

# CLIMATE OF PAKISTAN

1. Arid
2. Semi arid
3. Low land
4. Highland
5. Coastal

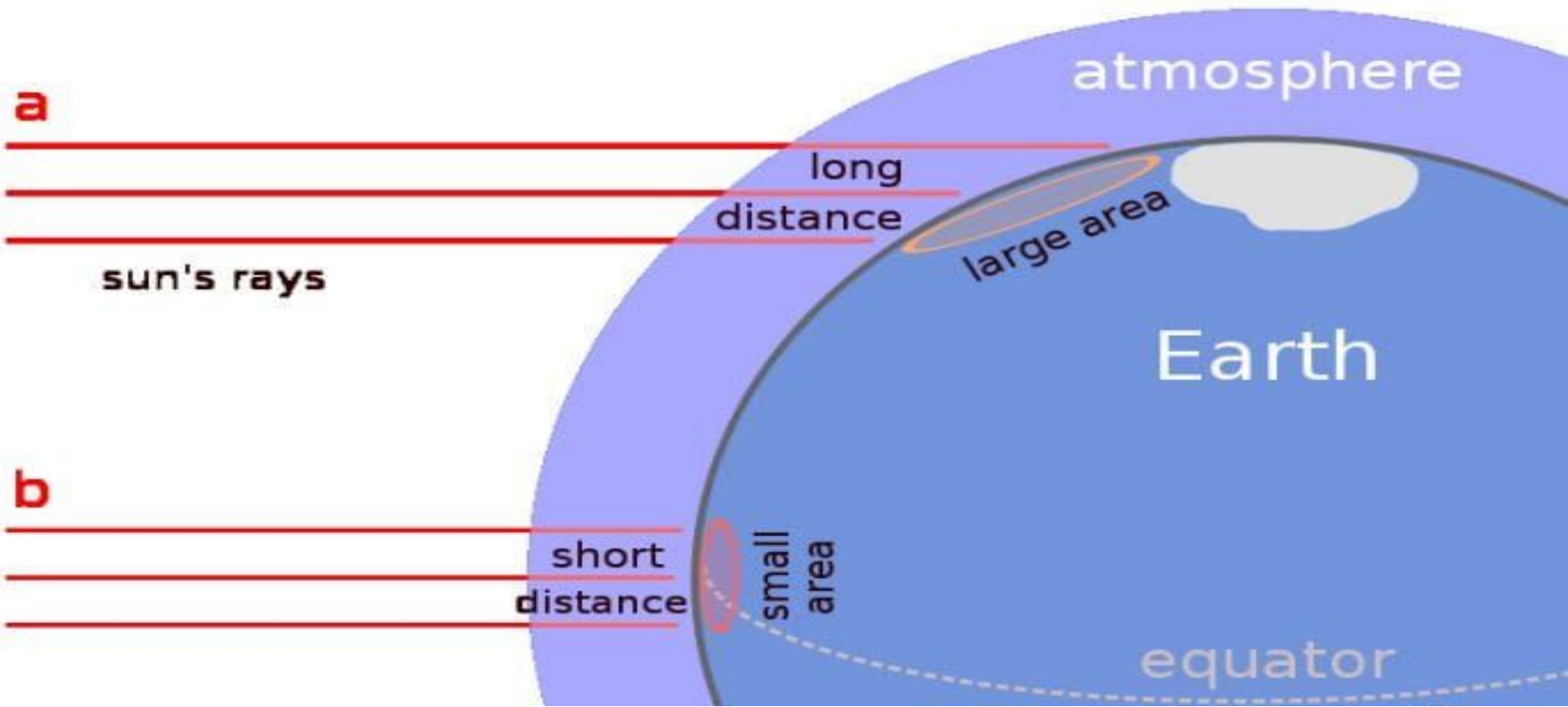
**5 climatic zones**

# FACTORS AFFECTING THE CLIMATE

## Temperature

### 1. Angle of sun

1. Temperature and rainfall are both directly or indirectly dependent on the influence of sun
2. Influence of sun varies from place to place
3. For example the polar regions are cooler than the equator its because for solar radiation to reach the poles and heat them it travels a large distance in space and hence loses intensity
4. At poles the radiation arrives at an oblique angle and solar energy spreads over an area meanwhile pakistan is located in a place where most solar energy is concentrated on a small area

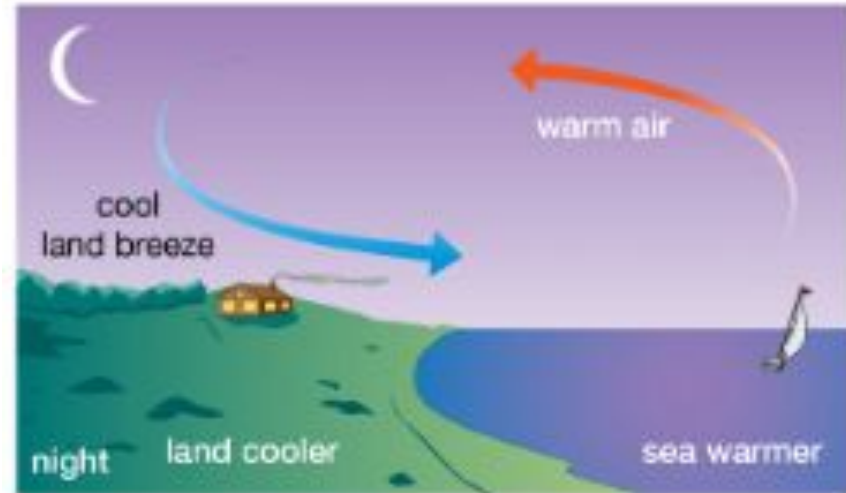
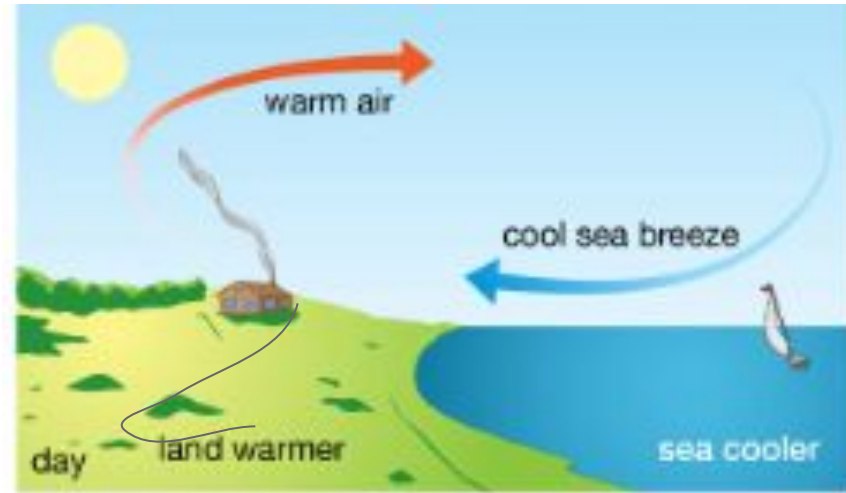


