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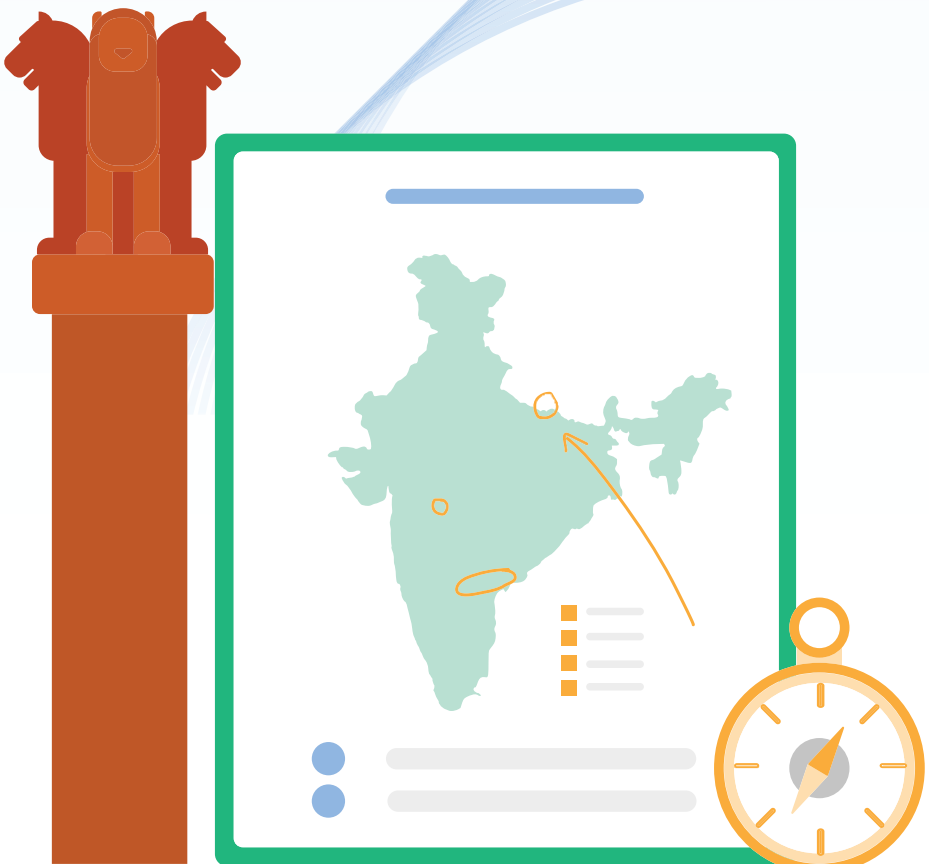
INDIAN GEOGRAPHY



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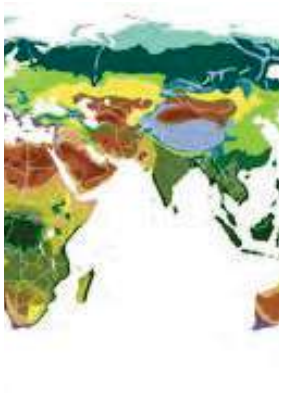

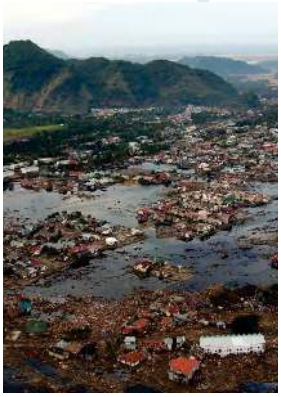

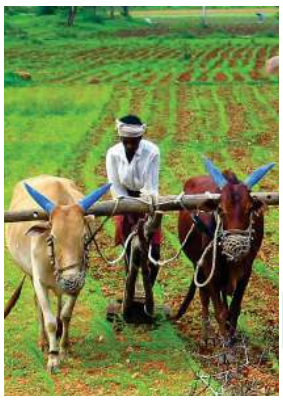

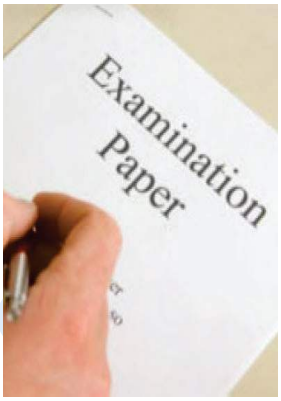

CHAPTER - 1

INDIA: LOCATION AND EXTENT

India - Location

- India is the part of South Asia located in the Northern Hemisphere.
- Extends from **8°4'N to 37°6'N** latitude and from **68° 7'E to 97° 25'E** Longitude, roughly about 30° distance or latitudinal and longitudinal extent.
- **The Tropic of Cancer at 23° 30'N** cuts the country in almost two equal halves.
- Indian mainland extends from Kashmir in the north to Kanyakumari in the south and from Arunachal Pradesh in the east to Gujarat in the west.
- The northernmost point is **Indira Col in Siachen Glacier in the eastern part of Karakoram ranges** and the Southernmost point is Indira Point in the **Nicobar Islands in the Andaman Sea.**
- The tiny town of **Kibithu in Arunachal Pradesh** is the easternmost point of India. The Lohit River enters India from Kibithu.
- The westernmost point of India is the small, inhabited **village of Ghuar Moti**, located in Kutch District of Gujarat.
- Distance from South to North is **3214 km.** and that from west to east is **2933 km.**
- Latitudes are equidistant. The distance between two latitudes is 111 km.
- Longitudes are basically not equidistant from each other at all places. They bulge at the equator and converge at the poles. The average distance between two longitudes is 100 km.
- Note that the distance between two longitudes decreases towards the poles whereas the distance between the two latitudes remains the same.
- The **southern part** of the country, lies within the **tropics** and the northern part of the country lies in the **subtropical zone** or the **warm temperate zone**.
- With the 30° difference or variation between the longitudes, there is almost a difference of **two hours' time between the easternmost and westernmost part** of the country.
- To avoid any complications, the **82° 30'E** longitude is selected as the **Indian Standard Meridian**. The Indian Standard time is **5 hours and 30 minutes** in advance of Greenwich Mean Time.

