IASBABA

[INDIAN PHYSIOGRAPHY]

Integrated Learning Programme 2018 is a step towards 'Enabling a person located at the most remote destination a chance at cracking AIR 1 in UPSC/IAS'

Indian Geography

Hello Friends, before we start dealing with the topic – Indian Geography, it is important for us to understand that why do we have to study Indian Geography? Or a better question, why is it included in the syllabus of UPSC?

These questions are important because if we are doing some activity, we should know the aim of it. Otherwise it's just like running on an endless road.

Geography as a subject is clubbed with History and Indian Sociology in GS Paper 1. The reason is that, that UPSC wants you to relate these subjects together.

As a civil servant, your job is to be an interface between the Government and the people. Suppose you are from Bengal, and are posted at Haryana, in order to implement any policy you will have to understand the local people. That is only possible when you understand that society. The society of a region is the direct result of the history and geography of a place.

Geography of a place is important as it defines the culture, values, habits, food, dressing, economy etc. of a place. UPSC wants you to understand the geography of India and not just read it.

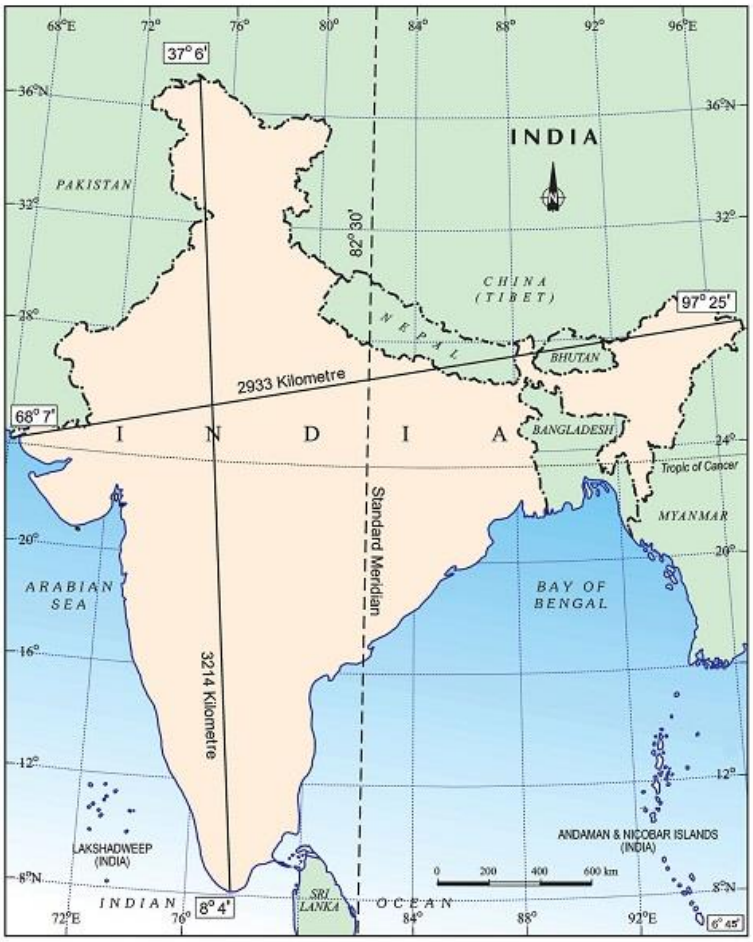
You should be able to know India as your home. As in, you should be able to tell what is where, and why is it there.

This module deals with the Physiography of India.

After covering this BLOCK you should be able to:

- describe the location of India in terms of latitude, longitude and hemisphere;
- Identify the extreme locations in India;
- describe with the help of map, the significance of the relative location of India in terms of neighbouring countries;
- Identify the States and Union Territories with the help of political map of India;
- Understand the formation and location of major physical divisions of India;

Location of India



Location of India

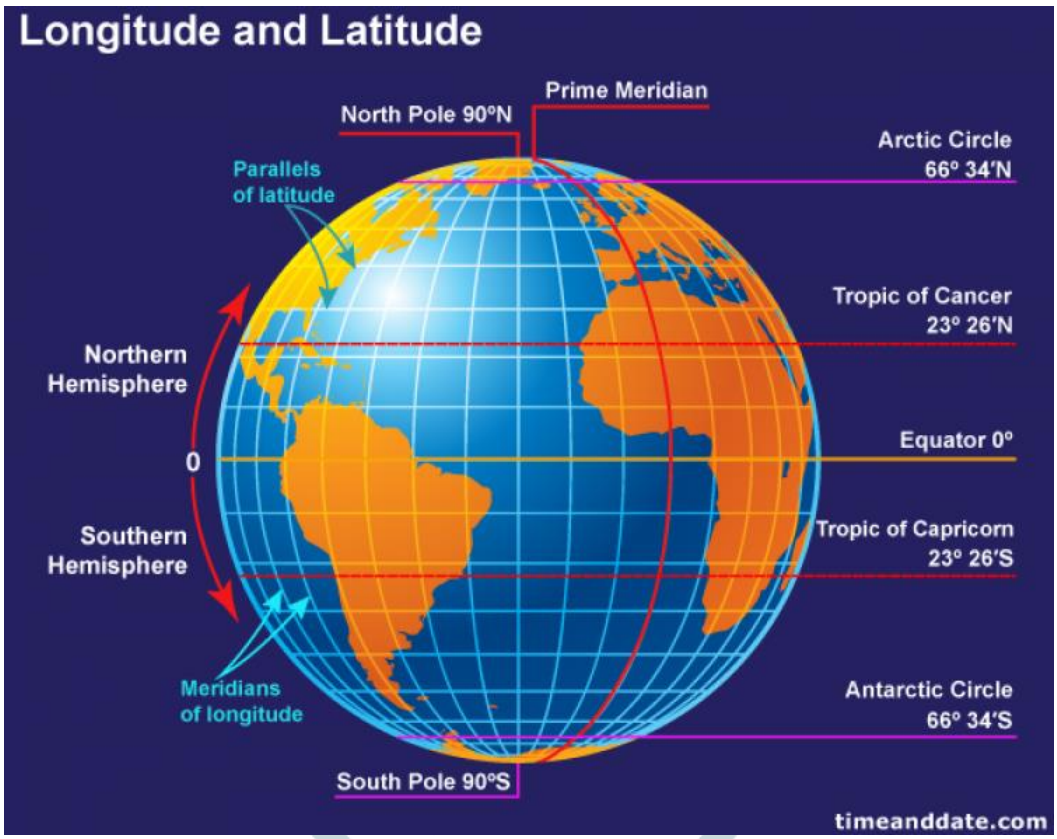
- The Indian mainland extends between 8°4’ North and 37°6’ North latitudes and from 68°7’ East and 97°25’ East longitudes.
- The latitudinal and the North-south extent is 3214 km and East-west extent is 2933 km.
- India accounts 2.42% of the total world land area.

A recap of basics:

Latitude: Latitude is the angular distance, north or south from the equator, of a point on the earth’s surface.

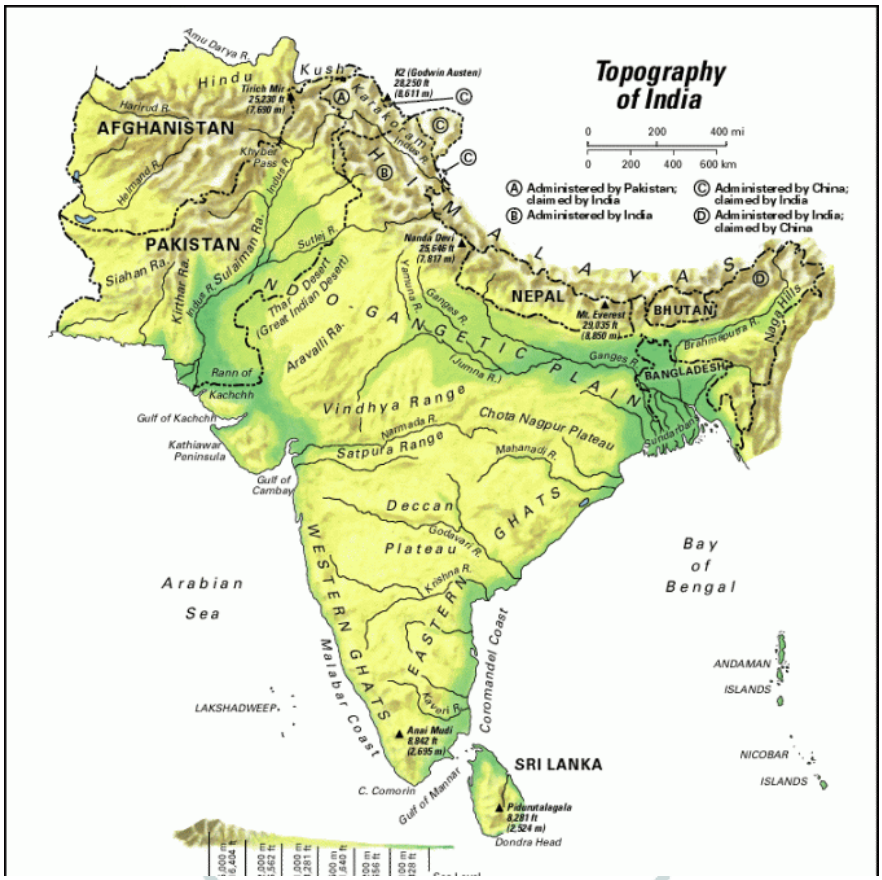
Longitude: Longitude is an angular distance on the earth’s surface, measured east or west from the prime meridian at Greenwich.

Angular distance: The angular distance between the points from the centre is called angular distance.