## Influence of large water bodies / sea

1. Water has a high specific heat capacity
2. Water absorbs more heat to have an increase in temperature compared to land
3. Since the land gets hot quickly the air above it also heats up quicker and gets less dense
4. The sea takes time to get hot and absorbs heat from the air making air denser and cool
5. The air from above the sea travels towards land because
6. Air moves from high pressure area to low pressure areas
7. Making summers a little less hot compared to how it would have been without the influence of sea
8. Helps in regulating the temperature

# WHAT EXACTLY DOES INFLUENCE OF LARGE WATER BODIES/ SEA MEANS?

Air cycle



## Altitude

1. Altitude also has big impacts on temperatures experienced by an area
2. The solar radiation is a short wavelength radiation
3. It does not directly heat the atmosphere
4. The earth surface reflects the radiation in form of long wavelengths
5. The temperature of atmosphere decreases with increase in altitude
6. Short wavelength has to pass its heat to a lot of air particles to transfer heat to high altitude areas
7. As altitude increases the air gets thinner and amount of atmosphere decreases
8. There are less molecules to absorb wavelength
9. Hence high areas have less air and less temperatures because the medium is air there is less possibility of heat transfer

## Characteristics

- 1) low temperature
- 2) long winters
- 3) permanent snow on mountains

- 4) cool weather
- 5) extremely low temp in valley

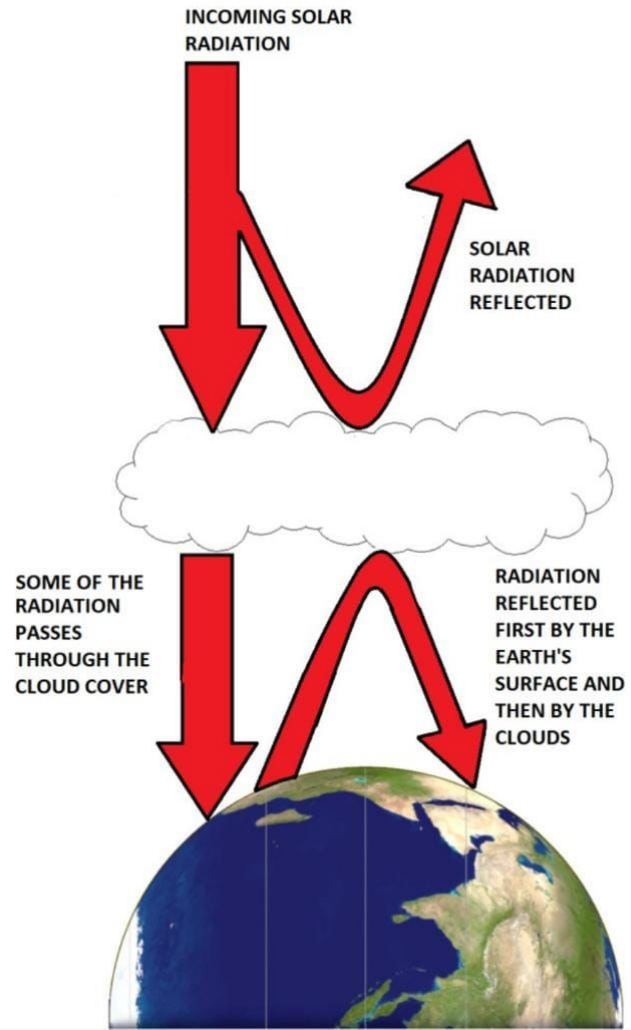
### c) precipitation

- 1) it forms in clouds
- 2) water vapour condenses
- 3) forms bigger droplets of water
- 4) heavy drops fall
- 5) At higher altitudes - drops may be form of snow

## Cloud cover

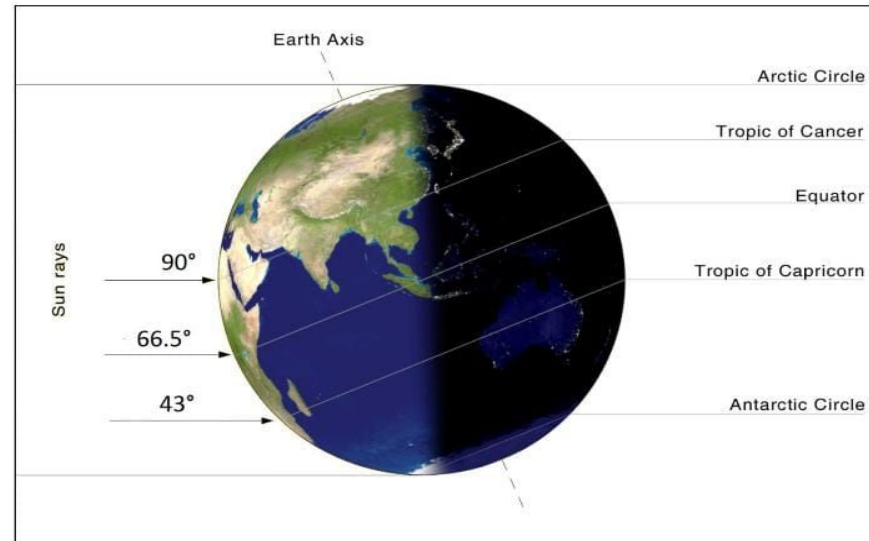
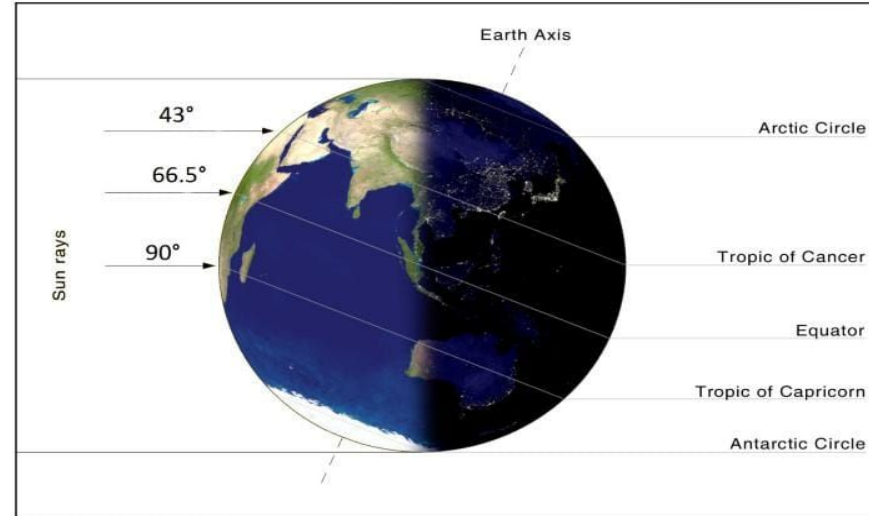
1. Temperatures decrease during day when clouds appear and block out sun rays
2. Which are then reflected back into space
3. However cloud only forms when air has enough moisture to retain and has been cooled
4. Hence cloudy days are cooler than sunny days during same months
5. Cloudy nights are hotter than cloudless nights
6. As cloud trap the heat inside
7. Cloud traps in the heat of the sun and is reflected back into the earth





## Tilt of Earth

1. On a short term basis it controls the temperature variation during the whole day. When the sun is directly above and when it is night.
2. Tilt of earth allows the different intensity of sunlight on different areas



# RAINFALL

Types of rainfall :

Monsoon.