India - Extent and Size

- India accounts for **2.4% of the total geographical area of the world** making it the **7th largest country** in the world.
- It comprises a total area of **3.28 million sq. km.**
- India has **7516.6 km. coastline** (including of the coastlines of the islands of Andaman and Nicobar in Bay of Bengal and that of Lakshadweep in the Arabian Sea).
- **Coastline of India mainland is 6100km**
- **India has a land boundary of about 15,200 km.**
- India's great size is blessed with great physical diversity. In the North, India is guarded by the **mighty Himalayas**, the forested hills in the North East, Peninsular block in the South and the great sandy expanse of **Marusthali** in

the West.

IMAGE 1.1: INDIA: EXTENT AND SIZE

- The Himalayas are bounded by **Hindukush and Suleiman ranges** in the north-west, the **Purvanchal Hills** in the north-east and by the Great Indian Ocean in the south. This entire area taken together forms the geographic entity called **"The Indian Subcontinent".**
- The Indian subcontinent includes countries like Pakistan, Nepal, Bhutan, and Bangladesh and the mainland of India.
- The Tropic of Cancer passes through the eight states of India namely, Gujarat, Rajasthan, Madhya Pradesh, Chhattisgarh, Jharkhand, West Bengal, Tripura and Mizoram.
- The Standard Meridian of India passes through 5 states of India, namely: Uttar Pradesh, Madhya Pradesh, Chattisgarh, Odisha, Andhra Pradesh.

India's Neighbours

- International borders: **Bangladesh** and **Myanmar** (East) **Bhutan, Nepal, and China** (North), **Pakistan** and **Afghanistan** (North-west).
- Neighbouring island countries: **Sri Lanka and the Maldives.**
- States with International borders: Gujarat, Rajasthan, Punjab, Himachal Pradesh, Uttarakhand, Uttar Pradesh, Bihar, West Bengal, Sikkim, Assam, Arunachal Pradesh, Nagaland, Manipur, Mizoram and UT of Jammu and Kashmir.
- **Coastal states:** Gujarat, Andhra Pradesh, Tamil Nadu, Maharashtra, Kerala, Odisha, Karnataka, West Bengal, and Goa (in decreasing order of Coastline).
- **Ocean bodies:** Arabian Sea, Bay of Bengal, Indian Ocean.
- **Gulf of Mannar** and **Palk Strait** divides Sri Lanka and India.

Bordering country	Length of the common border (in km.)	No. of Indian states having common borders	Names of Indian State/UTs having common borders
Bangladesh	4096.7	5	West Bengal, Assam, Meghalaya, Tripura, Mizoram
China	3488	5	Himachal Pradesh, Uttarakhand, Sikkim, Arunachal Pradesh and Union territories of Ladakh (Previously under state of Jammu & Kashmir)
Pakistan	3323	4	UT of Jammu and Kashmir, UT of Ladakh, Punjab, Rajasthan, Gujarat

Nepal	1751	5	Uttarakhand, Uttar Pradesh, Bihar, West Bengal, Sikkim
Myanmar	1643	4	Arunachal Pradesh, Nagaland, Manipur, Mizoram
Bhutan	699	4	Sikkim, West Bengal, Assam, Arunachal Pradesh
Afghanistan	106	1	Jammu & Kashmir (POK)

Strategic Importance of India's Location

- The maritime location of peninsular India has provided links to its neighbouring regions through sea and air routes.
- Strategic importance due to trans-Indian ocean routes which connect the countries of Europe in the west and the countries of East Asia.
- The maritime location of India establishes close contact with West Asia, Africa and Europe from the Western coast and with the south-east and south Asia from Eastern Asia.
- The vast coastline and the natural harbors have benefitted India in carrying out trade and commerce with its neighbouring and distant countries.
- It has given India a distinct climate than the rest of Asian countries like the way monsoons have a unique effect on the climate of India.

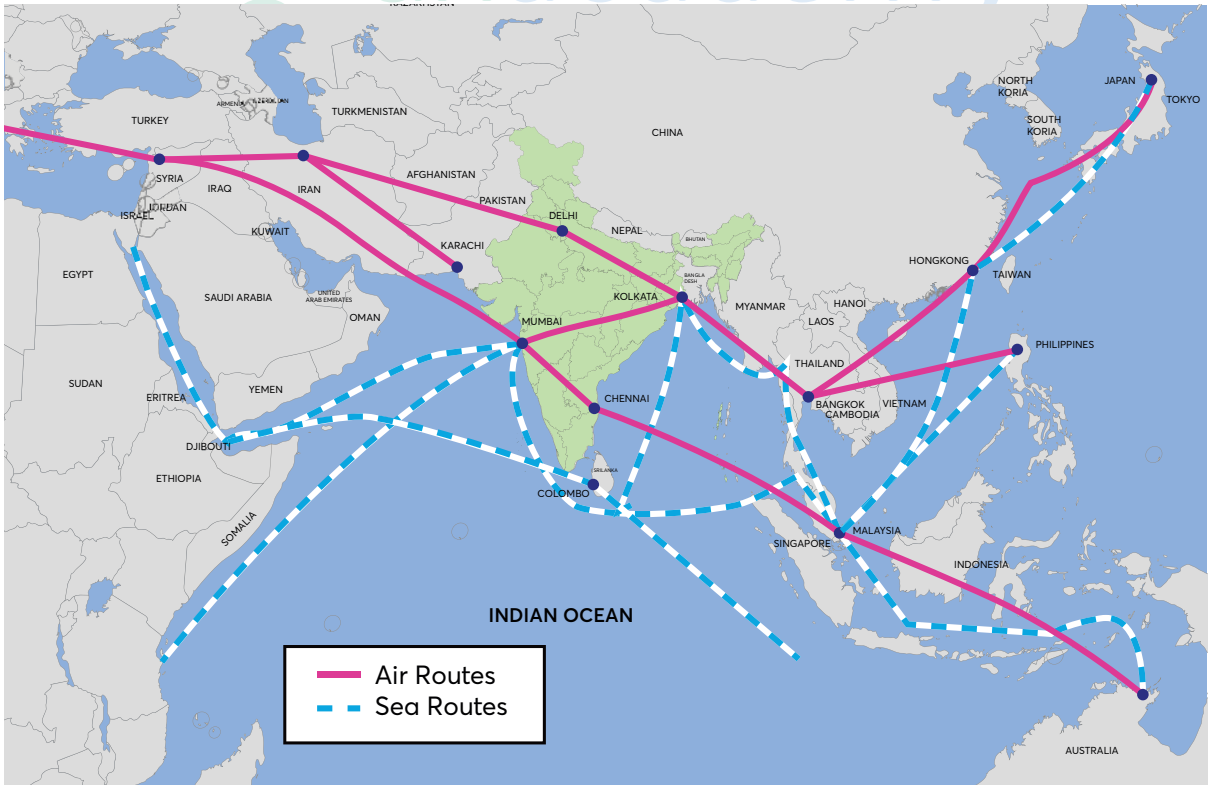

Image 1.2: Location of India With Respect to Trade Routes with Neighbouring Regions

