

## 10th Social Science Lesson 3 Notes in English

### 3. Climate and Natural Vegetation of India

#### Introduction

- We drink more water during summer and do not drink the same amount of water during winter.
- This is because of the prevalence of **varying weather conditions between north and south India**.
- In this chapter, you will learn about the climate, rainfall distribution, natural vegetation and wildlife of our country.

#### The factors affecting the climate

Climate of India is affected by the factors of **latitude, distance from the seas, monsoon wind, relief features and jet stream**.

#### Latitude

- Latitudinally, India lies between **8°4'N and 37°6'N latitudes**. The Tropic of cancer divides the country into two equal halves.
- The area located to the south of Tropic of cancer experiences high temperature and no severe cold season throughout the year whereas, the areas to the north of this parallel enjoys **subtropical climate**.
- Here, summer temperature may rise above **40°C and it is close to freezing point** during winter.

#### Altitude

- When the altitude increases, the temperatures decreases. Temperature decreases at **the rate of 6.50C for every 1000 metres of ascent**. It is called normal lapse rate.
- Hence, places in the mountains are cooler than the places on the plains.
- That is why the places located at higher altitudes even in south India have cool climate.
- Ooty and several other hill stations of south India and of the Himalayan ranges like Mussourie, Shimla etc., are much cooler than the places located on the Great Plains.

#### Distance from the Sea

- Distance from the sea does not cause only temperature and pressure variations but also affects the amount of rainfall.
- A large area of India, especially the **peninsular region, is not very far from the sea and this entire area has a clear maritime influence on climate**.

- This part of the country does not have a very clearly marked winter and the temperature is equable almost throughout the year.
- Areas of central and north India experience much seasonal variation in temperature due to the absence of influence of seas.
- Here, summers are hot and winters are cold. The annual temperature at **Kochi does not exceed 30°C as its location is on the coast while it is as high as 40°C at Delhi**, since it is located in the interior part.
- Air near the coast has more moisture and greater potential to produce precipitation.
- Due to this fact, the amount of rainfall at Kolkata located near the coast is 119 cm and it decreases to just 24 cm at Bikaner which is located in the interior part.

### Monsoon Wind

- The most dominant factor which affects the climate of India is the monsoon winds.
- These are seasonal reversal winds and India remains in the influence of these winds for a considerable part of a year.
- Though, the sun's rays are vertical over the central part of **India during the mid-June, the summer season ends in India by the end of May**.
- It is because the onset of southwest monsoon brings down the temperature of the entire India and causes moderate to heavy rainfall in many parts of the country.
- Similarly, the climate of southeast India is also influenced by northeast monsoon.

### Relief

- Relief of India has a great bearing on major elements of climate such as **temperature, atmospheric pressure, direction of winds and the amount of rainfall**.
- The Himalayas acts as a barrier to the freezing cold wind blows from central Asia and keep the Indian subcontinent warm.
- As such the north India experiences tropical climate even during winter.
- During southwest monsoon, areas on the western slope of the Western Ghats receive heavy rainfall.
- On the contrary, vast areas of **Maharashtra, Karnataka, Telangana, Andhra Pradesh and Tamil nadu** lie in rain shadow or leeward side of the Western Ghats receive very little rainfall.
- During this season, Mangalore, located on the coast gets the rainfall of about 280 cm whereas the Bengaluru located on the leeward side receives only about 50 cm rainfall.

### Jet Streams

- Jet streams are the **fast moving winds blowing in a narrow zone in the upper atmosphere**.
- According to the Jet stream theory, the onset of southwest monsoon is driven by the shift of the sub tropical westerly jet from the plains of India towards the Tibetan plateau.

- The easterly jet streams cause tropical depressions both during southwest monsoon and retreating monsoon.

### Monsoon

- The word 'monsoon' has been derived from the **Arabic word 'Mausim' which means 'season'**.
- Originally, the word 'monsoon' was used by Arab navigators several centuries ago, to describe a system of seasonal reversal of winds along the shores of the Indian Ocean, especially over the Arabian Sea.
- It blows from the south-west to north-east during summer and from the north-east to south-west during winter.
- Monsoons are a complex meteorological phenomenon. Meteorologists have developed a number of concepts about the origin of monsoons.
- According to the Dynamic concept, Monsoon wind originates due to the seasonal migration of planetary winds and pressure belts following the position of the sun.
- During summer solstice, the sun's rays fall vertically over the Tropic of cancer. Therefore, all the pressure and wind belts of the globe shift northwards.
- At this time, **Inter -Tropical Convergence Zone (ITCZ)** also moves northward, and a major part of Indian landmass comes under the influence of southeast trade winds.
- While crossing equator this wind gets deflected and takes the direction of southwest and becomes southwest monsoon.
- During the winter season, the pressure and wind belts shift southward, thereby establishing the **north-east monsoon (trade winds)** over this region. Such systematic change in the direction of planetary winds is known as monsoon.