Western depression.

Convictional current.

# MONSOON

1. Monsoons are seasonal winds that blow from sea towards land
2. Enters into bangladesh then India and Pakistan
3. July to august (usually)
4. After this they reverse their action and blow from land to sea

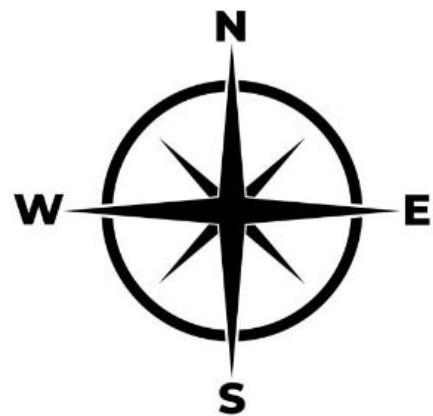
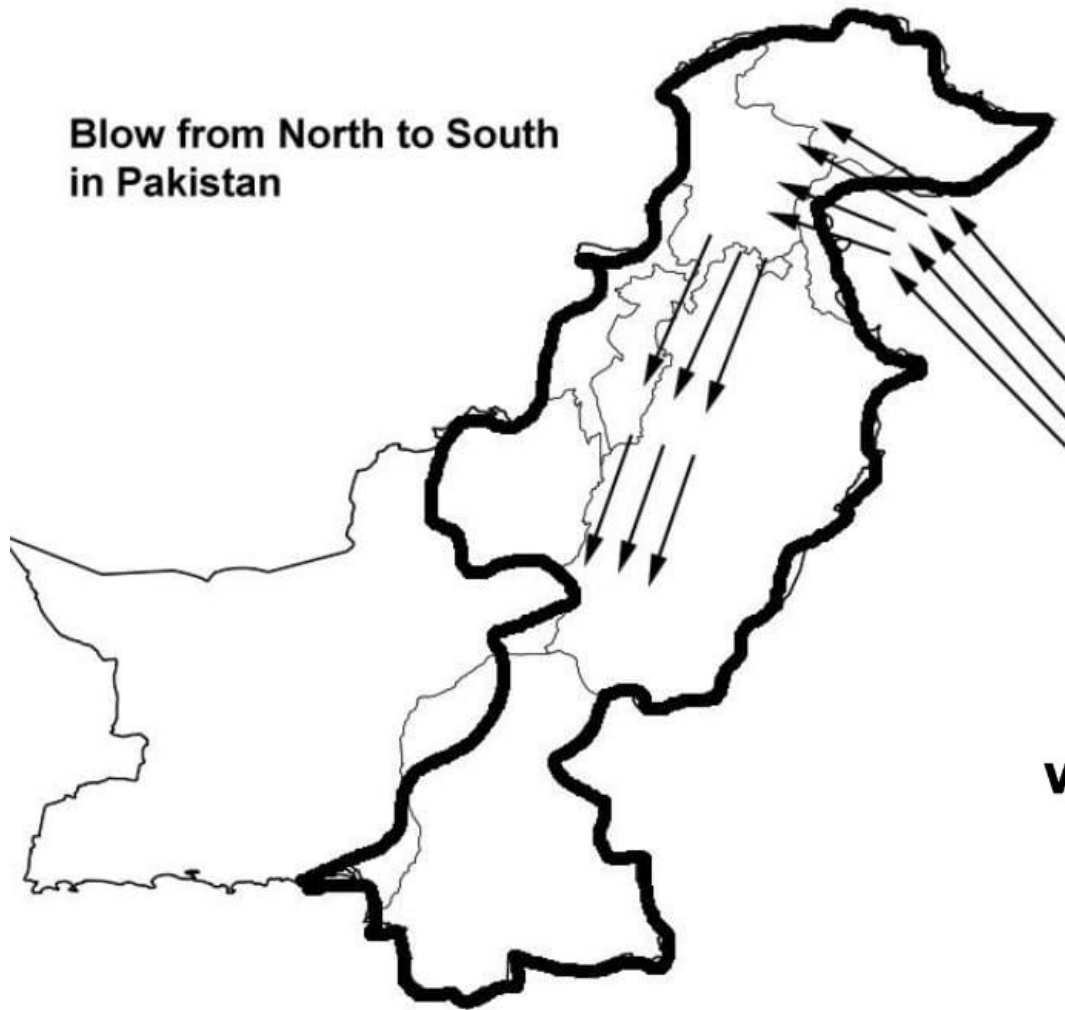
During the summers the land of sindh and punjab plains get heated up due to the high angle of sun