CHAPTER - 2

INDIA: STRUCTURE AND PHYSIOGRAPHY

Introduction:

- Indian Subcontinent is the result of interplay of endogenic and exogenic forces and lateral movement of plates through which the geomorphic processes and geological structure of the subcontinent came into being.
- Based on the different geological structure and formations, India is divided into three geological divisions, as follows:

» The Peninsular Block

» The Himalayan and other Peninsular Mountains

» Indo-Ganga-Brahmaputra Plains

Peninsular Block

- The northern limit of peninsular block is the Kutch region, running along the western flanks of the Aravali range and then runs parallel to Yamuna and Ganga to as far as Rajmahal Hills and Ganga delta.
- In North-East India, the Karbi Anglong and the Meghalaya Plateau are also an extension of this block.
- This north eastern part of the block is separated from the main block by the Malda Fault in West Bengal from the Chota Nagpur Plateau.
- Parts of Rajasthan desert are also an extension of this peninsular block.
- Peninsular block is formed by ancient gneisses and granites and has been a rigid mass of block standing since the cambrian period except for the western part, where a part of it is submerged beneath the sea.
- Peninsular block being a part of Indo-Australian Plate, it has been subjected to various vertical movements and block faulting. The rift valleys of the Narmada, the Tapi and the Mahanadi and the Satpura block mountains are some examples of it.
- Peninsula consists mostly of relics and residuals like Aravali ranges, Nallamala hills, Javadi hills, Veliconda hills, Palkonda range and Mahendragiri hills.
- Many rivers flow through this Peninsular block. Most of the east flowing rivers like Mahanadi, Krishna and Godavari form delta before entering into the Bay of Bengal.
- The west flowing rivers like Narmada, Tapi etc do not form any delta because:

» Due to the steep slope of Western Ghats, the west flowing rivers generally have a rapid flow. Because of this, the rivers carry their silt into deep sea.

» There is very less silt deposition. Concurrently, the Narmada and Tapi rivers flow via the rift valleys and while doing so the eroded material carried by them gets deposited in the fractures of the fault zones. Thus, they do not form deltas.

» Moreover, the tides are also one reason that the rivers of western side do not form deltas. The west flowing rivers form estuaries instead.

The Himalayan and other Peninsular Mountains

- These mountains are young fold mountains, and their geological

structure is much weaker and more flexible than the old and stable peninsular block.

- The exogenic and endogenic interplay results in the formation of different kinds of folds, faults and thrust plains.
- These mountains are the result of tectonic activities.
- In fact, these mountains lying on the zones of convergence along the tectonic plate boundaries are still undergoing the tectonic activities and are still in their process of formation.
- The rivers cut across these mountains during their youthful stage resulting into marvellous features like gorges, V-shaped valleys, rapids, waterfalls etc. before they descend into the plains.
- The several Himalayan rivers like Ganga, Yamuna, Brahmaputra etc. cut across the lofty Himalayas as very fast flowing streams in their upper reaches. Such fast movement of running water causes more vertical erosion that lateral erosion and causes valleys to deepen.
- The rivers of Western Ghats too form spectacular gorges and V-shaped valleys which are the result of the vertical erosional activities of peninsular rivers like Krishna, Ghataprabha, Tungabhadra, Periyar etc. Many waterfalls like Dudhsagar, Sivasamudram, Jog are the resultant erosional features of Western Ghats.

Indo-Ganga-Brahmaputra Plains

- As the name suggests, the floodplains of the three most important Himalayan rivers Ganga, Brahmaputra, and Indus forms the third geological division.
- The floodplain was originally a geo-synclinal depression.
- The plain reached its peak development approximately 64 million years ago, during the third phase of Himalayan mountain formation.

Geosynclines

- A geosyncline is large troughlike or basinlike downwarping of the crust in which thick sedimentary and volcanic rocks accumulated.
- These are major structural and sedimentation all units of the earth's crust. They are elongated trough-like depressions submerged beneath the sea water.
- They are potential sites of mountain building activity. These basins become filled with great thickness of sediments and along with the accumulation of pile of sediments; there occurs progressive subsidence of the basin floor resulting into plain formation at a much later geological stage.

- The plain was the result of sediments brought and filled by Himalayan and Peninsular rivers.
- These plains are mostly formed of alluvial deposits and therefore are extremely fertile and the depth of deposits vary between 1000-2000 m.

India - Physiography

- Physiography of a region is the outcome of the geologic structure, geomorphic processes, and stage of development of landforms. India has great diversity in terms of physical features. The north is characterized by the rugged mountain topography with high peaks, beautiful valleys, and deep gorge. The southern part is the solid block of rigid landmass which is very stable and is dissected by plateaus, denuded rocks, and resultant scarps. The middle part is characterized by vast rolling plains.
- India is divided into 6 physiographic divisions:

» The Northern and the Northeastern Mountains
» The Northern Plains
» The Peninsular Plateau
» The Indian Desert

» The Coastal Plains

» The Islands

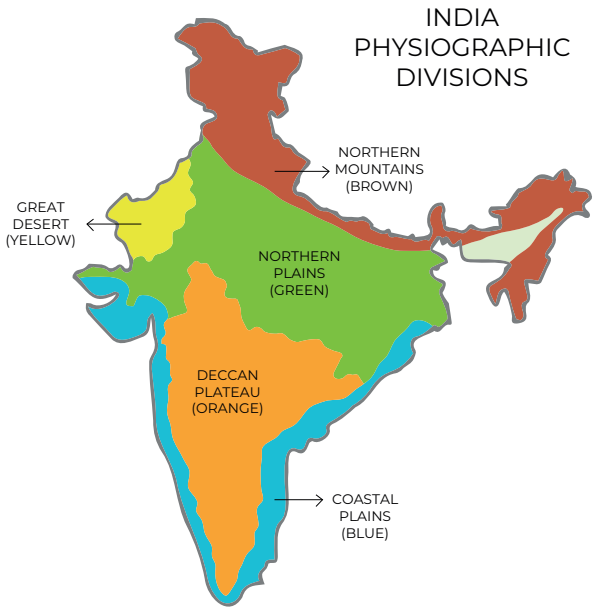

IMAGE 2.1: PHYSIOGRAPHY OF INDIA

The Northern and North Eastern Mountains

These set of mountains consist of Himalayas and the North Eastern hills. Let us first learn about Himalayan mountain system in detail.

