

## Chapter-4.

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# CLIMATE

• Climate refers to the sum total of weather condition, and variation over a large area for a long period of time, (more than thirty years).

• Weather refers to the state of the atmosphere over an area at any point of time.

• Element of weather and climate:

- Temperature.
- Atmospheric Pressure.
- Wind.
- Humidity.
- Precipitation.

⇒ climatic control:

• There are six major control of the climate of any place:

- (a) Latitude.
- (b) Altitude.
- (c) Pressure and wind system.
- (d) Distance from sea (Continentality).
- (e) Ocean currents.
- (f) Relief features.

⇒ Factors affecting India's climate:

- Latitude.
- Altitude.
- Pressure and winds.

Latitude → The Tropic of Cancer passes through the middle, of the country. Half of the country lying south, of Tropic of Cancer, belongs to the Tropical area.



⇒ Altitude :

• The Himalayas prevent the cold winds from central Asia from entering the subcontinent making winter milder as compared to central Asia.

⇒ Pressure and winds :

- Atmospheric conditions that govern climate and associated weather conditions in India are:
  - Pressure and surface winds.
  - upper air circulation.
  - western cyclonic disturbances and tropical cyclones.

⇒ Upper Air circulation :

- The higher level of the atmosphere is dominated by a westerly wind flow. An important component of this flow is the jet stream.
- Jet streams are a narrow belt of high altitude westerly winds in the troposphere (transition between troposphere and stratosphere).

⇒ Western cyclonic disturbance and tropical cyclones :

- The western disturbance, which enters the Indian subcontinent from the west and the north west during the winter months, originates over the Mediterranean sea and is brought into India by the westerly jet stream.
- Tropical cyclones originate over the Bay of Bengal and the Indian Ocean.
- Tropical cyclones occur during the monsoon as well as in October - November and are part of the easterly flow.

⇒ The Indian Monsoon :

- Monsoons are seasonal winds which reverse their direction of flow with the change of season.
- The climate of India is strongly influenced by monsoon winds.

## ⇒ Factors that affect the mechanism of Indian Monsoon: (3)

- Differential heating and cooling of land and water create low pressure on land while the sea experiences high pressure.
- Shifting of inter tropical convergence zone (ITCZ) over the Ganga plain during summers.
- The intensity and position of high pressure area toward the east of Madagascar approximately at 20°S over the Indian ocean affects the Indian monsoon.
- The heating up of the Tibetan plateau in summers creates low pressure above the plateau.
- The movement of the westerly jet stream to the north of the Himalayas and the presence of the tropical easterly jet stream over the Indian peninsula during summer.
- Southern oscillation.

## ⇒ The onset of the monsoon and withdrawal:

- The duration of the monsoon is between 100-120 days from June to mid-September.
- When the monsoon arrives the normal rainfall increases suddenly and continues constantly for several days. This is known as the 'burst of the monsoon'.
- It proceeds into two - the Arabian Sea branch and the Bay of Bengal branch.
- The Arabian Sea branch reaches Mumbai about ten days later on approximately the 10<sup>th</sup> June.
- The Bay of Bengal branch also advances rapidly and arrives in Assam in the first week of June.

- The withdrawal of the monsoon begins in northwestern <sup>④</sup> States of India by early September.
- By mid-October, it withdraws completely from the northern half of the peninsula.
- By December, the monsoons retreats completely from the rest of India.

### ⇒ The seasons :-

- Four main seasons can be identified in India.
  - The cold weather season.
  - The hot weather season.
  - The advancing monsoon.
  - The retreating monsoon.

### ⇒ The cold weather season (winter) :-

- The season begins from mid-November and stays till February in northern India.
- coldest months are December and January in the northern part of India.

### ⇒ The hot weather season (summer) :-

- The hot weather season in India ranges from March to May.
- Temperature upto 48 degree celsius are experienced in North India.
- In peninsular India, temperatures remain lower due to the moderating influence of the oceans.

### ⇒ Advancing monsoon (The rainy season) :-

- By early June, the trade winds of the Southern Hemisphere get ~~attracted~~ attracted to the northern Hemisphere due to the creation of low pressure condition there.
- Rainfall in the Ganga valley decreases from east to the west.

• Rajasthan and parts of Gujarat get scanty rainfall.

→ Retreating / post monsoons (The Transition Season) :-

- During October - November the movement of the Sun towards south causes the monsoon through in the Northern Plains to become weaker.
- By early November, the low-pressure conditions, over north-western India, get transferred to the Bay of Bengal which cause cyclonic depressions.

→ Monsoon as a unifying Bond :-

- There is a great diversity in the climatic conditions due to location, extent and relief features.
- These monsoon winds bind the whole country by providing water to set the agricultural activities in motion.