- India lies entirely in the northern hemisphere, and eastern hemisphere.
- The **Tropic of Cancer (23°30' North)** passes through the centre of the country.
- It divides the country into almost two equal parts Northward of this latitude is **North India** and South of it is known as **south India**.
- Similarly, 82°30' East longitude passes almost from the middle of the country. It is known as **Standard Meridian** of India.
- The 82°30' E longitude passes through Mirzapur (in Uttar Pradesh).
- The 82°30' East has been selected as standard Merdian because there is a time lag of almost two hours between Gujarat and Arunanchal Pradesh. Therefore, a Central Meridian is selected to determine the time for the whole country.

Indian Subcontinent and relative location of India:



Relative Location of India

South Asia is also known as the Indian Sub-Continent because of the unique culture and characteristic physiography of the region. Relative location of a place is given in terms of relationship with respect to other places.

- India is part of Asian continent.
- India is surrounded by water from three sides. Arabian sea in west, Bay of Bengal in the east and Indian ocean in the south.
- Towards its north west is Pakistan and Afghanistan.
- China, Bhutan, Tibet and Nepal lies to its north.
- Bangladesh and Myanmar lies to its east.
- Srilanka and Maldives are located in the Indian Ocean towards its south.

- The southernmost point of the country is Indira Point (Nicobar Islands) which lies on 6°4′ N latitudes and Kanyakumari is southernmost point of Indian mainland which lies on 8°4′ N latitudes.

Significance of India's location:

Historical:

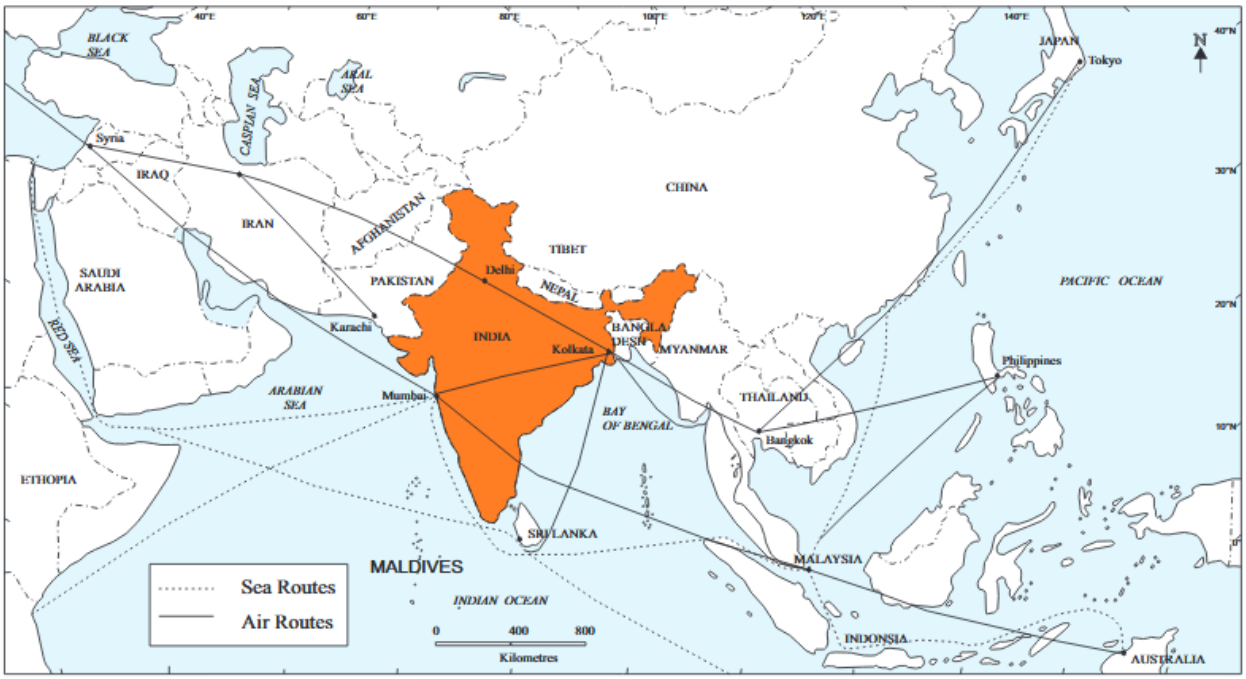
Historically India is shielded from the surrounding areas from mountains and seas. This led to the development of a unique culture in India. This made India a subcontinent. Even when the invaders came they settled in India adding to the diversity in culture and richness in traditions and art forms.

Economic:

The sheer size of India and its location gave it unique climatic conditions and landforms.

This led to almost all types of natural vegetation and diversity in wild life. This also made it possible to have diversity in agricultural practices and crops.

India is strategically located in Indian Ocean. It commands sea routes between Europe and Africa, South-East Asia, far East Asia and Oceania. It is because of this that India shares good trade relation between many countries since ancient times.



Location of India with trade routes

Various passes like Nathu-La (Sikkim), Shipki-La (Himachal Pradesh), Zoji-La and Burji la pass (Jammu & Kashmir) have their own importance. The main India-Tibet trade route that connects Kalimpong near Darjeeling with Lhasa in Tibet passes through Jelepa La. Several passes have provided a passage to many ancient travelers. These routes are not only important for trade but also to exchange ideas and culture.

Political Geography of India:

- India is the **seventh largest** country in the world.
- It has land boundaries of **15,200 km** and **6100km** long coast line.
- India's landmass covers 3.28 million square kilometer of area. This accounts for nearly **2.42 percent** of the total geographical area of the world.

For administrative convenience, India has been divided into 29 states and 7 Union Territories. The states have been divided on Linguistic basis.

Political map of India

List of 29 States and Capitals of India

S.no	State	Capital
1	Andhra Pradesh	Hyderabad (De jure - 2 June 2024) Amaravati (proposed)
2	Arunachal Pradesh	Itanagar
3	Assam	Dispur
4	Bihar	Patna
5	Chhattisgarh	Raipur
6	Goa	Panaji
7	Gujarat	Gandhinagar
8	Haryana	Chandigarh (shared with Punjab)
9	Himachal Pradesh	Shimla
10	Jammu and Kashmir	Srinagar (summer), Jammu (winter)
11	Jharkhand	Ranchi
12	Karnataka	Bengaluru (formerly Bangalore)
13	Kerala	Thiruvananthapuram
14	Madhya Pradesh	Bhopal
15	Maharashtra	Mumbai
16	Manipur	Imphal

17	Meghalaya	Shillong
18	Mizoram	Aizawl
19	Nagaland	Kohima
20	Odisha	Bhubaneswar
21	Punjab	Chandigarh
22	Rajasthan	Jaipur
23	Sikkim	Gangtok
24	Tamil Nadu	Chennai
25	Telangana	Hyderabad (from June 2, 2014 – shared with Andhra Pradesh)
26	Tripura	Agartala
27	Uttar Pradesh	Lucknow
28	Uttarakhand	Dehradun
29	West Bengal	Kolkata

7 Union Territories of India

S.no	Union Territory	Capital
1	Andaman and Nicobar Islands	Port Blair
2	Chandigarh	Chandigarh
3	Dadar and Nagar Haveli	Silvassa
4	Daman and Diu	Daman
5	Delhi	Delhi

6	Lakshadweep	Kavaratti
7	Puducherry (Pondicherry)	Pondicherry

India is a federal constitutional republic and is the world's most populous democracy. It is governed by Parliamentary form of Government.

There are 29 states and seven union territories in India. Each state and union territory of India has an administrative, legislative and judicial capital.

- An **administrative capital** is one where all the offices of the executive government are situated.
- A **legislative capital** is the one where the state assembly convenes.
- A **judicial capital** is the one where the territorial high courts are located.

All the states and two union territories, Puducherry and the National Capital Territory of Delhi, have an elected form of government and legislatures. They are headed by a Chief Minister, who is elected for a term of five years. Other union territories are directly ruled by the Central government. Under the States Reorganisation Act of 1956, the states were reorganised on the basis of language.

Think!!

Since we have already mentioned that geography is related to every other stream, can you think of the geographical reasons for Indian 'Federalism'? Also think of the geographical reasons of divisions of Indian states and constituencies.

Note: You need to understand that when we write this term 'GEOGRAPHY' it not only means physical geography but human geography as well.

Physiography of India

Before we discuss the Physiography of India, you need to understand some basic terms:

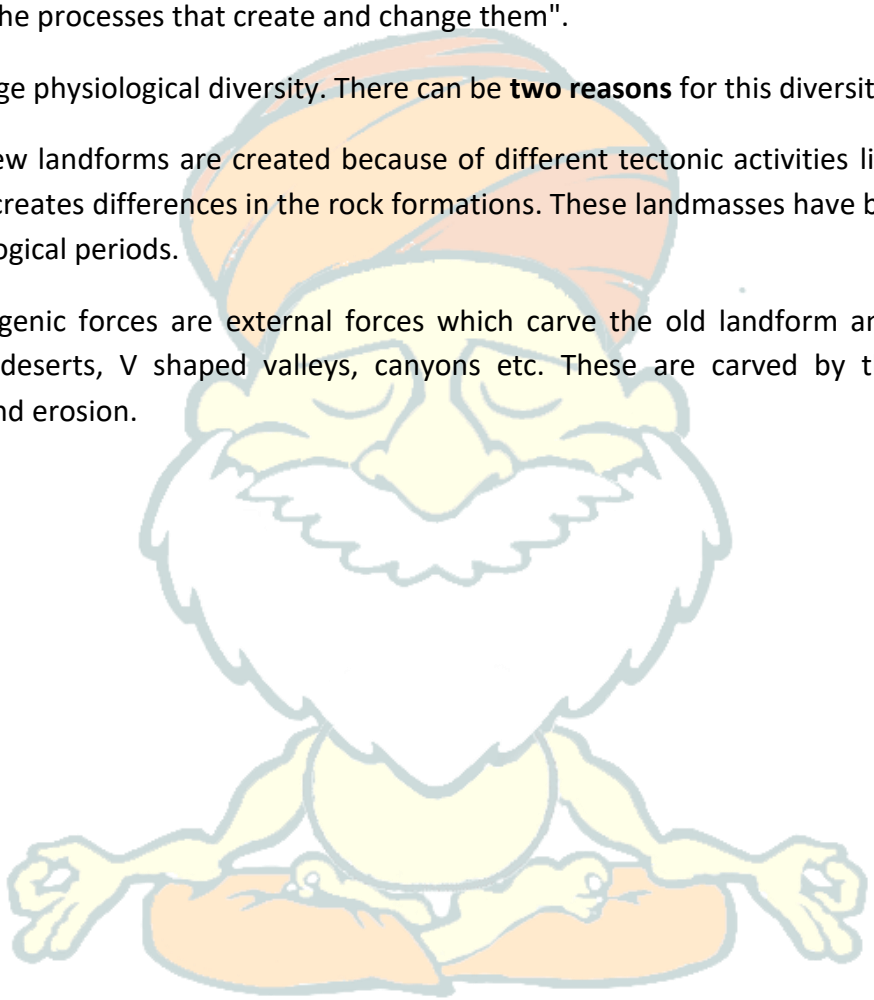
Physiography: It is the study of "Features and attributes of earth's land surface".