The Himalayan Mountain System

- First it is to be noted that the Himalayas and the Himalayan mountain system are not the same. Himalayas are just one part of the 3 parts of the Himalayan mountain system.
- They are young and structurally fold mountains and stretch over the northern borders of India.
- The Himalayan ranges run from the Indus to the Brahmaputra river in a west-east direction.
- They are formed by the tectonic collision of the Indian Plate with the Eurasian Plate.
- Himalayas are the highest mountain ranges in the world and have the highest peaks, deep valleys, gorges and glaciers.
- They form an arc over the Indian subcontinent, which covers a distance of around 2,400 km. in length and varying width from 400 km. in Kashmir to 160 km. in Arunachal Pradesh.
- The altitudinal variations of Himalaya are greater in the eastern part than those in the western part.
- These mountains act as a physical barrier between Central and East Asian countries and India and protect the Indian subcontinent from the icy cold winds of Central Asia.
- They act as climatic, drainage and cultural divide.
- The northern mountain system is divided into three parts, called – The Himalayas, The trans-Himalayas and The Purvanchal Hills.

Himalayas:

- Himalayas run from west (Indus) to east (Brahmaputra) direction along the northern boundary of India.
- They cover a distance of 2500 km. and their width varies from 400 km. in the west and 150 km. in the East.
- The Himalayas can be classified on many bases. There is the most common classification based on their north-south alignment. This is called the longitudinal division of Himalayas. There is also a west to east division of Himalayas based on region and height of the mountains.
- There are three parallel ranges in the Himalayas (longitudinal division)

» **Himadri or the Greater Himalayas**

(They are the inner most mountain ranges)

» **Himachal or the Lesser Himalayas** (they are the middle Himalayas)

» **Shivaliks or the Outer Himalayas**

- The general orientation of these mountains is northwest to southeast in the north western side of India, towards east-west direction in the North Bengal and Sikkim and towards southwest to northwest direction in the Arunachal side and North-south direction in Mizoram, Nagaland and Manipur region.
- The Himalayan mountains from North-east to Nepal are covered with lush green thick forest but the forest cover decreases west from Nepal following the general pattern of rainfall which decreases east to west.

Greater Himalayas or Himadri

- The Greater Himalayas run for 2400 km. from west to east and their width is about 120-190 km.
- The average height of these mountains is 6000 m. and average width is around 120 – 190 km.
- They are the most continuous range consisting of the loftiest peaks and contain all the prominent Himalayan peaks. The core of this Himalayan part is composed of granite.
- They are perennially snowbound, and a number of glaciers descend from this range.
- Mount Everest (8850 m.) – the highest peak in the world, Mt. Kanchenjunga (8586 m.), Mt. Makalu (8481 m.), Mt. Dhaulagiri (8172 m.) are some of the important peaks of this mountain range.
- Other prominent ranges include Kamet, Nanga Parbat and Annapurna.
- The Ganga and the Yamuna, rivers originate from this Himalaya.

Himachal or the Lesser Himalayas

- Lesser Himalayas or Middle Himalayas or Himachal is the middle section of the vast Himalaya Mountain.
- The range lies between the Great Himalayas to the northeast and Shivalik range to the southeast.
- The average height of these mountains is 3700 – 4500 m. and average width is 50 km.
- Himachal extended for some 2,400 km. northeast to southeast across the northern limit of the Indian subcontinent.
- Areas included are Nepal, Bhutan, Indian states of Himachal, Uttarakhand, and Sikkim and UTs of Kashmir and Ladakh.
- Pirpangal, Nag Tibba, Dhauladhar, Mahabharat are some of the important ranges.
- The Middle Himalayas are famous for their valleys like Kulu, Kashmir, Kangra etc.
- Most popular hill stations are in these mountains are Shimla, Ranikhet, Darjeeling, Nainital etc.

Shivalik or the Outer Himalayas

- Shivalik ranges are the southernmost hills of the Himalayas.
- It is separated from the Lesser Himalayas at some places by flat-bottomed Valleys.
- The ancient name of this range was 'Upgiri'.
- The Outer Himalayas makes almost a continuous chain of more than 2400 km. from the Indus gorge in northwest to the Brahmaputra in Assam.
- The width of Shivaliks is 10-50 km. and the height seldom exceed 1300 m.

- In Punjab and Himachal Pradesh, the southern slopes of Shivalik ranges are nearly lacking of forest cover. These slopes are extremely dissected by seasonal streams called Chaos.
- There exist many longitudinal valleys between the Shivaliks and Himachal, running parallel to the mountains and are called 'Duns', like Dehradun, Kotli Dun, Patli Dun.

Formation of 'duns' and 'duars' in Shivalik Hills:

- Shivalik Hills were formed by the accumulation of conglomerates (sand, stone, silt, gravel, debris etc.). These conglomerates, in the initial stages of deposition, obstructed the courses of the rivers draining from the higher reaches of the Himalayas and formed temporary lakes.
- With the passage of time, these temporary lakes accumulated more and more conglomerates. The conglomerates were well settled at the bottom of the lakes.
- When the rivers were able to cut their courses through the lakes filled with conglomerate deposits, the lakes were drained away leaving behind plains called 'duns' or 'doons' in the west and 'duars' in the east.

On the basis of alignment of ranges, relief, and similar geomorphological features, the Himalayas are divided into the following subdivisions.