### Seasons

The meteorologists recognize the four distinct seasons in India. They are;

1. Winter or cold weather season (January - February).
2. Pre Monsoon or summer or hot weather season (March - May).
3. Southwest monsoon or rainy season (June - September).
4. Northeast monsoon season (October - December).

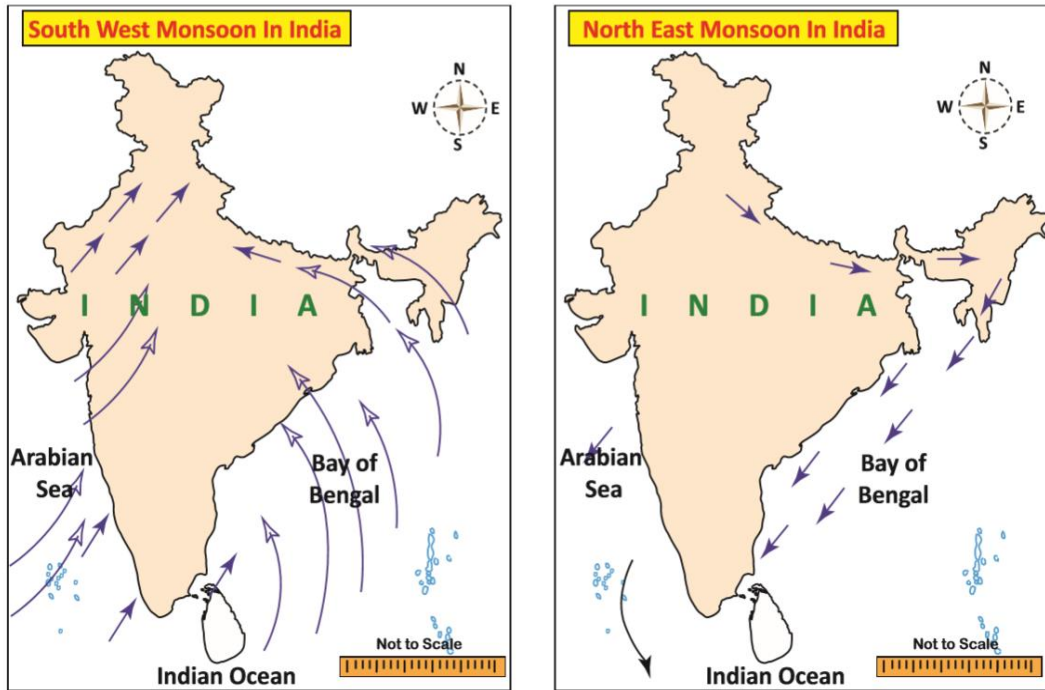
### Winter or cold weather season

- During this period, **the vertical rays of the sun falls over tropic of capricorn** which is far away from India.
- Hence, India receives the **slanting sun's rays which results in low temperature**.
- The cold weather season is characterized by clear skies, fine weather, light northerly winds, low humidity and large day time variations of temperature.

- During this season a high pressure develops over north India and a north-westerly wind blows down the Indus and Ganges valleys.
- In south India, the general direction of wind is from east to west.
- The mean temperature increases from north to south, the decrease being sharp as one moves northwards in the north-western part of the country.
- The mean daily **minimum temperatures range from 22°C in the extreme south, to 10°C in the northern plains and 6°C in Punjab.**
- The rain during this season generally occurs over the Western Himalayas, Tamil nadu and Kerala.
- Western disturbances and associated trough in westerlies are main rain bearing system in northern part of the country.
- The jet stream plays a dominant role in bringing these disturbances to India.
- These disturbances cause rainfall in **Punjab, Haryana and Himachal Pradesh, and snowfall in the hills of Jammu and Kashmir.** This rainfall is very useful for the cultivation of winter wheat.

