Content

Credits

The NCERT of Class 11 India: Physical Environment has been referred while preparing this PDF notes. All the facts, information and data has been taken from NCERT textbook and other relevant government websites itself. The facts, information and data has been organised in a reading friendly manner for students so that they can understand it easily.

Chapter 1 – India: Location

The mainland of India, extends from Kashmir in the north to Kanyakumari in the south and Arunachal Pradesh in the east to Gujarat in the west. India's territorial limit further extends towards the sea upto 12 nautical miles (about 21.9 km) from the coast.

India's Latitudinal extent: 8°4' N to 37°6' N

The latitudinal variation shows that the southern part of the country lies within the tropics and the northern part lies in the sub-tropical zone or the warm temperate zone. This location is responsible for large variations in land forms, climate, soil types and natural vegetation in the country.

Our southern boundary extends upto 6°45' N latitude in the Bay of Bengal.

India's Longitudinal extent: 68°7'E to 97°25' E

The latitudinal and longitudinal extent of India, are roughly about 30 degrees, whereas the actual distance measured from north to south extremity is 3,214 km, and that from east to west is only 2,933 km.

The reason for this difference is based on the fact that the distance between two longitudes decreases towards the poles whereas the distance between two latitudes remains the same everywhere.

The distance between two latitudes is approximately 69 miles (111 kms).

From the longitudinal variation, it is clear that the 30 degrees variation causes the time difference of around two hours between the easternmost and the westernmost parts of our country. But, in India, we follow the same time everywhere. How is it possible?

Standard meridians are selected in multiples of 7°30' of longitude. That is why India has chosen 82°30' E as the Indian Standard Meridian and the time of this meridian is taken as Indian Standard Time (IST) which is 5 hours 30 minutes ahead of GMT (GMT +5:30).

There are some countries with vast East-to-West extent like USA, Russia etc. They have more than one standard meridian. Example, USA has 7, Russia has 11 time zones.

To do activity: Note down few more countries which have more than one time zone.

India with its area of 3.28 million sq. km accounts for 2.4 per cent of the world's land surface area and stands as the seventh largest country in the world.

Top 10 Largest countries of the World

S. No.	Country	Area (sq. km)
1	Russia	17,098,242
2	Canada	9,984,670
3	China	9,706,961
4	USA	9,372,610
5	Brazil	8,515,767
6	Australia	7,692,024
7	India	3,287,590
8	Argentina	2,780,400
9	Kazakhstan	2,724,900
10	Algeria	2,381,741

Source: worldometers.info

Indian subcontinent includes seven countries - **India, Pakistan, Nepal, Bhutan, Bangladesh, Maldives* and Sri Lanka*.**

(India do not share land boundaries with these countries)*

Indian subcontinent is bounded by Himalayas in the north, Hindukush and Sulaiman ranges in the northwest, Purvachal hills in the north-east and by the large expanse of the Indian ocean in the south.

The Himalayas, together with other ranges, have acted as a formidable physical barrier in the past. Except for a few mountain passes such as the Khyber, the Bolan, the Shipkila, the Nathula, the Bomdila, etc. it was difficult to cross it.

Major Passes of India

Passes	Countries/States	Passes Through
Khyber Pass	Pakistan, on the border of Afghanistan	Spin Ghar Mountains
Bolan Pass	Balochistan Province of Pakistan	Toba Bakar Range
Shipkila	Kinnaur District of Himachal Pradesh	India – Tibet border
Nathula	East Sikkim District of Sikkim	India – China border
Bomdila	Arunachal Pradesh	Connects Arunachal Pradesh with Lhasa, the capital city of Tibet

Peninsular part of India extends towards the Indian Ocean. This has provided the country with a coastline of 6,100 km in the mainland and 7,517 km in the entire geographical coast of the mainland plus the island groups Andaman and Nicobar located in the Bay of Bengal and the Lakshadweep in the Arabian Sea.

INDIA AND ITS NEIGHBOURS

India is located in the south-central part of the continent of Asia, bordering the Indian ocean and its two arms extending in the form of Bay of Bengal and the Arabian Sea.