- Kashmir or North-western Himalayas
- Himachal and Uttaranchal Himalayas
- Darjeeling and Sikkim Himalayas
- Arunachal Himalayas
- Eastern Hills and Mountains

Kashmir or Northwestern Himalayas:

- Karakoram, Ladakh, Zaskar, Pir Panjal, and Dhaola Dhar are the main ranges of this section
- The Kashmir Himalayas' northeastern region is a cold desert located between the Greater Himalayas and the Karakoram ranges.
- The northern slopes are gentler, bare and show plains with lakes, while the southern slopes are steep, rugged and forested.
- Siachen and Baltoro glaciers are part of Kashmir Himalaya.
- The world-famous valley of Kashmir and the famous Dal Lake are located between the Great Himalayas and the Pir Panjal range.
- It is also well-known for their Karewa formations, which are useful for growing Zafran, a local variety of saffron.
- This region also contains some of the most important freshwater lakes, such as Dal and Wular, as well as saltwater lakes, such as Pangong Tso and Tso Moriri.
- Famous pilgrimage sites such as Vaishno Devi, Amarnath Cave, Charar-e-Sharif, and others are also located here, and a large number of pilgrims visit these sites each year.
- Zojila, Rohtang, Baralacha la and Shipki La are important passes.
- This area has the beautiful valleys of Kullu, Kangra and Lahaul and Spiti.
- It is also home to the beautiful Kashmir Valley and the Dal lake.
- The Dal lake presents a very unique and interesting physical feature. The Jhelum river in the Kashmir valley is still in its youth stage and yet it forms meanders.

Meanders

- Meanders are a physical feature which is associated with the mature stage of evolution in the formation of fluvial landforms.
- In Kashmir Valley, the meanders in Jhelum river are caused by the local base level provided by the erstwhile larger lake of which the present Dal Lake is a small part..

The Himachal and Uttarakhand Himalayas:

- This region is roughly located between

the Ravi in the west and the Kali (a tributary of Ghaghara) in the east and drained by two of India's major river systems, the Indus and the Ganga.

- The rivers Ravi, Beas, and Satluj (tributaries of Indus), and the Yamuna and Ghaghara (tributaries of Ganga) flow through this area.
- All three Himalayan ranges, namely the Great Himalaya, the Lesser Himalayas (locally known as Dhaoladhar in Himachal Pradesh and Nagtibha in Uttarakhand), and the Shiwalik range from north to south, are prominent in this section.
- The Bhotias are the majority of the people who live in the valleys of the Great Himalayan range. These are nomadic groups that migrate to the 'Bugyals' (summer glasslands in the higher reaches) in the summer and return to the valleys in the winter.
- The Valley of Flowers is also situated in this region.
- This region is famous for the formation of Duns. Dehradun1 is the largest and the most famous dun in this region.
- The region is also known to have five famous Prayags. The places of pilgrimage like Gangotri, Yamunotri, Kedarnath and Hemkund Sahib are situated in this region.

The Darjiling and Sikkim Himalayas:

- They are bounded to the west by the Nepal Himalayas and to the east by the Bhutan Himalayas.
- This Himalaya is renowned for its fast-flowing rivers, such as Tista, high mountain peaks such as Kanchenjunga (Kanchengiri), and deep valleys.
- The higher reaches of this region are inhabited by Lepcha tribes, whereas the southern portion, especially the Darjiling Himalayas, is populated by a mix of Nepalis, Bengalis, and Central Indian tribes.
- Instead of Shiwaliks, the 'duar formations' are significant here, and have also been used for the growth of tea gardens.
- This region is also known for their scenic beauty and rich flora and fauna, particularly various types of orchids.

The Arunachal Himalayas:

- These extend from the east of the Bhutan Himalayas up to the Diphu pass in the east in southwest to northeast direction.
- Kangtu and Namcha Barwa are important mountain peaks of the region.
- The fast-flowing rivers from the north to the south dissect this region and form deep gorges.
- Ex: Bhramaputra flows through a deep gorge after crossing Namcha Barwa.
- Kameng, Subansiri, Dihang, Dibang and Lohit are some of the important rivers of this region.
- These rivers have hydro-electric power potential because of their perennial flow with the high rate of fall.
- Numerous ethnic tribal groups, including the Monpa, Abor, Mishmi, Nyishi, and Nagas, live in these areas from west to east.
- Most of these communities practise Jhumming, known as shifting or slash and burn cultivation.

The Eastern Hills and Mountain:

- These are part of the Himalayan mountain system and have alignment from north to south direction.
- In the north, they are known as Patkai Bum, Naga hills, the Manipur hills and in the south as Mizo or Lushai hills.
- This region is also inhabited by

numerous tribal groups practising Jhum cultivation.

- The majority of these ranges are separated by numerous small rivers. The Barak River (tributary of Meghna) is important in Manipur and Mizoram.
- Manipur's physiography is characterised by the presence of a large lake known as 'Loktak' lake in the middle, surrounded by mountains on all sides. Mizoram, also known as the 'Molassis basin,' is composed of soft unconsolidated deposits.

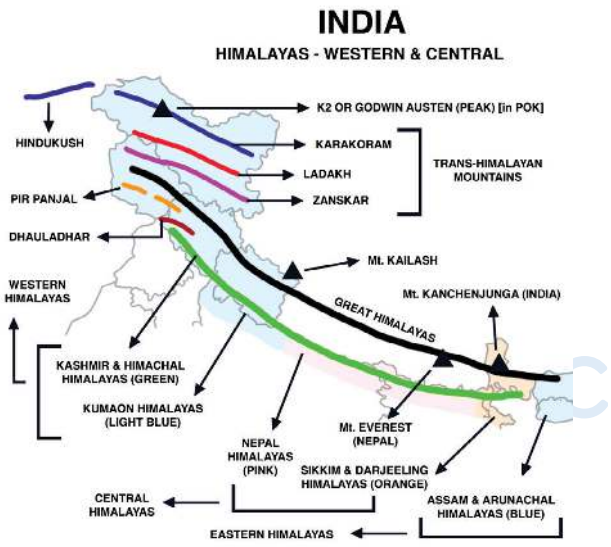

Image 2.2: Himalayas - Western & Central

Important Mountain Passes in Himalayas

- **Banihal Pass:** This mountain pass separates the Kashmir Valley in the Indian UT of Jammu and Kashmir from the Outer Himalayas and plains to the south.
- **Jelep La Pass:** It is a high mountain pass between Tibet and India in Sikkim. The pass connects Lhasa (Tibet) to India.
- **Karakoram Pass:** The Karakoram Pass is between India and China and is located in the Karakoram Range.
- **Mana Pass:** It is a one of the mountains passes in the Himalayas located in Uttarakhand state. It is on the border between India and Tibet.
- **Nathu La Pass:** It connects the Indian state of Sikkim with China's Tibet Autonomous Region. This pass is of strategic importance in Indo-China relations.
- **Rohtang Pass:** It connects the Kullu valley with Lahaul and Spiti valleys of Himachal Pradesh. Manali-Leh Highway, a part of NH 21, transverses Rohtang Pass.
- The Atal tunnel, the world's longest highway tunnel (9.02 km) above a height of 3,000 metres, was recently built in Rohtang. It links Solang Valley in the Manali district to Sissu in the Lahaul and Spiti district.
- **Shipki La Pass:** It is located in Himachal Pradesh and border post on the India-Tibet border. The river Satluj enters India from Tibet through this pass.