#### **Pre Monsoon or summer or hot weather season**

- During this season, the vertical rays of the sun falls over the peninsular India. Hence, there is a steady increase in temperature from south to north.
- It is practically hot and dry in the entire country in the initial part of this season.
- Weather over the land areas of the country is influenced by thunderstorms associated with rain and sometimes with hail mostly in the middle and later part.
- During this season, temperature starts increasing all over the country and by April, the interior parts of south India record mean daily temperatures of 30°C–35°C.
- Central Indian land mass becomes hot with day-time maximum temperature reaching about 40°C at many locations.
- Many stations in **Gujarat, North Maharashtra, Rajasthan and North Madhya Pradesh** exhibit high day-time and low night-time temperatures during this season.
- Because of the atmospheric pressure conditions, the winds blow from southwest to northeast direction in Arabian Sea and Bay of Bengal.
- They bring pre monsoon showers to the west coast during the month of May. There are few thunder showers called "**Mango Showers**" which helps in quick ripening of mangoes along the coast of Kerala and Karnataka.
- "**Norwesters**" or "**Kalbaisakhis**" are the local severe storms or violent thunderstorms associated with strong winds and rain lasting for short durations.
- It occurs over the eastern and north eastern parts over Bihar, West Bengal and Assam during April and May. They approach the stations from the northwesterly direction.



India Monsoons

### Southwest monsoon or Rainy Season

- The southwest monsoon is the most significant feature of the Indian climate.
- The onset of the southwest monsoon takes place normally over the southern tip of the country by the first week of June, advances along the **Konkan coast in early June and covers the whole country by 15th July**.
- The monsoon is influenced by global phenomenon like **ElNino**. Prior to the onset of the southwest monsoon, the temperature in north India reaches upto **46°C**.
- The sudden approach of monsoon wind over south India with lightning and thunder is termed as the '**break**' or '**burst of monsoon**'.
- It lowers the temperature of India to a large extent. The monsoon wind strikes against the southern tip of Indian land mass and gets divided into two branches.
- One branch starts from Arabian sea and the other from Bay of Bengal. The Arabian sea branch of southwest monsoon gives heavy rainfall to the west coast of India as it is located in the windward side of the Western Ghats.
- The other part which advances towards north is obstructed by Himalayan Mountains and results in heavy rainfall in north.
- As Aravalli Mountain is located parallel to the wind direction, Rajasthan and western part do not get much rainfall from this branch.
- The wind from Bay of Bengal branch moves towards northeast India and Myanmar. This wind is trapped by a chain of mountains namely Garo, Khasi and Jaintia are mainly responsible for the heaviest rainfall caused at Mawsynram located in Meghalaya.

- Later on, this wind travel towards west which results in decrease in rainfall from east to west.
- Over all about **75% of Indian rainfall** is received from this monsoon. Tamil nadu which is located in the leeward side receives only a meagre rainfall.