When	Originate from
July - August( summers)	Bay of Bengal Arabian Sea

Member Countries of BIMSTEC



**Blow from North to South  
in Pakistan**

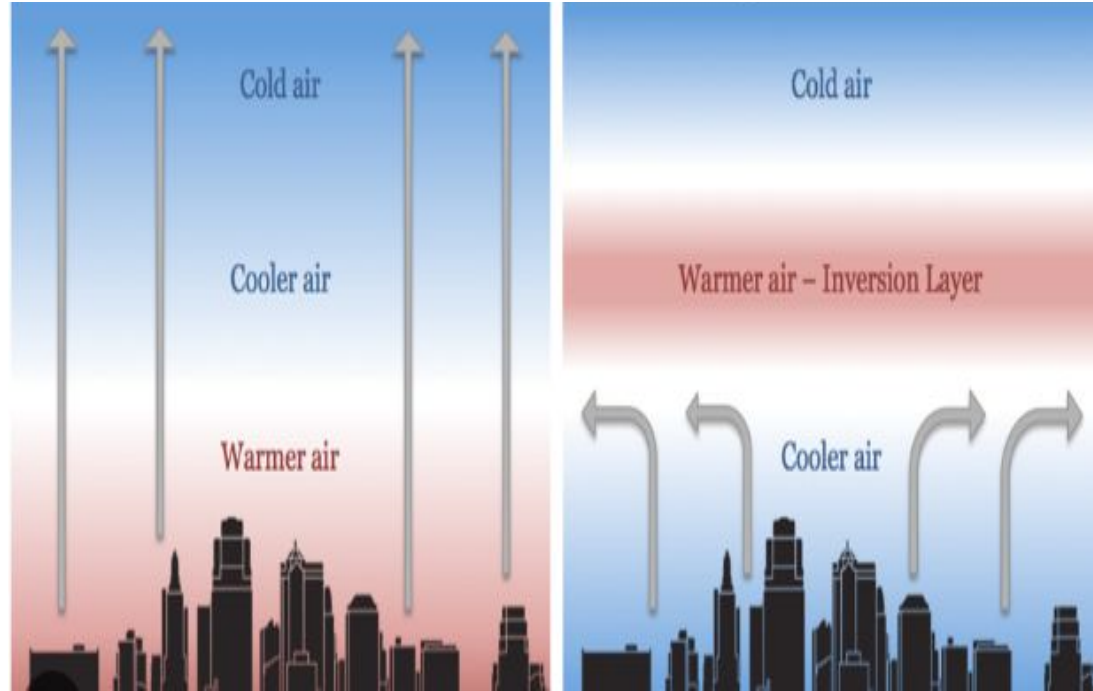


# TEMPERATURE INVERSION LAYER

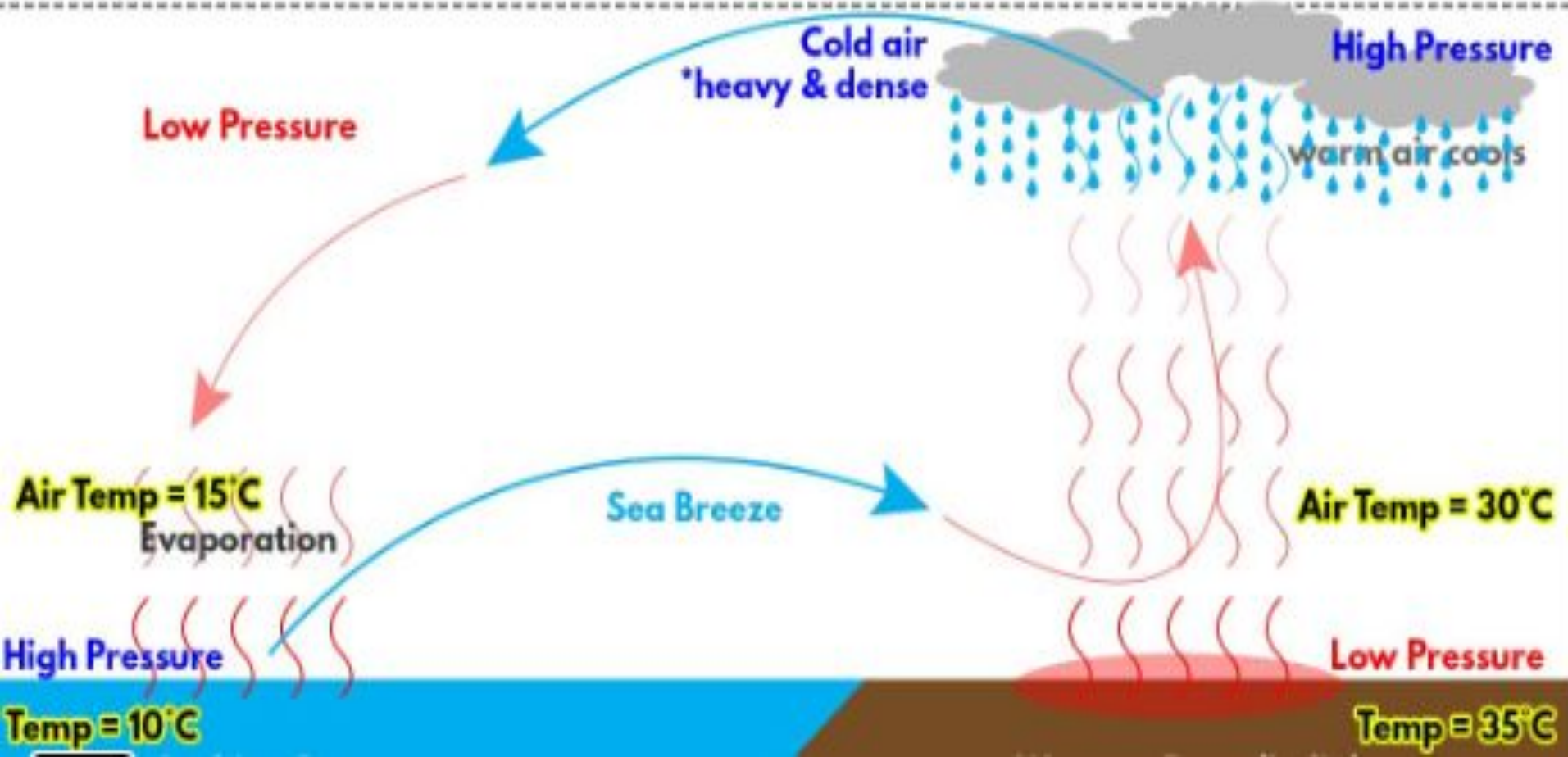
1. A temperature inversion is a layer in the atmosphere in which air temperature increases with height
2. Layer exists over **Sindh and areas of Makran coast during the**

monsoon season (July–August),

3. height of 1–2 km
4. This layer does not allow the monsoon system from arabian sea to bring significant rainfall