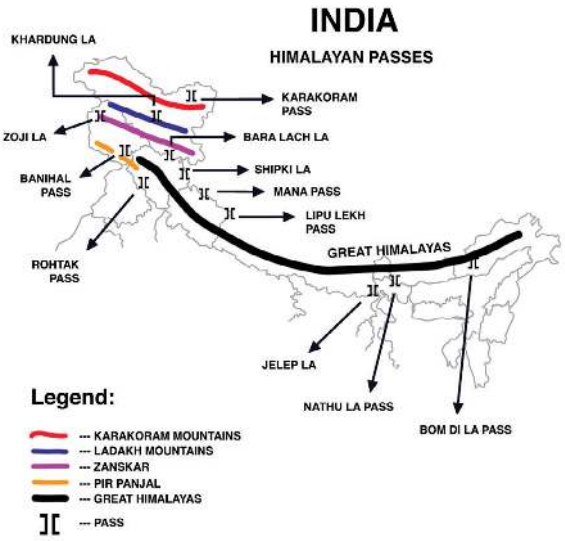

Image 2.3: Himalayan Passes

- **Zoji La Pass:** It is one of the high mountain pass in UT of Ladakh, located on the Indian National Highway 1D between Srinagar and Leh in the western section of the Himalayan mountain range.

The Trans-Himalayan Mountains

- The Trans Himalayas are the ranges immediately to the north of the Great Himalayan Range.
- It includes the mountain ranges of Karakoram, Zanskar, Ladakh and Kailash ranges.
- It is also called the Tibet Himalayas because most of it lies in the Tibet region.
- It stretches 1000 km. from east to west and average height is about 3000 m.

Karakoram Range

- These range forms India's frontier with Afghanistan and China. It is the northernmost range in the Trans-Himalayan Mountains.
- The average width of this range is 120 – 140 km. Most peaks hardly ever fall below 5,500 m. Some of the peaks have height more than 8,000 m above sea level.
- K2 is the 2nd highest peak in the world & the highest in India. It is also known as Godwin Austen.

Ladakh Range

- This part of the Trans Himalayan Ranges lies to the north of Leh.
- The Ladakh Plateau lies to the north-east of the Karakoram Ranges. It is dissected into a number of plains and mountains. It is the highest plateau of Indian Union and has many plains like Soda plains and Aksai Chin.
- This range merges with the Kailash range in Tibet.

Zanskar Range:

- This part of Trans Himalayas is situated in the Indian UT of Ladakh.
- The average height is about 6000 m.
- This range separates Zanskar from Ladakh.

Kailash Mountain Range

- Kailash range is one of the highest and most rugged parts of the Trans Himalayas. It is located in the southwestern part of the Tibet.
- Mount Kailash is an important holy site for both Hindus and Buddhist.
- It is the origin of the river Indus.

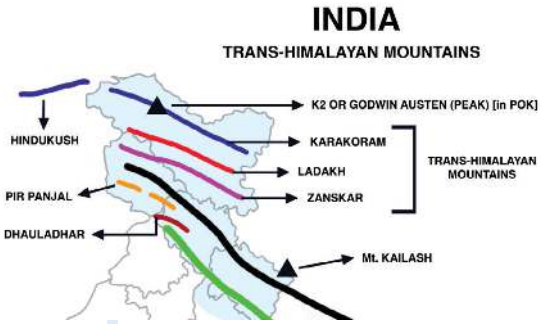

Image 2.4: Trans-Himalayan Mountains

The Purvanchal Or Eastern Hills and Mountains

- After crossing the Dihang gorge (Brahmaputra gorge) in Arunachal Pradesh, the Himalayan ranges suddenly turn southward. It forms the series of comparatively low hills running in the shape of a crescent with its convex side pointing towards the west.
- Collectively these hills are called as the Purvanchal because they are located in the eastern part of the country. Purvanchal hills extends from the Arunachal Pradesh in the north direction to Mizoram in the south direction and forms a border between Myanmar and India.
- From north to south the elevation of the Eastern Hills decreases. The region is categorized by rough terrain, dense forests, and hasty streams. These

Ranges are usually 2,000 m. or less in elevation.

- This region receives the most of monsoonal rainfall and therefore is covered with lush dense green forests.
- Such green cover in the hills often makes them inaccessible.
- Mawsynram, a village near Cherrapunji in Meghalaya is the wettest place on earth, receiving the highest annual rainfall.
- These hills are inhabited by tribal groups who practice Jhum cultivation.
- The Indo-Burma mountain range is a part of Arakan Yoma Suture zone which stretches south via Andaman– Nicobar island chain to Sunda.

It comprises of the following hills:

- **Mishmi hills –** These hills contain the loftiest range of the Purvanchal. Dapha Bum is its highest peak.
- **Patkai Bum Range –** This is the northernmost range making the easternmost boundary of the Great Himalaya Mountains. These ranges have synclinal structure and is made up of Tipam sandstone.
- **Naga Hills –** These hills lie south to the Patkai Bum. The Samati (3826 m.) is its tallest summit. Patkai Bum and Naga hills form the watershed between India and Myanmar.
- **Manipur Hills –** It lies south to Naga hills and forms a boundary between Manipur and Myanmar. Its central part is a great basin which looks like a bed of an old lake, a residue of which occupies the south-east corner of the basin and is identified as Loktak Lake. The Barail Range parts Naga Hills from Manipur hills.
- **Mizo Hills (Lushai Hills) –** It lies south to Manipur hills and its highest point is the Blue Mountain (2157 m.) in the south. Mizoram is known as the Molasses basin which is made up of soft unconsolidated deposits.