Neighbours of India include Bangladesh, China, Pakistan, Nepal, Myanmar, Bhutan, Afghanistan, Maldives and Sri Lanka. Of these, India shares land boundaries with all except Maldives and Sri Lanka.

India & its Neighbouring Countries

Country	Border Length (in kms)
Bangladesh	4,096.7
China	3,488
Pakistan	3,323
Nepal	1,751
Myanmar	1,643
Bhutan	699
Afghanistan	106

India – Bangladesh (4096.7 km)	
States	**Border Length (in kms)**
West Bengal	2216.7
Assam	263
Meghalaya	443
Tripura	856
Mizoram	318

India – China (3488 km)	
States	**Border Length (in kms)**
Jammu & Kashmir	1597
Himachal Pradesh	200
Uttarakhand	345
Sikkim	220
Arunachal Pradesh	1126

India – Pakistan (3323 km)	
States	**Border Length (in kms)**
Jammu & Kashmir	1222
Punjab	425
Rajasthan	1170
Gujarat	506

India – Nepal (1751 km)	
States	**Border Length (in kms)**
Uttarakhand	303
Uttar Pradesh	651
Bihar	601
Sikkim	100
West Bengal	96

India – Myanmar (1643 km)	
States	**Border Length (in kms)**
Arunachal Pradesh	520
Nagaland	215
Manipur	398
Mizoram	510

India – Bhutan (699 km)	
States	**Border Length (in kms)**
Sikkim	32
West Bengal	183
Assam	267
Arunachal Pradesh	217

****

the Tibetan region at an altitude of 4,164 m in the Kailash Mountain range.
- In Tibet, it is known as 'Singi Khamban; or Lion's mouth.
- After flowing in the northwest direction between the Ladakh and Zaskar ranges, it passes through Ladakh and Baltistan.
- It cuts across the Ladakh range, forming a spectacular gorge near Gilgit in Jammu and Kashmir.
- It enters into Pakistan near Chilas in the Dardistan region. Find out the area known as Dardistan.
- The Indus receives a number of Himalayan tributaries such as the Shyok, the Gilgit, the Zaskar, the Hunza, the Nubra, the Shigar, the Gasting and the Dras.
- It finally emerges out of the hills near Attock where it receives the Kabul river on its right bank.
- The other important tributaries joining the right bank of the Indus are the Khurram, the Tochi, the Gomal, the Viboa and the Sangar. They all originate in the Sulaiman ranges.
- The river flows southward and receives 'Panjnad' a little above Mithankot. The Panjnad is the name given to the five rivers of Punjab, namely the Satluj, the Beas, the Ravi, the Chenab and the Jhelum.
- It finally discharges into the Arabian Sea, east of Karachi.
- The Indus flows in India only through Ladakh.

Important tributaries

Jhelum

- The Jhelum, an important tributary of the Indus, rises from a spring at Verinag situated at the foot of the Pir Panjal in the south-eastern part of the valley of Kashmir.
- It flows through Srinagar and the Wular lake before entering Pakistan through a deep narrow gorge. It joins the Chenab near Jhang in Pakistan

Chenab

- The Chenab is the largest tributary of the Indus.
- It is formed by two streams, the Chandra and the Bhaga, which join at Tandi near Keylong in Himachal Pradesh. Hence, it is also known as Chandrabhaga.
- The river flows for 1,180 km before entering into Pakistan