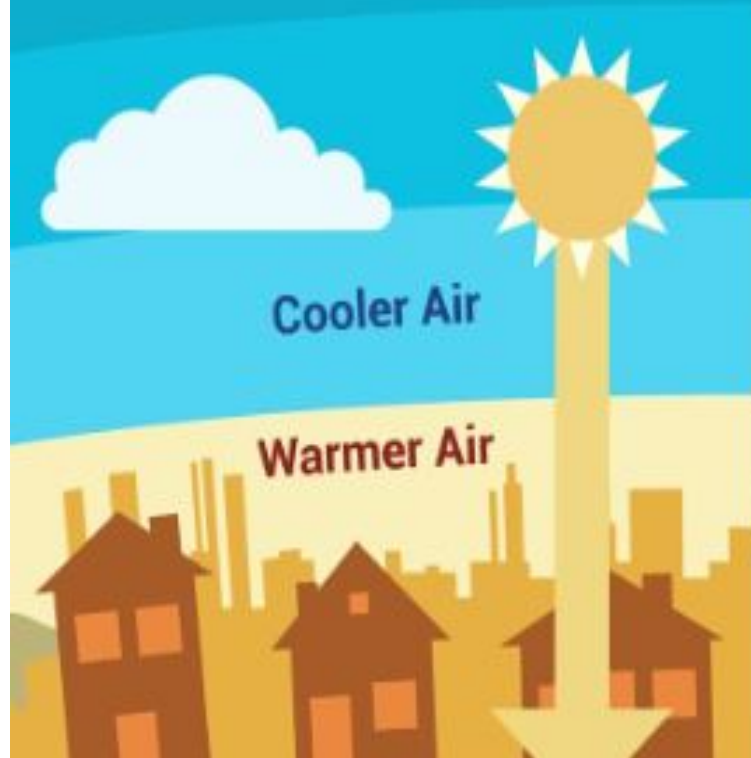


8 - 12 km





**NO INVERSION**



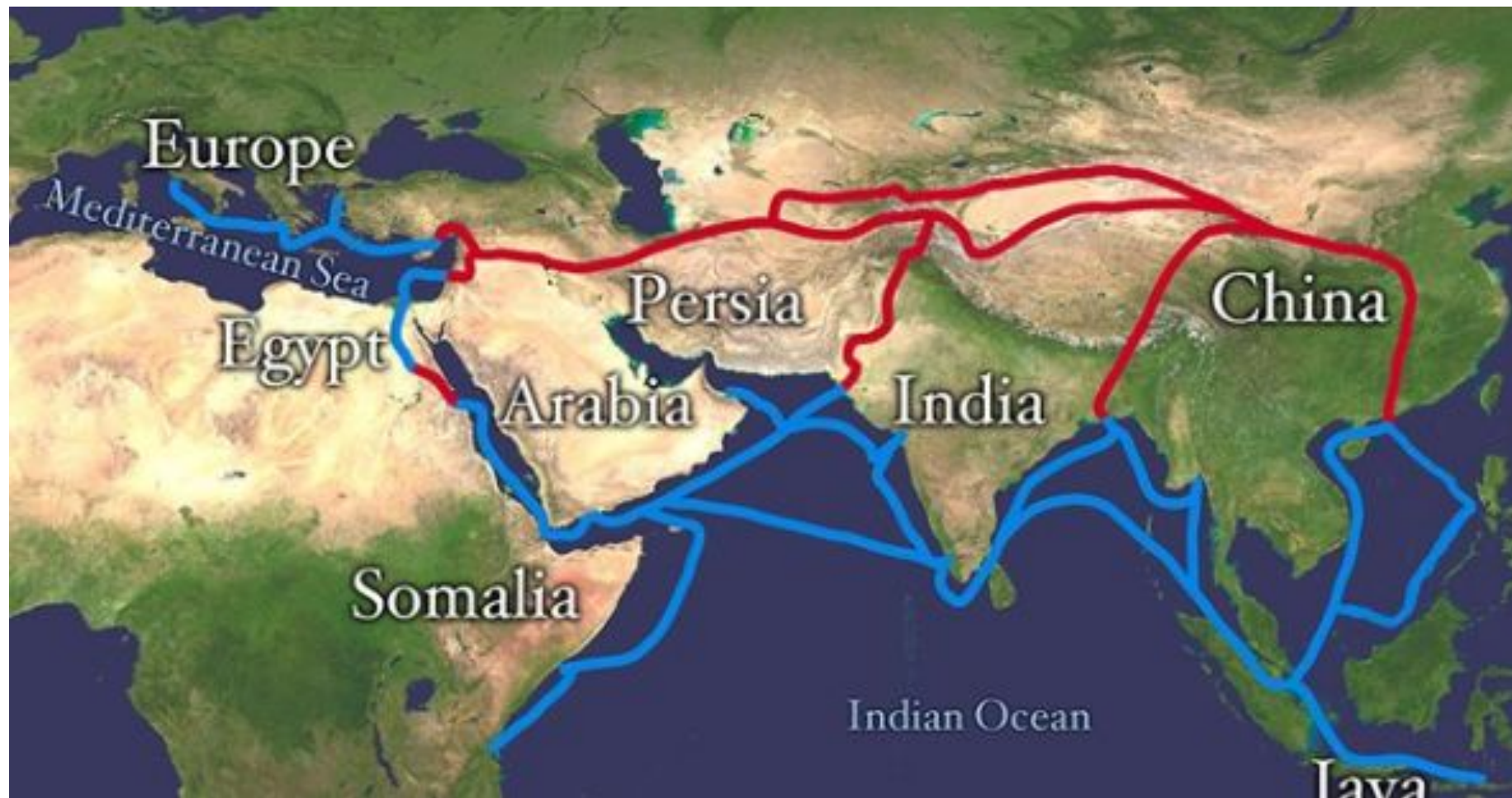
**INVERSION**

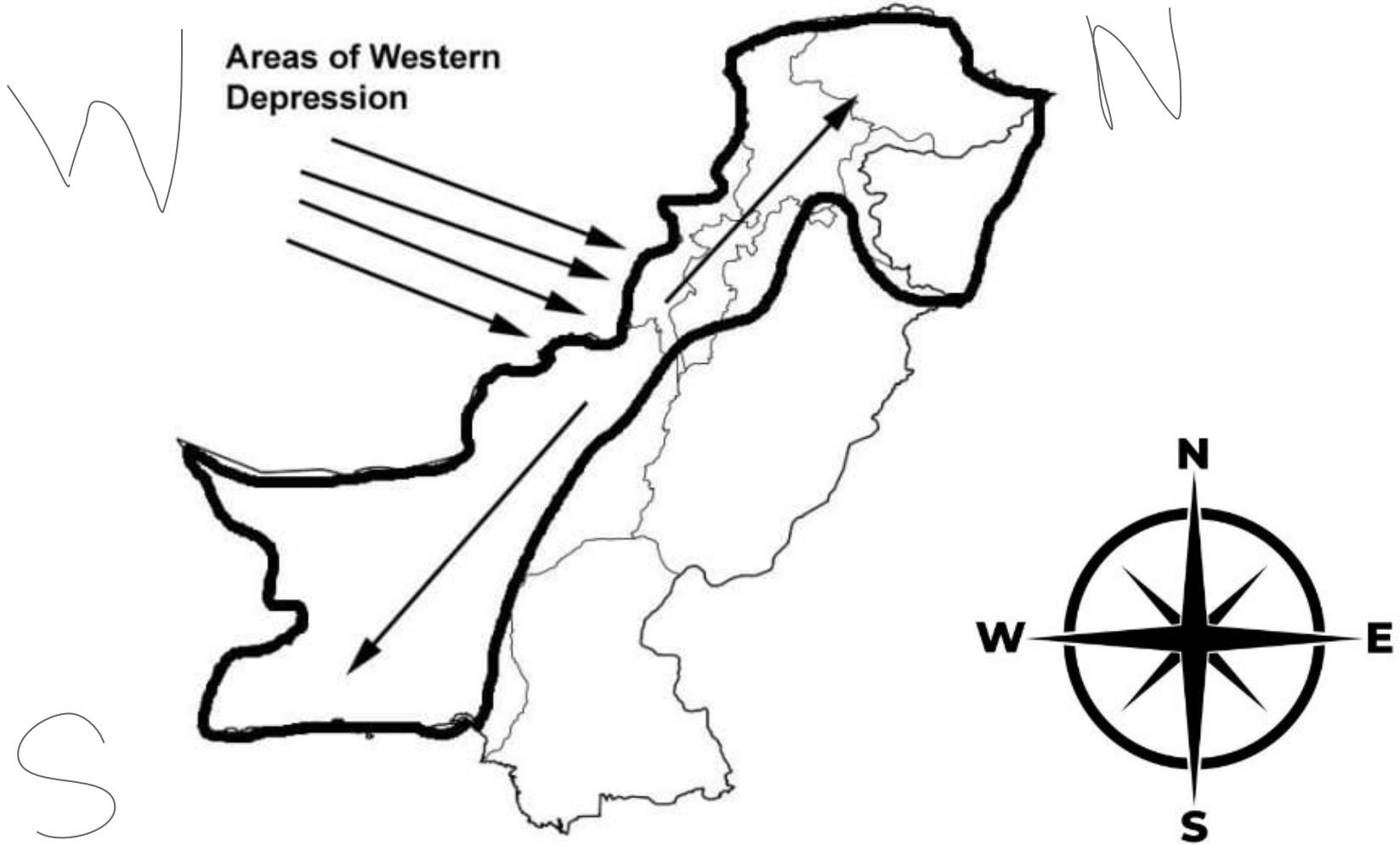


# WESTERN DEPRESSION

1. This system enter to Afghanistan, Iran and pakistan
2. Since they make a long journey they lose most of their water when they reach Pakistan
3. They bring rainfall during the winter
4. Arabian sea retains its warmth
5. Cold air flows from coastal areas towards the sea
6. These western depression also moves from high pressure areas to the low pressure areas
7. For rainfall sufficient cooling of air and moisture in air is necessary

When :	Originate from :
Winters ( December to March)	Mediterranean sea





# CONVECTIONAL RAINFALL

1. It occurs when sun heats up the land
2. The air absorbs heat by conduction
3. It then gets less dense and rises
4. The moisture in air condenses to form clouds
5. When this air is cooled to a certain level rainfall occurs

# TYPES OF STORMY RAINFALL AND HAZARD

1. Cyclones
2. Thunderstorm
3. Flood
- 4.

# CYCLONES

A satellite view of Earth from space, showing a large cyclone over the ocean. The cyclone is a large, circular storm system with a clear eye in the center. The ocean is a deep blue, and the clouds are white and grey. The Earth's horizon is visible at the top of the frame.

1. It is a tropical storm with winds blowing in large spiral around a relatively calm center known as 'eye'. It is formed over warm water.

2. They are formed when the average temperature of large water body exceeds over 27

