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मुख्यमंत्री अभ्युदय योजना



GENERAL STUDIES INDIAN GEOGRAPHY

मुख्यमंत्री अभ्युदय योजना प्रकोष्ठ

उत्तर प्रदेश प्रशासन और प्रबंधन अकादमी

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यह अध्ययन-सामग्री उत्तर प्रदेश सरकार की मुख्यमंत्री अभ्युदय योजना के अंतर्गत मुख्यमंत्री अभ्युदय योजना प्रकोष्ठ (उत्तर प्रदेश प्रशासन और प्रबंधन अकादमी) द्वारा सिविल सेवा परीक्षा की तैयारी कर रहे प्रतियोगियों की सहायता के लिए तैयार कराई गई है।

इस पाठ्य-सामग्री को उत्तर प्रदेश प्रशासन एवं प्रबंधन अकादमी, लखनऊ में 65वें आधारभूत प्रशिक्षण कार्यक्रम के अंतर्गत प्रशिक्षण प्राप्त कर रहे प्रशिक्षु डिप्टी कलक्टर्स (UPPCS-2018) द्वारा प्रोजेक्ट कार्य के रूप में तैयार किया गया है।

इस सामग्री को पूर्णतः शैक्षणिक और जन कल्याणकारी-उद्देश्यों के लिए तैयार किया गया है-इसका एक मात्र उद्देश्य प्रदेश के छात्र/छात्राओं का प्रतियोगी परीक्षाओं की तैयारी में मार्गदर्शन व सहयोग करना है।

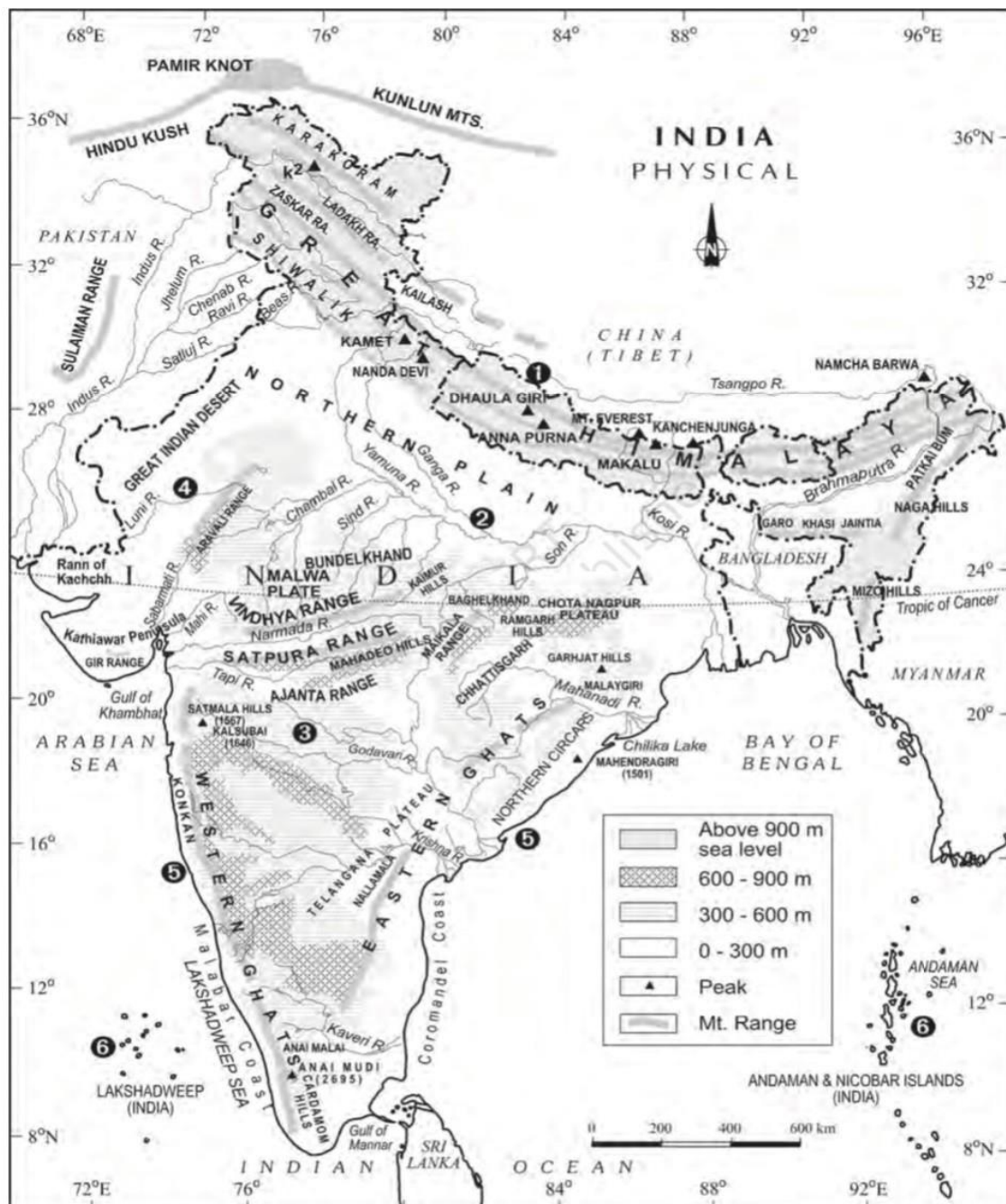
वैधानिक सूचना - इस अध्ययन सामग्री का किसी भी प्रकार से व्यावसायिक उपयोग प्रतिबंधित है।

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INDIAN PHYSIOGRAPHY

India can be physio-graphically divided into the Northern Mountains, the Northern Plains, the Peninsular Plateau and the Coastal Plains and Islands. Northern Mountains of India are made up of Himalayan mountain complex. The location of the Northern mountains mostly lies between India and China.



➤ **Physiographic division of India:**

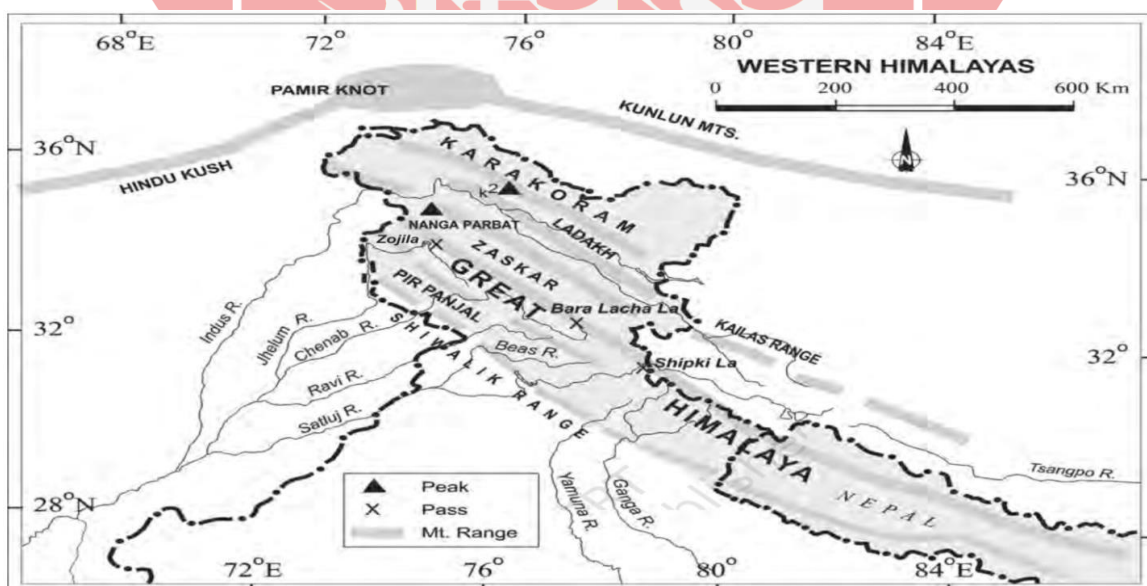
- Northern mountains
- Northern plains
- Peninsular Plateau
- Coastal plains
- Islands

1. Northern mountains:

The northern Himalayas are young fold mountains. They are formed in Tertiary era that is they are formed between 60 to 2 million years back. The westernmost peak of Himalaya mountains is Nanga Parbat and the easternmost peak of Himalayas is Namcha Barwa. At both the extremes, the Himalayan mountains take sharp bends towards the south. These sharp bends are known as syntaxial bends of Himalayas.

Northern Himalayas are divided into 4 parts in North-South direction based on the structure and relief.

- Trans Himalayan mountains
- Greater Himalayan mountains
- Middle/ Lesser Himalayan mountains
- Outer Himalayan mountains

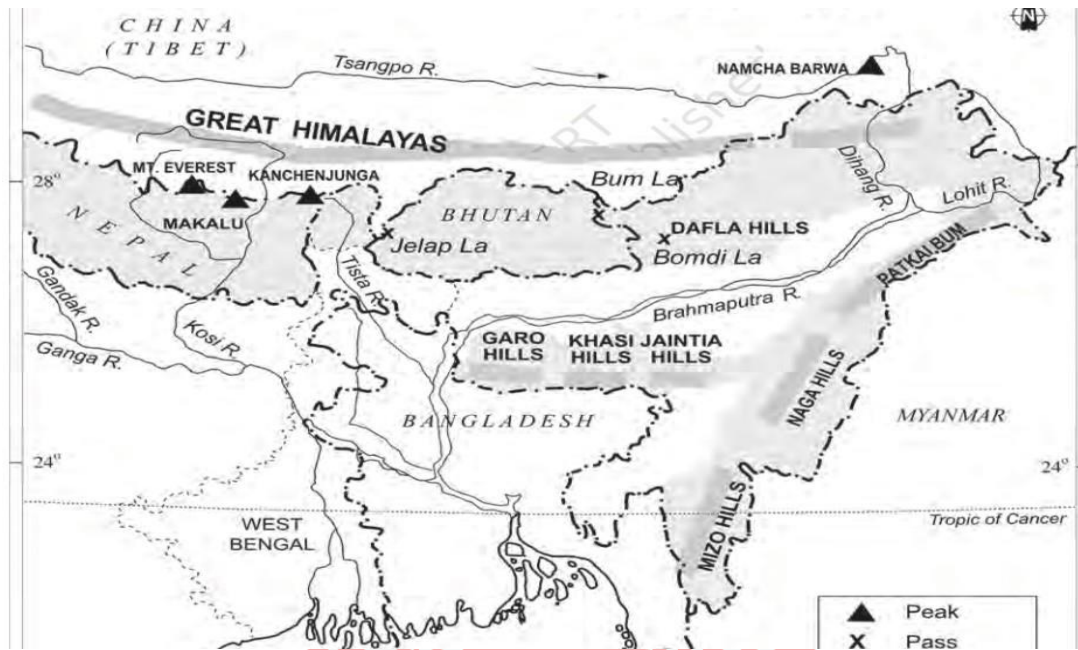


1. Trans Himalayas

- Trans Himalayas of the Northern Mountains of India are located in earlier Tethys Sea area. Trans Himalayas have 3 important mountain ranges in India mainly in Jammu and Kashmir, namely Karakoram, Zaskar and Ladakh ranges.
- The largest glacier of Himalayas, Siachen Glacier is situated in the Karakoram ranges of Trans Himalayas.
- Lake Manasarovar is located in the Kailash range of Tibet and it is the source for river Indus. Lake Rakshastal is the source for river Sutlej.
- The highest mountain peak of India, K2 / Mount Godwin-Austen located in Karakoram range, is in Pakistan Occupied Kashmir(Pok), which is being administered by Pakistan. Hence, Kanchenjunga (in Greater Himalayas) is considered the highest mountain peak of India.

2. Greater Himalayas

- Greater Himalayas or Himadri ranges of the Northern Mountains in India are formed 20-25 million years back and they are the most continuous range of mountains.
- The average height of Greater Himalayas is 6000 m. The narrowest width of these mountains is 20-25 km in North-South direction.
- There are large number of mountain peaks that are being located here. Highest mountain peak Mount Everest or Sagarmatha (8848 m height) is located in Greater Himalayas of Nepal.
- Other mountain peaks Kanchenjunga, Dhaulagiri, Makalu, Nanga Parbat, Nanda Devi, Annapurna, Kamet, Namcha Barwa, etc. are located in Greater Himalayas.
- It is a single continuous mountain range and looks like a wall. The Himadri runs in an arc like shape from Nanga Parbat in west to Namcha Barwa in east.
- The folds of Greater Himalayas are asymmetrical in nature and the core of Himadri ranges is composed of granite.



3. Lesser Himalayas

- Lesser Himalayas of the Himalayan mountain ranges in North India are formed 2-5 million years back. The average height of these mountains range from 3700 m to 4500 m and their average width is 50 km.
- These mountains are covered with snow only during winter. In summer, they have cool and pleasant climate.
- They are popular for hill stations like Shimla, Mussoorie, Kullu, Manali, Dehradun, Darjeeling, etc.
- They are very much discontinuous in nature. Pir Panjal range (longest range of Lesser Himalayas) is located in Jammu & Kashmir, Dhauladhar range in Himachal Pradesh, Mussoorie range in Uttar Pradesh and Mahabharat range in Nepal.
- They have densely covered forests and are highly uneven and rugged terrains. Valleys are located between Greater Himalayas and Lesser Himalayas.
- Valley of Kashmir is located in between Greater Himalayas and Pir Panjal ranges.

4. Outer Himalayas

- Outer Himalayas or Siwaliks of Northern Mountains in India have an average height of 900-1100 m and a width of 10-50 km.
- They are highly descending in their structure and are having many Gorges and Canyons. They are being covered with dense forests. They are consisting of unconsolidated sediments.
- They are also very much discontinuous in nature. They are represented by

Jammu Hills in Jammu & Kashmir and are very much developed in Uttarakhand and Nepal. In Sikkim, they are very much absent.

- The longitudinal valleys that are existing between Lesser Himalayas and the Siwaliks are called Duns, e.g. Dehradun, Kotli Dun, Patli Dun, etc. Dehradun is located in between Siwaliks and Mussoorie Hills.
- Udhampur town is located in between Jammu Hills and Pir Panjal ranges. Duns are areas of intensive cultivation. So, population is concentrated here because of fertile lands.

➤ **Passes in Himalayan Ranges**

- Passes are also called Cols. They are having economic as well as cultural significance and are strategically important.
- Karakoram Pass, located near Siachen, connects China and Pakistan in Pok. Banihal Pass is Gateway to Kashmir Valley
- Pir Panjal Pass is located on Jammu and Srinagar Highway. Zojila Pass is located close to the Srinagar and Leh Highway
- River Sutlej enters India through a Pass known as Shipki La Pass in Himachal Pradesh. Lipulekh Pass in Uttarakhand is a tri-junction for India, China and Nepal.
- Nathula Pass in Sikkim is one of the trading border posts in between India and China.
- In 1962, China invasion started through Tawang Pass and Bomdila Pass in Arunachal Pradesh.

➤ **Regional sub-division of Himalayas**

The Northern Mountains of India can also be divided on the basis of the region they are located in the Himalayas in between Indus and Sutlej rivers are called Punjab Himalayas, between Sutlej and Kali rivers are known as Garhwal / Kumaon Himalayas, between Kali and Tista rivers are being known as Nepal Himalayas and between Tista and Brahmaputra rivers are called Arunachal / Assam Himalayas.

2. **Northern plains**

The Northern Plains of India were formed less than 1.5 million years back. They are either flat or gently sloping in nature. These plains are formed due to deposition of sediments that were brought down by the Indus, Ganges, Brahmaputra rivers and the tributaries. Some geologists propose that there was geosynclinal trough between the Himalayas and the Deccan plateau which was filled by these sediments.