Ravi

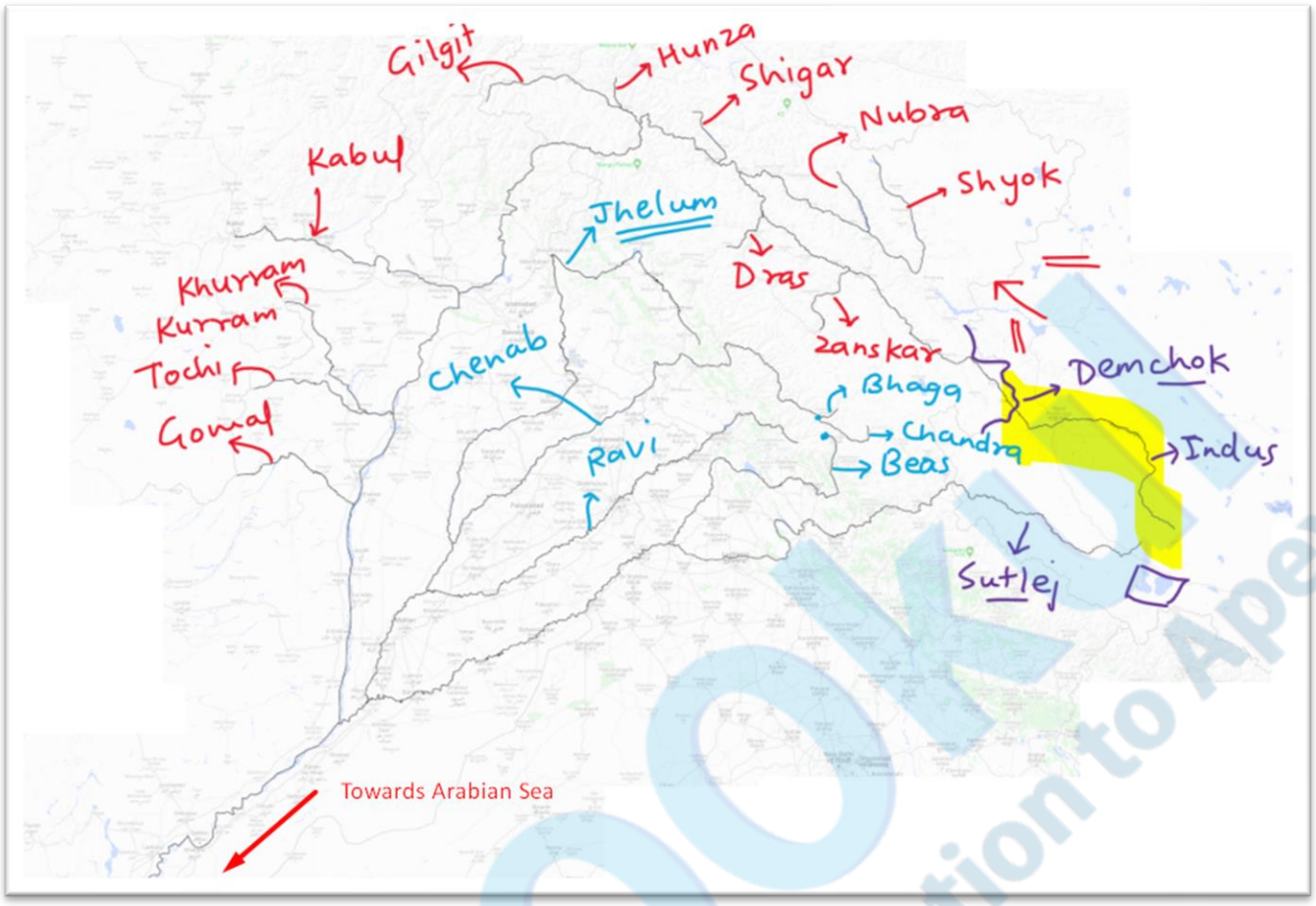
- The Ravi is another important tributary of the Indus.
- It rises west of the Rohtang pass in the Kullu hills of Himachal Pradesh and flows through the Chamba valley of the state.
- Before entering Pakistan and joining the Chenab near Sarai Sidhu, it drains the area lying between the southeastern part of the Pir Panjal and the Dhauladhar ranges.

Beas

- The Beas is another important tributary of the Indus, originating from the Beas Kund near the Rohtang Pass at an elevation of 4,000 m above the mean sea level.
- The river flows through the Kullu valley and forms gorges at Kati and Largi in the Dhaoladhar range.
- It enters the Punjab plains where it meets the Satluj near Harike.