### Post monsoon or Retreating or Northeast monsoon season

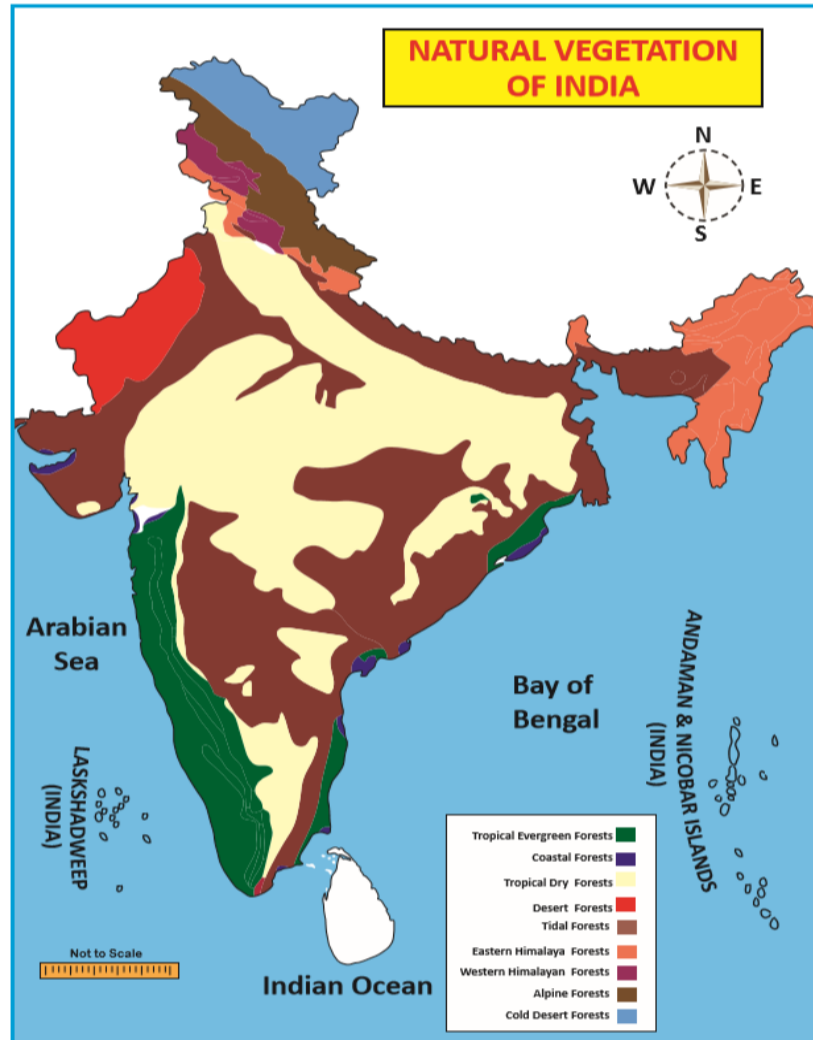
- The southwest monsoon begins to retreat from north India by the end of September due to the southward shifting pressure belts.
- The southwest monsoon wind returns from Indian landmass and blows towards Bay of Bengal.
- The **coriolis force** deflects this wind and makes it to blow from northeast. Hence, it is known as Northeast monsoon or Post-monsoon season.
- The season is associated with the establishment of the north-easterly wind system over the Indian subcontinent.
- **Andhra Pradesh, Tamil nadu, Kerala and south interior Karnataka** receive good amount of rainfall accounted for **35%** of their annual total.
- Many parts of Tamil nadu and some parts of Andhra Pradesh and Karnataka receive rainfall during this season due to the storms forming in the Bay of Bengal.
- Large scale losses to life and property occur due to heavy rainfall, strong winds and storm surge in the coastal regions.
- The day time temperatures start falling sharply all over the country. The mean temperature over northwestern parts of the country shows a decline from about **38°C in October to 28°C in November**.

### Distribution of rainfall

- The average annual rainfall of India is **118 cm**. However, spatial distribution of rainfall in the country is highly uneven.
- About **11% area receives over 200 cm of annual rainfall**, **21% area receives 125 to 200 cm**, **37% area receives 75 to 125 cm**, **24% area gets 35 to 75 cm** and **7% area gets less than 35 cm**.
- The Western coast, Assam, South Meghalaya, Tripura, Nagaland and Arunachal Pradesh are the heavy rainfall areas which get more than **200 cm rainfall**.
- The whole of Rajasthan, Punjab, Haryana, Western and Southwestern parts of Uttar Pradesh, Western Madhya Pradesh, the entire Deccan Trap or Plateau region east of Western Ghats except for a narrow strip along Tamil nadu coast receive a **low rainfall of less than 100 cm**.
- The rest of the areas receive a rainfall ranging between **100 and 200 cm**.

### Natural Vegetation





- Natural vegetation refers to a plant community unaffected by man either directly or indirectly. It has its existence in certain natural environment.
- Natural vegetation includes all plant life forms such as **trees, bushes, herbs and forbs etc**, that grow naturally in an area and have been left undisturbed by humans for a long time.
- Climate, soil and landform characteristics are the important environmental controls of natural vegetation.
- On the basis of the above factors the natural vegetation of India can be divided into the following types.

### Tropical Evergreen Forest

- These forests are found in areas with 200 cm or more annual rainfall.
- The annual temperature is about **more than 22°C** and the average annual humidity exceeds **70 percent** in this region.
- Western Ghats in Maharashtra, Karnataka, Kerala, Andaman-Nicobar Islands, Assam, West Bengal, Nagaland, Tripura, Mizoram, Manipur and Meghalaya states have this type of forests.

- The most important trees are rubber, mahogany, ebony, rosewood, coconut, bamboo, cinchona, candel, palm, iron wood and cedar. These have not been fully exploited due to lack of transport facilities.