Facts about Northern Plains of India

- Sometimes, the northern plains of India are called "Fore deep". Depth of alluvial lands of the Great Northern Plains is around 400-1400 m. These are the largest depth plains in the world.
- These plains are continuously drained by the large river systems of Indus, Ganga and Brahmaputra. The states of northern plains of India stretch from Rajasthan to Assam.
- River Indus and its tributaries cover Jammu and Kashmir, Himachal Pradesh, Punjab, Haryana and Western Rajasthan. River Ganges and its tributaries cover Uttar Pradesh, Bihar and West Bengal. River Brahmaputra covers Assam.
- Doab in India is a very important feature of the Great Northern Plains. Doab is a small upland area separating adjacent river valleys or streams and acts as a barrier. Doabs are very fertile lands.
- Ganga-Yamuna Doab lies in Western UP. Bari Doab lies between Ravi and Beas rivers. Bist Doab lies between Sutlej and Beas rivers.
- Floodplains are one more feature of these Plains. Sediments are brought in by the flood water and are deposited on the banks of the river valley. Low-lying parts of the floodplains located near the river valley are called Khadar plains. They are regularly flooded and are called new alluvial lands.
- Upland parts of the floodplains located away from the river valley are called Bhangar plains. They are occasionally flooded and are called old alluvial lands. Khadar and Bhangar plains are the "Granaries of India".
- Bhabar Region - Bhabar region lies at the foothills of the mountains. This region is made up of pebbles, stones, gravels and coarse sand. It is a highly porous region. When rivers flow through this area, they almost disappear because of percolation.
- Terai Region - The disappeared rivers emerge from the Terai region. It is very much swampy or marshy. Because of nature, we can see dense forests here. These are located between Bihar and Nepal and Uttar Pradesh and Nepal.

a) Rajasthan Plains

- Thar Desert is also a part of the Northern Plains of India and it comes under Indus plains from the topographic view.
- Rajasthan Plains can be divided into two regions, namely Bagar region and Marusthali desert region.
- Bagar region is a semi-arid region. Here, we can find big and small river streams, e.g. Luni river. Salt lakes can be found here, e.g. Sambhar lake.

- Marusthali region is a proper Desert region. It is an arid region covered with sand dunes. We can come across river channels here, e.g. River Ghaggar. River Ghaggar is the successor of ancient river Saraswati.
- Peninsular plateau of India is located towards the south of Great Northern Plains and it is the oldest and largest physiographic division of India. The topographical features of Peninsular Plateau include rift valleys, plateaus, block mountains, river basins, etc.

b) Punjab plains

- This plain is formed by five important rivers of Indus system. Punjab literally means “(The Land of) Five Waters” referring to the following rivers: Jhelum, Chenab, Ravi, Sutlej, and Beas. The eastern boundary of Punjab Haryana plain is marked by subsurface Delhi- Aravali ridge.
- The northern part of this plain [Shiwalik hills] has been intensively eroded by numerous streams called Chos. This has led to enormous gullying (Arid Landforms). To the south of the Satluj river there is Malwa plain of Punjab. The area between the Ghaggar and the Yamuna rivers lies in Haryana and often termed as ‘Haryana Tract’.

c) Ganga plains

- This is the largest unit of the Great Plain of India stretching from Delhi to Kolkata (about 3.75 lakh sq km).
- The peninsular rivers such as Chambal, Betwa, Ken, Son, etc. joining the Ganga river system have also contributed to the formation of this plain. Rivers flow sluggishly in the lower sections of Ganges as a result of which the area is marked by local prominences such as levees, bluffs, oxbow lakes, marshes, ravines, etc. (Fluvial Landforms, Arid Land forms).

d) Brahmaputra plains

Its western boundary is formed by the Indo-Bangladesh border as well as the boundary of the lower Ganga Plain. Its eastern boundary is formed by Purvanchal hills. terai regions of darjeeling is known as duars.

3. Peninsular Plateau

- There are three divisions of Peninsular plateau of India, namely North-Eastern Plateau, Central Highlands and Deccan Plateau.
- The northern portion of the Peninsular Plateau is inclined towards North and hence many rivers like Son, Chambal, Betwa, etc. drain the North Indian plains. The southern portion of the Peninsular plateau is inclined

towards East and hence most of the rivers like Godavari, Krishna, Cauvery, etc. except Narmada and Tapi flow into Bay of Bengal.

- Aravalli ranges are the North-Western boundaries of Peninsular Plateau whereas Western Ghats or Sahyadri ranges are the Western boundaries and Eastern Ghats are the Eastern boundaries.
- North-Eastern Plateau consists of Shillong plateau and Karbi Anglong plateau. The Shillong plateau is further divided into 3 parts, namely Garo hills, Khasi hills and Jaintia hills.
- The Central Highlands consists of Aravalli ranges, Malwa Plateau, Chota Nagpur Plateau, Rajmahal Hills and Vindhya ranges.
- The Deccan Plateau-
The Deccan Plateau lies to the south of the Narmada River and is shaped as an inverted triangle. It is bordered by:
 - a) The Western Ghats in the west
 - b) The Eastern Ghats in the east
 - c) The Satpura, Maikal range and Mahadeo hills in the north

It is volcanic in origin, made up of horizontal layers of solidified lava forming trap structure with step-like appearance. The sedimentary layers are also found in between the layers of solidified lava, making it inter-trapping in structure. The plateau is suitable for the cultivation of cotton; home to rich mineral resources and a source to generate hydroelectric power.

NOTE-

➤ CENTRAL HIGHLANDS INCLUDE-

- Marwar Upland
- Bundelkhand Plateau
- Baghelkhand Plateau
- Chota Nagpur Plateau

➤ DECCAN PLATEAU INCLUDE-

- Maharashtra Plateau
- Karnataka Plateau
- Telangana Plateau

➤ **HILL RANGES OF PENINSULAR PLATEAU-**

a) **ARAVALLI RANGE**

one of the oldest fold mountains of the world, now form residual mountains with an elevation of 300m to 900m. Guru Shikhar Peak on Mount Abu is the highest peak in the Aravalli Range. Origin of Sabarmati and Luni rivers.

b) **VINDHYAN RANGE**

The rivers Chambal, Betwa and Ken rise. It runs more or less parallel to the Narmada Valley in an east-west direction from Jabalpur in Gujarat to Sasaram in Bihar for a distance of over 1,200 km.

c) **SATPURA RANGE**

Mahadeo hills lie to the east of Satpura hills. Pachmarhi is the highest point of the Satpura range. Dhupgarh (1350m) is the highest peak of Pachmarhi.

d) **WESTERN GHATS**

The Western Ghats are a mountain range running parallel along the western coast of India starting from Gujarat and ending in Tamil Nadu covering the states of Maharashtra, Goa, Karnataka and Kerala.

e) **EASTERN GHATS**

Eastern Ghats run almost parallel to the east coast of India leaving broad plains between their base and the coast. It is a chain of highly broken and detached hills starting from the Mahanadi in Odisha to the Vagai in Tamil Nadu.

➤ **Western Ghats**

- Western Ghats are continuous in nature and they stretch from river Tapi to Kanyakumari and are parallel to the Western coast. They have intermittent Passes like Bhorghat Pass between Nashik and Mumbai, Thalghat Pass between Mumbai and Pune, Shenkotta Pass between Kollam and Madurai and Palghat Pass between Coimbatore and Palakkad.
- They are narrower than Eastern Ghats and their average width is 50-80 km. Their altitudes are high when compared to Eastern Ghats and are canonical in shape. The height of Western Ghats raises from North to South.
- They are the source for many rivers like Godavari, Krishna, etc.
- They lie perpendicular to the South West monsoons and cause heavy rainfall in the west coast plains.

➤ **Eastern Ghats**

- Eastern Ghats are somewhat discontinuous in nature and appear continuous only between Mahanadi delta and Godavari delta. They are divided into several parts. Beyond Vijayawada they are known by different names.
- Eastern Ghats run parallel to the Eastern coast and they stretch from Odisha to the Nilgiri hills.
- They are wider than the Western Ghats and their average width varies from 100-200 km.
- There are no major rivers that originate from Eastern Ghats and they lie almost parallel to the North East Monsoon in India and hence do not cause much rainfall.

➤ **Some Facts about Peninsular Plateau**

- Highest peak in Aravallis is Guru Shikhar peak.
- Amarkantak is the highest peak in Maikal range and is the source for river Narmada
- Dhupgarh is the highest peak in the Satpura Range.
- Sadbhavna Peak is the highest peak of Vindhya Range. Sadbhavna Peak is also called Goodwill Peak or Kalumar Peak or Kalumbe Peak.
- Anaimudi or Anamudi remains the highest peak of Western Ghats as well as Peninsular India.
- Mahendragiri is the highest peak of Eastern Ghats.
- Eastern Ghats and Western Ghats merge at Nilgiri Hills. Doddabetta is the highest peak of Nilgiri Hil
- Mahabaleswar is the source point of river Krishna.
- Trimbak is the source point of river Godavari.

4. **Coastal Plains and Islands of India**

- The coastal plains and islands of India are the areas which are either connected to or surrounded by the sea. The coastal plains of India are the plains that are on the shores of the seas surrounding the Peninsular India. The plains along the shores of Arabian sea are called Western coastal plains and the plains along the shores of Bay of Bengal are called Eastern coastal plains.
- The plains in the west coast are narrower when compared to East coast because the slopes of Western Ghats are steep when compared to Eastern Ghats. As the slopes are gentle in Eastern Ghats, the rivers running over these flow gently and deposit sediments in large volume.

➤ Western Coastal Plains of India

- These are a narrow belt of plains having the width of 10-25 km between the Arabian sea and the Western Ghats and having a length around 1500 km. They are narrower in Karnataka and broader in Kerala.
- These plains are further subdivided into Kerala, Karnataka, Konkan and Gujarat plains. These are plains of submergence, eg. Dwaraka Arabian sea is encroaching the land. But in Malabar plains, emergence of land is being found, which is an exception.
- These plains are drained by short streams and we do not find deltas here. We can find many lagoons here.
- The coastline is fractured like a sawtooth. Many ports are located in the Western coastal plains of India because of the sawtooth structure. All the harbours here are natural.
- Numerous Creeks and Marshes are found in Gujarat, e.g. Sir Creek. Kandla, a tidal port, is located on a creek.
- The Backwaters that are found here, are called Kayals.

➤ Eastern Coastal Plains of India

- These plains are wider and have an average width of 80-100 km between Eastern Ghats and Bay of Bengal. These plains can further be subdivided depending on the place where they are located in like Uikal plains, Andhra plains, Tamil Nadu plains, etc.
- As many rivers in the Indian peninsula drain eastwards, large and fertile deltas can be found in the Eastern coastal plains of India. These deltas are highly irrigated and are having dense population.
- Here, we do not find many lagoons and good number of ports are also absent. Here, the only natural harbour is Visakhapatnam. These are Emergent or Expansion plains because of receding of Bay of Bengal. New Moore island is an example of emergent coastal plains in India.
- East coastline is very smooth and straight.

5. Islands of India

- There are many islands in Gulf of Mannar, Bay of Bengal and the Arabian sea. The Lakshadweep islands in Arabian sea are small islands and are formed by coral reefs. The Rameswaram island in Gulf of Mannar is also of coral origin.
- The major groups of islands in Bay of Bengal are Andaman group and Nicobar group. The Andaman and Nicobar Islands are mostly of volcanic origin. The Nicobar group of islands lies to the South of Andaman group and are much smaller in extent and number.

➤ **Andaman and Nicobar Islands**

- Andaman and Nicobar Islands are uneven in nature and rugged in terrain. These islands are remnants of submerged mountain range. The submerged mountain range is an extension of Arakan mountains of Myanmar.
- These islands are almost densely forested. About 90% of the islands are covered with forests. It is an area having low population density
- These islands are being influenced by both Northeast and Southwest monsoons.
- 10° channel passes between Andaman Islands and Nicobar Islands.
- India's only active volcano is located on Barren island in Andaman Islands.

➤ **Lakshadweep Islands**

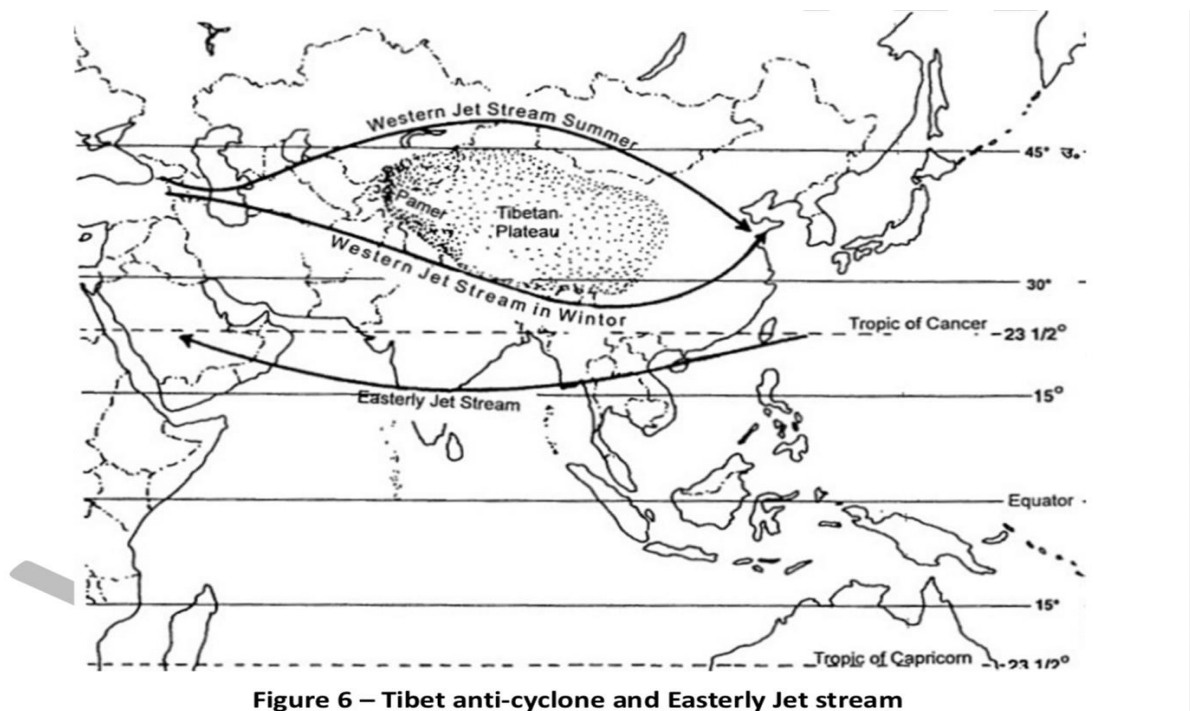
- Lakshadweep islands are having flat topography and they do not have any forests.
- These islands are influenced by only South-West monsoons.
- These islands are having high population density.
- 9° channel passes between Lakshadweep and Minicoy islands.
- 8° channel passes between Lakshadweep and Maldives islands.

Coastal plains and islands of India holds extreme importance from strategic as well as economic viewpoint of the country. Most of India's foreign trade is done through the ports that are located at the junction of coastal plains of India and the seas. Islands increase our sovereignty and jurisdiction over a large areas of territorial waters.

CLIMATE

The monsoons are experienced in the tropical area roughly between 20° N and 20° S. The climate of India is described as the 'monsoon' type. In Asia, this type of climate is found mainly in the south and southeast

Divisions of Monsoon



1. The southwest monsoon season
Rainfall received from the southwest monsoons is seasonal in character, which occurs between June and September.
2. The retreating monsoon season
The months of October and November are known for retreating monsoons.

- Factors influencing southwest monsoon formation

1. The differential heating and cooling of land and water creates a low pressure on the landmass of India while the seas around experience comparatively high pressure.

2. The shift of the position of Inter Tropical Convergence Zone (ITCZ) in summer, over the Ganga plain (this is the equatorial trough normally positioned about 5°N of the equator. It is also known as the monsoon-trough during the monsoon season).
3. The Tibetan plateau gets intensely heated_during summer, which results in strong vertical air currents and the formation of low pressure over the plateau at about 9 km above sea level.
4. 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.
5. Tropical Easterly Jet (African Easterly Jet)

TERMS

1. OCTOBER HEAT

Owing to the conditions of high temperature and humidity, the weather becomes rather oppressive. This is commonly known as the 'October heat'. It is feature of retreating monsoon. It creates rainfall in tamil nadu region.