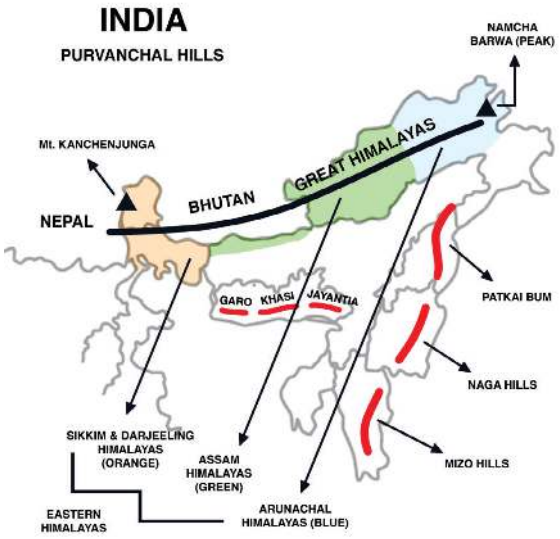

IMAGE 2.5: PURVANCHAL HILLS

Significance of Northern Mountains

- **Physical barriers:** It acts as a compound wall which splits India from central and East Asian countries. It is also responsible for the variance in climatic and weather forms between Indian sub-continent from rest of the Asia.
- **Natural frontier:** The Himalaya acts as a defense barricade and have been protecting India from foreign invasions since ancient period.
- **Climatic Influence:** The Himalayas play a crucial role in influencing the climate of India. India is a land of monsoon due to the existence of Himalayas. It captures the monsoon winds from Arabian Sea and the Bay of Bengal branches and forces it to shed their moisture content within the Indian sub-continent in the form of snow and rain.
- Himalaya also act as a barrier to the cold winter storms of East Asia from entering India, thus protecting us from severe cold.
- Due to the huge vertical height of Himalayas, they split the westerly jet streams into two branches i.e., southern

and northern branch. The southern branch entering India plays an important role in carrying the monsoon.

- **Source Region of Rivers:** Himalaya is the plentiful reservoir of Great Indian rivers such as Indus, Ganga, and Brahmaputra. The snow liquefy in summer and precipitation in winter makes them perennial rivers (Rivers having water all over the year). The ample rains, massive snowfield and huge glaciers nourish these drainage systems. Himalayan Rivers give life to northern India.
- **Fertility of Soil:** The Himalayan Rivers carry slits on their way down and deposit in the northern plain. In this way the entire northern plains were made by the Himalayas. These alluvial deposits are the reasons behind the high fertility of this land. Hence, it is often said that northern great plain is a gift of Himalayas.
- **Hydro Electric Power Projects:** The Himalayan valley, due to the presence of natural waterfalls and perennial nature of rivers offers the best location for construction of dams.
- **Biodiversity and Vegetation:** The Himalayan ranges are well-known for rich biodiversity. There is altitudinal zonation of vegetation from the tropics to the alpine. The forests provide fuel wood, medicinal plants and various raw materials that are needed for the forest-based industries.
- **Agriculture:** The Himalayas does not have much flat lands but offer slopes that are terraced for cultivation. The major crop is rice. Crops like maize, wheat, ginger, potatoes, and tobacco are also cultivated. Tea is a unique crop which grows only on hill slopes. Many fruits such as pears, mulberries, apples, peaches, cherries along with citrus fruits are grown in the Himalayan region.
- **Mineral Resources:** Himalayan region contains many valuable mineral resources. The tertiary rocks have vast potential of mineral oil. Coal is found in Kashmir. The minerals like Cobalt, Copper, Zinc, Nickel, Lead, Antimony, Tungsten, Limestone, Gypsum and Magnetite are also present in the Himalayan locality. The Silver, Gold, and other semi-precious and precious stones are also found in the region of Himalaya.
- **Tourism:** The beautiful landscapes on Himalayan mountain offer a great tourist spot. The the cool climate, winter sports and snowfall and, attracts millions of tourists from the neighboring places which are under the scorching heat of summer and different parts of the world. Hill stations such as Mussouri, Shimla, Kulu, Manali, Nainital, Chamba, Ranikhet, Darjeeling, Almora, Gangtok, Mirik, etc provide huge scope of tourism due to their scenic natural beauty as well as healthy environment.
- **Pilgrimage:** Historically the Himalayas is known as the house of the Gods. Apart from its tourist places, the region is studded with sanctified shrines. Badrinath, Kedarnath, Vaishnodevi, Amarnath, Kailash, Tungnath, Uttarkashi, Gangotri, Yamunotri etc. which are at high altitudes are famous pilgrim centers in the Himalayas.

The Northern Plains

- The Great Plains of Northern India exists in the south direction of the Himalayas. It is, in actuality, bounded by the Himalayas in the north and the Deccan plateau on the south.
- This plain stretches for about 3,200 km. from west to east and 200 to 400 km. from north to south. It covers an area of about 5,80,000 sq. km.
- The Great Plains of Northern India was formed by the sediments or alluvial deposits carried down by the

Indus-Ganga-Brahmaputra and their tributaries from the Himalayas.

- The rivers which were flowing into Tethys sea in very early period (Before Indian Plate collided with Eurasian Plate) deposited enormous amount of sediments in the Tethys Geosyncline.
- After upliftment of Himalayas, sediments and debris carried down by the rivers, started to gather there to form the massive alluvial plain of northern India.
- This widespread plain is level and monotonous; it is characterized by some local diversities.

From north to south, these plains can be divided into three major zones:

Bhabar

- Bhabar is a porous narrow belt found in the northern-most stretch of the Great Plains.
- It is around 8-16 km. wide running in an east-west direction along the foothills (alluvial fans) of the Shivaliks.
- Descending rivers from the Himalayas deposit their load alongside the foothills in the form of alluvial fans. These alluvial fans merged together to form Bhabar belt.
- The porosity of Bhabar is the very unique feature. This porosity is because of deposition of large number of pebbles and rock debris through the alluvial fans.
- The streams fade once they reach the Bhabar region due to this porosity. Hence, the area is noticeable by dry river courses excluding in the rainy period.
- The Bhabar belt is reasonably narrow in the east, however extensive in the west and north-west mountainous region.
- The area is unsuitable for agriculture and only big trees with large roots thrive in this belt.

Terai

- South of the Bhabar belt is the Terai belt.
- Terai is basically a poorly drained, damp (marshy) and thickly forested narrow tract to the south of Bhabar running parallel to it.
- The Terai is about 15-30 kilometers wide.
- The underground streams from the Bhabar belt re-emerge in this region.
- This densely forested region provides shelter to a variety of wildlife. Kaziranga National Park in Assam and Jim Corbett National Park in Uttarakhand are situated in the Terai region.
- The Terai is more noticeable in the eastern part compared to the western part because the eastern parts receive relatively greater quantity of precipitation.
- Most of the Terai land, particularly in Punjab, Uttar Pradesh, and Uttarakhand, is turned into agricultural land which yields good crops of sugarcane, rice and wheat.