3. Hence forming a low pressure area

4. This area then draws air from high pressure areas

5. A cone is formed when two oppositely travelling cold and warm winds meet

6. Intense lightning followed by very strong winds and heavy rainfall occurs

7. Develops in ocean or sea

8. Coastal areas of Pakistan that are Sindh and Makran coast of Balochistan



# THUNDERSTORM

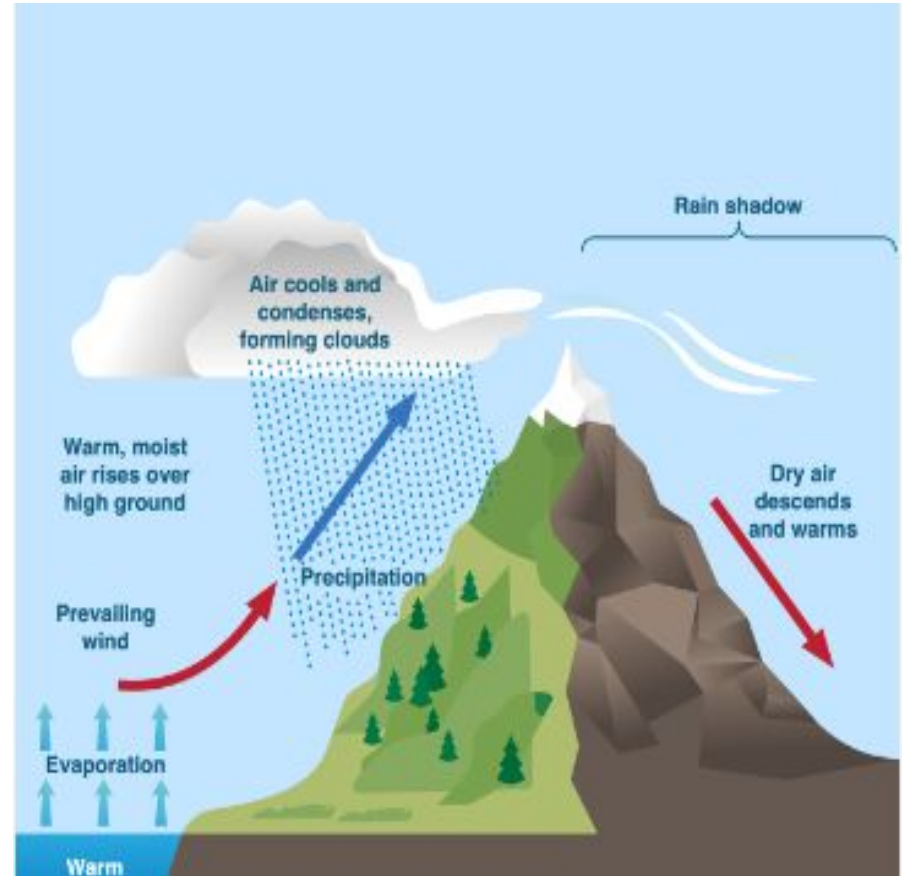


- 1 Thunderstorm occur in the same fashion as convectional rainfall
2. The air rises very quickly forming cumulonimbus clouds
3. These clouds are tall and big
4. Followed by strong winds, lightning and heavy rainfall
5. Hailstones may also be formed
6. Water vapours are cooled multiple times to form water first and then ice



# RELIEF RAINFALL

1. Relief rain is formed when air is forced to cool when it rises over relief features in the landscape such as hills or mountains. As it rises it cools, condenses and forms rain.
2. The characteristics of a specific area's landscape are referred to as relief features. The highest and lowest points of an area's elevation are referred to as relief features
3. Valleys are lowest point/feature
4. Hills and mountains are elevated points/feature



**3** As condensation takes place, clouds are formed and rain falls



**2** Rising air cools and condenses

Windward  
side

**1** Moist air is forced to rise over mountain

Mountains

**4** Clouds lose their moisture after crossing the mountain range, resulting in the leeward side receiving little or no rain