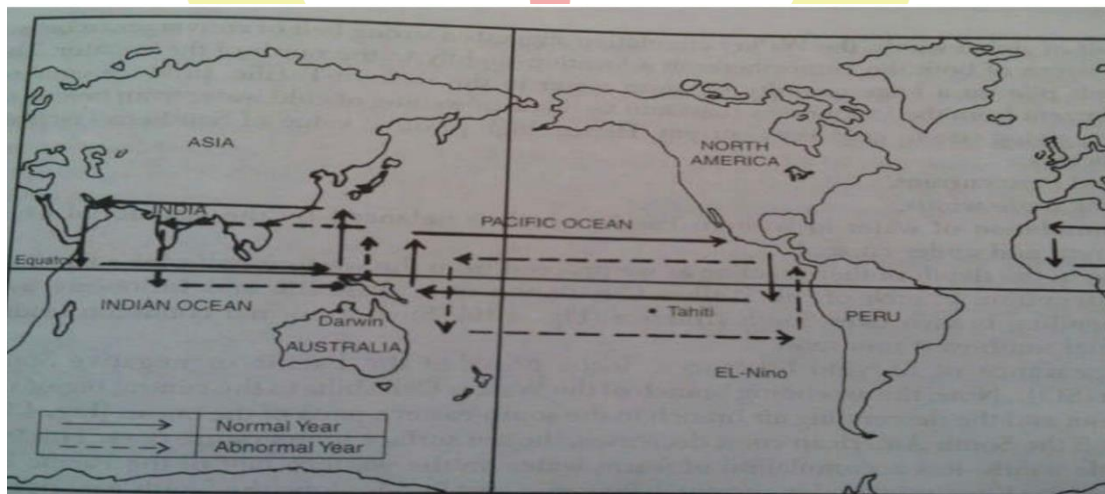


Figure 8 – walker cell and Indian Monsoon

2. EL NINO

creates dry conditions in Indian ocean region and wet conditions in Pacific Ocean region.

3. LA NINA

creates wet conditions in Indian ocean region and dry conditions in Pacific Ocean region.

4. ITCZ

The Inter Tropical Convergence Zone (ITCZ,) is a broad trough of low pressure in equatorial latitudes. This is where the northeast and the southeast trade winds converge.

5. WESTERN DISTURBANCES

It is an extratropical storm originating in the Mediterranean region that brings sudden winter rain to the north- western parts of the Indian sub-continent. It is a non-monsoonal precipitation pattern driven by the westerlies. It is usually associated with cloudy sky, higher night temperatures and unusual rain.

• Important pre-monsoon effects

1. Kalbaisakhi- Nor'westers or the Kalbaishakhi, as known in Odisha, or Bordoisilaor Bardoli Chhera, are an isolated rainfall and thunderstorm event which occurs in India (assam and west bengal) and Bangladesh.
2. Mango Showers- Mango showers are the pre-monsoon showers in the Indian states of Karnataka, kerala, Konkan and Goa that help in the ripening of mangoes. It is also known as April rains or summer showers.
3. Cherry blossom- Pre-monsoon showers in karnataka.

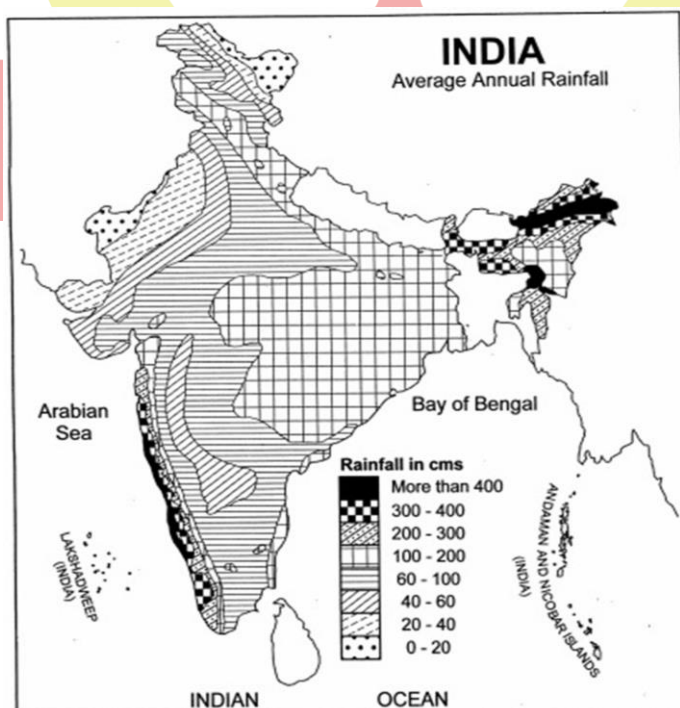


Figure 13 – India: Annual rainfall

Mechanism of monsoon-

- **Onset of south-west monsoon-**
- The location of ITCZ shifts north and south of the equator with the apparent movement of the Sun.
- During the month of June, the sun shines vertically over the Tropic of Cancer and the ITCZ shifts northwards.
- The southeast trade winds of the southern hemisphere cross the equator and start blowing in southwest to northeast direction under the influence of Coriolis force.
- These winds collect moisture as they travel over the warm Indian Ocean.
- In the month of July, the ITCZ shifts to 20°-25° N latitude and is located in the Indo-Gangetic Plain and the south-west monsoons blow from the Arabian Sea and the Bay of Bengal. The ITCZ in this position is often called the Monsoon Trough.
- The shift in the position of the ITCZ is also related to the phenomenon of the withdrawal of the westerly jet stream from its position over the north Indian plain, south of the Himalayas.
- The easterly Jet Stream (Somali Jet) sets in along 15°N latitude only after the western jet stream has withdrawn itself from the region. This easterly jet stream is held responsible for the burst of the monsoon in India.
- As these winds approach the land, their southwesterly direction is modified by the relief and thermal low pressure over northwest India.
- **The monsoon approaches the Indian landmass in two branches:**
 - A. **The Arabian Sea branch** - The monsoon winds originating over the Arabian Sea.
 - B. **The Bay of Bengal branch** - The Arakan Hills along the coast of Myanmar deflect a big portion of this branch towards the Indian subcontinent. The monsoon, therefore, enters West Bengal and Bangladesh from south and southeast instead of from the south-westerly direction.
- Another phenomenon associated with the monsoon is its tendency to have 'breaks' in rainfall. The monsoon rains take place only for a few days at a time. These breaks in monsoon are related to the movement of the monsoon trough.

➤ **Retreating monsoon -**

- The retreating southwest monsoon season is marked by clear skies and rise in temperature.
- The land is still moist. Owing to the conditions of high temperature and humidity, the weather becomes rather oppressive. This is commonly known as the 'October heat'.
- In the second half of October, the mercury begins to fall rapidly, particularly in northern India.
- The weather in the retreating monsoon is dry in north India but it is associated with rain in the eastern part of the Peninsular. Here, October and November are the rainiest months of the year.
- The widespread rain in this season is associated with the passage of cyclonic depressions which originate over the Andaman Sea and manage to cross the eastern coast of the southern Peninsula. These tropical cyclones are very destructive.
- A bulk of the rainfall of the Coromandel Coast is derived from these depressions and cyclones.
- Unlike the rest of the country, which receives rain in the southwest monsoon season between June and September, the northeast monsoon is crucial for farming and water security in the south.

➤ **WEATHER CONDITIONS-**

- 1) **CYCLONES-** Cyclones are rapid inward air circulation around a low-pressure area. The air circulates in an anticlockwise direction in the Northern hemisphere and clockwise in the Southern hemisphere. Cyclones are usually accompanied by violent storms and bad weather.

There are two types of cyclones:

- a) **Tropical Cyclone-** Tropical cyclones develop in the region between the Tropics of Capricorn and Cancer. conditions favourable for the formation and intensification of tropical storms are:

- Large sea surface with temperature higher than 27°C.
- Presence of the Coriolis force.
- Small variations in the vertical wind speed.
- A pre-existing weak low-pressure area of low-level-cyclonic circulation.
- Upper divergence above the sea level.

- Naming of tropical cyclones is done by world meteorological organization.

Hudhud, Titli, Phethai, Fani, Vayu and Amphan are month the names of cyclones in the Indian Ocean region.

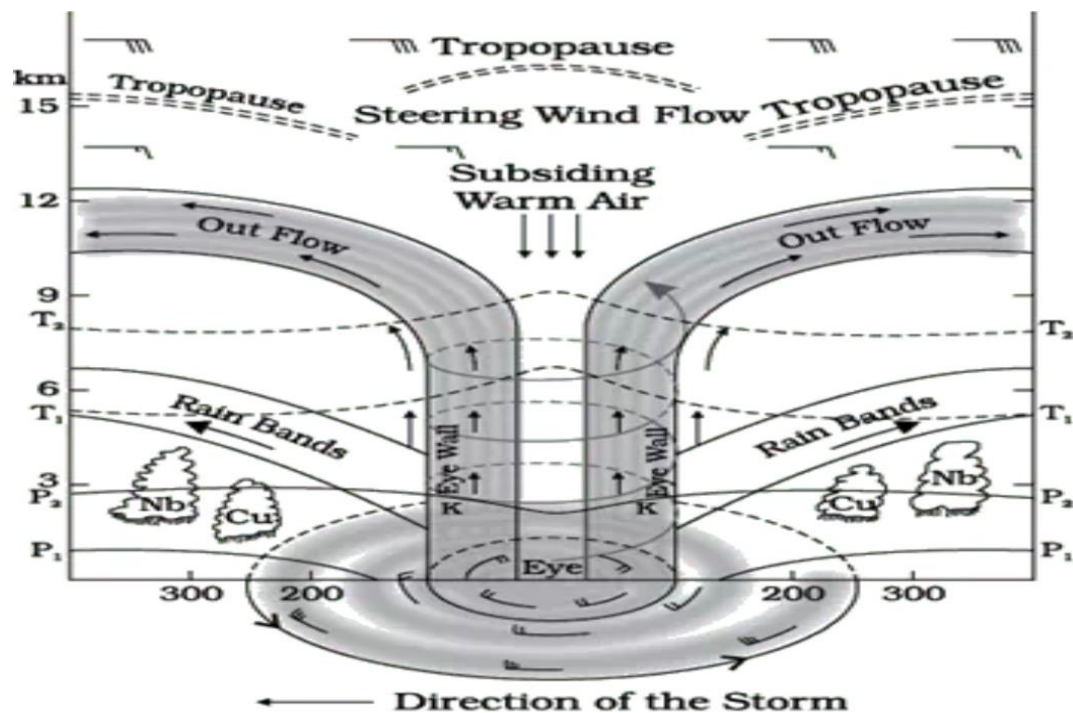
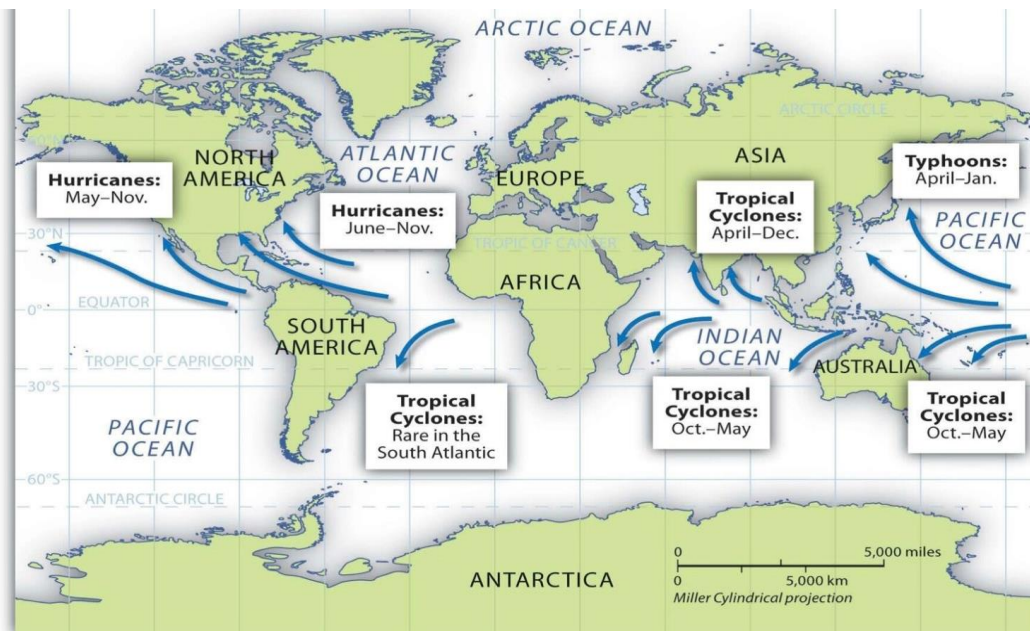


Fig: Vertical section of the tropical cyclone

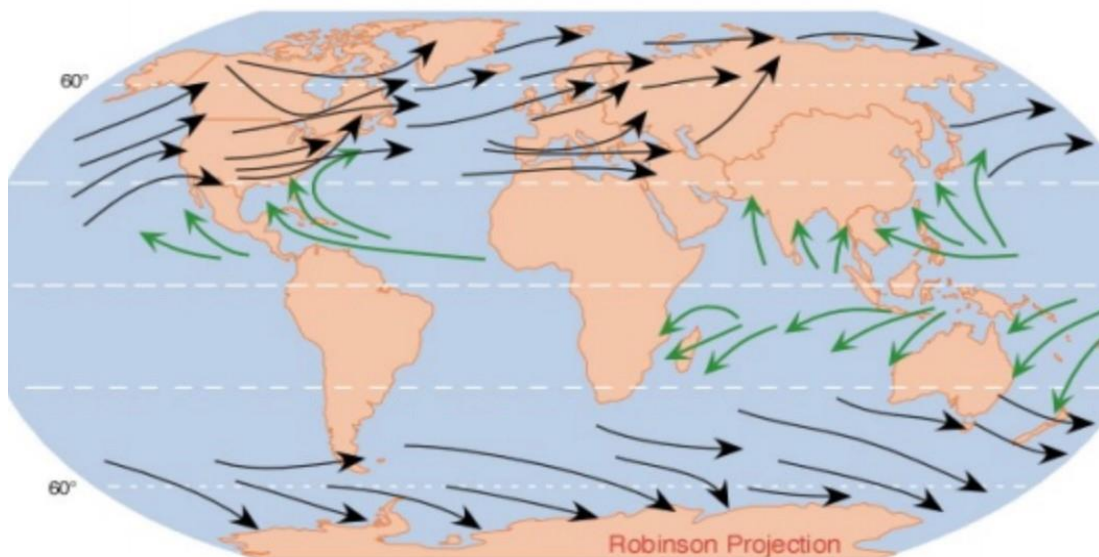
➤ Name of cyclone across world-

- a) Typhoons - China
- b) Taifu - Japan
- c) Willy-Willy - Australia
- d) Hurricanes - USA
- e) Tornadoes - Guinea lands of West Africa and southern USA



2. Extra Tropical Cyclones-

- Tropical cyclones occur in temperate zones and high latitude regions, though they are known to originate in the Polar Regions.
- Are active above the mid-latitudinal regions between 35° and 65° latitudes in both hemispheres.
- The direction of movement is from west to east more pronounced in the winter seasons.



g: Principle areas of Temperate cyclones (Black arrow lines) and Tropical cyclones (Green arrow lines)

- It is in these latitude zones the polar and tropical air masses meet and form fronts.

➤ **DIFFERENCE BETWEEN TROPICAL AND TEMPERATE CYCLONES-**

- Tropical cyclones, move from east to west while temperate cyclones move from west to east.
- Tropical cyclones have higher velocity as compared to temperate cyclones.
- Tropical cyclones are formed only on seas while temperate are formed on both land and sea.
- A tropical cyclone doesn't last for more than 7 days while temperate lasts for 15-20 days.

3. ANTICYCLONES-

- High pressure center with movement of winds is clockwise in the northern hemisphere and anticlockwise in the southern hemisphere.

Anticyclones

- An anticyclone is the opposite of a cyclone i.e. i.e., it has an outward-spiralling air circulation around a high pressure centre.
- An anticyclone's winds rotate clockwise in the Northern Hemisphere around a center of high pressure.
- In anticyclones, air comes in from above and sinks to the ground. High pressure centers generally have fair weather.