Alluvial Plains

- The south of Terai belt is characterized by deposits of new and old alluvium deposit. Now alluvial plains are divided into Bhanger and Khadar.
- These plains have characteristic features of mature stage of fluvial erosional and depositional features such as sandbars, meanders, oxbow lakes, and braided channels.
- The Brahmaputra plains are famous for the riverine islands and sandbars. These regions are very prone to floods and shifting river courses.

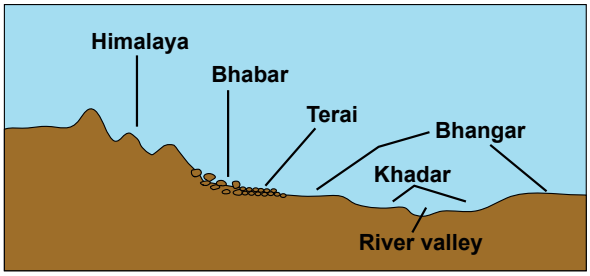

Image 2.6: Major Zones in Northern Plain

Bhanger

- Bhangar is the older alluvium beside the riverbeds forming terraces higher than the floodplain.
- The terraces are often saturated with calcareous stone like pebbles termed as 'Kankar'.
- 'The Barind plains' in the delta region of Bengal and the 'bhur formations' in middle Ganga and Yamuna doab are the regional variants of Bhangar.
- Bhur represents an elevated piece of land situated along the banks of the Ganga river, especially in the upper Ganga- Yamuna Doab. This is formed due to accumulation of wind-blown sands during the hot dry months of the year.

Khadar

- Khadar is made up of novel alluvium and makes the flood plains alongside the riverbanks.
- A new stratum of alluvium is deposited by river floods almost every year.
- This makes them the most fertile soils of Ganga region.

- It is in these plains that the world's largest delta is formed. The Sundarbans delta is one of the most important examples.
- Apart from these features, the Northern Plains are overall very featureless with general elevation of only 100-150 m. above the mean sea level.
- The UT of Delhi and State of Haryana forms a water divide between the Indus and the Ganga river system.
- Due to soil fertility and thriving agriculture in this region, it supports a large population.

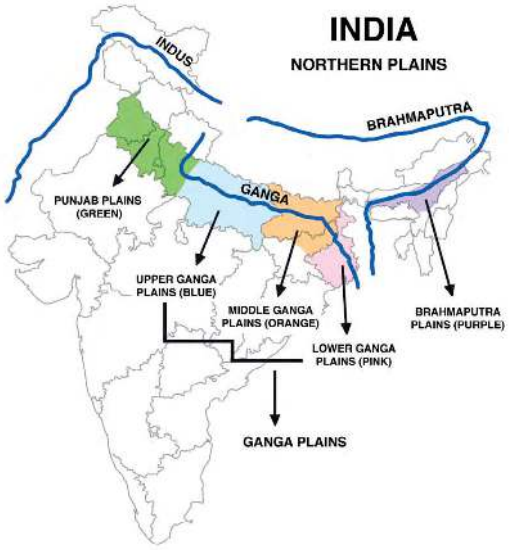

Image 2.7: Northrn Plains

On the basis of region, the Great Plains may be classified into three divisions

The Punjab plain drained by the Indus

- Western portion of the Northern plain is called as Punjab plain.
- This plain is drained by the Indus and her tributaries, like the Satluj, Beas, and Ravi. Only a fragment of the Indus basin lies in India.
- The plain slopes lightly down towards the south-west; hence the rivers follow the slope of the land.
- The plain is mostly made of silts. The soil is porous. The plains that are shaped by the accumulation of new alluvium near the riverbanks is termed as Bet.

The Ganga plain drained by the Ganga

- It is spreads from the east margin of the Punjab in the west to Bangladesh border in the east. This is a widespread plain encompassing state like Uttar Pradesh, Bihar and West Bengal.
- It is divided into Rohilkhand Plains, Awadh Plains and Bihar Plains.
- It is drained by the rivers like Yamuna, Ghaghara, Ganga, Gandak, Kosi and Tista from the Himalayas in the north side and Chambal, Betwa, Son and Damodar from the plateau in the south. The entire region slopes towards south and south- east.

Divisions of the Ganga Plains

- Upper Ganga plain: It extends from the Yamuna river in the west to Allahabad city in the east.
- Middle Ganga plain: It stretches from Allahabad in the west to Rajmahal hills in the east.
- Lower Ganga plain: It extends from Rajmahal hill to the Bay of Bengal.

The Brahmaputra plain drained by the Brahmaputra

- This region is located in the north-eastern part of the country and is edged between the Arunachal Himalayas in the north and the Meghalaya Plateau in south.
- Ranges of mountains are found standing on both sides of the river.
- Innumerable Sandbars and islets are found on the Brahmaputra and the river flows out in different channels avoiding obstacles of sandbar.
- Majuli Island is the India's First island district and biggest inhabited riverine islands in the world located in the river Brahmaputra. It is the nerve centre of Neo-Vaishnavite culture. It has been included in the tentative list of World Heritage Sites by UNESCO.
- The green Brahmaputra valley is renowned for tea plantation.

Significance of Northern Plains:

- This one fourth region of the country's land hosts half of the Indian population.
- Flat surface, fertile alluvial soils, slow moving perennial rivers, and favorable climate facilitate the intense agricultural activity in this region.
- The extensive use of irrigation and intensive agriculture practice has made the Punjab, Haryana and western part of Uttar Pradesh became the granary of India.
- The entire plain has a close network of roads and railways which has led to large scale industrialization and urbanization.
- There are many religious places present along the banks of the sacred rivers of Ganga and Yamuna which are very sacred to Hindus. The religions of Buddha and Mahavira flourished here and the movements of Bhakti and Sufism. This makes n**orthern plains** as destination for the cultural tourism.

The Peninsular Plateau

- Peninsular plateau is triangular in shape & encircled by hills, composed of oldest rocks as it was formed from the drifted part of Gondwanaland.
- It is a tableland made up of old crystalline, igneous and metamorphic rocks.
- The broad & shallow valleys and rounded hills are the characteristic features of this plateau.
- The Peninsular plateau stretches from the Aravali range till the southern tip