

Ch 4

Climate of India

1. **Name the climate of India? Why is it called so?**

➤ Tropical Monsoon Climate.

- India belongs to tropical and sub-tropical (warm temperate climate) climatic region – 8°4' N to 37°6' N latitudes. Hence, southern part of India belongs to Tropical or Torrid Zone and northern part of India belongs to sub-tropical or warm temperate zone.
- Indian climate is influenced by :-
 - ❖ Seasonal reversal of Wind direction i.e., South-west monsoon in summer and North-east monsoon in winter.
 - ❖ Seasonal rainfall i.e., hot and wet summer; cool and dry winter.

2. **Mention two each points that support the unity and diversity of Indian Climate?**

➤ Indian climate is known as Tropical Monsoon climate i.e., unified by the following characteristics throughout the country :-

- Seasonal summer Rainfall.
- Presence of four seasons (Summer, Monsoon, Autumn and Winter).

But there are many variations in Indian Climate. For example :-

- The areas like Western slopes of Western Ghats, North-eastern Himalayan region (Meghalaya) receive very high amount of rainfall whereas regions like Thar Desert receives very low amount of annual rainfall.
- The areas of south Indian coastal region are influenced by equable climate or moderate climate whereas the areas which are located far from the influence of the sea are influenced by extreme climate or continental climate.

3. **Name the four main seasons of India?**

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- Hot and Dry Summer – March to May.
- Hot and wet Summer or South – west monsoon season – June to September.
- Retreating Monsoon Season – October, November.
- Cold and Dry winter – December to February.

4. **Distinguish between the four seasons on the basis of Temperature, Pressure, Wind and Rainfall.**

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| SEASON | TEMPERATURE | PRESSURE | WIND | RAINFALL |
|--------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| ▪ Hot and Dry Summer (March to May). | High Temperature Since Northern hemisphere is closer to the sun after 21 st march. | High Pressure over sea and low pressure over land due to high temperature. | Local winds blow like : <ul style="list-style-type: none">• Kalbaisakhi.• Loo• Pre monsoon showers like Mango shower and cherry | Local area receives rainfall by local wind for short period of time. |

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| | | | blossom etc. | |
| ▪ Hot and Wet Summer (June to September). | Temperature is high. | High pressure over sea and low pressure over land due to high temperature. | South–west monsoon wind-onshore wind. | India receives its major rainfall in this season by south – west monsoon winds. Hence, known as Rainy season. |
| ▪ Retreating Monsoon Season(October, November) | Temperature starts falling in northern parts of India whereas South India remains hot due to its nearness to the equator. October heat is experienced due to clear sky. | Northern part of India is influenced by high pressure due to fall in temperature. Apparent movement of sun towards south. Monsoon withdraws itself from this part of India. | Retreating Monsoon winds. North – east Monsoon starts blowing in the northern part and coastal regions affected by tropical cyclone. For ex – Bay cyclone affects east coast of India. | East coast of India receives rainfall by the retreating monsoon winds and tropical cyclone. Rainfall reduced all over India due to withdrawal of monsoon. |
| ▪ Cold and Dry Winter (December to February). | Low temperature is experienced in the northern part of India due to apparent movement of sun in the south hemisphere. South part of India remains hot since it is near the equator. | Low pressure prevails over the sea and high pressure over the land due to low temperature. | Offshore winds blow from land to sea i.e., North – east monsoon. | Generally, rainfall does not occur in this season as offshore winds blow. But two parts of India receives Winter rainfall – <ul style="list-style-type: none"> • Coromandel Coast (Tamil Nadu) by North–east monsoon. • North-west parts of India (Punjab, Haryana) by Westerly Jet Stream. |

5. **Mention four characteristics of Monsoon rainfall in India?**



- In India, Monsoon rainfall is generally orographic in nature.
- Irregular and uneven distribution of rainfall.
- Arrival and withdrawal varies, even the amount of moisture carried by the winds also varies.
- Erratic in nature.