Pressure System	Pressure Condition at the Centre	Pattern of Wind Direction	
		Northern Hemisphere	Southern Hemisphere
Cyclone	Low	Anticlockwise	Clockwise
Anticyclone	High	Clockwise	Anticlockwise

Table: Pattern of Wind Direction in Cyclones and Anticyclones

DRAINAGE SYSTEM OF INDIA

HIMALAYAN RIVERS-

These rivers are again subdivided into two groups. Trans Himalayan and Himalayan. The Trans-Himalayan Rivers originate beyond the Great Himalayas. These are the Indus, the Sutlej and the Brahmaputra rivers. Himalayan rivers are those which originate in the Himalayas and flow through the Northern Plains, e.g., the Ganga, the Yamuna and **their tributaries**. These rivers are useful for irrigation and navigation and the lowlands drained by them have fertile alluvial deposits.

➤ INDUS RIVER SYSTEM-

- a) **INDUS-** Origin is kailash mansarovar
left bank tributaries- Zaskar River, Suru River, Soan River, Jhelum River, Chenab River, Ravi River, Beas River, Sutlej River, Panjnad River, Ghaggar-Hakra River, Luni river
Note- Luni is tributary of indus
right bank tributaries- Shyok, Gilgit, Kabul, Kurram and Gomol rivers
- b) **JHELMUM-** Origin is wular lake
- c) **CHENAB-** Origin is bara lacha la (himachal pradesh)
- d) **RAVI-** Origin is rohtang pass (himachal pradesh)
- e) **BEAS-** Origin is rohtang pass (himachal pradesh)
- f) **SUTLUJ-** Origin is kailash mansarovar lake
left bank tributaries- Tirung, the Gayathing, the Baspa, the Duling and the Soldang are left bank tributaries
right bank tributaries- the Spiti, the Ropa, the Taiti, the Kashang, the Mulgaon, the Yula, the Wanger, the Throng and the Rupis as right bank tributaries.

➤ GANGA RIVER SYSTEM-

- a) **Ganga-** Origin is gomukh in gangotri glacier
tributaries include gomti, ghagra, gandak, kosi
left bank tributaries- Ramganga, Garra, Gomti, Ghaghara, Gandak, Burhi Gandak, Koshi, Mahananda, Brahmaputra
right bank Tributaries- Yamuna, Tamsa (also called Tons), Karamnasa, Sone, Punpun, Falgu, Kiul, Chandan, Ajoy, Damodar, Rupnarayan.



- b) **Gomti-** Origin is phuljhar lake (pilibhi)
- c) **Ghaghra-** origin is gurla mandhata peak in Kailash mansarovar
- d) **Gandak-** Originates near tibet-nepal border
left bank tributaries- Trishuli, Budhi Gandaki River, Marshyangdi, Madi, Seti
 Gandaki River, Daraudi, Kali Gandaki
right bank tributaries- Badigad River
- e) **Kosi-** Originates in kailash mansarovar
- f) **Yamuna-** Originates in yamunotri glacier on bandarpuch peak

left bank Tributaries- Tons, Hindon, Hanuman Ganga, Sasur Khaderi
right bank tributaries- Giri, Baghain, Chambal, Betwa, Sindh, Ken

- g) **Damodar-** Origin is chotanagpur plateau
left bank tributaries- Barakar, Konar, Jamunia, Nunia
right bank tributaries- Sali (West Bengal)

- h) **Son-** origin is amarkantak plateau
right bank tributaries- rihand, north koel

➤ **BRAHMPUTRA RIVER SYSTEM-**

The Brahmaputra rises in the glacier about 100 kms south east of Mansarower Lake. In Tibet it is known as Tsangpo and runs parallel to the Himalayas. Its two important tributaries Dihang and Lohit meet near Sadiya

- a) **Brahmaputra-** Originates from the Kailash ranges of Himalayas
left bank Tributaries- Lhasa River, Nyang River, Parlung Zangbo, Lohit River, Dhansiri River, Kolong River
right bank tributaries- Kameng River, Manas River, Beki River, Raidak River, Jaldhaka River, Teesta River, Subansiri River
- b) **Teesta-** Tributary of the Brahmaputra (known as Jamuna in Bangladesh), flowing through India and Bangladesh; originates in the Himalayas near Chunthang, Sikkim and flows to the south through West Bengal before entering Bangladesh. Rangeet River is the major tributary of Teesta River. Rangeet river is the largest river in Sikkim. Rangeet river joins Teesta river at a place known as Tribeni.

PENINSULAR RIVERS-

The Peninsular Rivers originate in the Western Ghats. They have a large seasonal fluctuation in volume as they are solely fed from rainfall. These rivers flow in valleys with steep gradients. Major rivers of the Peninsula such as Mahanadi, Godavari, Krishna, Cauvery flow eastwards on the plateau and drain into Bay of Bengal.

- **MAHANADI-** Origin is Sihawa mountains Chattisgarh
left bank tributaries- Seonath, Mand, Ib, Hasdeo
right bank tributaries- Ong, Parry, Jonk, Telen
- **GODAVARI-** Origin is Triambakeshwar plateau (Nasik)
left bank tributaries- Purna, Pranhita, Indravathi and Sabari

right bank tributaries- Pravara, Manjira and Maner

- **KRISHNA-** origin is mahabaleshwar hills in maharashtra
left bank tributaries- Bhima, Dindi, Peddavagu, Musi, Paleru, Munneru
right bank tributaries- Kudali (Niranjna) Venna, Koyna, Panchganga, Dudhaganga, Ghataprabha, Malaprabha, Tungabhadra
- **CAUVERY-** origin is brahmagiri range in western ghats
left bank tributaries- Harangi, Hemavati, Shimsha, Arkavathy
right bank tributaries- Lakshmana Tirtha, Kabini, Bhavani, Noyyal, Amaravati, Moyar

➤ **OTHER IMPORTANT RIVERS-**

- 1) **SABARMATI-** Origin is Aravalli range (DHEBAR LAKE)
- 2) **MAHI-** Origin is vindhyar range
- 3) **LUNI-** Origin is aravalli range
- 4) **CHAMBAL-** Origin is janapav, mhow(mp)
- 5) **NARMADA-** Origin is amarkantak plateau
- 6) **TAPI-** Origin is satpura range

➤ **DIFFERENCE BETWEEN HIMALAYAN AND PENINSULAR RIVERS-**

- A. **HIMALAYAN-** Origin is himalayan mountains (young fold mountains); form big deltas and meanders; perennial in nature; i-shaped valleys with antecedent drainage; have large basins and catchment areas
- B. **PENINSULAR-** Origin is peninsular plateau; east flowing rivers form estuaries and west flowing form delta; shallow valleys; have small basins and catchment areas; much older river systems as compared to himalayan mountains; do not form meanders due to rugged terrain.

➤ **DAMS-**

- Hirakund Dam- **Mahanadi**
- Gandhi Sagar, Jawahar Sagar, Rana Pratap Sagar Dam- **Chambal**
- Ranjit Sagar Dam- **Ravi**
- Koteswar or Thein- **Bhagirathi**
- Omkareshwar, Bargi and Indira Sagar, Sardar Sarovar Dam- **Narmada**
- Nagarjuna Sagar Dam- **Krishna**

- Tilaiya Dam, Maithon Dam- **Barakar**
- Bhakra Nangal, Govind Sagar Dam- **Sutluj**
- Salal, Dulhasti Dam- **Chenab**
- Tulbul Dam- **Jhelum**
- Idduki Dam- **Periyar**
- Krishnaraj Sagar Dam- **Cauvery**
- Almatti Dam- **Krishna**
- Mettur Dam- **Cauvery**

➤ **CITIES ON BANKS OF RIVERS-**

- HAMPI- **Tungabhadra**
- LUDHIANA- **Sutluj**
- UJJAIN- **Kshipra**
- SURAT- **Tapi**
- AHMEDABAD- **Sabarmati**
- HYDERABAD- **Musi**
- CHITRAKOOT- **Mandakini**
- GORAKHPUR- **Rapti**
- AYODHYA - **Saryu**
- NASIK- **Godavari**
- GWALIOR- **Chambal**
- BUNDELKHAND- **Betwa**
- MUMBAI- **Warli**
- MADURAI- **Vaigai**
- JABALPUR- **Narmada**
- BHUBHANESHWAR- **Mahanadi**
- JAGDALPUR- **Indravati**
- AMRAVATI- **Krishna**
- UDUPI- **Sitanadi**

➤ **IMPORTANT FACTS-**

- Ganga is largest river while brahmaputra is most voluminous.
- Godavari is largest river of south india (dakshin ganga).
- Sutluj cuts all the three ranges of himalayas.
- Alakhnanda and bhagirathi meet at devprayag.
- Rangit is tributary of teesta river.
- Brahmani is not tributary of mahanadi.

- Chilika lake is on debi and daya rivers.
- Bhitarkanika is on brahmani and baitrani rivers.
- Sutluj cuts all the three himalayan ranges.
- Rivers draining into Arabian sea included Sabarmati, Sharavati, Mandovi, Zuari, Kalindi, Periyar.

➤ **LIST OF HYDROPOWER PROJECTS OF INDIA-**

- **Andhra Pradesh-**
Krishna-Nagarjunasagar Hydro Electric Power plant
Krishna-Srisaillam Hydro Electric Power plant
- **Orissa-**
Machkund-Machkund Hydro Electric Power plant
Mahanadi-Hirakud Hydro Electric Power plant
- **Gujarat-**
Narmada- Sardar Sarovar Hydro Electric Power plant
- **Himachal Pradesh-**
Sutlej-Bhakra Nangal Hydroelectric Power plant
Sutlej-Nathpa Jhakri Hydroelectric Power plant
Beas-Pong hydroelectric project
ravi-chamera hydroelectric project
- **Karnataka-**
Kaveri-Shivanasamudra Hydroelectric Powerplant (india's first hydroelectric project)
- **Kerala-**
Periyar-Idukki Hydro Electric Power plant
- **Madhya Pradesh-**
Narmada-Indira Sagar Hydro Electric Power plant
- **Madhya Pradesh, Uttar Pradesh-**
Rihand-Rihand Hydroelectric Power plant
- **Jammu kashmir-**
chenab-salal, dulhasti hydroelectric project

NATURAL VEGETATION

Natural vegetation refers to a plant community, which has grown naturally without human aid and has been left undisturbed by humans for a long time. This is termed as a virgin **vegetation**. Thus, cultivated crops and fruits, orchards form part of **vegetation** but not **natural vegetation**.



- **Tropical Evergreen Rain Forests**

In Tropical Evergreen Rain Forests precipitation is more than 200 cm; found in the Northeastern regions of Arunachal Pradesh, Meghalaya, Assam, Nagaland, the Western Ghats, the Tarai areas of the Himalayas, and the Andaman groups of Islands; trees found in this area are **Rosewood, Garjan, Mahogany, Ebony and bamboo**

- **Deciduous or Monsoon Type of Forests-**

Deciduous or Monsoon Type of Forests are found on the lower slope of the Himalayas, West Bengal, Chhattisgarh, Bihar, Orissa, Karnataka, Maharashtra Jharkhand, and the adjoining areas; precipitation in this area is between 100 cm and 200 cm; trees found include **teak, Deodar, Blue Gum, PalAsh, Sal, Sandalwood, Arjun, Khair, and Bamboo.**

- **Dry Deciduous Forests-**

In Dry Deciduous Forests precipitation is between 50 cm and 100 cm; mainly seen in the areas of the Central Deccan plateau, Punjab, Haryana, parts of Uttar Pradesh, Madhya Pradesh, and South-east of Rajasthan.

- **Mountain Forests-**

These are those found in mountains

- a) On the foothills of the Himalayas until a height of 1500 meters, evergreen treeslike Sal, teak, and bamboo grow copiously.
- b) On the higher slope, temperate conifer trees like **pine, fir, spruce and oak grow.**

- **Tidal or Mangrove Forests-**

On the edges of the deltas e.g., the deltas of theCauvery, Krishna, Mahanadi, Godavari, and Ganga.

- **Semi-Desert and Desert Vegetations-**

Receives rainfall of less than 50 cm; **Thorny bushes, acacia, and Babul** are found in this vegetation region.

NOTE-

Soil of evergreen forests is deficient in nutrients red sanders or sandalwood is dry deciduous forest (famous for smuggling cases)

➤ **PROTECTED AREAS-**

a) **BIOSPHERE RESERVES-**

Biosphere reserves is an international designation by United Nations Educational, Scientific and Cultural Organization (UNESCO) for representative parts of natural and cultural landscapes extending over large areasof terrestrial or coastal/marine ecosystems or a combination of both.

1) **Structure of Biosphere Reserve-**

- **Core area-** Most protected area of a biosphere reserve. It may contain endemicplants and animals. A core zone is a protected region, like a National

Park or Sanctuary/protected/regulated mostly under the Wildlife (Protection) Act, 1972. It is kept free from human interference.

- **Buffer Area-** It includes restoration, limited tourism, fishing, grazing, etc; which are permitted to reduce its effect on the core zone. Research and educational activities are to be encouraged.
- **Transition Area-** It is the outermost part of the biosphere reserve. It is the zone of cooperation where human ventures and conservation are done in harmony. It includes settlements, croplands, managed forests and areas for intensive recreation and other economic uses characteristics of the region.

2. Biosphere Reserves in India-

- There are 18 biosphere reserves in India:

1. Cold Desert, Himachal Pradesh;
2. Nanda Devi, Uttarakhand;
3. Khangchendzonga, Sikkim;
4. Dehang-Debang, Arunachal Pradesh;
5. Manas, Assam;
6. Dibru-Saikhowa,
7. Assam; Nokrek,
8. Meghalaya; Panna,
9. Madhya Pradesh; Pachmarhi,
10. Madhya Pradesh; Achanakmar- Amarkantak,
11. Kachchh, Gujarat (Largest Area);
12. Similipal, Odisha;
13. Sundarban, West Bengal;
14. Seshachalam, Andhra Pradesh;
15. Agasthyamala, Karnataka-Tamil Nadu-Kerala;
16. Nilgiri, Tamil Nadu-Kerala (First to be Included);
17. Gulf of Mannar, Tamil Nadu;
18. Great Nicobar, Andaman & Nicobar Island.

MAN AND BIOSPHERE PROGRAM-

Biosphere reserves include gulf of mannar, nilgiri, nanda devi, pachmarhi, nokrek, similipal, kanchenzonga, agasthyamalai, great nicobar.

b) WILDLIFE SANCTUARY-

The Wild Life (Protection) Act of 1972 provided for the declaration of certain areas by the State Government as wildlife sanctuaries if the area was thought to be of adequate ecological, geomorphological and natural significance.