Satluj

- The Satluj originates in the 'Raksas tal' near Mansarovar at an altitude of 4,555 m in Tibet where it is known as Langchen Khambab.
- It flows almost parallel to the Indus for about 400 km before entering India, and comes out of a gorge at Rupar.
- It passes through the Shipki La on the Himalayan ranges and enters the Punjab plains.
- It is an antecedent river. It is a very important tributary as it feeds the canal system of the Bhakra Nangal project.



Indus and its Tributaries

THE GANGA SYSTEM

- The Ganga is the most important river of India both from the point of view of its basin and cultural significance.
- It rises in the Gangotri glacier near Gaumukh (3,900 m) in the Uttarkashi district of Uttarakhand. Here, it is known as the Bhagirathi. It cuts through the Central and the Lesser Himalayas in narrow gorges.
- At Devprayag, the Bhagirathi meets the Alaknanda; hereafter, it is known as the Ganga.
- The Alaknanda has its source in the Satopanth glacier above Badrinath. The Alaknanda consists of the Dhauli and the Vishnu Ganga which meet at Joshimath or Vishnu Prayag.
- The other tributaries of Alaknanda such as the Pindar joins it at Karna Prayag while Mandakini or Kali Ganga meets it at Rudra Prayag.
- The Ganga enters the plains at Haridwar. From here, it flows first to the south, then to the south-east and east before splitting into two distributaries, namely the Bhagirathi and the Padma.
- The river has a length of 2,525 km. It is shared by Uttarakhand (110 km) and Uttar Pradesh (1,450 km), Bihar (445 km) and West Bengal (520 km).
- The Ganga river system is the largest in India having a number of perennial and non-perennial rivers originating in the Himalayas in the north and the Peninsula in the south, respectively.
- The Son is its major right bank tributary.
- The important left bank tributaries are the Ramganga, the Gomati, the Ghaghara, the Gandak, the Kosi and the Mahananda
- The river finally discharges itself into the Bay of Bengal near the Sagar Island.

Important tributaries

Yamuna

- The Yamuna, the western most and the longest tributary of the Ganga, has its source in the Yamunotri glacier on the western slopes of Banderpunch range (6,316 km).
- It joins the Ganga at Prayag (Allahabad).

throughout the year with small daily and annual range.
- Area north of the Tropic of Cancer being away from the equator, experiences extreme climate with high daily and annual range of temperature.

The Himalayan Mountains

- The Himalayas act as a barrier to protect the subcontinent from the cold northern winds. These cold and chilly winds originate near the Arctic circle and blow across central and eastern Asia.
- The Himalayas also trap the monsoon winds, forcing them to shed their moisture within the subcontinent.

Distribution of Land and Water

- India is surrounded on three sides by water bodies and on the other by land and as compared to the landmass, water heats up or cools down slowly.
- This differential heating of land and sea creates different air pressure zones in different seasons in and around the Indian subcontinent.
- Difference in air pressure causes reversal in the direction of monsoon winds.

Distance from the Sea

- With a long coastline, large coastal areas have an equable climate.
- Areas in the interior of India are far away from the moderating influence of the sea. Such areas have extremes of climate.
- On the other hand, the seasonal contrasts in weather at places in the interior of the country such as Delhi, Kanpur and Amritsar affect the entire sphere of life.

Altitude

- Temperature decreases with height. Due to thin air, places in the mountains are cooler than places on the plains.

Relief

- The physiography or relief of India also affects the temperature, air pressure, direction and speed of wind and the amount and distribution of rainfall.
- The windward sides of Western Ghats and Assam receive high rainfall during June-September whereas the southern plateau remains dry due to its leeward situation along the Western Ghats.