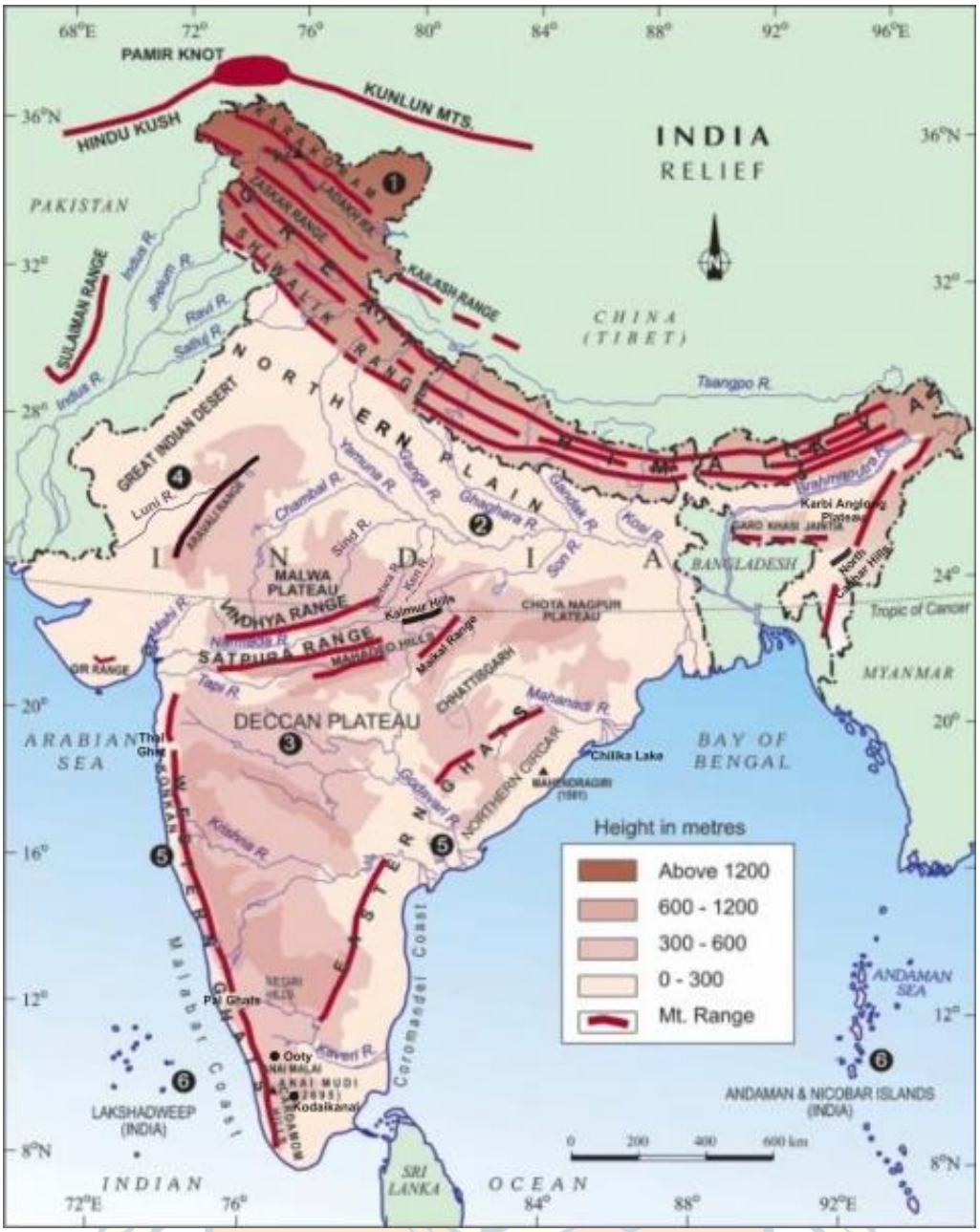
Geomorphology: It is defined separately as "Branch of geology dealing with surface land features and the processes that create and change them".

India has a large physiological diversity. There can be **two reasons** for this diversity:

Endogenic: New landforms are created because of different tectonic activities like folding and faulting. This creates differences in the rock formations. These landmasses have been formed in different geological periods.

Exogenic: Exogenic forces are external forces which carve the old landform and create new features like deserts, V shaped valleys, canyons etc. These are carved by the process of Weathering and erosion.





On the basis of physical features, India can be divided into following six divisions:

1. The Great Himalayas
2. The Northern Plains
3. The Peninsular Plateau
4. The Great Indian Desert
5. The Coastal plains
6. The islands

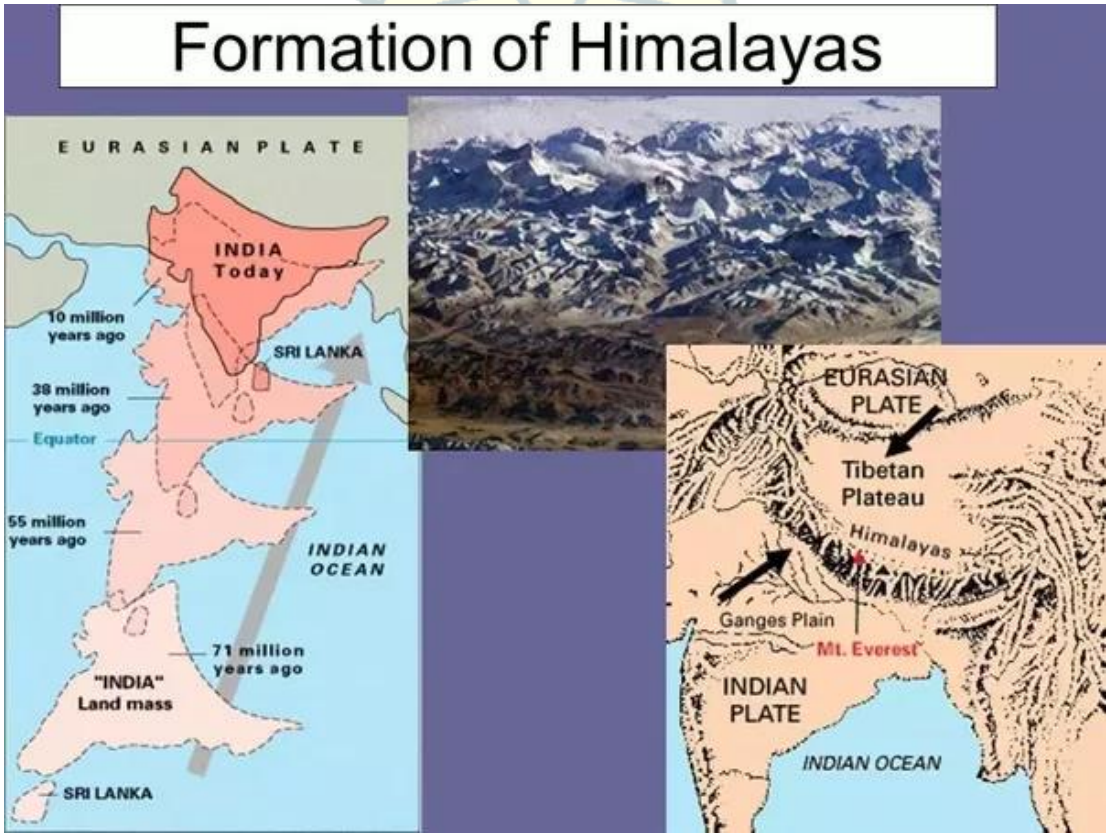
THE HIMALAYAS:

Himalayas are the young fold mountains. This is the highest mountain range of the world. Himalayas act as natural barrier. The extreme cold, snow and rugged topography discourage the neighbors to enter India through Himalayas. They run from west-east direction from Indus to Brahmaputra along the northern boundary of India.

The **Himalayas**, or **Himalaya**, form a mountain range in Asia separating the plains of the Indian subcontinent from the Tibetan Plateau.

Some of the world's major rivers, the Indus, the Ganges, and the Tsangpo – Brahmaputra, rise in the Himalayas, and their combined drainage basin is home to roughly 600 million people. The Himalayas have profoundly shaped the cultures of the Indian subcontinent; many Himalayan peaks are sacred in Hinduism and Buddhism.

Formation of Himalayas:



225 million years ago (Ma) India was a large island situated off the Australian coast and separated from Asia by the Tethys Ocean.