6. **Mention four characteristics of Monsoon winds?**



| <i>SOUTH-WEST MONSOON WINDS</i> | <i>NORTH-EAST MONSOON WINDS</i> |
|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| • Onshore in nature. | • Offshore in nature. |
| • Blows from sea to land. | • Blows from land to sea. |
| • Blows in Summer season. | • Blows in Winter season. |
| • It carries moisture; moist wind since blows from sea to land. | • It does not carry moisture; dry wind since blows from land to sea but after blowing over Bay of Bengal when it reaches Tamil Nadu coast, it shades moisture and causes rainfall. |

7. ***Name the factor that influences the Indian climate?***



| <i>NAME OF THE FACTOR</i> | <i>INFLUENCE IN SUMMER</i> | <i>INFLUENCE IN WINTER</i> | <i>EXAMPLE</i> |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ▪ Himalayas | During summer, it acts as a barrier for south-east monsoon winds and helps to receive south west monsoon rainfall during hot and wet summer season in northern plains of India. | Himalayas acts as a barrier for cold Siberian winds, hence northern part of India do not become frozen in Winter. | |
| ▪ Distance from Sea | When the places are located near the sea (coastal region) are influenced by low range of temperature or moderate or equable climate but places located far from influence of seas, have high range of temperature or extreme or continental climate (Continentality). | | Mumbai, Chennai, Kochi, Mangalore, Vishakapattanam, Tiruvanthapuram, Kanyakumari are located near the sea (equable climate). Whereas Delhi, Lucknow, Allahabad, Jaipur, Pune, Bangalore, Hyderabad, Srinagar, etc., are located far from sea (Extreme climate). |
| ▪ Altitude | When altitude increases, temperature decreases at the rate of 1° C fall temperature per 165 m of ascent. | | Shimla is cooler than Delhi; Ooty is cooler than Mumbai. |
| ▪ Latitude | Tropic of cancer divides India into two heat zones: – Northern part belongs to warm temperate zones – summers are hot; winters are cold. Whereas, Southern part near to the equator belongs to tropical zone – absence of Winter (hot throughout the year). | | |
| ▪ Relief Features | <ul style="list-style-type: none"> • When altitude increase, temperature decreases in hilly regions. • Windward side of a hill receives high amount of rainfall whereas leeward slopes receives less rainfall. | | Mumbai receives more rain than Pune; Mangalore receives more rain than Bengaluru etc. |

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| ▪ Jet Streams | Easterly Jet streams helps to bring South west monsoon winds through intensifying low pressure into depressions. | Westerly Jet streams / Western disturbances cause winter rainfall in north-western part of India – i.e., helpful for Rabi crop production. | |
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8. ***Distinguish between the following :-***

| <i>SUMMER MONSOON</i> | <i>WINTER MONSOON</i> |
|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| • South-west monsoon. | • North-east monsoon. |
| • Onshore winds. | • Offshore winds. |
| • Carries huge amount of moisture since causes rainfall in and almost all over India. | • Carries less amount of moisture (does not cause any rainfall except Coromandel Coast). |

| <i>ARABIAN SEA BRANCH OF SOUTH-WEST MONSOON</i> | <i>BAY OF BENGAL BRANCH OF SOUTH-WEST MONSOON</i> |
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| • Strongest branch; carries more moisture. | • Weaker branch; carries less moisture. |
| • Speed is slower. | • Speed is faster. |
| • Reaches India first – 1 st June at Kerala. | • Reaches later – 5 th to 10 th June – North-east monsoon. |
| • Less part of India receives rain by this branch. | • Maximum part of India receives rain by this branch. |

| <i>SOUTH WEST MONSOON</i> | <i>RETREATING MONSOON</i> |
|-----------------------------------|----------------------------------------|
| • Carries more moisture. | • Carries less moisture. |
| • Onset of monsoon is associated. | • Withdrawal of monsoon is associated. |
| • From June to September. | • October, November. |
| • Whole India affected. | • East coast affected. |