Leeward  
side



# FLOODS

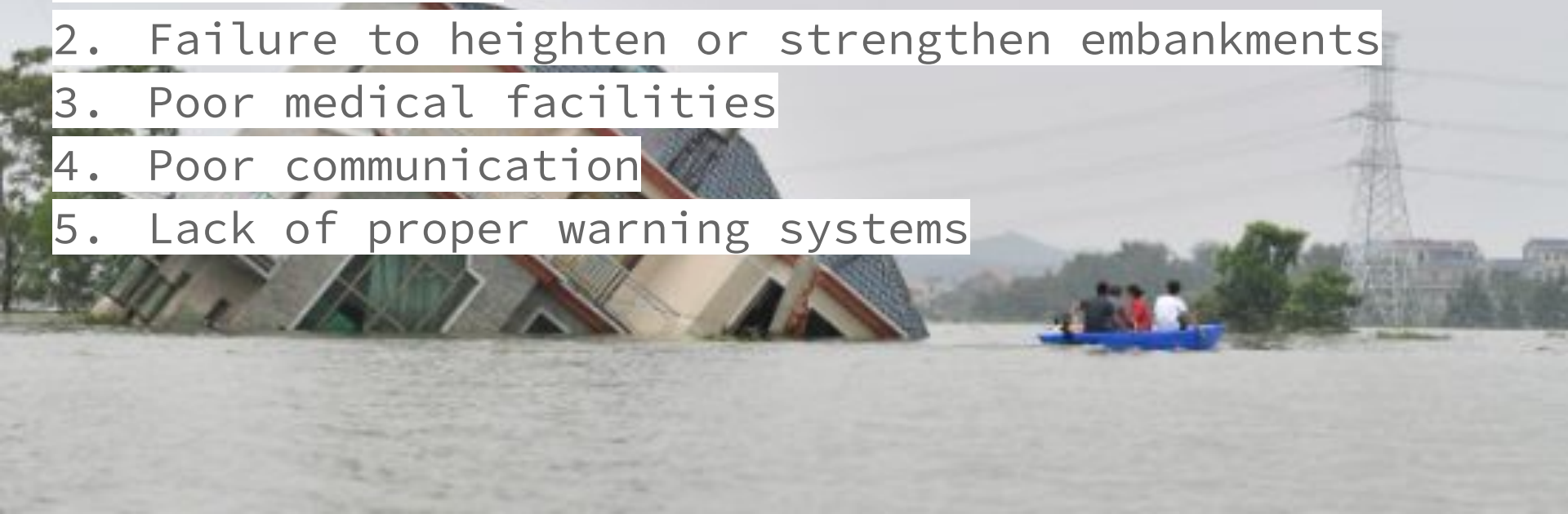
A photograph of a residential street completely flooded with murky water. In the foreground on the right, a white speed limit sign with the number '20' is partially submerged. In the background, there are houses with dark roofs and trees under an overcast sky.

1. Flood usually occurs in Pakistan in summer
2. When the glacial melting mixes up with the heavy rainfall of the monsoon season
3. It can also be caused by breaking of dams or barrages
4. Unusually high tides in coastal area
5. Or by tsunamis

# CAUSES FOR SEVERE EFFECTS

Effects can be fatal and severe due to

1. Deforestation
2. Failure to heighten or strengthen embankments
3. Poor medical facilities
4. Poor communication
5. Lack of proper warning systems



# EFFECTS OF FLOOD

1. People and livestock may die
2. Cause diseases and epidemics
3. Block out roads and affect trade and communication
4. Contamination of water supplies
5. Crops washed away
6. Shortage of food and agro based supplies
7. Trees die being submerged in water
8. Tourism not possible and lesser earning options for local people

# DROUGHTS

A drought is when a region suffers from water deficiency  
Due to below average precipitation or rainfall.

Types of droughts

1. Meteorological
2. Agricultural
3. Hydrological

1. A meteorological drought is brought when there is less to no rainfall or precipitation occurring in an area
2. Agricultural drought affects the crops independently of the precipitation this may be caused due to poor planning hence crops getting less water than needed or none
3. Hydrological drought occurs when the resources for water fall below statistical average such as lakes and reservoirs

# EFFECTS

1. Crop yield reduction hence increase in prices
2. Low livestock production
3. Desertification
4. Habitat damage
5. Dust storms
6. Reduced HEP production
7. Shortage of water for commercial or industrial use
8. Social unrest
9. Wildfires
10. Civil War



# CLIMATIC ZONES

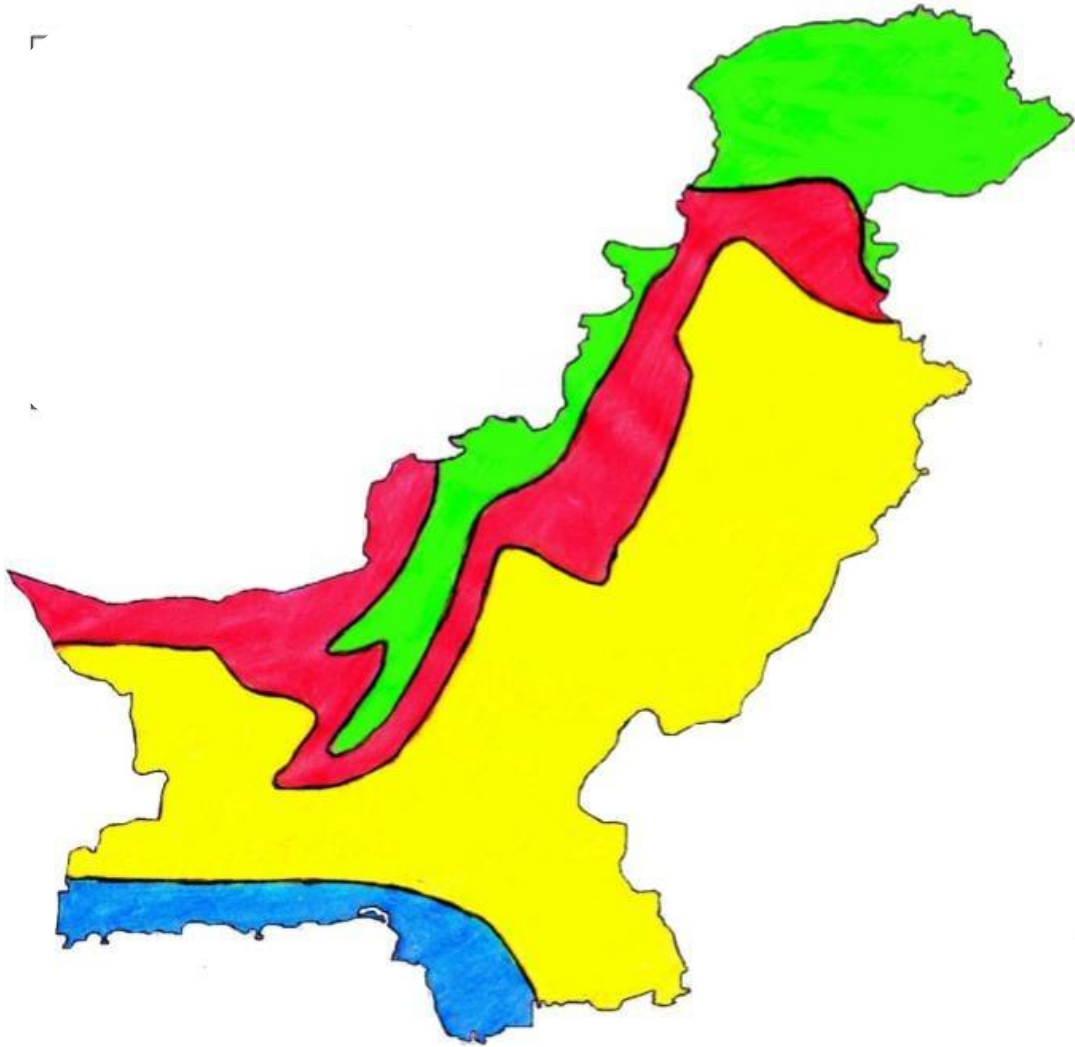
Highland zone (humid)