### Tropical Deciduous Forest

- These are found in the areas with **100 to 200cm.** annual rainfall. These are called 'Monsoon Forests'.
- The mean annual temperature of this region is about 27°C and the average annual relative humidity is **60 to 70 percent.**
- The trees of these forests drop their leaves during the spring and early summer. (**Sub Himalayan - Region from Punjab to Assam, Great Plains- Punjab, Haryana, Uttar Pradesh, Bihar, West Bengal, Central India - Jharkhand, Madhya Pradesh, Chattisgarh, South India - Maharashtra, Karnataka, Telangana, Andhra Pradesh, Tamilnadu and Kerala states are notable for this type of natural vegetation.**)
- Teak and sal are the most important trees. Sandalwood, rosewood, kusum, mahua, palas, haldu, amla, padauk, bamboo and tendu are the other trees of economic importance. These forests also provide fragrant oil, varnish, sandal oil and perfumes.

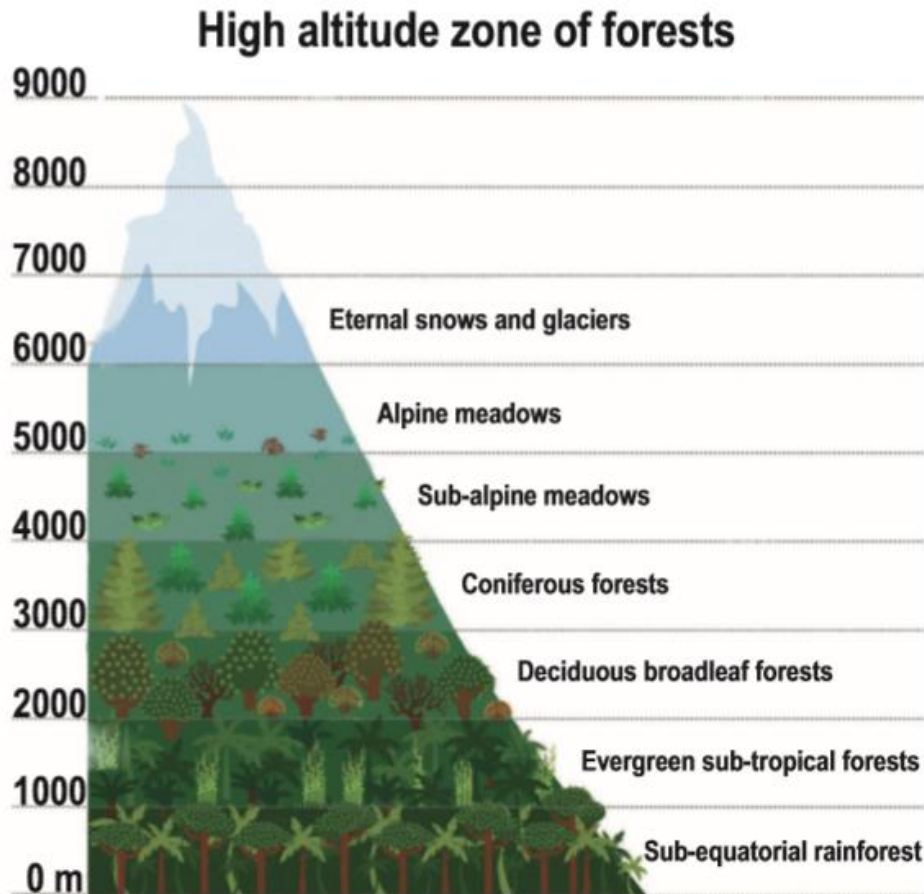
### Tropical Dry Forest

- These are found in the areas with **50 to 100 cm.** annual rainfall.
- They represent a transitional type of forests. These are found in east Rajasthan, Haryana, Punjab, Western Uttar Pradesh, Madhya Pradesh, Eastern Maharashtra, Telangana, West Karnataka and East Tamilnadu.
- The important species are mahua, banyan, amaltas, palas, haldu, kikar, bamboo, babool, khair etc., Desert and Semi-desert Vegetation: These are also called as '**Tropical thorn forests**'.
- These are found in the areas having annual rainfall of less than 50 cm. They have low humidity and high temperature.
- These forests are found in north-west India which includes west Rajasthan, south-west Haryana, north Gujarat and south-west Punjab.
- They are also found in the very dry parts of the **Deccan plateau in Karnataka, Maharashtra and Andhra Pradesh.** Babul, kikar and wild palms are common trees found here.

### Mountain or Montane Forest

- These forests are classified on the basis of altitude and amount of rainfall.
- Accordingly two different types of forests namely Eastern Himalayas Forests and Western Himalayas Forests.