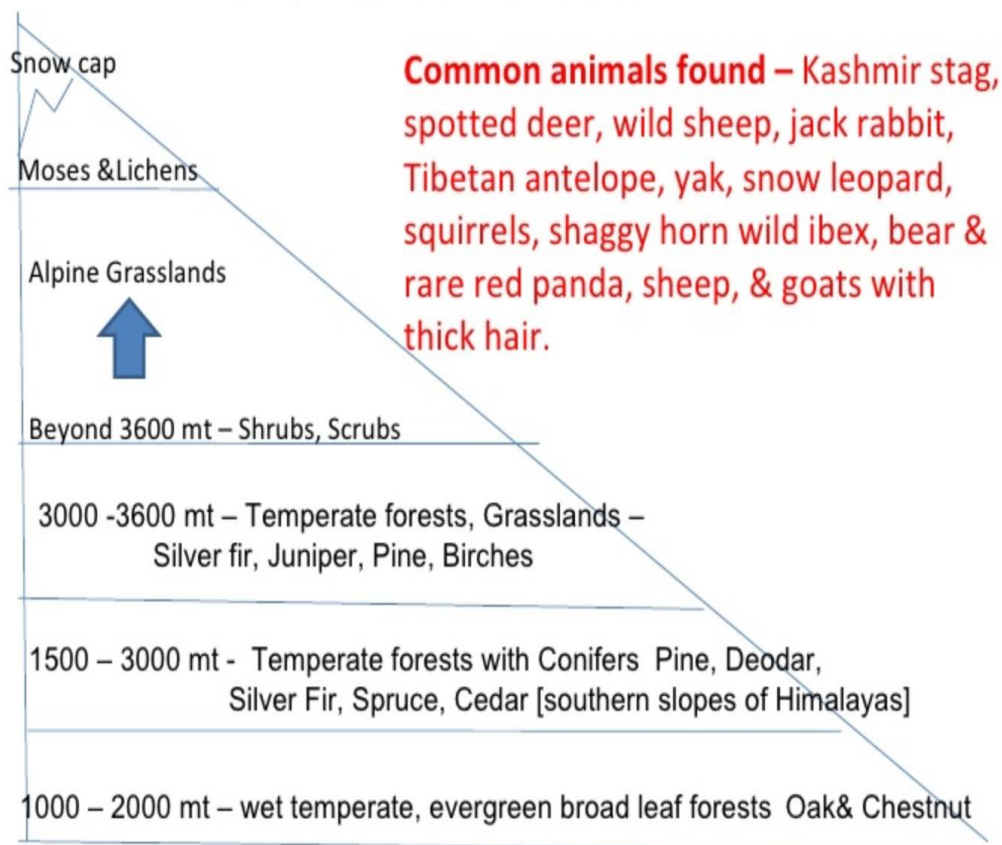
National Parks by the State Government in addition to the declaration of wildlife sanctuaries.

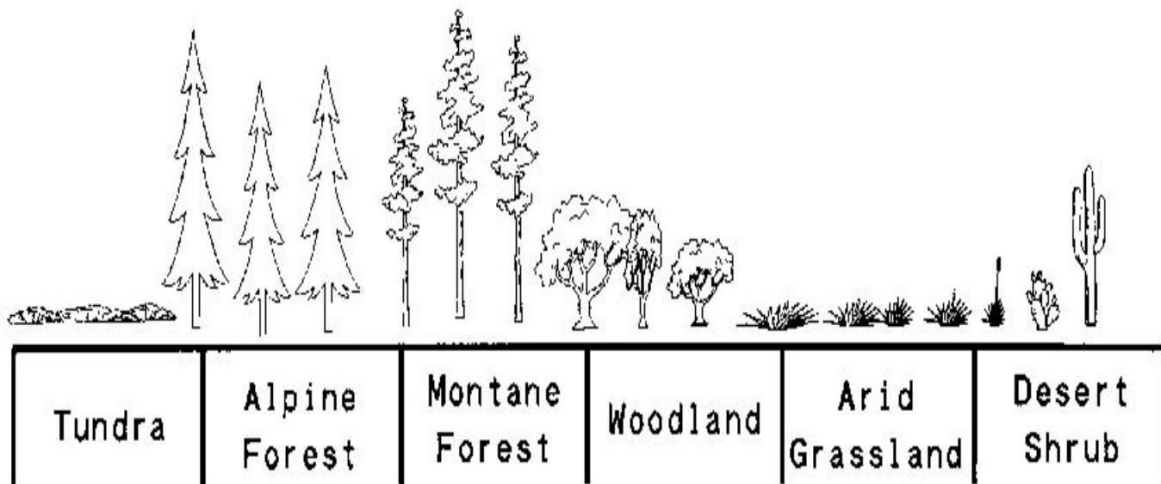
➤ **Difference between wildlife sanctuary and national parks-**

National Parks enjoy a greater degree of protection than sanctuaries.

- Certain activities which are regulated in sanctuaries, such as grazing of livestock, are prohibited in National Parks.
- Wildlife sanctuary can be created for a particular species (for e.g. grizzled giant squirrel w.l.s in srivalliputhur) whereas the national park is not primarily focused on a particular species.

Montane forests





➤ CONSERVATION RESERVE AND COMMUNITY RESERVES

conservation reserve and community reserves are the outcome of amendments to the wildlife protection act in 2003.

1. CONSERVATION RESERVES-

- The Amendment Act of 2003 provided for the creation of a new type of protected area called a Conservation Reserve.
- It is an area owned by the State Government adjacent to National Parks and sanctuaries for protecting the landscape, seascape and habitat of fauna and flora. It is managed through a Conservation Reserve Management Committee.
- The State Government may, after having consultations with the local communities, declare any area owned by the Government as conservation reserve.

2. COMMUNITY RESERVES-

- The Amendment Act of 2003 provided for the creation of a new type of protected area called a Community Reserve.
- The State Government may notify any community land or private land as a Community Reserve.
- No change in land use pattern shall be made within the Community Reserve, except in accordance with a resolution passed by the Management Committee and approval of the same by the State Government.

FEW IMPORTANT FACTS-

1. diversity is greater in himalayas as compared to westernghats.
2. diversity is greater in lower latitudes and loweraltitudes.
3. the western side of western ghats has denser vegetation than eastern side.



SOILS OF INDIA

➤ Alluvial soil (43%)

- Widespread in northern plains and river valleys. In Peninsular-India, they are mostly found in deltas and estuaries. Humus, lime and organic matters are present.
- New alluvium is termed as Khadar and old alluvium is termed as Bhangar.
- Colour: Light Grey to Ash Grey.
- Texture: Sandy to silty loam or clay.
- Rich in: potash, Poor in: phosphorous. Wheat, rice, maize, sugarcane, pulses, oilseed etc are cultivated mainly.

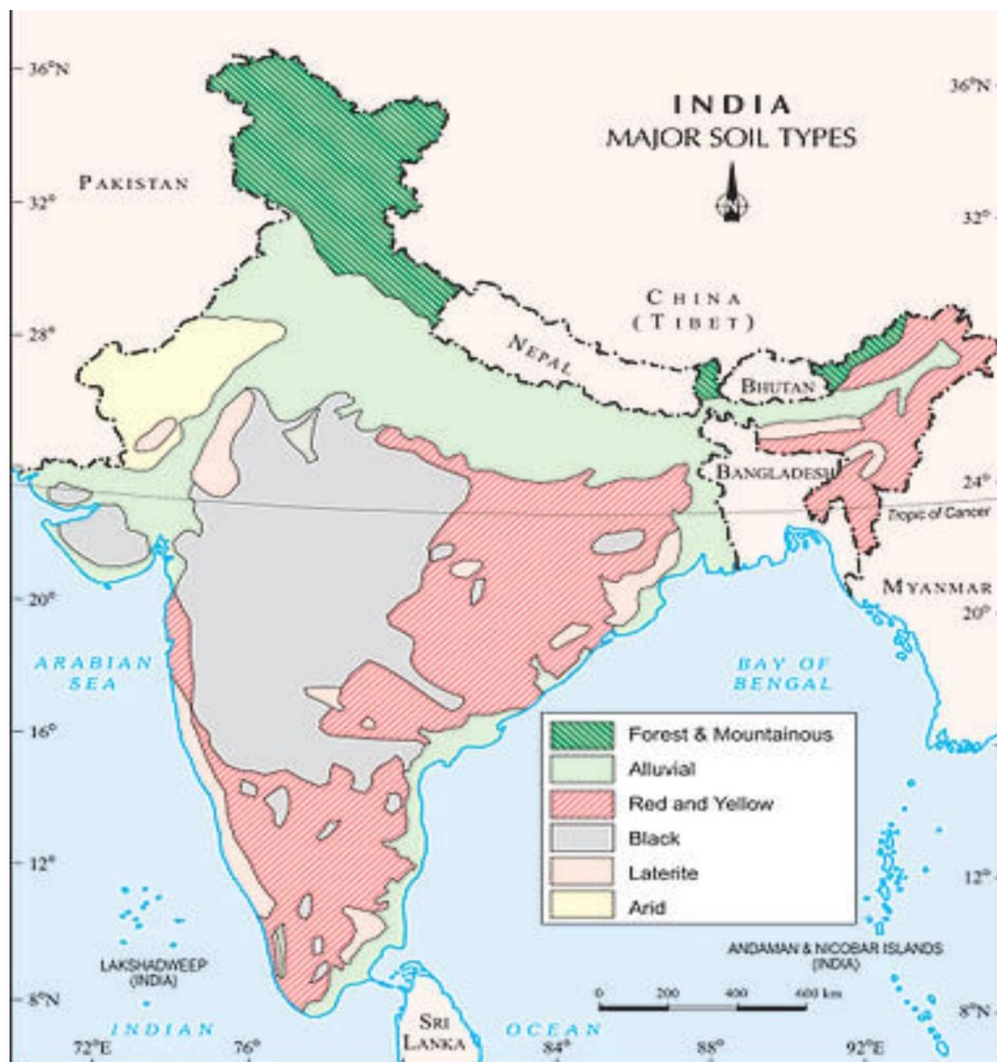
➤ Red soil (18.5%)

- Deficient in: lime, phosphate, manganese, nitrogen, humus and potash.
- Colour: Red because of Ferric oxide. The lower layer is reddish yellow or yellow.
- Texture: Sandy to clay and loamy.
- Wheat, cotton, pulses, tobacco, oilseeds, potato etc are cultivated.

➤ Black / regur soil (15%)-

- Regur means cotton – best soil for cotton cultivation.
- Most of the Deccan is occupied by Black soil.
- Mature soil.
- High water retaining capacity.
- Swells and will become sticky when wet and shrink when dried.
- Self-ploughing is a characteristic of the black soil as it develops wide cracks when dried.
- Rich in: Iron, lime, calcium, potassium, aluminum and magnesium.

- Deficient in: Nitrogen, Phosphorous and organic matter.
- Colour: Deep black to light black.
- Texture: Clayey.



➤ **Arid / desert soil-**

- Seen under Arid and Semi-Arid conditions.
- Deposited mainly by wind activities.
- High salt content.
- Lack of moisture and Humus.
- Kankar or Impure Calcium carbonate content is high which restricts the infiltration of water.
- Nitrogen is insufficient and Phosphate is normal.
- Texture: Sandy
- Colour: Red to Brown.

NOTE-

- a) saline soils are termed as rey, usar, kallar, chopan.
- b) desert soils are only soils which are rich in nitrogen, phosphorous, potash etc. but they have absence of water.

➤ **Laterite soil-**

- Name from Latin word 'Later' which means Brick.
- Become so soft when wet and so hard when dried.
- In the areas of high temperature and high rainfall.
- Formed as a result of high leaching.
- Lime and silica will be leached away from the soil.
- Organic matters of the soil will be removed fast by the bacteria as it is high temperature and humus will be taken quickly by the trees and other plants. Thus, humus content is low.
- Rich in: Iron and Aluminum
- Deficient in: Nitrogen, Potash, Potassium, Lime, Humus
- Colour: Red colour due to iron oxide.
- Rice, Ragi, Sugarcane and Cashew nuts are cultivated mainly.

Note- Laterite soil is good for cashew cultivation.

➤ **Peat/ marshy soil-**

- Areas of heavy rainfall and high humidity.
- Growth of vegetation is very less.
- A large quantity of dead organic matter/humus which makes the soil alkaline.
- Heavy soil with black colour.

➤ **Forest soil-**

- Regions of high rainfall.
- Humus content is less and thus the soil is acidic.

➤ **Sub-mountain soil-**

- In the mountain regions of the country.
- Immature soil with low humus and acidic.

AGRICULTURE

AGRICULTURE

The science or practice of farming, including cultivation of the soil for the growing of crops and the rearing of animals to provide food, wool, and other products.

Table 4.1: India: Growth of GDP and major sectors (in %)

Sector	Tenth Five	11 th Five	2012-17	
	Year Plan (2002-07)	Year Plan (2007-12)	Target I	Target II
Agriculture	1.7	3.2	4.0	4.2
Industries	8.3	7.4	9.6	10.9
Services	9.0	10.0	10.0	10.0
GDP	7.2	8.2	9.0	9.5

Farming types: -

There are three types of farming and they are as follow: -

1. Subsistence farming: -

- Subsistence farming is described as family farming because it meets the needs of the farmer's family. It required a low level of technology and household labour.
- These types of farming produce small output. They do not use high yielding varieties of old seeds and fertilizer.
- Facilities like electricity and irrigation are not available for them. Most subsistence farming is done manually.
- Subsistence farming can be classified in two types: -

1. Intensive subsistence farming: -

- It includes a small plot of land and for growing crops, simple and low-cost tools, and more labour. The word intensive means hard work, so it means it requires more labour.
- The climate of this farming with a large number of days with sunshine and fertile soils permit growing more than one crop annually in the same land.
- Rice is the main crop of this farming. Other crops include wheat, maize, pulses, and oilseeds.
- This farming is spread in the thickly populated area of the monsoon regions. These regions are south, South East, East Asia.

2. Primitive subsistence farming: -

It includes shifting cultivation and nomadic herding.

➤ Shifting cultivation: -

- This cultivation spread in thickly forested areas like amazon basin, tropical Africa, Southeast Asia, and northeast India. These are the areas of heavy rainfall.
- It is a quick regeneration of vegetation.
- The process of shifting cultivation is that first of all the land is cleared by falling trees and burning them. Then the ash of the trees is mixed with the land soil.
- This cultivation farming is grown on crops like maize, yam, potatoes, and cassava. Crops are grown in this land for 2 or 3 years. Then the land left out because fertilizer of the soil decreases.
- The farmers move to the other land to repeat this process. This is also called 'slash and burn agriculture'.

Shifting cultivation is known by different names in different parts of the world

- a) Jhumming- North East India
- b) Milpa- Mexico
- c) Roca- brazil
- d) Ladang- Malaysia

➤ Nomadic Herding:

- This type of farming is done on the semi-dry area and dry area. Like central Asia, some parts of India like Rajasthan and Jammu and Kashmir.

- The process of this farming is that the herdsmen move one place to another place for feed and water, along defined routes.
- The most used animals in this farming are sheep, camel, yak, and goats.
- The product of this farming is milk, meat, and other to the herdsman and their families.

3. Commercial Farming: -

- In this farming, crops are growing for sale in the market. The main purpose of this farming is to do business.
- It required large areas and a high level of technology.
- It's done with the high cost of tools.
- Commercial farming is 3 types.

1. Commercial grain farming: -

- This farming is done for grains.
- This farming is done in the winter season.
- In this farming, only a single crop can be grown at one time.
- This farming spread in North America, Europe, and Asia.
- These areas are populated with large farmers.

2. Commercial mixed farming: -

- This type of farming is done for growing foods, fodders crops.
- In this farming, one or more crops are grown together.
- It has good rainfall and irrigation.
- The crops are cared for carefully.
- The crops are done almost at the same duration.
- This farming is most used in Europe, eastern USA Argentina, southeast Australia, New Zealand and South Africa.

3. Commercial plantation farming: -

- This farming required a large amount of labour and large areas.
- It used simple crops like tea, coffee, cotton, rubber, banana, and sugarcane.
- The products are processed in the farm itself or nearby factories.
- These products do not directly go to the sale. After growing these products, the leaves are roasted in the factories or farms. These are all tree crops.
- This farming required large transportation because the products of this farming are transported to one area to another area.

- Areas of plantation farming in tropical regions of the world –
 1. Rubber in Malaysia.
 2. Tea in India.
 3. Coffee in Brazil.
- This farming is mostly done in hilly areas like sub-Himalayan, Nilgiri and west Bengal.

4. Home Farming: -



- Home farming includes terrace farming, gardening.
- It required small space and small tools like a garden rake, pruning shear, etc.
- This farming has the ability to grow any vegetable, fruits, flowers, and small trees in the same land.
- This farming is also used as a decorated thing for the home.
- It required small labour.
- This farming used as both commercial and subsistence.

There are two types of farming: -

1. Container farming: -

This farming is used when you have limited space in gardens, be it a small yard, courtyard or balcony. This farming has the ability to grow almost any vegetable, fruit, and flowers.