Arid climate zone (desert)

Low land climate zone

Semi arid climatic zone

Coastal climate (humid)



# ARID CLIMATIC ZONE

Arid climate refers to the climate of desert areas i.e. Kharan (South-west Balochistan), Cholistan (South-east of Punjab), Thar (South-east of Sindh), Thal (north-east of Punjab) deserts in different parts of Pakistan.

The main features of desert climate are as follows:

- summers are hot and dry days and cool evenings.
- During the day, hot winds called loo in Urdu blow across the plains.
- The Thar desert in the southeast of Sindh receives little rainfall during monsoons.
- The desert areas observe dusty winds that blow continuously from mid-May to mid-September.
- Extreme heat, dryness, and dust storms are some permanent features of desert climate that temporarily lower the temperature.
- Winters are cold, with minimum mean temperatures of about 4 °C in the month of January
- Desert areas in southern Balochistan receive scanty rainfall during winters.

# LOW LAND CLIMATIC ZONE

Low land climate includes the climate of the Indus plain in Punjab and Sindh. The main features of lowland climate are as follows:

- Summers are hot, arid, and sometimes extremes.
- Monsoon rainfall occurs during summers between July and August.
- Winters are mild and cool.
- North and northwest of the Indus plain witness thunderstorms.
- Rainfall is very less and most of the summer days witness high temperatures.

# WHAT DOES HUMID MEAN?

Areas which receive more than 700 mm rainfall

It can be further divided into sub humid where the rainfall is below 700 but above 500 mm

Areas which are humid have a high amount of water vapour present in air

# HIGHLAND CLIMATIC ZONE

## Warm Summers and Cold Winters

small part of Balochistan Plateau, parts of Waziristan Hills, Safed Koh Ranges, almost whole of Azad Kashmir and Gilgit-Baltistan

areas of very high altitude where the mountain tops (above 4000m) are below freezing in winters and in summers too. As altitude increases temperature plummets.

There is a difference of temperature between day and night (this gives maximum and minimum temperatures in the day).

Also there is a difference in temperature between sun and shade. Temperatures are relatively cooler than the Indus Plain because of the decreasing influence of the Sun; as we are away from the Tropic of Cancer. So Sun's rays strike at an oblique angle and transfer less of their solar energy

Winters are longer than the summers. Warm summers (21-32° C) exist and precipitation is mainly in form of rain in summers. In Northern Mountains rain come from monsoons and convection in summers while Western Depressions bring rain in winters. Some areas in Karakorum receive less rainfall due to being rain shadow areas Cold winters (0-5° C) exist and precipitation is mainly in form of snow in both valleys and mountain tops

# COASTAL CLIMATE

Coastal climate refers to the climate of the areas that are located along with the coastal strip running from Ran of Kutch at the Pak-India border to Makran Coast at the Pak-Iran border. The coastal strip of Pakistan includes places like the Makran coast, Karachi, Thatta, Indus Delta, Run of Kutch, etc.

## **Main Features of Coastal Climate of Pakistan**

- Sea breezes blow throughout the year.
- Warm winds blow from Thar desert in the east.
- The proximity to the sea causes a high level of humidity that crosses 50% between April and September.
- Rainfall is scanty which occurs only during summer because of monsoon winds in the month of July or August.
- Makran Coast also receives little rainfall due to the western depression winds. Western Depression winds blow from the Mediterranean sea and enter Balochistan from Iran and Afghanistan causing rainfall in places they cross.

# SEMI ARID CLIMATIC ZONE

Warm summer and cool winters

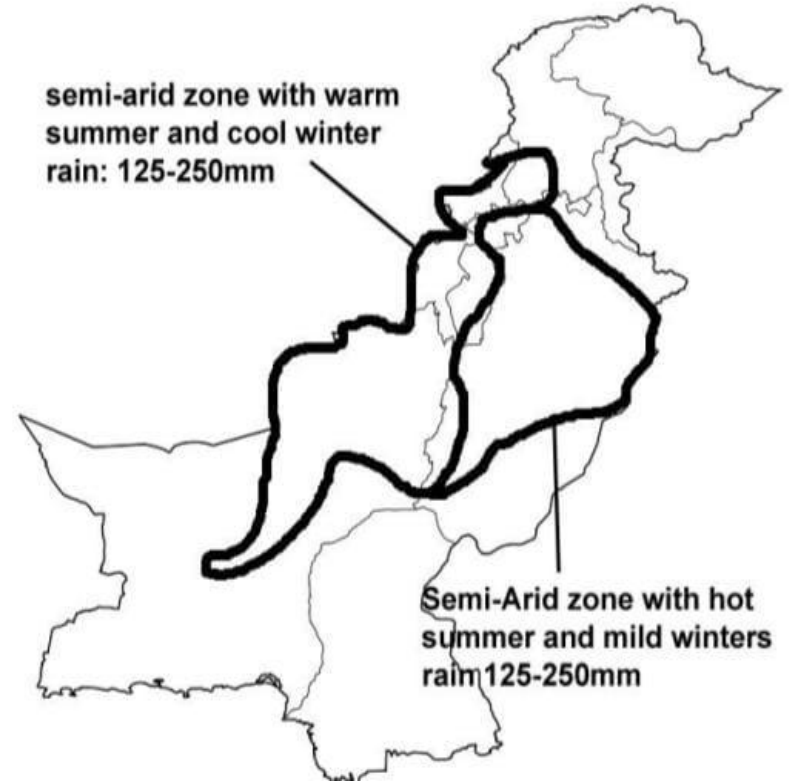
Includes areas of punjab, balochistan and khyber pakhtunkhwa

Receives less than 250mm rainfall

Receives rain through westerr depression and convection, some from monsoon as well

Thunderstorms are also commor

Semi-Arid Climate zones



# Pakistan Aridity Classes

0 400 Km