Around 70 million years ago, the upward moving, Indo – Australian plate collided with Eurasian plate and the sediments between the two massive bodies crumpled up and got folded. These folds are known as the Himalayan Mountains. The folding did not stop and different parallel mountain chains were formed. (The above diagram explains the formation of mountains.)

The Himalayas are still rising by more than 1 cm per year as India continues to move northwards into Asia, which explains the occurrence of shallow focus earthquakes in the region today. However the forces of weathering and erosion are lowering the Himalayas at about the same rate. The Himalayas and Tibetan plateau trend east-west and extend for 2,900 km, reaching the maximum elevation of 8,848 meters (Mount Everest – the highest point on Earth).

Physiographic division of Himalayas:

For a systematic study of relief, the Himalayas are divided into following four divisions from North to South:

I. The Trans Himalayas
II. The Greater Himalayas
III. The Lesser Himalayas
IV. The Siwaliks or Outer Himalayas

The Trans Himalayas:

- Formed around 65 million years ago by first upheaval of Himalayas.
- Around 40km wide, they contain the Tethys sediments.
- The rocks of this region contain marine sediments which are underlined by 'Tertiary Granite'.
- Laddakh range and Zaskar range are two important ranges of this region.
- Important peaks include K2 (Mt. Austin Goodwin) and Nanga Parbat. K2 is the highest peak of India.
- One of the most important pass in this range is Karakoram. Other important passes are Aghil Pass, Khardung la and Burzil.

Himalayan Cordillera

Greater Himalayas:

- Greater Himalayas rise abruptly like a wall north of Lesser Himalayas.
- They are about 25km wide and average height is 6100m.
- It is the most continuous range and separated by Lesser Himalayas by Main Central Thrust (MCT).
- It is snow bound and many glaciers descend from this range.
- It has high peaks like Mt. Everest, Kanchenjunga, Makalu, Dhaulagiri, Nanga Parbat etc. having a height of more than 8000 metres, Mt. Everest (8848 m) is the highest peak of the world.
- High Mountain passes also exist in this range, namely, Bara Lacha-La, Shipki-La, Nathu-La, Zoji La, Bomidi-La etc.
- The Ganga and Yamuna rivers originate from these Himalayas.

Lesser Himalayas:

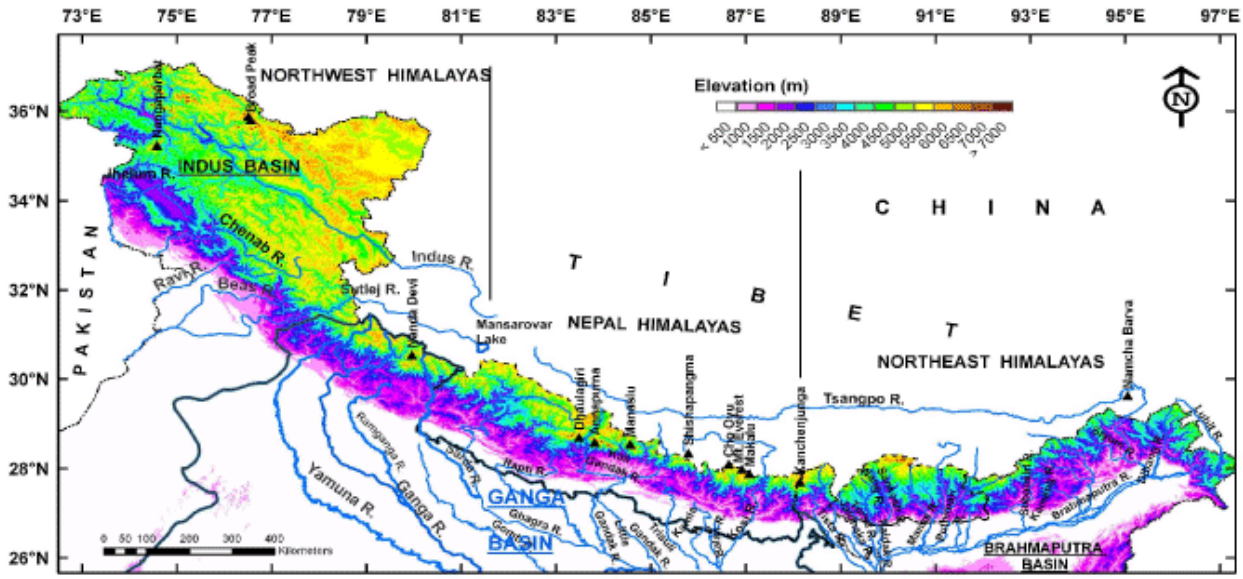
- Width of Lesser Himalayas is around 80km and average height varies from 1300 – 4500m along the length.
- The Prominent ranges in this are Pir Panjal, Dhaula Dhar and Mahabharata ranges.
- It compresses of many famous hill stations like Shimla, Dalhousie Darjeeling, Chakrata, Mussoorie, Nanital etc.
- It also comprises of famous valleys like Kashmir, Kullu, Kangra etc.
- The lesser Himalayas are separated from Siwaliks by Main Boundary thrust.

Siwaliks or Outer Himalayas:

- These are the youngest of the mountain ranges and formed around 10 million years back.
- The average width varies from 8km in the east to 45km in the west.
- The average height of mountains is around 900 – 1500m above the sea level.
- They have low hills like Jammu Hills, etc. The valleys lying between Siwalik and Lesser Himalayas (Himachal) are called 'Duns' like Dehra Dun, Kotli Dun and Patli Dun.
- The Siwaliks are separated from the plains by Himalayan Front Fault.

Apart from geological division, Himalayas are also divided longitudinally. **The longitudinal divisions of Himalayas are:**

I. The Kashmir Himalayas
II. The Himachal Himalayas
III. The Kumaun Himalayas
IV. The Central Himalayas
V. The Eastern Himalayas



The Kashmir Himalayas:

- Sprawling over the area of 3,50,000 sqkm in the state of Jammu and Kashmir.
- It is 700km in length and 500km in width.
- It contains Trans Himalayas and part of Greater Himalayas and Lesser Himalayas in South.
- Special feature of these Himalayas is the Karewa soil found in Kashmir Valley and Bhadarwa Valley of Jammu. (Note: Karewa is found only in these two places and nowhere else in India.)
- Karewas are lacustrine (lake) deposits are fit for cultivation of saffron (kesar/Zafran) and orchards of apple, peach, almonds, walnuts and apricot.
- Kashmir Himalayas has highest number of glaciers including Siachin (the highest battle field of the world). (Try to mark some important glaciers of this region.)

Himachal Himalayas:

- Covers an area of 45000 sq km.
- All the three ranges i.e. Greater, lesser and outer Himalayas are well represented.
- Upper reaches are thickly forested and have snow covered plains.
- Rohtang, Bara Lacha, and Shipki la are important passes connecting Himachal with Tibet.
- Beautiful and highly productive valleys like Kullu, Manali, Kangra, Lahul and Spiti lie in this region.
- It is famous for hill stations like Shimla, Dalhousie, Chamba, Dharmshala etc.

Kumaun Himalayas:

- They lie between Satluj and Kali river and cover a distance of 320 km and occupy an area of 38000 sq km.
- The highest peak is Nanda Devi. Many peaks of religious importance like Badrinath, Kedarnath and Dunagiri lie in this range.
- The region is connected with Tibet through passes like – Thang la, Mana Pass, Lipu lekh, Niti pass etc. (Note: Try to locate these passes on the physical map of India.)

Central Himalayas:

- The range stretches from river Kali to Tista for about 800 km.
- Major part of it lie in Nepal. Some part lies in Sikkim and Darjeeling dist. Of West Bengal.
- The highest peaks of the World like Mt. Everest, Annapurna, Kanchenjunga, Makalu and Dhaulagiri are situated here.
- It is continuous and has very few passes. Nathu la and Jelep la connects Sikkim to Tibet.

Eastern Himalayas:

- These lie between Tista and Brahmaputra river and covers a distance of 720 km.
- The eastern Himalayas covers the state of Arunachal Pradesh and Bhutan.
- It contains largely of Siwalik hills rising abruptly from Assam plains.
- Mountains take a syntexial bend or a hair pin bend in the east and turn South towards Nagaland, Mizoram and Manipur. The North – South part is called Purvanchal. It contains main small hills like Naga hills, Mizo hills, Barail etc.
- They face heavy rainfall and fluvial erosion is quite significant.

Syntaxial Bends:

The general East – West trend of Himalayas is terminated abruptly at the eastern and western extremities and ranges are sharply bent southwards in deep knee bend flextures. These are called Syntaxial bends.

Importance of Himalayas to India:

A physical barrier:

The Himalayas form a natural boundary of the Indian sub continent. Since long they have formed a formidable barrier to the free movement of man. The Passes of the Himalayas are very high and in winter remain covered with snow. As such, in the past, no large army could cross these mountains.

Moderates Indian Climate:

- Protects India from cold blizzards coming from the north and help in maintaining moderate temperature.
- Helps in orographic monsoon rainfall by intercepting the moist air. If Himalayas were not present, India would have been a dry desert like Gobi.

Source of Perennial Rivers of India:

- Himalayan glaciers feed the perennial rivers of India.
- They are a source of many mighty rivers like Ganga, Yamuna, Brahmaputra, Tista etc.
- These rivers provide water for irrigation of crops, navigation and sustenance of life forms.

Source of sediments:

- Through hundreds of river channels, they are a source of mineral rich sediments and fill the fertile plains of North India.
- The fertile plains of the Punjab, Haryana, Uttar Pradesh, Bihar, West Bengal and Assam have all been the product of this eroded material, producing a wide variety of agricultural crops.

Biodiversity:

The Himalayan region is very rich in animal and forest resources. In the front of the outer Himalayas lies the Tarai jungle - the abode of many wild beasts like yak, leopard, bear and samba on the west, panthers and tigers in the central part and elephants, tigers, mistunes on the east. Besides, owing to a variety of climatic conditions the Himalayas are rich in forest resources.