2. Vertical Farming:-

It is described as a window garden. Most vertical farming is used for small plant crops and vine crops. It includes gheeya, Loki, tomato, chili, coriander. The

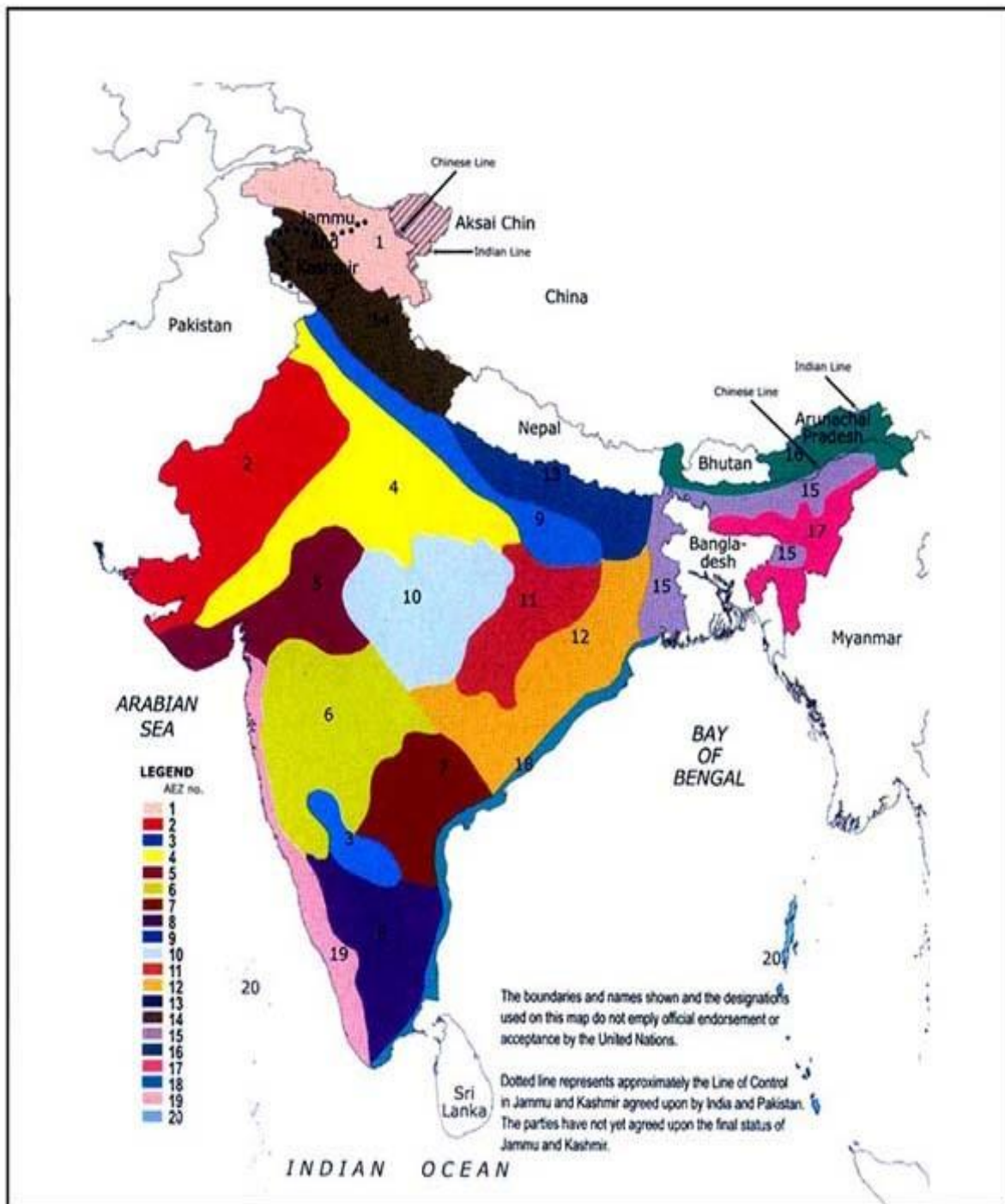
production of vine crops is less in the traditional way; vertical farming is very useful for vine crops.

➤ **Types of Farmers in India**

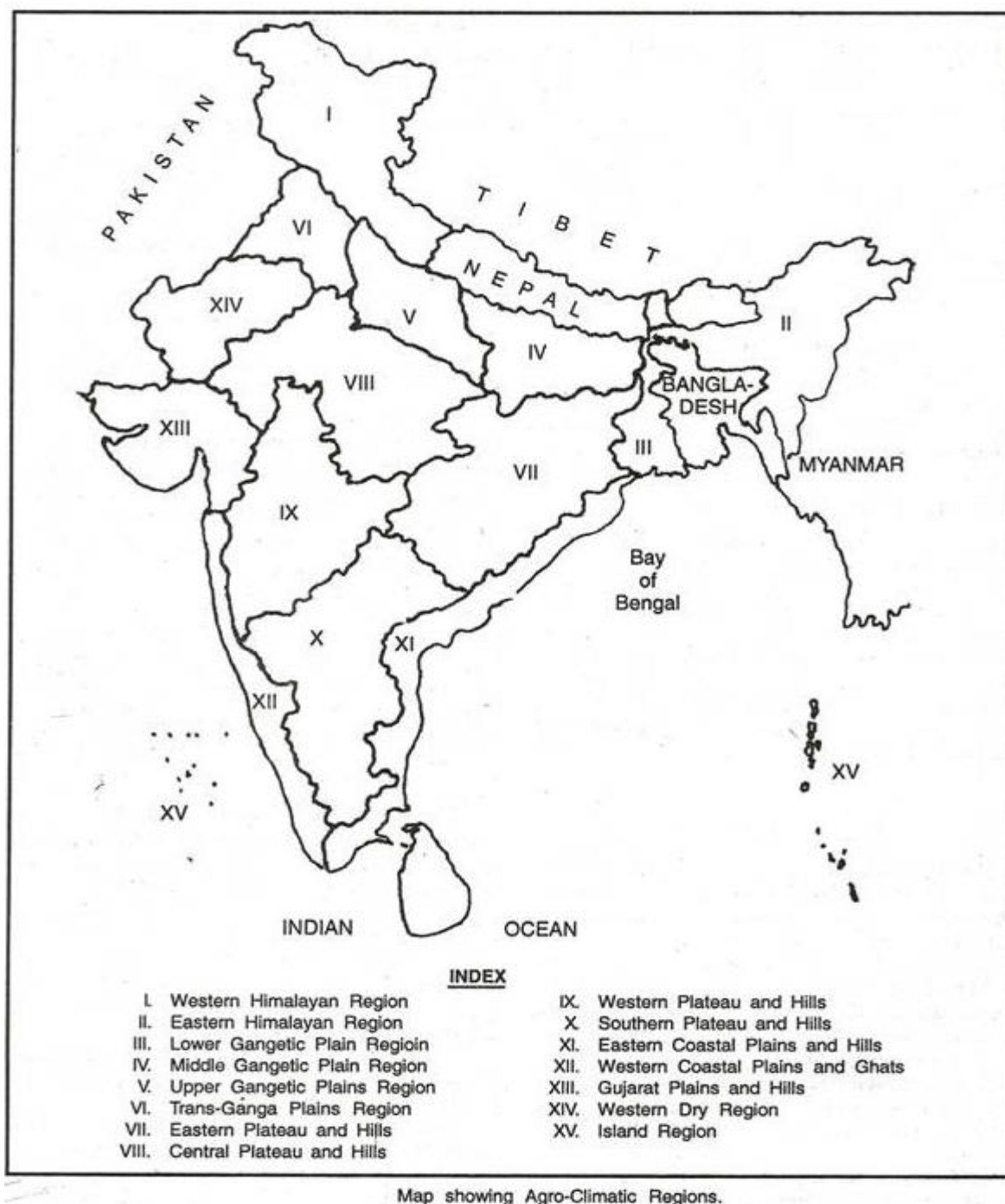
TYPES OF FARMERS	USES
MARGINAL FARMERS	FARMERS WHO HAVE LESS THAN 1 HECTARE OF LAND ARE CALLED MARGINAL FARMERS.
SMALL FARMERS	FARMERS WHO HAVE 1 OR 2 HECTARE OF LAND ARE CALLED SMALL FARMERS.
SEMI-MEDIUM FARMERS	FARMERS WHO HAVE 2 TO 4 HECTARE OF LAND ARE CALLED SEMI MEDIUM FARMERS.
MEDIUM FARMERS	FARMERS WHO HAVE 4 TO 10 HECTARE OF LAND ARE CALLED MEDIUM FARMERS.
MEDIUM FARMERS	FARMERS WHO HAVE 4 TO 10 HECTARE OF LAND ARE CALLED MEDIUM FARMERS.
LARGE FARMERS	FARMERS WHO HAVE 10 HECTARE AND ABOVE LAND ARE CALLED LARGE FARMERS.

1) **Total agro-ecological zones in india-20**

1. Western Himalayas
2. Western Plain, Kachchh, and part of Kathiwar Peninsula
3. Deccan Plateau
4. Northern Plain and Central Highlands including Aravallis
5. Central Malwa Highlands, Gujarat Plains, and Kathiwar Peninsula
6. Deccan Plateau, hot semi-arid ecoregion
7. Deccan (Telengana) Plateau and Eastern Ghats
8. Eastern Ghats, Tamil Nadu Plateau and Deccan (Karnataka)
9. Northern Plain, hot sub-humid (dry) ecoregion
10. Central Highlands (Malwas, Bundelkhand, and Eastern Satpura)
11. Eastern Plateau (Chattisgarh), hot sub-humid ecoregion
12. Eastern (Chotanagpur) Plateau and Eastern Ghats
13. Eastern Plain
14. Western Himalayas
15. Bengal and Assam plains
16. Eastern Himalayas
17. North Eastern Hills (Purvanchal)
18. Eastern Coastal Plain
19. Western Ghats and Coastal Plain
20. Island of Andaman Nicobar and Lakshadweep



2) Total agro-climatic zones in india-15.

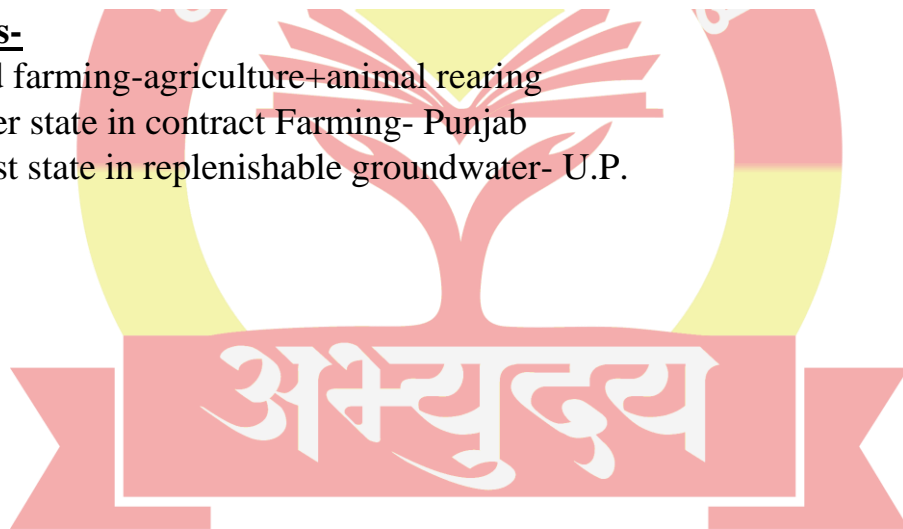


Map showing Agro-Climatic Regions.

1. Western Himalayan division
2. Eastern Himalayan division
3. Lower Gangetic plain region
4. Middle Gangetic plain region
5. Upper Gangetic plain region
6. Trans-Gangetic plain region
7. Eastern plateau and hill region
8. Central plateau and hill region
9. Western plateau and hill region
10. Southern plateau and hill region
11. East coast plain and hill region
12. West coast plain and hill region
13. Gujarat plain and hill region
14. Western plain and hill region
15. Island region

➤ **Terms-**

- Mixed farming-agriculture+animal rearing
- Pioneer state in contract Farming- Punjab
- Richest state in replenishable groundwater- U.P.



	Rabi	Kharif	Zaid
Sowing Season	Winter from October to December	Beginning of the rainy season between April and May	In between the Rabi and the Kharif seasons, there is a short season during the summer months known as the Zaid season (in the months of March to July)
Harvesting Season	Summer from April to June	September-October	
Important Crops	Wheat, Barley, Peas, Gram and Mustard.	Paddy, Maize, Jowar, Bajra, Tur (Arhar), Moong, Urad, Cotton, Jute, Groundnut and Soyabean.	Watermelon, Muskmelon, Cucumber, Vegetables and Fodder crops

➤ **GREEN REVOLUTION-**

(Norman borlaug is father of green revolution and m.s swaminathan is father of indian green revolution.)

Various revolutions and its areas-

1. Blue revolution-fisheries
2. White revolution-milk
3. Black revolution-petroleum
4. Yellow revolution-oilseeds
5. Pink revolution -onion/meat

➤ **FOOD CROPS**

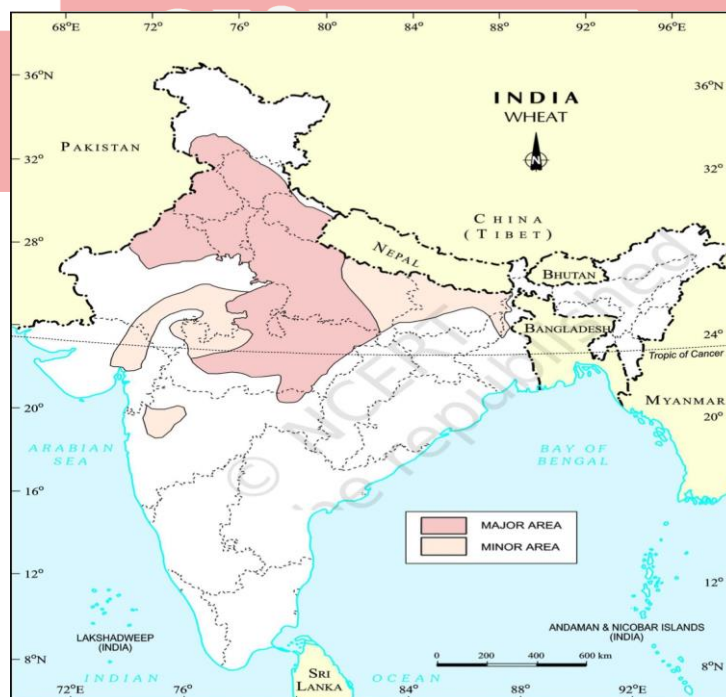
1. RABI CROPS

Sown in winter and harvested in summer- Wheat, mustard, potato, gram, pea, lentil, barley

A. Wheat

conditions-moderate temperature + moderate rainfall: The ideal wheat climate has winter temperature 10° to 15° c and summer temperature varying from 21° c to 26° c. Annual rainfall of 100 cm is the highest limit of wheat cultivation.

leading producers- Up>punjab>haryana.



2. KHARIF CROPS

Sown with initiation of monsoon and harvested in October-November - (paddy, millet, soyabean, peanut)

A. Rice

Conditions- Rice crop needs a hot and humid climate. It is best suited to regions which have high humidity, prolonged sunshine and an assured supply of water, conditions include normal temperature of 24 degrees+average rainfall of 150cm)

- a) Leading producers-west bengal>up>punjab>odisha.
- b) State with maximum area under rice cultivation-up.
- c) Aman and Boro are varieties of rice.



➤ CASH CROPS

A. Cotton

conditions- tropical and sub-tropical areas and requires uniformly high temperature varying between 21°C and 30°C. The growth of cotton is retarded when the temperature falls below 20°C. Frost is enemy number one of the cotton plant and it is grown in areas having at least 210 frost free days in a year.

(cotton fibres are obtained from seed)

leading producers-gujarat>maharashtra>telangana>Andhra

B. Sugarcane

conditions-needs hot and humid climate with average temperature between 21° to 27°C and rainfall varying from 75 to 150 cm.