#### Eastern Himalayan Forest:

- These are found on the slopes of the mountains in north-east states. These forests receive **rainfall of more than 200 cm.**
- The **vegetation is of evergreen type.**
- The Altitude between 1200-2400 m found in this type of forest sal, oak, laurel, amura, chestnut, cinnamon are the main trees from 1200 to 2400 m altitude oak, birch, silver, fir, fine, spruce and juniper are the major trees from 2400 to 3600 m height.

#### Western Himalayan Forest:

- The rainfall of this region is moderate. These forests are found in the states of **Jammu and Kashmir, Himachal Pradesh and Uttarakhand.**
- Upto **900 m** altitude semi desert vegetation is found and it is known for bushes and small trees.
- In altitude from **900 to 1800 m**, chir tree is the most common tree. The other important trees of this region are sal, semal, dhak, jamun and jujube. (height from 1800 to 3000 m is covered with semi temperate coniferous forests.)
- Chir, deodar, blue pine, poplar, birch and elder are the main trees of this region.

### Alpine Forest

- It occurs all along the Himalayas with above **2400 m altitude**. These are purely having coniferous trees.
- Oak, silver fir, pine and juniper are the main trees of these forests. The eastern parts of Himalayas has large extent of these forests.

### Tidal Forest

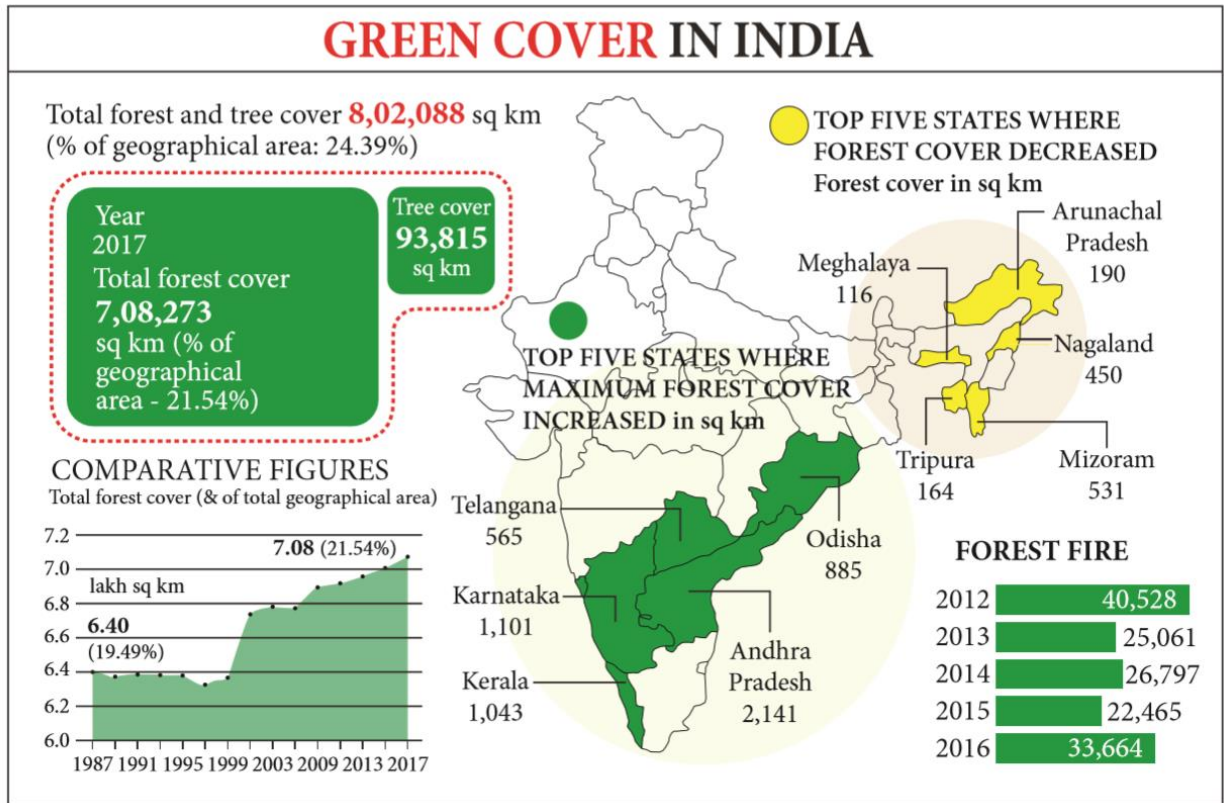
- These forests occur in and around the deltas, estuaries and creeks prone to tidal influences and as such are also known as delta or swamp forests. The delta of the **Ganga- Brahmaputra has the largest tidal forest**.
- The deltas of Mahanadi, Godavari and Krishna rivers are also known for tidal forests. These are also known as mangrove forest.