Source of various forest produce:

They provide wood for paper pulp and timber, resin, medicine etc.

Mineral resources:

The Himalayan region contains commercially valuable minerals. Copper, lead, zinc, bismuth, antimony, nickel, cobalt and tungsten are known to occur in both the eastern and western Himalayas.

In India anthracite coal is only found in Kalakot mines of Jammu and Kashmir.

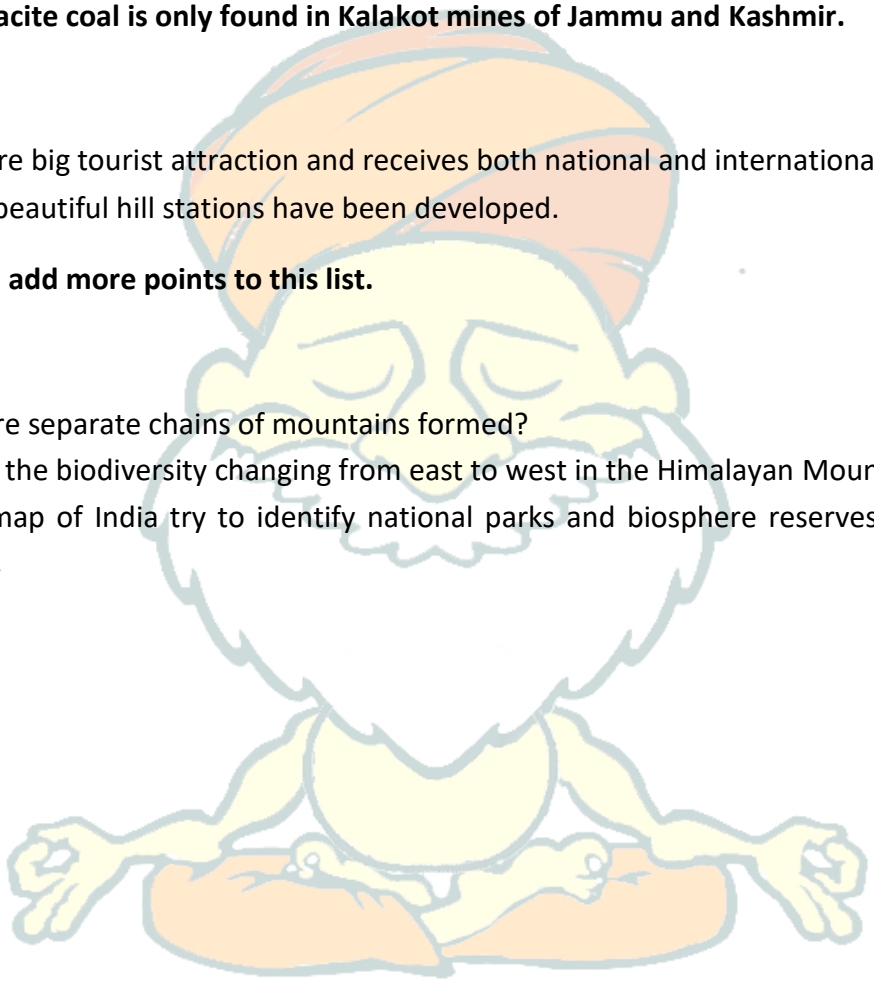
Tourism:

- They are big tourist attraction and receives both national and international tourists.
- Many beautiful hill stations have been developed.

Note: You can add more points to this list.

Think!!

- Why are separate chains of mountains formed?
- How is the biodiversity changing from east to west in the Himalayan Mountains?
- On a map of India try to identify national parks and biosphere reserves in Himalayan region.



Northern Fertile Plains:

- It is an aggradational plain formed by the alluvial deposits brought down by Indus, Ganga and Brahmaputra rivers and their tributaries.
- It is a flat regular transition zone between the Siwaliks in the North and Peninsular plateau in the South. It is separated from Siwaliks by Himalayan Front Fault (HFF).
- The plain stretches for about 2400 km from West to East and it has varying width from about 500 km in Punjab to 90 km in Assam.
- The depth of these sediments is not fully known but they are deepest near Ambala in Punjab. There the depth of these sediments is around 8000 m.
- The plains are remarkably homogenous with little variation in relief features for hundreds of kilometers. Because of this there is frequent flooding in the plains by the rivers.

Physiography of Northern Plains

Based on the texture or coarseness of deposits, the northern plains are segregated into different regions from North to South. Plains are divided into following sub – divisions:

- The Bhabar Plain
- The Tarai Plain
- The Bhangar plains
- The Khadar Plains

The Bhabar Plains:

- This is the northern most layer of the plains. It lies South of the Siwaliks from west to east.
- The width of this region is not uniform and it is wider in west than in East. The complete stretch is 8-15km wide.
- As the rivers enter suddenly into the plains from Himalayas, the deposition starts and heavier particles are deposited. Hence the sediments consist of gravel and unassorted particles. The porosity of this region is so high that most of the small streams (Chos) disappear in the bhabar tract.
- It is not suitable for cultivation. Only big tress can thrive in the region.

The Tarai Tract:

Tarai Tract

- Tarai lies South of Bhabar.
- It is 15-30 km wide with its width increasing from west to east. (Note: this is opposite from the Bhabar plains).
- This is a zone of excessive dampness, thick forests, rich wild life and malarial climate.
- This zone is formed as the rivers which got submerged in Bhabar plains reemerge in this region.
- In most of the northern states, from Haryana to Bihar, the Tarai forests have been cleared and plains are used for agriculture now.
- The Tarai belt is known for the cultivation of Sugarcane, rice, wheat, maize, oil seeds, pulses and fodder.

The bhangar plains:

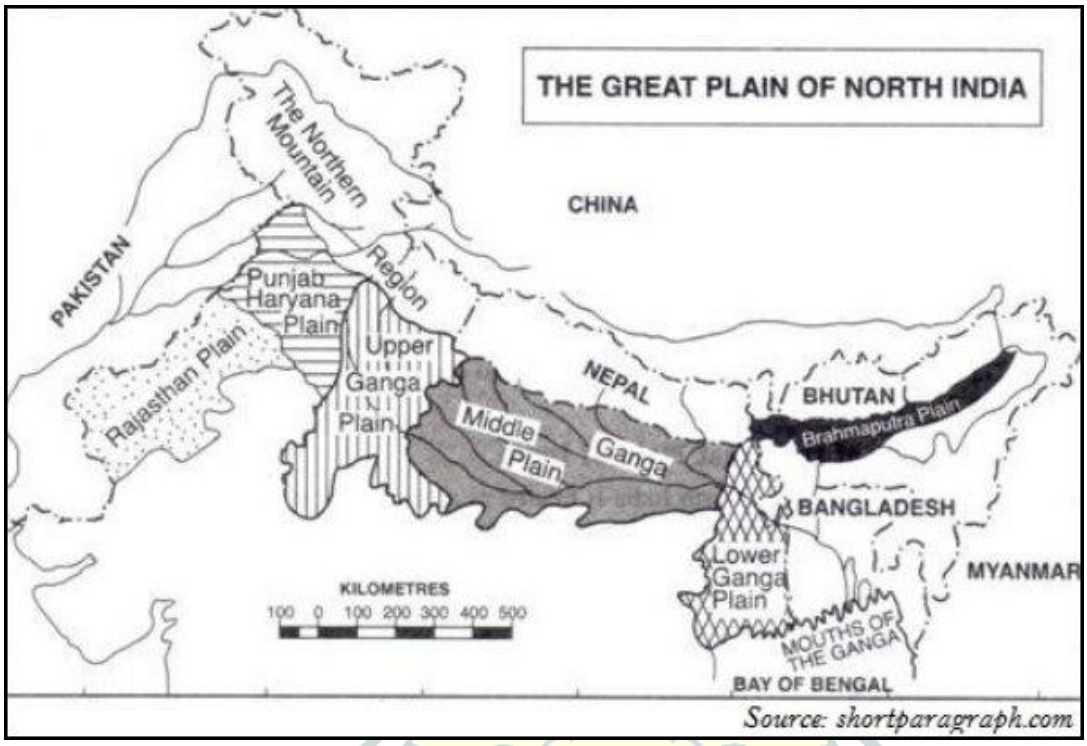
- Bhangar is the upland alluvial tracts formed by the old alluvium.
- They lie above the flood limits of the river and hence are not renewed yearly.
- The soil is dark in colour, rich in humus and very productive.
- It contains concretions and nodules of impure Calcium carbonates called ‘Kankars’.
- In relatively drier areas, Bhangar also exhibits small tracts of saline and alkaline efflorescenses known as ‘Reh’, ‘kallar’ or ‘Thur’.

The Khadar Plain:

Khadar plain

- The new alluvium tracts along the course of river are known as ‘Khadar’ or ‘Bet’.
- Khadar tracts are enriched every year by flooding of the river.
- This is found in the mature and old stage of the river.
- This is highly fertile and Most of this land is also reclaimed for agriculture.
- Khadar plains are ecologically sensitive areas and support rich wildlife.
- Deltaic Plains of India are extension of Khadar Plains. It consist mainly of old mud, new mud and marsh. In this region, the uplands are called ‘Chars’ while marshy areas are called ‘Bils’.

Meso – Regions of Northern Plains:



On the basis of geo-climatic and topographical characteristics, the Indian plains are divided into following Meso Regions:

1. The Plains of Rajasthan
2. The Punjab Haryana Plains
3. The Ganga Plains
4. The Brahmaputra Plains

Rajasthan Plains:

- This plain is formed by the river system of the Indus. It lies to the west of Aravallis.
- It includes the Marusthali (Desert) and Bagar of Rajasthan.
- This plain has a general slope from North – East to South – West.
- In Rajasthan Luni is the most important river, draining the land.
- The details will be discussed in 'The deserts' separately.