| <i>LOO</i> | <i>KALBAISAKHI</i> |
|---------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| • Hot and Dry wind. | • Cyclonic in nature |
| • It increases temperature and decreases humidity of a place. | • It is harmful for life and property but the rainfall associated with it is very helpful for summer fruits production. |
| • Northern plains from Rajasthan to Western part of West Bengal. | • West Bengal, Assam, Bihar and Oddisha. |
| • Both are local winds and blow during Hot and dry summer (March to May). | |

| <i>KALBAISAKHI</i> | <i>MANGO SHOWER / CHERRY BLOSSOM</i> |
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| • Wind speed is more. | • Wind speed is less. |
| • Mostly harmful. | • Helpful for mango, tea, coffee production. |
| • Affects West Bengal, Assam, Bihar, Jharkhand etc. | • Affects Karnataka, Kerala, Tamil Nadu. |
| • Both are local winds and blow during | |

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| Hot and dry summer (March to May). |
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| EXTREME CLIMATE | EQUABLE CLIMATE |
|--------------------------------------|----------------------------------------------------|
| • Range of temperature is high. | • Range of temperature is low. |
| • Located far from sea. | • Located near the sea. |
| • Summers are hot; winters are cold. | • Less variation in summer and winter temperature. |
| • Delhi, Lucknow. | • Mumbai, Chennai. |

| HIGH RAINFALL ZONE | LOW RAINFALL ZONE |
|---------------------------------------------------------|-----------------------------------------|
| • Annual Rainfall is more than 200 cm. | • Annual Rainfall is less than 50 cm. |
| • Vegetation growth is dense. | • Vegetation growth is less. |
| • Evergreen trees are found. | • Thorny scrubs and grasses. |
| • Western slopes of Western Ghats, Andaman and Nicobar. | • Thar Desert, parts of Deccan plateau. |

| TROPICAL CYCLONE | TEMPERATE CYCLONE |
|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| • Place of origin is Bay of Bengal and Arabian Sea. | • Place of origin is Mediterranean Sea. |
| • Last for short period of time. | • Last for longer period of time. |
| • East coast is affected – parts of Oddisha, Andhra Pradesh, Tamil Nadu and West Bengal. | • North western part of India – Punjab, Haryana, Himachal Pradesh, Jammu and Kashmir. |
| • Generally blows in Retreating monsoon season – October, November. | • Generally blows in Winter season – December to February. |
| • Harmful for life and property. | • Helpful for Rabi crop production. |

| SUMMER RAINFALL | WINTER RAINFALL |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| • Caused by – <ul style="list-style-type: none"> ▪ South west monsoon winds in Rainy Season. ▪ Local winds during hot and dry summer (pre-monsoon showers). | • Caused by – <ul style="list-style-type: none"> ▪ North east monsoon (Coromandel Coast). ▪ North West India (Western disturbances). |
| • Total amount of rainfall is more. | • Total amount of rainfall is less. |
| • Almost all over India receives Summer rainfall. | • Only two parts of India i.e., Coromandel Coast and North West India receives winter rainfall. |
| • Helpful for Kharif crop production. | • Helpful for Rabi crop production. |

| WINDWARD SLOPE | LEEWARD SLOPE / RAINSHADOW AREA |
|------------------------------|----------------------------------------|
| • Receives more rainfall. | • Receives less rainfall. |
| • Evergreen trees grow. | • Deciduous trees grow. |
| • Vegetation growth is more. | • Vegetation growth is less. |
| • Mumbai. | • Pune. |

| ONSET OF MONSOON | WITHDRAWAL OF MONSOON |
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| • It occurs in month of June. For ex – Kerala at 1 st June. | • It occurs in month of September in Jammu and Kashmir and Rajasthan. |

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| <ul style="list-style-type: none"> • Associated with thunderstorm (burst of monsoon). | <ul style="list-style-type: none"> • Associated with clear sky, oppressive climate, scorching sunlight, high day temperature, tropical cyclones etc. (October heat). |
| <ul style="list-style-type: none"> • It is a fast process. | <ul style="list-style-type: none"> • It is a slow process. |