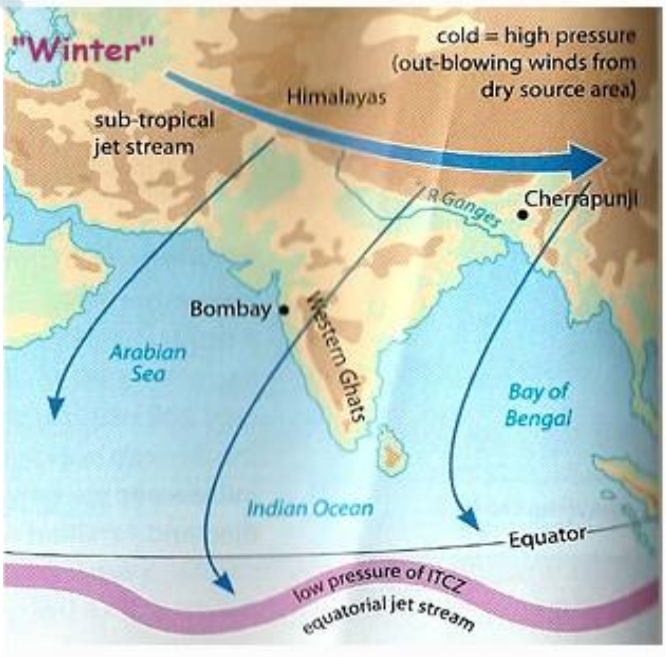
Factors Related to Air Pressure and Wind

- Distribution of air pressure and winds on the surface of the earth.
- Upper air circulation caused by factors controlling global weather and the inflow of different air masses and jet streams.
- Inflow of western cyclones generally known as disturbances during the winter season and tropical depressions during the south-west monsoon period into India, creating weather conditions favourable to rainfall.

Mechanism of Weather in the Winter Season

Surface Pressure and Winds

- In winter months, the weather conditions over India are generally influenced by the distribution of pressure in Central and Western Asia.
- A high-pressure centre in the region lying to the north of the Himalayas develops during winter.

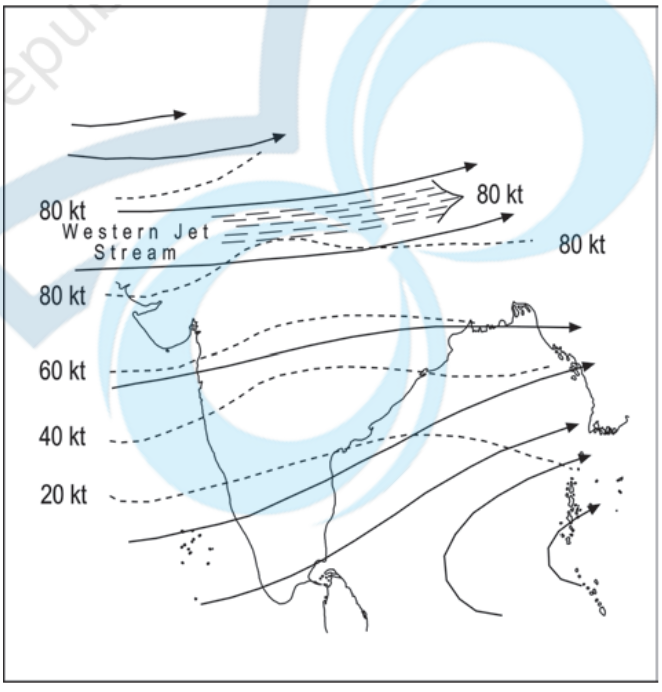


- This centre of high pressure gives rise to the flow of air at the low level from the north towards the Indian subcontinent, south of the mountain range.

- The surface winds blowing out of the high-pressure centre over Central Asia reach India in the form of a dry continental air mass.
- These continental winds come in contact with trade winds over northwestern India.
- The position of this contact zone is not, however, stable. Occasionally, it may shift its position as far east as the middle Ganga valley with the result that the whole of the northwestern and northern India up to the middle Ganga valley comes under the influence of dry northwestern winds.

Jet Stream and Upper Air Circulation

- Higher up in the lower troposphere, about three km above the surface of the earth, a different pattern of air circulation is observed.
- The variations in the atmospheric pressure closer to the surface of the earth have no role to play in the making of upper air circulation.
- All of Western and Central Asia remains under the influence of westerly winds along the altitude of 9-13 km from west to east.
- These winds blow across the Asian continent at latitudes north of the Himalayas roughly parallel to the Tibetan highlands. These are known as jet streams.



