply. A drought can last for months or years, or may be declared after as few as 15 days. Generally, this occurs when a region receives consistently below average precipitation
- There are four ways of categorizing drought
- **Permanent drought**
- Exist where crop cultivation isn't possible
- **Seasonal drought:**
- Occurs in areas with well-defined rainy and dry season
- **Invisible drought:**
- It is the result of a water deficiency that reduces crop yields
- **Unpredictable drought**
- It is the result of abnormally low rainfall

Causes of droughts in Pakistan:

- Unreliability of monsoon winds.
- Global climate.
- Deforestation
- Mismanagement of water resources.
- Disputed and unfair distribution of water.
- Overgrazing