- a) leading producers-uttar pradesh>maharashtra>karnataka>tamil nadu
- b) MSP is declared on sugarcane, jute, copra, cotton+other rabi, kharif crops
- c) U.P. is known as 'sugar bowl' of india

➤ OILSEEDS

Toria, mustard, sesamum, linseed, castor seed, sunflower, soyabean
largest producer of oilseeds- M.P.>Rajasthan>Gujarat

A. Groundnut

conditions-temperature of the area should be around 27-30°C for good germination and growth. The minimum annual rainfall required for the crops is in between 45⁰ to 125⁰ mm.

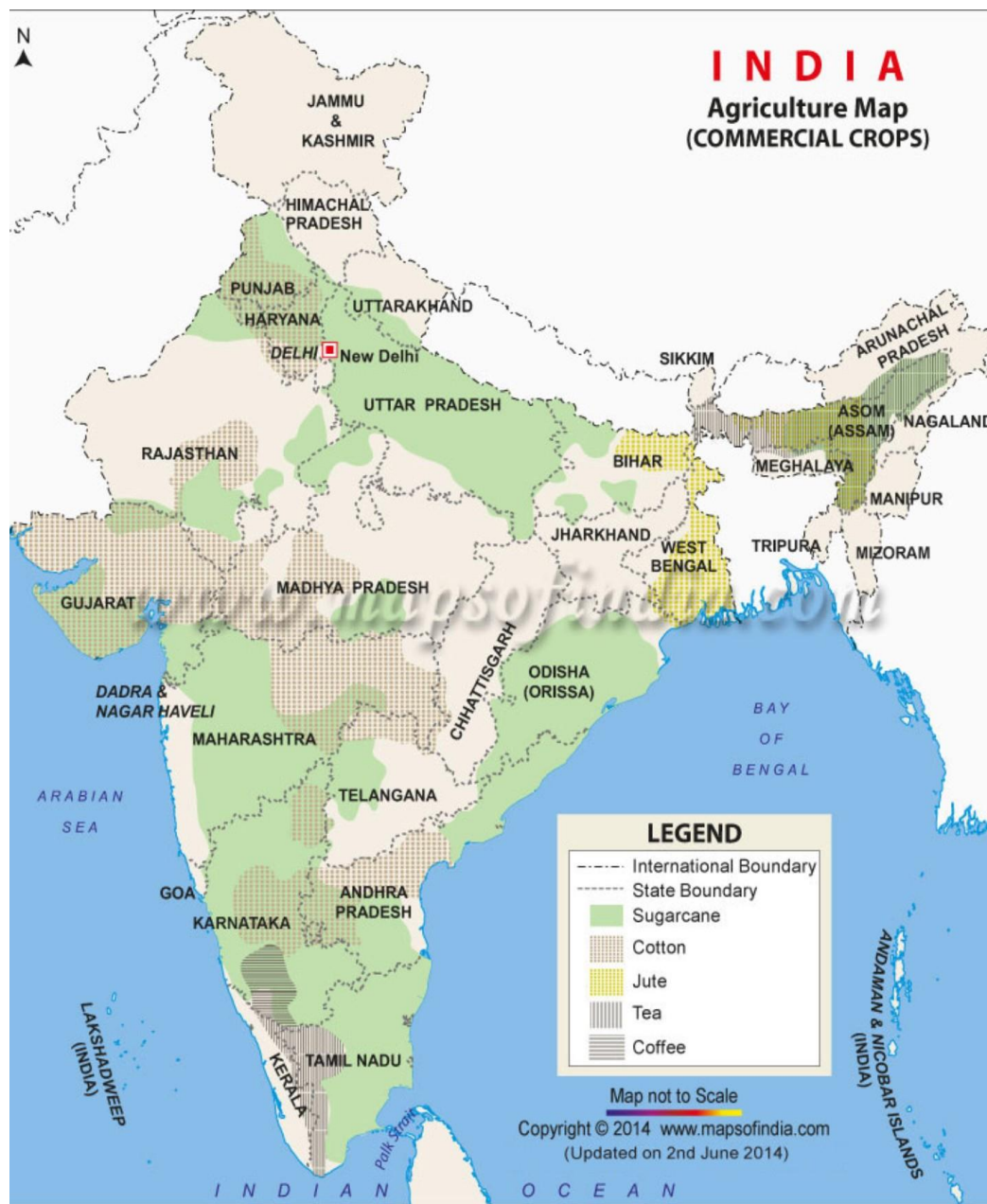
largest producer-gujarat>rajasthan>tamil nadu

B. Soyabean

conditions-needs about 15 to 32°C temperature for germination but for rapid growth the crop needs higher temperature. The crop requires about 60-65 cm annual rainfall drought at flowering or just before flowering results in flower and pod drops.

largest producer- M.P.>Maharashtra>Rajasthan

Oilseed with maximum oil content- Sesamum



➤ **PULSES**

urad, gram, green gram, tur, lentils

Note -lentil is rabi crop

➤ **SILK**

a) Mulberry, Tasar, Muga, Eri

b) life cycle of silkworm- egg-caterpillar-pupa-moth

c) largest producer of mulberry Silk-karnataka

d) largest producer of muga Silk-assam

e) largest producer of eri Silk-assam

f) largest producer of tasar Silk-Jharkhand

➤ **PLANTATION CASH CROPS**

A. Coffee-

(conditions-requires hot and humid climate with temperature varying between 15°C and 28 °C and rainfall from 150 to 250 cm. It does not tolerate frost, snowfall, high temperature above 30°C and strong sun shine and is generally grown under shady trees.)

Largest Producer-Karnataka

B. Tea-

grown in both tropical and sub-tropical areas (GREEN GOLD)

conditions-temperature within 13°C and 28-32°C is conducive for growth of tea.

largest producer-assam

C. Rubber-

largest producer of rubber- kerela>tripura>karnataka>tamil nadu

D. Tobacco-

largest producer-andhra Pradesh

E. Coconut-

largest producer-kerela

F. Cashew nut-

largest producer-maharashtra

➤ **FISHERIES**

largest producer- andhra>west bengal>gujarat>kerela

➤ **MILK AND RELATED OPERATION**

a Father of india's white revolution-Varghese Kurien

b. National Dairy Research Institute- Karnal

➤ **Rankings-**

- India is first in milk production.
- U.P. is leader in food grains production.
- India is second in rice production.
- India is second in wheat production.
- India is third in fisheries production

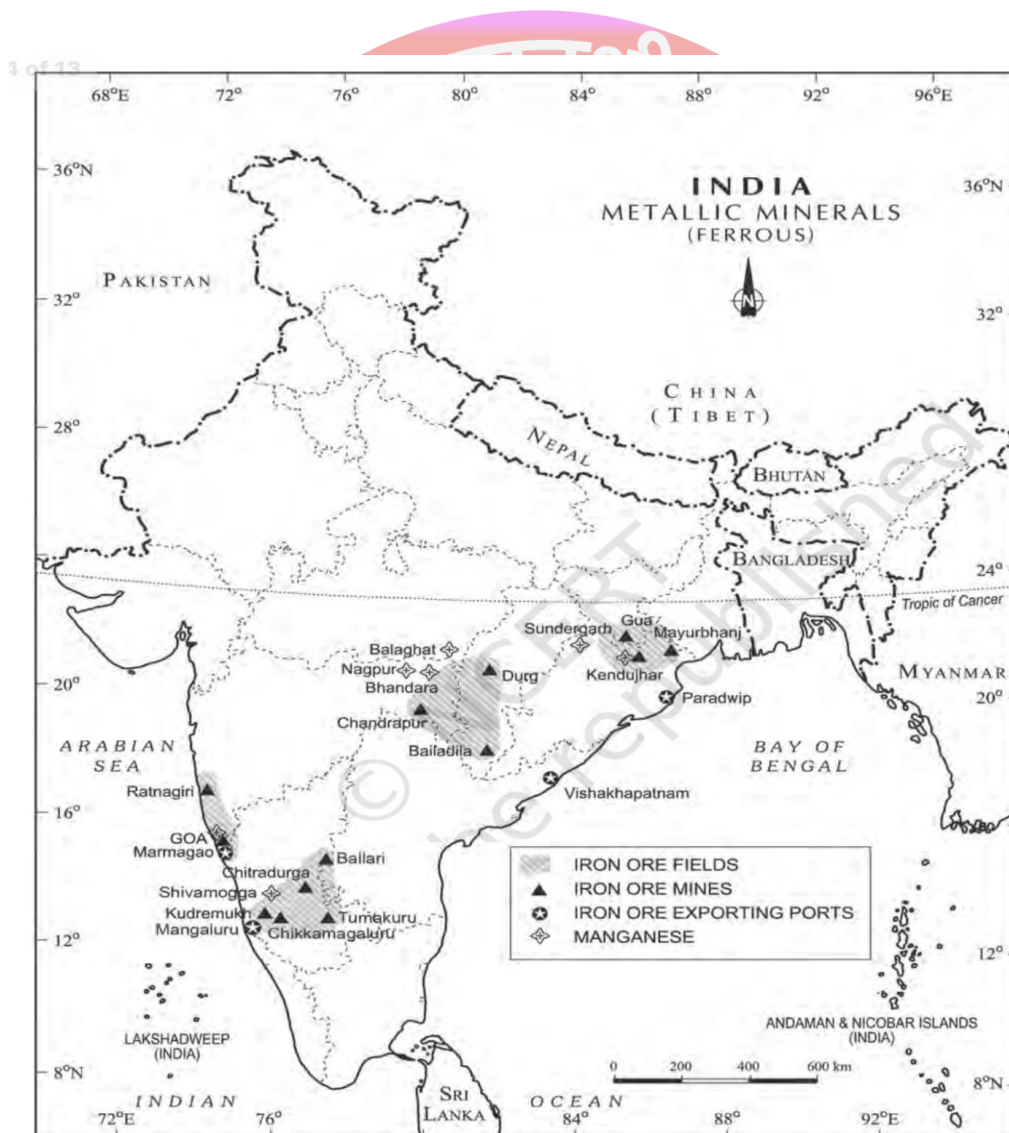


MINERALS AND ENERGY

Classification of minerals-

- 1) Metallic minerals include ferrous minerals like iron ore, manganese, nickel, cobalt etc. and non-ferrous minerals like copper, lead, bauxite, tin etc.
- 2) Precious mineral like gold, platinum, diamond etc.
- 3) Non-metallic minerals include mica, salt, potash, sulphur etc.
- 4) Energy resources include coal, petroleum, natural gas etc.

5)



Metallic minerals

a) Ferrous minerals-

➤ Iron

- Magnetite is the finest iron ore with a very high content of iron up to 70 per cent.
- Haematite is second largest with 50-60% iron content.
- crescent shaped iron ore region includes jharkhand, chattisgarh, odisha and west bengal.
- Major iron belts include-
 - 1) Odisha-Jharkhand belt: badampahar mines in mayurbhanj and kendujhar districts.
 - 2) Durg-Bastar -Chandrapur belt: Singhbhum district of Jharkhand haematite iron ore is mined in Gua and Noamundi.
 - 3) Ballari-Chitradurga-ChikkamagaluruTumakuru belt in Karnataka: kudremukh mines in Karnataka
 - 4) Maharashtra-Goa belt: Ratnagiri district of Maharashtra

6 of 13



➤ **Manganese**

- It is also used in manufacturing bleaching powder, insecticides and paints.

b) **Non-ferrous minerals-**

➤ **Copper**

The Balaghat mines in Madhya Pradesh, Khetri mines in Rajasthan and Singhbhum district of Jharkhand are leading producers of copper.

➤ **Bauxite**

- India's bauxite deposits are mainly found in the Amarkantak plateau, Maikal hills and the plateau region of Bilaspur-Katni.

(NOTE- Alumina and Bauxite are ores of Aluminium)

➤ **NOTE-**

- Leading producer of copper- Madhya Pradesh
- Leading producer of Bauxite- Odisha
- Leading producer of lead- Rajasthan
- Leading producer of tin- Chattisgarh
- Leading producer of gold- Karnataka
- Leading producer of diamond- Madhya Pradesh
- Leading producer of iron Ore- Odisha
- Leading producer of manganese- Madhya Pradesh
- Leading producer of mica- Andhra Pradesh

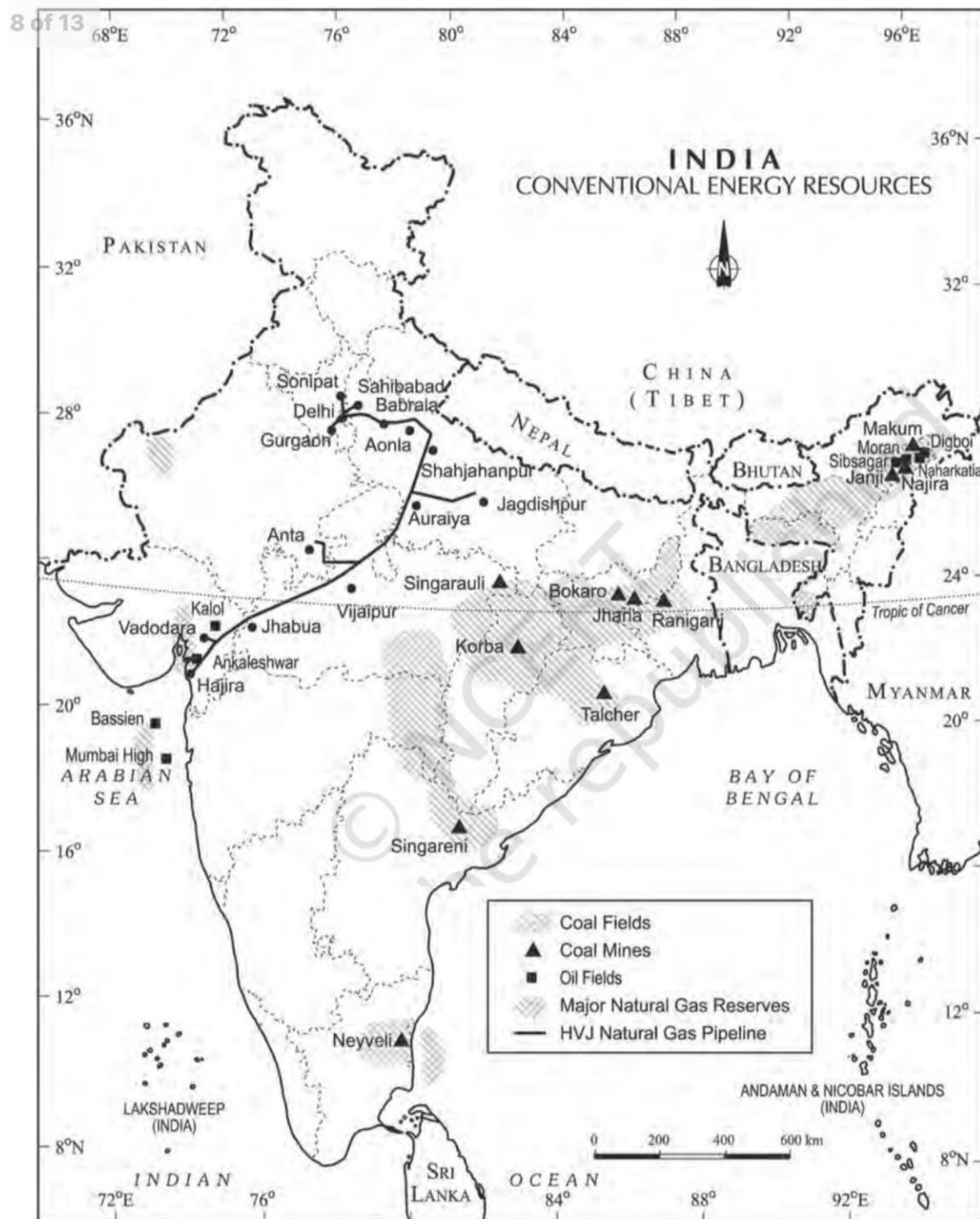


Fig. 7.5 : India - Conventional Energy Resources

c) Rare Minerals-

➤ Uranium

(India imports Uranium from kazakhstan, Canada and Russia)

Reserves include-

- Durg (chattisgarh)
- Bhandara (maharastra)
- Kullu (Himachal)
- Jhunjhunu (Rajasthan)

➤ Thorium

It is 3.5 times of uranium in earth's crust

Reserves include-

Monazite sands are found in

- kerela
- Tamilnadu
- Andhra
- Assam.