- Tibetan highlands act as a barrier in the path of these jet streams. As a result, jet streams get bifurcated. One of its branches blows to the north of the Tibetan highlands, while the southern branch blows in an eastward direction, south of the Himalayas. It has its mean position at 25°N in February at 200-300 mb level.
- It is believed that this southern branch of the jet stream exercises an important influence on the winter weather in India.

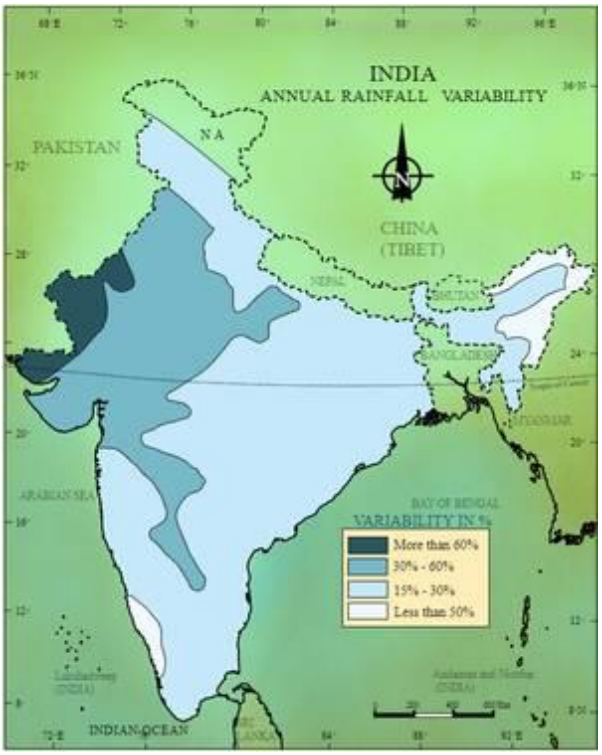
Western Cyclonic Disturbance and Tropical Cyclones

- The western cyclonic disturbances which enter the Indian subcontinent from the west and the northwest during the winter months, originate over the Mediterranean Sea and are brought into India by the westerly jet stream.
- An increase in the prevailing night temperature generally indicates an advance in the arrival of these cyclones disturbances.
- Tropical cyclones originate over the Bay of Bengal and the Indian ocean.
- These tropical cyclones have very high wind velocity and heavy rainfall and hit the Tamil Nadu, Andhra Pradesh and Orissa coast.
- Most of these cyclones are very destructive due to high wind velocity and torrential rain that accompanies it.