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| WINTER RAINFALL IN COROMANDEL COAST | WINTER RAINFALL IN NORTH WEST PART OF INDIA |
| <ul style="list-style-type: none"> • Caused by North East monsoon. | <ul style="list-style-type: none"> • Caused by western disturbances. |
| <ul style="list-style-type: none"> • Orographic in nature. | <ul style="list-style-type: none"> • Cyclonic in nature. |
| <ul style="list-style-type: none"> • Place of origin – central Asia. | <ul style="list-style-type: none"> • Place of origin – Mediterranean Sea. |

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| EL NINO | LA NINA |
| <ul style="list-style-type: none"> • Warm ocean current. | <ul style="list-style-type: none"> • Accumulation of cool water. |
| <ul style="list-style-type: none"> • Place of origin – coast of Peru in South America. | <ul style="list-style-type: none"> • Place of origin – Central and Eastern part of Pacific Ocean. |
| <ul style="list-style-type: none"> • It is Spanish word. It means the child Christ because it appears around Christmas. | <ul style="list-style-type: none"> • It is Spanish word. It means the sister of El Nina. |
| <ul style="list-style-type: none"> • Increases temperature. | <ul style="list-style-type: none"> • Decreases temperature. |
| <ul style="list-style-type: none"> • As a result, Monsoon rainfall amount decreases in India which results in drought and crop failure. | <ul style="list-style-type: none"> • La Nina is beneficial for India as it brings heavy shower. |

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| MONSOON WINDS | LAND & SEA BREEZE |
| <ul style="list-style-type: none"> • Influence large area. | <ul style="list-style-type: none"> • Influence the coastal areas. |
| <ul style="list-style-type: none"> • Causes huge rainfall (south-west monsoon). | <ul style="list-style-type: none"> • Provides moderate climate in coastal regions. |
| <ul style="list-style-type: none"> • Changes its direction seasonally i.e., <ul style="list-style-type: none"> ▪ During summer south-west monsoon (Onshore). ▪ During winter North-east monsoon (Offshore). | <ul style="list-style-type: none"> • Changes its direction daily : <ul style="list-style-type: none"> ▪ During Day Sea breeze (Onshore). ▪ During night land breeze (Offshore). |
| <ul style="list-style-type: none"> • Both winds are periodic in nature that means they change their direction periodically. | |

9. **Distinguish between the various winds on the basis of their characteristics, effects and area.**



| NAME OF THE WIND AND SEASONS | CHARACTERISTICS | EFFECTS | AREA |
|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • Kalbaisakhi (Hot and Dry summer; March to May). | <ul style="list-style-type: none"> ❖ Cyclonic wind. ❖ Accompanied with lightning, storm, heavy shower etc. ❖ Also known as Nor-wester since it blows from west and North-west. ❖ It means calamity of the month of | <p>Positive –</p> <ul style="list-style-type: none"> ❖ Helps in production of rice in Bengal and tea in Assam; summer fruits. <p>Negative –</p> <ul style="list-style-type: none"> ❖ Destruction for life and property. | Parts of West Bengal, Assam, Bihar, Oddisha, Jharkhand and Bangladesh. |