Punjab Haryana Plains:

- The general slope of these plains is from North East to South West.
- It is drained by the Tributaries of Indus – Satluj, Beas and Ravi.

- Because of the presence of so many river, it is full with Khadar soil which is highly productive and well irrigated.
- It is separated from the Ganga plains by Delhi Ridge.

The Ganga Plains:

The Ganga plain lies between Yamuna catchment in the west to Bangladesh border in the East.

It is about 1400 km from West to East and has an average width of 300km from North to South.

The Ganga plain is subdivided into following sub regions:

The upper Ganga Plain –

- It includes the Ganga – Yamuna doab, Rohilkand division and parts of the Agra Division.
- The general slope is from North to South.
- It is one of the most productive parts of India in which green revolution was a big success.

The Middle Ganga Plain –

- It includes central and eastern UP and plain of Bihar up to Muzaffarpur.
- It has thick alluvial deposits with less Kankar formations.
- Being a low gradient plain, rivers often change their course.

The Lower Ganga Plain –

- It extends from Patna to the Bay of Bengal.
- Moving Eastward, the river suddenly changes its course towards South and drains in Bay of Bengal.
- It is prone to flooding and is full with new sediments.
- The region is under intensive rice farming and aquaculture.

The Brahmaputra Plain:

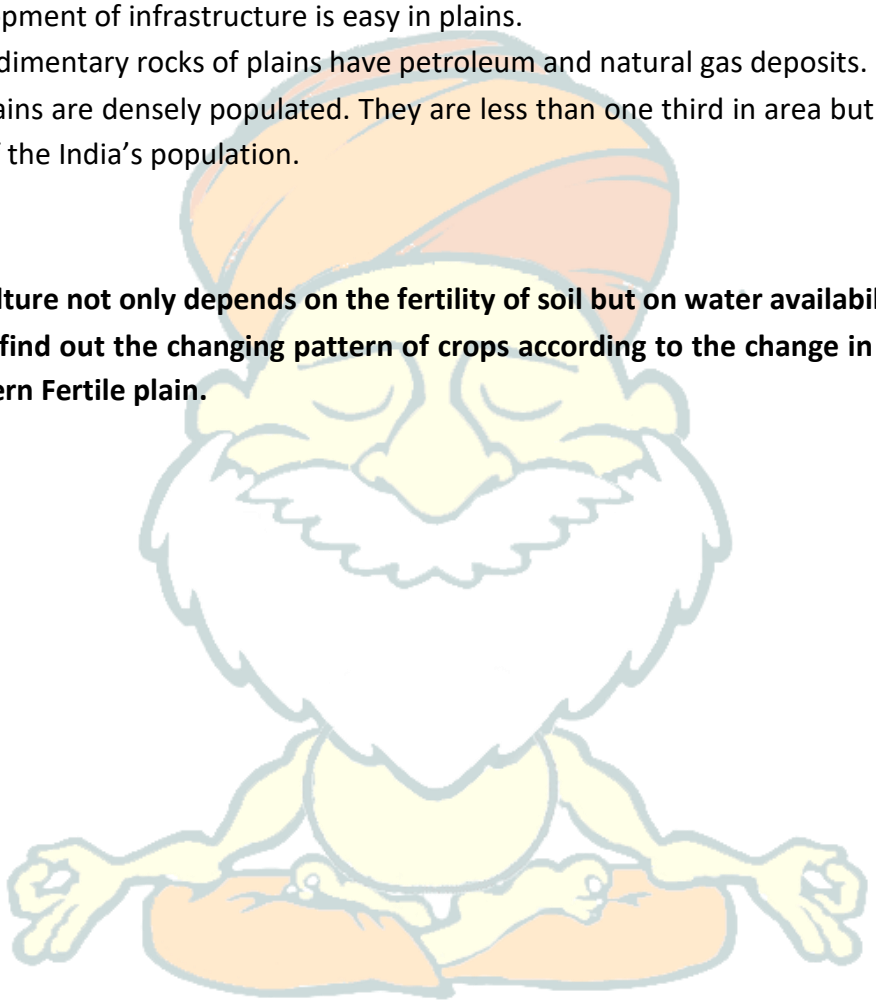
- It is the easternmost part of the Great plains of India.
- It is about 720 km long and 80 km wide.
- It receives its deposits from large Brahmaputra river.
- Due to very low gradient, Brahmaputra is highly braided and has many riverine islands. Majauli is the largest riverine island of the world.
- Rice and jute are the main crops of this region.

Significance of the Great plains of India

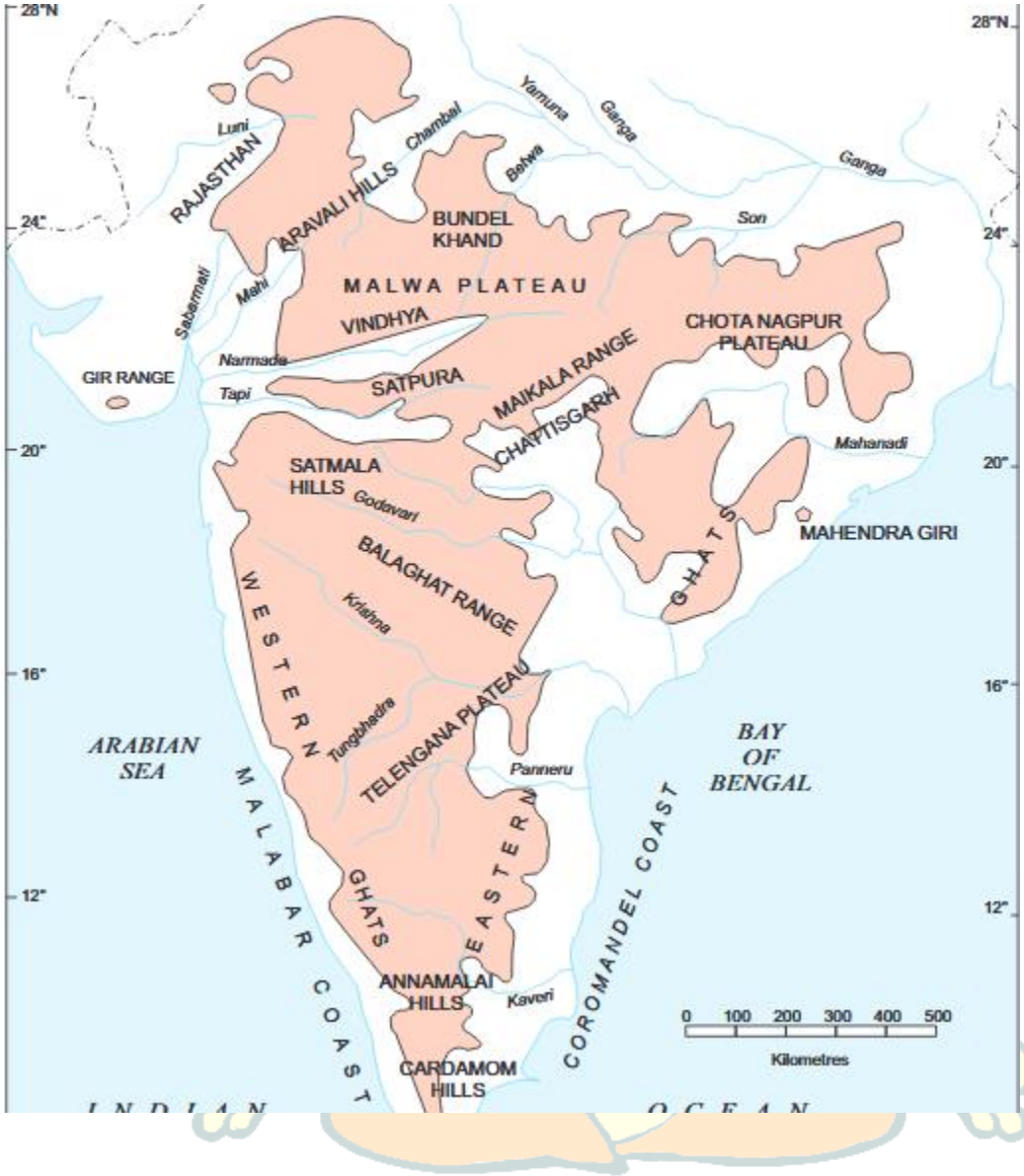
- The plains are often termed as the 'Granary of India'. The soils of the plains are one of the most fertile soils of India. They are being devoted to cereal and non – cereal crops.
- They have rich underground water table. The underground water is utilized with the help of wells and tube wells for irrigation, industrial and domestic needs.
- The rivers of the plains have very gentle gradient which makes them navigable for long distances.
- Development of infrastructure is easy in plains.
- The sedimentary rocks of plains have petroleum and natural gas deposits.
- The plains are densely populated. They are less than one third in area but supports over 40% of the India's population.

Think!!

- **Agriculture not only depends on the fertility of soil but on water availability.**
- **Try to find out the changing pattern of crops according to the change in rainfall in the Northern Fertile plain.**



The Peninsular Plateau:



- The Peninsular plateau is a triangular shaped table land. It is part of ancient land mass called Gondwana level.
- It covers an area of nearly 5 lakh sq.km.
- It is spread over the states of Gujarat, Maharashtra, Bihar, Karnataka and Andhra Pradesh.

The physiographic regions of peninsular plateau:

- The North Central Highlands
- The South Central Highlands
- The Eastern Plateau
- The Meghalaya Mikir Uplands
- The North Deccan
- The South Deccan
- The Western Ghats
- The Eastern Ghats

The North Central Highlands:

The central highlands of peninsular India include the Aravallis, The Malwa Plateau and the Vindhyan Range.