Mechanism of Weather in the Summer Season

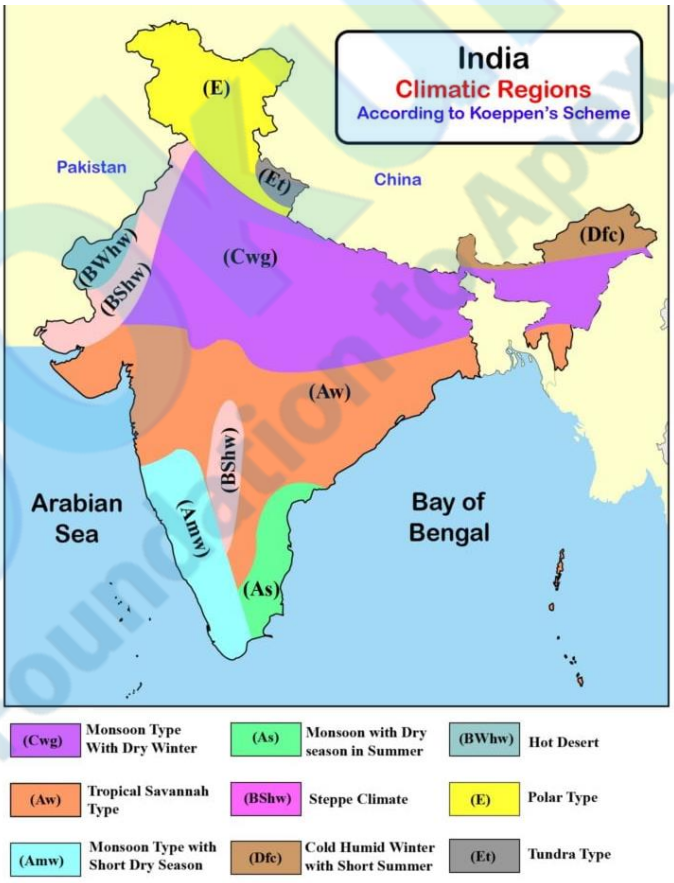
Surface Pressure and Winds

- As the summer sets in and the sun shifts northwards, the wind circulation over the subcontinent undergoes a complete reversal at both, the lower as well as the upper levels.
- By the middle of July, the low-pressure belt nearer the surface [termed as Inter Tropical Convergence Zone (ITCZ)] shifts northwards, roughly parallel to the Himalayas between 20° N and 25° N.



Climatic Regions of India

- The whole of India has a monsoon type of climate. But the combination of elements of the weather reveal many regional variations.
- These variations represent the sub-types of the monsoon climate. It is on this basis that the climatic regions can be identified.
- A climatic region has a homogeneous climatic condition which is the result of a combination of factors.
- Temperature and rainfall are two important elements which are considered to be decisive in all the schemes of climatic classification
- The classification of climate, however, is a complex exercise. There are different schemes of classification of climate.
- Major climatic types of India based on Koeppen's scheme which classify climate on monthly values of temperature and precipitation. He identified five major climatic types, namely:
  - Tropical climates, where mean monthly temperature throughout the year is over 18°C.
  - Dry climates, where precipitation is very low in comparison to temperature, and hence, dry. If dryness is less, it is semi-arid (S); if it is more, the climate is arid(W).
  - Warm temperate climates, where mean temperature of the coldest month is between 18°C and minus 3°C.
  - Cool temperate climates, where mean temperature of the warmest month is over 10°C, and mean temperature of the coldest month is under minus 3°C.
  - Ice climates, where mean temperature of the warmest month is under 10°C.
- Koeppen used letter symbols to denote climatic types such as:



Monsoons and the Economic Life in India

- Monsoon is that axis around which revolves the entire agricultural cycle of India. It is because about 64 per cent people of India depend on agriculture for their livelihood and agriculture itself is based on southwest monsoon.
- Except Himalayas all the parts of the country have temperature above the threshold level to grow the crops or plants throughout the year.
- Regional variations in monsoon climate help in growing various types of crops.
- Variability of rainfall brings droughts or floods every year in some parts of the country.

Chapter 5 – Natural Vegetation

Natural vegetation refers to a plant community that has been left undisturbed over a long time, so as to allow its individual species to adjust themselves to climate and soil conditions as fully as possible.

Great variety of natural vegetation is found in India. Himalayas have temperate vegetation; the Western Ghats and the Andaman Nicobar Islands have tropical rain forests, the deltaic regions have tropical forests and mangroves; the desert and semi desert areas of Rajasthan are known for cactii, a wide variety of bushes and thorny vegetation.

The vegetation of India changes from one region to another, because of the wide variations in the climate and the soil.

TYPES OF FORESTS

(i) Tropical Evergreen and Semi Evergreen forests

(ii) Tropical Deciduous forests

(iii) Tropical Thorn forests

(iv) Montane forests

(v) Littoral and Swamp forests

Tropical Evergreen Forests

Climatic conditions: warm and humid areas, annual precipitation of over 200 cm and mean annual temperature above 22°C.

Majorly found in: Western slope of the Western Ghats, hills of the north-eastern region and the Andaman and Nicobar Islands.

Unique features: They are well stratified. Layers closer to the ground are covered with shrubs and creepers, followed by short structured and tall variety of trees. Trees may reach upto height of 60m or more.

They do not shed their leaves on definite time, hence remain green throughout the year, so called as 'Evergreen'.

Important Species: Rosewood, Mahogany, Aini, Ebony, etc

Indian Rosewood		

Mahogony		
Aini