### Coastal Forest

- These are littoral forests. Generally, coastal areas have these types of forests. Casurina, palm and coconut are the dominant trees.
- Both the eastern and western coasts have this type of forests. The coasts of Kerala and Goa are known for this type.

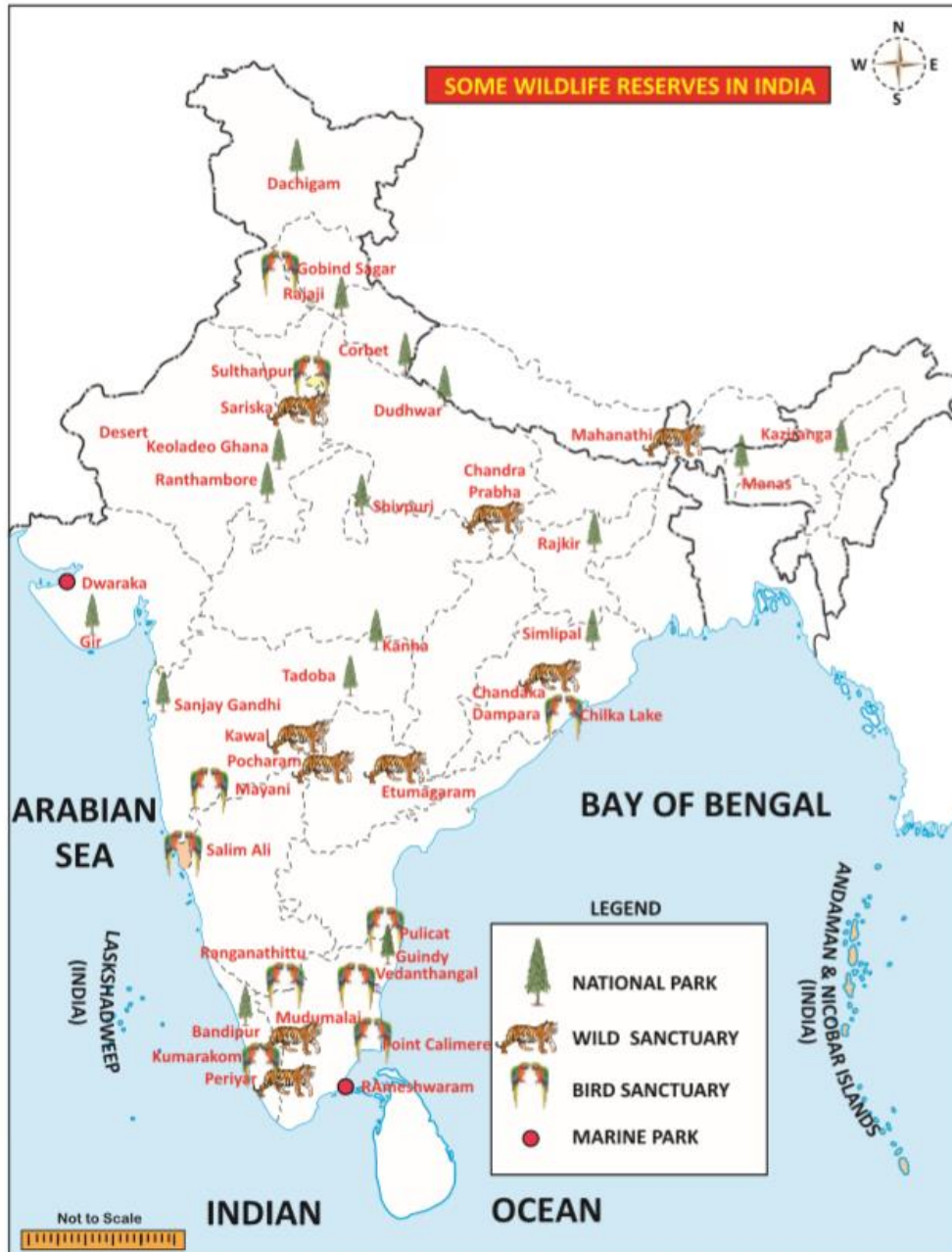
### Riverine Forest

- These forests are found along the rivers on Khadar areas. These are known for tamarisk and tamarind trees.
- The rivers of Great Plains are more prominent for this type of natural vegetation.