The Aravallis:

- It runs from North East to South West for 800 km between Delhi to Gujarat.

- It is one of the oldest folding mountain ranges of the World.
- It is highly denuded. Its highest peak is Guru Shikhar.
- The Great Boundary fault (GBF) separates Aravallis from Vindhyan mountains.

The Malwa plateau:

- It is bordered by the Aravallis in the North, Vindhyan range in the South and Bundelkhand plateau in the East.
- Malwa plateau has two drainage systems, one towards the Arabian Sea (Narmada and Mahi) and other towards Bay of Bengal (Chambal, Sind, Betwa, Ken).

The South Central Highlands:

It has got two parts – Bundelkhand and Baghelkhand

Bundelkhand:

- It stretches over the districts of Banda, Hamirpur, Jalaun, Jhansi, and Lalitpur in UP and Datia, Chhatarpur and Panna in MP.
- The rivers like betwa, Dhasan and Ken have carved out steep gorges, rapids, cataracts and waterfalls.

Baghelkhand:

- It includes the plateaus of Satna and Rewa in MP and Mirzapur in UP. Its elevation varies from 150 – 1200 m with uneven relief.
- The region is drained by Narmada and Son.

The Chotanagpur Plateau:

- The Chotanagpur plateau sprawls over parts of West Bengal, Jharkhand, Chattisgarh, Odisha, and northern part of Telangana.
- It is one of the resource rich region of India. It contains good quality iron ore, mica, bituminous coal etc.

The Meghalaya plateau:

- It consists of the Garo, Khasi, Jaintia hills and the outlying Mikir and Rengma Hills.
- It is detached from the Indian Peninsular by the Malda Gap.
- The Shillong peak is the highest elevation (1823 m) in the Meghalaya plateau.

Deccan Trap

The North Deccan:

- It includes the entire state of Maharashtra, except the Konkan coast and Sahyadris.
- It is covered by the Basalt of Cretaceous period.
- The basaltic sheet has a thickness of 3 km in the western part which diminishes towards the East and South East.
- It is covered by black soil famous for cotton cultivation.

The South Deccan:

The South Deccan consists of three parts – Karnataka Plateau, Telangana Plateau and Tamil Nadu Uplands.

Karnataka Plateau –

- The plateau spans in the state of Karnataka and the Cannanore and Kozhikode district of Kerala.
- The plateau has an average elevation of 600 – 900 m.
- The Northern upland of Karnataka plateau is called Malnad while the Southern part is called Maidan.
- It is drained by Kaveri and Tungabhadra rivers.

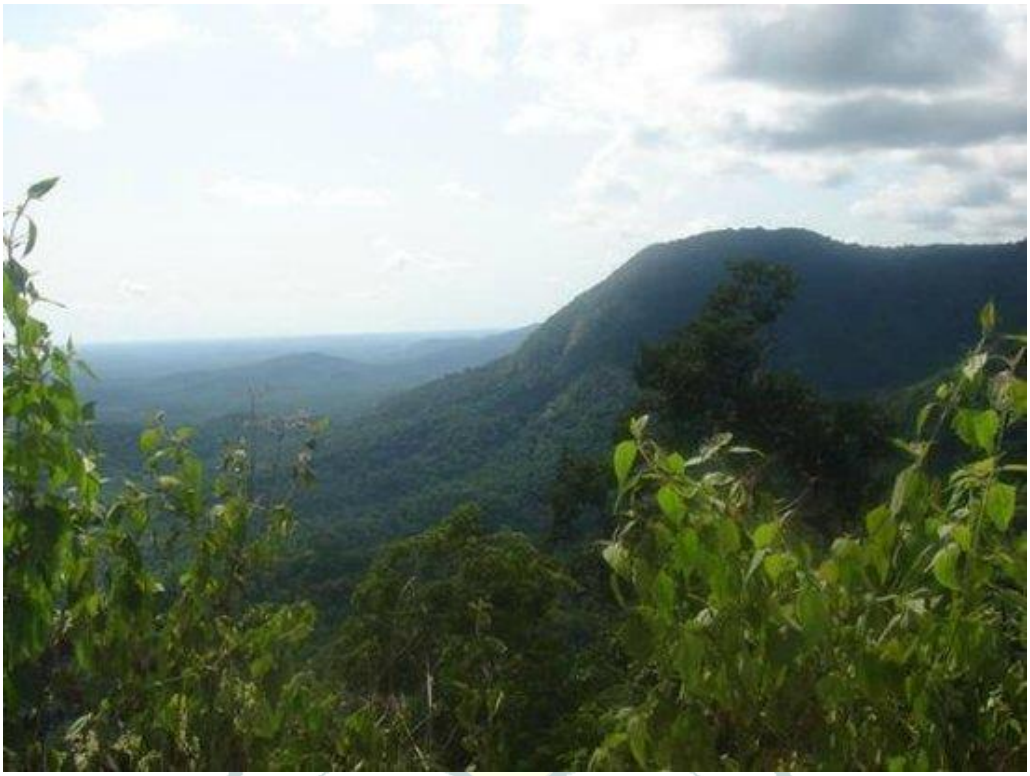
The Telangana Plateau –

- The plateau of Telangana consists of Dharwar and Cuddapah rock formations.
- Hyderabad is situated on Telangana plateau.

The Tamil Nadu uplands –

- This lies between the South Sahyadris and Tamil Nadu coastal plains.
- It is largely covered by Archean Rocks. At places there are Cuddapah and Alluvial Formations.
- Between Coimbatore and Annamalai, there is a broad gap, known as Palakkad Gap. This is about 25 km wide and connects Kerala coast and Tamil Nadu highlands.

The Western Ghats:



Western Ghats

- The Western Ghats (Sanskrit – Sahyadris) run parallel to the western coast for about 1600 km in the north – south direction from the mouth of the Tapi River to Kanyakumari.
- The western slope of Sahyadri is strep while the Eastern slope is gentle.
- These are Block Mountains formed by down warping of a part of land in the Arabian Sea.
- They form a watershed of the peninsula. The eastern side of Sahyadris is semi-arid.
- Most of the important rivers of Peninsular India Godavari, Krishna and Kaveri originate from the Western Ghats.
- Jog falls on the Sharavati River is the highest waterfall of India.
- Highest peak of Western Ghats is Anaimudi in Annamalai hills.
- The Western Ghats is very continuous and have very few passes. Important passes are Bal ghat, Thal ghat and Palghat.
- Windward side of Western Ghats receives very high rainfall. Because of this it has tropical rainforest. It is one of the Biodiversity hotspots of the World.

The Eastern Ghats:

Eastern Ghats

- The Eastern Ghats are discontinuous low belt.
- Their average elevation is 600 m.
- They run parallel to the east coast from south of Mahanadi valley to the Nilgiri hills.
- The highest peak in this region is Mahendragiri (1501 m).
- The famous hills are Mahendragiri hills, Nimaigiri hills in Orissa, Nallamallai hills in Southern
- Andhra Pradesh, Kollimalai and Pachaimalai in Tamilnadu.
- The area is drained by the Mahanadi, Godawari, Krishna and Kaveri river systems.
- The Nilgiri hills join Western & Eastern Ghats in the south.

Significance of Peninsular Plateau:

- The region is rich in both metallic and non-metallic minerals. Mineral ores like iron, manganese, copper, bauxite, chromium, mica, gold, silver, zinc, lead, mercury, coal, diamond, precious stones, granite, marble and building stone.
- About 98% of the Gondwana coal deposits are found in the Peninsular region.
- A substantial part of Plateau is covered under black soil. The soil is conducive for the cultivation of cotton, millets, maize, pulses, orange and citrus fruits.
- Some areas of southern peninsula are suitable for cultivation for the cultivation of tea, coffee, rubber, cashew spices, tobacco, groundnut and oil seeds.
- The forests provide teak, sal, sandalwood, ebony, mahogany, bamboo, cane, rosewood and logwood as well as large variety of forest products.

- The Ghats are rich in biodiversity of flora and fauna.
- The hilly and mountainous areas of peninsula are abodes of many scheduled tribes.
- There are numerous hill stations and hill resorts which are major attraction for tourists.

Q. Distinguish between Western Ghats and Eastern Ghats? (Note: This question has been asked several times by UPSC.)

You can answer this question differentiating the Ghats on the basis of Continuity, Average elevation, extent, vegetation, rivers etc.

The Indian Desert:

- The Indian Desert lies towards the western margin of Aravalli Hills.
- It is also called **Thar** Desert.
- It is the **ninth largest desert** in the world.
- It spreads over the states of **Gujarat and Rajasthan**.
- This region has semi-arid and arid weather conditions. It receives less than 150 mm of rainfall per year.

Indian Desert

- The vegetation cover is low with thorny bushes.
- **Luni** is the main river in this area. All other streams appear only at the time of rainfall otherwise they disappear into the sand.
- Western side of Thar Desert contains large **Sand dunes and Seifs**.
- It is believed that a large part of Indian desert is formed by recession of sea. Many saline regions are found in this region as well as saline lakes. Most important saline lake of India is **Sambhar lake** in Rajasthan.

The Coastal Plains of India:

- To the east and west of the peninsular plateau, two narrow strips of plain lands are found, which are respectively called Eastern Coastal Plain and Western Coastal Plain.
- Eastern Coastal and Western Coastal Plain are formed by the erosional and depositional & activities of the Sea waves and from the sediments brought by the peninsular rivers.