Note-uranium can be used directly in a nuclearreactor while thorium cannot be.



3) Non-Metallic minerals-

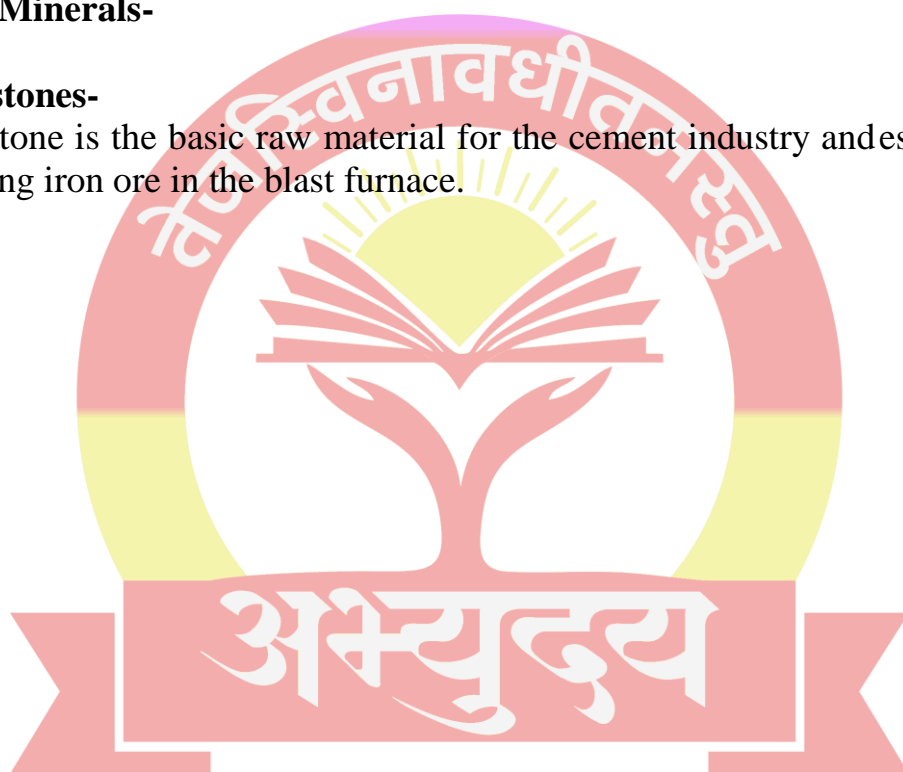
➤ Mica-

- Due to its excellent di-electric strength, low power loss factor, insulating properties and resistance to high voltage, mica is one of the most indispensable minerals used in electric and electronic industries.
- are found in the northern edge of the Chota Nagpur plateau. Koderma Gaya – Hazaribagh belt of Jharkhand is the leading producer; In Rajasthan, the major mica producing area is around Ajmer.
- Nellore mica belt of Andhra Pradesh is also an important producer in the country.

➤ Rock Minerals-

a. Limestones-

Limestone is the basic raw material for the cement industry and essential for smelting iron ore in the blast furnace.



ENERGY RESOURCES-

- Conventional Sources of Energy-

1. coal-

- a) coal is the most abundantly available fossil fuel. It is highly porous and less permeable.
- b) characteristics of indian coal-
 - low calorific value.
 - low sulphur content.
 - high ash content.
- c) Anthracite-is the highest quality hard coal.
- d) Bituminous- Coal that has been buried deep and subjected to increased temperatures is bituminous coal.
- e) Lignite-Lignite is a low grade brown coal, which is soft with high moisture content. The principal lignite reserves are in Neyveli in Tamil Nadu and are used for generation of electricity.
- f) Peat-is a soft, crumbly, dark brown substance that is formed from generations of dead and partially decaying organic matter. It is the first step in the formation of coal, and slowly becomes lignite after pressure and temperature increase as sediment is piled on top of the partially decaying organic matter.
- g) Regions-
 - The major resources of Gondwana coal, which are metallurgical coal, are located in Damodar valley (West Bengal), Jharkhand). Jharia, Raniganj, Bokaro are important coal fields. The Godavari, Mahanadi, Son and Wardha valleys also contain coal deposits.
 - Tertiary coals occur in the north eastern states of Meghalaya, Assam, Arunachal Pradesh and Nagaland.
- h) List of coal mines-
 - Jharia, Dhanbad, Bokaro, Karanpura, Daltonganj- Jharkhand
 - Raniganj, Birbhum- West Bengal.
 - Korba, Bishrampur, Jhilmil, Jorhat-Chhattisgarh
 - Singareni-Andhra
 - Neyveli (tertiary coal field)- Tamil nadu
 - Singrauli, Sohagpur, Johila, Umaria, Satpura coalfield- Madhya Pradesh
 - Leading producer of coal-chhattisgarh

(NOTE- Inputs in coal making-limestone, dolomite, manganese, coking coal, fire clay)

2. Petroleum-

- Petroleum or mineral oil is the next major energy source in India after coal. It provides fuel for heat and lighting, lubricants for machinery and raw materials for a number of manufacturing industries. Petroleum refineries act as a “nodal industry” for synthetic textile, fertiliser and numerous chemical industries.
- It exists underground in all 3 forms namely solid, liquid or gas regions
- Petroleum is also found in fault traps between porous and non-porous rocks. Gas, being lighter usually occurs above the oil. Mumbai High, Gujarat and Assam are major petroleum production areas in India. 3 major off shore fields of western India. Ankeleshwar is the most important field of Gujarat. Assam is the oldest oil producing state of India. Digboi, Naharkatiya and Moran-Hugrijan are the important oil fields in the state.
- List of petroleum regions-

A. onshore regions-

Assam oilfields include digboi, naharkatiya

Gujarat oilfields includes ankleshwar Rajasthan oilfields

B. offshore regions-

Western coast includes bombay high, bassein, aliabet

Eastern coast includes godavari, krishna and cauvery deltas

3. Natural gas-

- Natural gas is considered an environment friendly fuel because of low carbon dioxide. It is obtained from sedimentary rocks.
- **Regions-**
 - A. Large reserves of natural gas have been discovered in the Krishna-Godavari basin.
 - B. Along the west coast the reserves of the Mumbai High and allied fields are supplemented by finds in the Gulf of Cambay.
 - C. Andaman and Nicobar Islands are also important areas having large reserves of natural gas.
- **List of natural gas regions-**

Jaisalmer, Krishna Godavari delta, Tripura and some areas offshore in Mumbai have natural gas resources.
- **NOTE-**Coal bed methane is obtained by converting plant material into coal through burial and heating.

➤ MISCELLANEOUS ON MINERALS-METALLIC MINERALS-

1. DHARWAR ROCKS have maximum metallic minerals.
2. Iron ore-
 - Bailadila is largest mechanized mine;
 - india has haematite ore in highest quantity,
 - dallirajhara, koraput (odisha), chitradurg, makum, noamundi (jharkhand), badam pahar(chattisgarh) are iron ore regions.
3. Zinc-
 - Rampur agucha region of rajasthan; rajasthan has near monopoly in zinc, silver and copper
4. Copper-
 - Malanjkhand mines of M.P. is major copper producing area
 - khamman(andhra), hasan(karnataka), khetri(rajasthan), chanderpur (maharashtra) are famous copper regions.
 - Bauxite- Mayurbhanj(odisha) is leader.
5. Tin-
 - cassiterite is ore of tin
 - Chattisgarh is leading producer.

➤ NON-METALLIC MINERALS-

- 1) mica-is used in electric industry; mica belt includes hazaribagh, gaya and munger; india is world's leading producer of mica; koderma(jharkhand)
- 2) marble-makrana mines of rajasthan; marble is metamorphic rock.

➤ ENERGY-

- 1) Coal-
 - largely found in gondwana region;
 - namchik-namphuk regions are in arunachal pradesh, korba coal fields of chattisgarh, bisrampur in M.P., Singareni(M.P.), Talcher(odisha), Karanpura(Jharkhand).
- 2) Petroleum and natural gas-
 - kalol(gujarat), digboi(assam), numaligar(assam), baraun(bihar), ankleshwar(gujarat) nuna mati(assam), lunej(gujarat) tatipaka(andhra), koyali(gujarat), panagudi(tn);
 - oldest oil field is digboi

TRANSPORT

1. Road transport

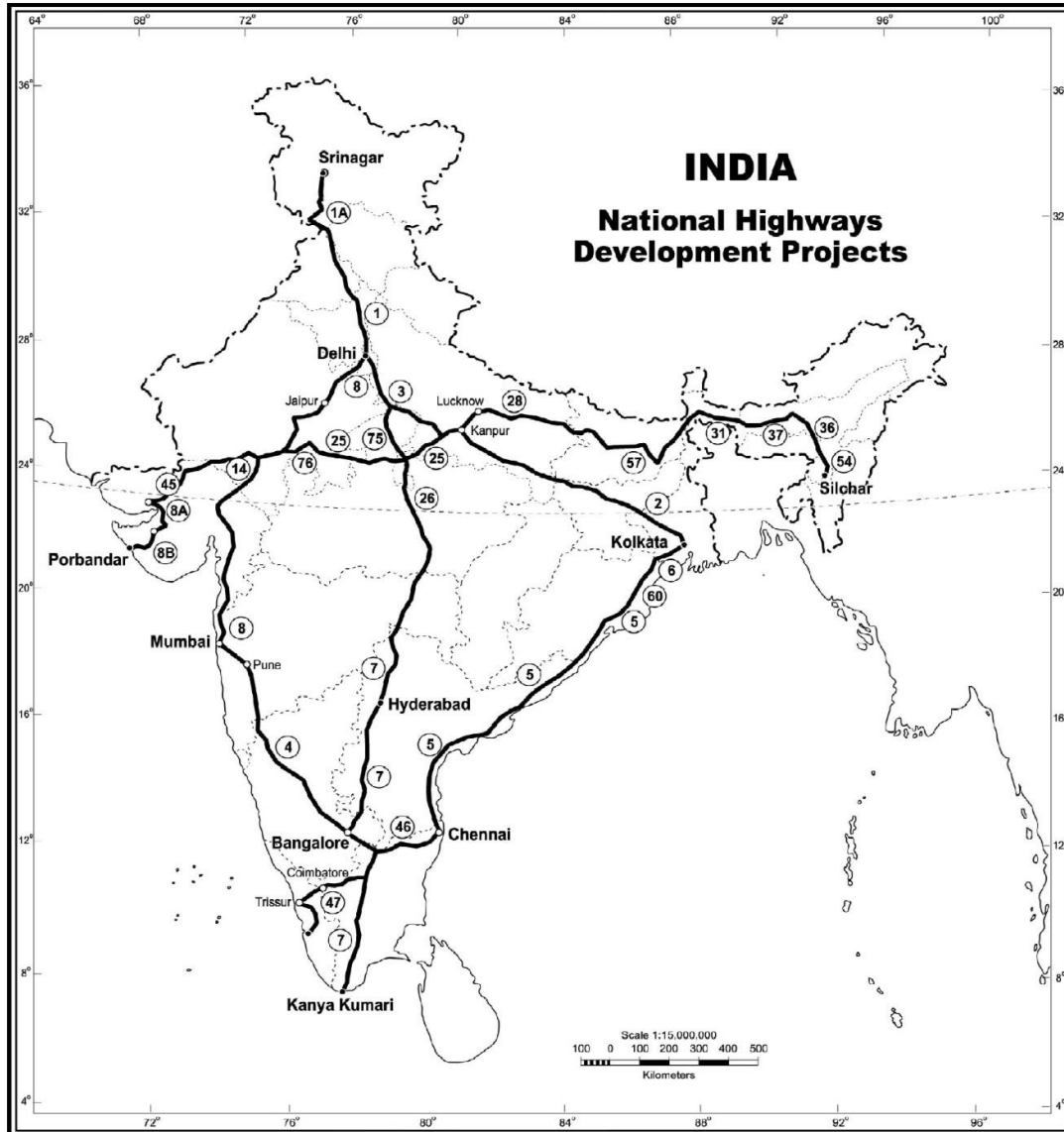
The Nagpur plan (1943) divides roads into 4 main categories: National Highways, State Highways, District Roads and Village roads. Expressways were added as an additional category.

Sr. No.	Road No.	Length in Category	% of Km Total road length
1.	National Highways	65,769	2
2.	State highways	1,28,000	4
3.	Major District Roads	4,70,000	14
4.	Rural Road	2,65,000	80
	Total	33,13,769	100

- 1) There are more than 265 national highways in the country.
- 2) The longest national highway is NH-7.
- 3) NH-1 and NH-2 both are termed as 'GRAND TRUNK ROAD.'
- 4) About 40% traffic of entire country is done by national highways.
- 5) Share of road transport is 80% in total transport of India.
- 6) HIGHEST LENGTH OF STATE HIGHWAYS-MAHARASTRA.HIGHEST LENGTH OF ROADS-MAHARASTRA.
- 7) GOLDEN QUADRILATERAL-DELHI, MUMBAI, CHENNAI AND KOLKATA.
- 8) JAWAHAR TUNNEL PASSES THROUGH BANIHAI PASS.

2. Rail Transport-

- a) FIRST RAILWAY LINE IN INDIA-1853-MUMBAI TO THANE.
- b) railway zones in india-a Central-mumbai b Western-mumbai



- c) Northern-delhi
- d) Eastern-Kolkata
- e) North-eastern-gorakhpur
- f) Northern central-prayagraj others
- g) Rail coach factory-kapurthala
- h) Diesel locomotive Works-Varanasi
- i) Integral coach factory - perambur (Chennai)
- j) Diamond Quadrilateral connects delhi, Mumbai, Chennai and Kolkata through roadways.

3. Water/Air Transport

(India has a total 13 major ports and 200 notified minor and intermediate ports.)
major ports of india- -Mumbai, Kandla, Mangalore, JNPT, Mormugao, and Cochin; Chennai, Tuticorin, Visakhapatnam, Paradip, Kolkata, and Ennore.

➤ facts-

- a) chennai port is largest artificial port.
- b) mormagao port is on zuari river.
- c) vishakhapatnam is land-locked port.
- d) kochi has largest shipyard in india.
- e) kandla port is located on gulf of kacch.
- f) ports on eastern coast are deeper than western coast.
- g) kakinada port is in andhra pradesh.
- h) LNG TERMINAL-DAHEJ, HAZIRA, KOCHI, DABHOL, PARADIP
- i) SETHUSAMUDRAM PROJECT CONNECTS cape camorin with gulf of mannar. biggest port in india-mumbai port.

➤ others-

- a) garden reach Shipyard-Kolkata
- b) mazgaon docks Shipyard-Mumbai
- c) cochin shipyard-kerela
- d) hindustan shipyard-andhra Pradesh

➤ Types of port on the basis of location-

- a) **Inland Ports**-These ports are located away from the sea coast. They are linked to the sea through a river or a canal.
- b) **Out Ports**-These are deep water ports built away from the actual ports.

➤ Types of port on the basis of specialised functions-

- a) **Ports of Call**-These are the ports which originally developed as calling points on main sea routes where ships used to anchor for refuelling, watering and taking food items.
- b) **Entrepot Ports**-These are collection centres where the goods are brought from different countries for export.
- c) **Packet Station**: These are also known as ferry ports. These packet stations are exclusively concerned with the transportation of passengers and mail across water bodies covering short distances.

➤ **NATIONAL WATERWAYS-**

- 1) NW-1 Ganga-Bhagirathi-Hooghly Prayagraj – Haldia
- 2) NW-2 BrahmaputraSadiya-Dhubri
- 3) NW-3 West Coast Canal, Champakara Canal, and Udyogamandal Canal Kottapuram – Kollam
- 4) NW-4 Krishna and Godavari Kakinada–Puducherry stretch of canals, Kaluvelly Tank, Bhadrachalam – Rajahmundry, Waziraba–Vijayawada
- 5) NW-5 consists of the stretches from Talcher to Dhamra on the Brahmani River
- 6) National Waterways 6 is a waterway between Laxhipur and Bhanga of theBarak River.