**Wildlife**

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- The term 'Wildlife' includes animals of any habitat in nature. Wild animals are non-domesticated animals and include both **vertebrates (fish, amphibians, reptiles, birds and mammals) and invertebrates (bees, butterflies, moths etc.)**.
- India has a rich and diversified wildlife. The Indian fauna consists of about **81,251 species of animals** out of the world's total of about 1.5 million species.
- The faunal diversity of the country consists of **about 6500 invertebrates, 5000 molluscs, 2546 fishes, 1228 birds, 458 mammals, 446 reptiles, 204 amphibians, 4 panthers and about 60,000 species of insects**.

- Our country is home to tigers, lions, leopards, snow leopards, pythons, wolves, foxes, bears, crocodiles, rhinoceroses, camels, wild dogs, monkeys, snakes, antelope species, deer species, varieties of bison and the mighty Asian elephant.
- Hunting, poaching, deforestation and other anthropogenic interferences in the natural habitats have caused extinction of some species and many are facing the danger of extinction.
- In view of this and the role of wild life in maintaining ecological balance, conservation and management of biodiversity of India is necessary at present situation.
- The **Indian Board for Wildlife (IBWL) was constituted in 1952** to suggest means of protection, conservation and management of wildlife to the government.
- The Government of India enacted **Wildlife (Protection) Act in 1972** with the objective of effectively protecting the wild life of the country and to control poaching, smuggling and illegal trade in wildlife and its diversities.
- United Nations Convention on **Biological Diversity (CBD) in 1992** recognizes the sovereign rights of states to use their own Biological Resources.
- To preserve the country's rich and diverse wildlife a network of **102 National Parks and about 515 Wildlife Sanctuaries** across the country have been created.

### Biosphere Reserves





- Biosphere reserves are protected areas of land coastal environments wherein people are an integral component of the system.
- The Indian government has established **18 Biosphere Reserves** in India which protect larger areas of natural habitat and often include one or more National Parks preserves along with buffer zones that are open to some economic uses.
- **Eleven of the eighteen biosphere reserves** (Gulf of Mannar, Nandadevi, the Nilgiris, Nokrek, Pachmarhi, Simlipal, Sundarbans Agasthiyamalai, Great Nicobar, Kanjanjunga and Amarkantak) of India fall under the list of Man and Biosphere programme of UNESCO.



S. No.	Biosphere Reserves	State
1	Achanakmar-Amarkantak	Madhya Pradesh, Chattisgarh
2	Agasthyamalai	Kerala
3	Dibru Saikhowa	Assam
4	Dihang Dibang	Arunachal Pradesh
5	Great Nicobar	Andaman and Nicobar Islands
6	Gulf of Mannar	Tamil nadu
7	Kachch	Gujarat
8	Kanchenjunga	Sikkim
9	Manas	Assam
10	Nanda Devi	Uttarakhand
11	The Nilgiris	Tamil nadu
12	Nokrek	Meghalaya
13	Pachmarhi	Madhya Pradesh
14	Simlipal	Odisha
15	Sundarbans	West Bengal
16	Cold desert	Himachal Pradesh
17	Sesahachalam hills	Andhra Pradesh
18	Panna	Madhya Pradesh

**More to Know:**

1. Project Tiger was launched in **April 1973** with the aim to conserve tiger population in specifically constituted "Tiger Reserves" in India. This project is benefited tremendously, with an increase of over 60% - the **1979 consensus put the population at 3,015** - while other equally disturbed species like the barasingha (swamp deer), rhino and elephants also fought back from the brink of oblivion.
2. The Nilgiri Tahr is facing a major threat in the Western Ghats. Continuous poaching activities and Eucalyptus cultivation hampering its habitat, the Nilgiri Tahr population is continuously decreasing.
3. The Black Buck is the state animal of Andhra Pradesh, Haryana and Punjab.

4. Mawsynram, the place which receives **highest rainfall (1141 cm)** in the world. It is located in Meghalaya.
5. Atacama desert is the driest place on the earth.
6. Weather refers to the state of atmosphere of a place at a given point of time.
7. Climate is the accumulation of daily and seasonal weather events of a given location over a period of 30-35 years.
8. Equable climate is also called as the **British climate**, which is neither too hot nor too cold.