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| | Baisakh. | | |
| • Mango Shower (Hot and Dry summer; March to May) / Blossom Shower. | <ul style="list-style-type: none"> ❖ Pre-monsoon shower. ❖ Blows from sea to land. ❖ Wind speed is lower than Kalbaisakhi. | Positive – <ul style="list-style-type: none"> ❖ Helps in ripening of mangoes. | South India – Karnataka, Kerala, Andhra Pradesh, Tamil Nadu. |
| • Cherry Blossom / Blossom Shower (Hot and Dry summer; March to May). | <ul style="list-style-type: none"> ❖ Pre-monsoon shower. ❖ Blows from sea to land. ❖ Wind speed is lower than Kalbaisakhi. | Positive – <ul style="list-style-type: none"> ❖ Helps in production of tea and coffee. | South India – Karnataka, Kerala, Andhra Pradesh, Tamil Nadu. |
| • Bardoichilla (Hot and Dry summer; March to May). | <ul style="list-style-type: none"> ❖ Cyclonic wind. ❖ Accompanied with lightning, storm, heavy shower etc. ❖ Also known as Nor-wester since it blows from west and North-west. ❖ It means calamity of the month of Baisakh. | Positive – <ul style="list-style-type: none"> ❖ Helps in production of rice in Bengal and tea in Assam; summer fruits. Negative – <ul style="list-style-type: none"> ❖ Destruction for life and property. | Assam, Meghalaya – North Eastern states. |
| • Loo (Hot and Dry summer; March to May). | <ul style="list-style-type: none"> ❖ Hot and Dry wind. ❖ Sometimes dusty. ❖ Blows from west. | Negative – <ul style="list-style-type: none"> ❖ Decreases humidity that creates dry weather. Change of dehydration is more. | Parts of Rajasthan, Gujrat, Uttar Pradesh, Bihar, West of West Bengal. |
| • Dust Storm (Hot and Dry summer; March to May). | <ul style="list-style-type: none"> ❖ Cyclonic in nature. ❖ Associated with high speed wind. ❖ Carries huge amount of sand with it. | Negative – <ul style="list-style-type: none"> ❖ Destruction for life and property, health hazardous and helps in the process of desertification. | Thar Desert, parts of Delhi, Chandigarh, Madhya Pradesh, Gujrat. |
| • Tropical Cyclone (Retreating monsoon; October, November; Sometimes September Bay cyclones). | <ul style="list-style-type: none"> ❖ High speed Cyclonic storm. ❖ Place of origin – Bay of Bengal. ❖ Associated with thunderstorm, heavy shower, lightning, and depression. | Positive – <ul style="list-style-type: none"> ❖ Helps in Zayad Crop production. Negative – <ul style="list-style-type: none"> ❖ Destructive for life and property | East coast of India, Tamil Nadu, parts of Oddisha, Andhra Pradesh, and West Bengal. |

10. **Definitions :-**

- a) **Rain shadow Region - The** Region i.e., located in the leeward side of mountain that receives low amount of rainfall is known as Rain shadow Region. Pune is located in the rain shadow region of Western Ghats; Shillong is located in the rain shadow region of Meghalaya.
- b) **Break of Monsoon** - Dry spell of time in the south west monsoon season between two wet spells when rainfall does not occur in rainy season is called Break of Monsoon.
- c) **October Heat** - **October** is a transition period between hot rainy season and cool dry season. During this period, the sky is cloudless and the temperature is high. This sultry and oppressive weather is called October Heat (Retreating monsoon season).

11. **Areas with low and high rainfall and reasons behind them –**

| AREAS | REASONS |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • Areas of low rainfall– <ul style="list-style-type: none"> ❖ Thar Desert (Western Rajasthan and Gujrat). ❖ Deccan Plateau ❖ Jammu and Kashmir | <ul style="list-style-type: none"> • Absence of climatic barrier perpendicularly to the path of Arabian branch of South-west monsoon (Aravalli is parallel). • Rain shadow region of Bay of Bengal branch. • High temperature and Evaporation. • Rain shadow region of western eastern ghats. • Rain bearing winds become dry before reaching this area due to its interior location (far from the sea). |
| <ul style="list-style-type: none"> • Areas of high rainfall – <ul style="list-style-type: none"> ❖ Western coast ❖ North-eastern Himalayan region (Meghalayan Plateau) ❖ Northern plains ❖ Andaman and Nicobar Islands. | <ul style="list-style-type: none"> • Windward side of Western Ghats. • Near the sea. • Windward side of North-eastern hills (Khasi hills). • Funnel shape of North-eastern hills. • Himalayas are acting as a climatic barrier from south-west monsoon winds. • Receives rainfall from – <ul style="list-style-type: none"> ❖ South-west monsoon. ❖ Tropical cyclone. ❖ Winter monsoon (Rainy months are more). |