The Eastern Coastal Plains –

- The **Eastern Coastal Plains** refers to a wide stretch of landmass of India, lying between the Eastern Ghats and the Bay of Bengal.
- It is wider and leveled than the western coastal plains and stretches from Tamil Nadu in the south to West Bengal in the north through Andhra Pradesh and Odisha.
- Chilka Lake is a brackish water lake along the eastern coastal plain. It lies in the state of Odisha and stretches to the south of the Mahanadi Delta.
- Deltas of many of India's rivers form a major portion of these plains.
- The Mahanadi, Godavari, Kaveri and Krishna rivers drain these plains.
- The region receives both the Northeast & Southwest monsoon rains with its annual rainfall averaging between 1,000 and 3,000 mm (39 and 118 in).
- The width of the plains varies between 100 and 130 km (62 to 80 miles).
- It is locally known as **Northern Circars** in the northern part between **Mahanadi** and **Krishna** rivers and **Coromandel Coast** in the southern part between **Krishna** and **Kaveri** rivers. Together these are known as eastern coastal plains.

The Western Coastal Plains –

Konkan Coast (West Coast)

- The **Western Coastal Plains** is a strip of coastal plain 50 kilometres in width between the west coast of India and the Western Ghats hills, which starts near the south of the Tapi River.
- The plains are located between the Western Ghats and the Arabian Sea. The plains begin at Gujarat in the north and end at Kerala in the south. It includes the states of Maharashtra, Goa and Karnataka.
- The region consists of three sections: the Northern part of the coast is called the **Konkan** (Mumbai-Goa), the central stretch is called the **Kanara**, while the southern stretch is referred to as the **Malabar** Coast.
- On its northern side there are two gulfs: **the Gulf of Khambat and the Gulf of Kutch.**
- The rivers along the coast form estuaries and provide conditions ideal for **pisciculture.**
- The northern portion of the west coast is called **Konkan** and the southern portion **Malabar.** The south Malabar or Kerala coast is broken and there are some lagoons. The north Malabar Coast is known as the Karnataka coast. Here the Saraswati River, before entering the plains, descends down a 275 m high cliff and forms the Gersoppa Falls.
- The Western Coastal Plains extend 1,500 km from Cape Comorin in the south to Surat in north, the width ranging from 10 to 25 km from north to south, the Gujarat Plains the Konkan plains (Daman to Goa, 500 km), the Karnataka coastal plains (225 km south from

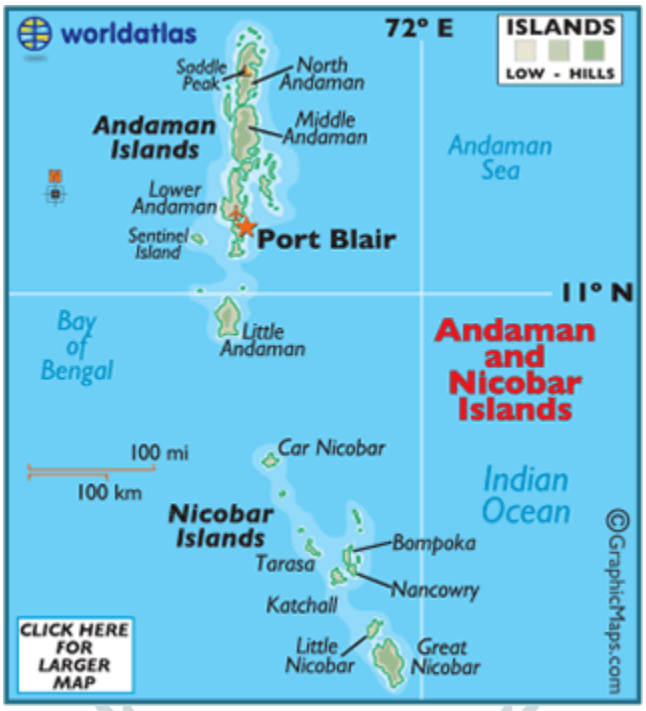
Goa), and the Kerala coastal plains from Cannanore to Cape Comorin, 500 km make up the west coastal plains.

- The West Continental shelf is widest (350 km) off the coast of Bombay where the oil-rich Bombay High has become famous.

The Islands

India has a total of 615 islands of which 572 lie in Bay of Bengal, and the remaining 43 in the Arabian Sea. Out of the 572 islands of Andaman and Nicobar islands, only 36 are inhabited.

Andaman and Nicobar Islands:



The Andaman and Nicobar islands archipelago consists of approximately 265 small and large islands.

Andaman Islands:

The Andaman Islands are divided into three main islands i.e. **North, Middle** and **South.**
Duncan passage separates Little Andaman from South Andaman.
Port Blair, the capital of Andaman Nicobar Islands lies in the South Andaman.

The Andaman group of islands in the north is separated by the **Ten Degree Channel** from the Nicobar group in the south [*Prelims 2014*].

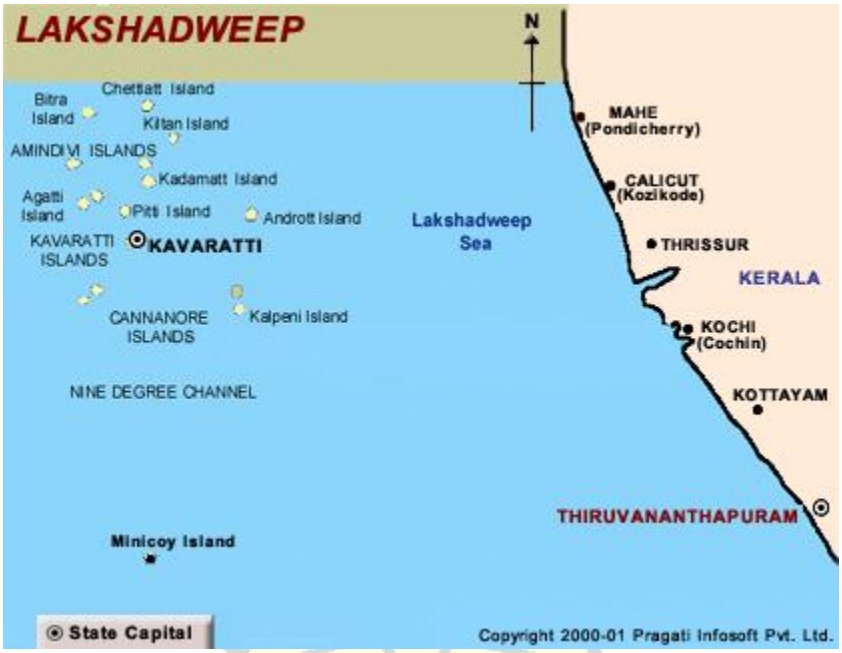
Which one of the following pairs of islands is separated from each other by the 'Ten Degree Channel'?

A. Andaman and Nicobar
B. Nicobar and Sumatra
C. Maldives and Lakshadweep
D. Sumatra and Java

Nicobar Islands:

- Among the Nicobar Islands, the **Great Nicobar** is the largest. It is the southernmost island and is very close to Sumatra island of Indonesia. The **Car Nicobar** is the northernmost.
- Most of these islands are made of tertiary sandstone, limestone and shale resting on basic and ultrabasic volcanoes [Similar to Himalayas].
- **THE BARREN AND NARCONDAM ISLANDS**, north of Port Blair, are **volcanic islands (Note: Barren Island is the only active volcano of India.)**
- Some of the islands are fringed with **coral reefs**. Many of them are covered with thick forests. Most of the islands are mountainous.
- **Saddle peak (737 m)** in **North Andaman** is the highest peak.

Lakshadweep Islands:



- Lakshadweep is an archipelago of **twelve atolls, three reefs and five submerged** banks, with a total of about thirty-nine islands and islets.
- The reefs are in fact also atolls, although mostly submerged, with only small un-vegetated sand cays above the high-water mark. The submerged banks are sunken atolls.
- Almost all the atolls have a **northeast-southwest orientation** with the islands lying on the eastern rim, and a mostly submerged reef on the western rim, enclosing a lagoon.
- It has **10 inhabited islands**, 17 uninhabited islands, attached islets, 4 newly formed islets and 5 submerged reefs.
- The main islands are **Kavaratti, Agatti, Minicoy, and Amini**.
- Most of the islands have **low elevation** and do not rise more than five metre above sea level (Extremely Vulnerable to sea level change).
- Their topography is flat and relief features such as hills, streams, valleys, etc. are **absent.**

Bangaram Atoll, Lakshadweep

Think!!

- What are the differences between the formations of Andaman and Nicobar Island, and Lakshadweep Islands?
- How many types of islands can be there? Are they all represented in the Indian group of Islands?

Geological Structure

No geographical description of a region would be complete unless it devotes sufficient attention on its geological structure. The geological structure, which includes the arrangement and deposition of rocks in the earth's crust, plays a dominant role in determining the relief of land and nature of soil. As such, study of geological structure plays a vital role in agricultural and industrial development as well as overall growth of the country.

Geological History:

The geological records of the world are classified on the basis of geological scale devised in Europe. On it basis, the geological history of earth is divided into-

5 eras: Neozoic, Cenozoic, Mesozoic, Paleozoic and Proterozoic.

4 Epochs: Quaternary, tertiary, Secondary and Primary

16 Periods: Holocene, Pleistocene, Pliocene, Miocene, Oligocene, Eocene, Paleocene, Cretaceous, Jurassic, Triassic, Permian, Carboniferous, Devonian, Silurian, Ordovician and Cambrian.

The geological records of India do not fully confirm with the Europe.

The Geological Survey of India (GSI) has suggested four geological eras- Archean, Purana, Dravidian and Aryan

The rock system of the country is divided into 4 major divisions:

- **The Archean Rock System**
- **The Purana Rock System**
- **The Dravidian Rock System**
- **The Aryan Rock System**

Type	Sub-type	location	minerals
Archean	Archean system(4000-2500 million years old)	Covers 2/3 part of Indian peninsula. Found in Andhra, telangana, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan and parts of Meghalaya plateau.	Rich in Ferrous and non-ferrous minerals like iron ore, copper, manganese, mica, dolomite, lead, zinc, silver and gold.
	Dharwad system (2500- 1800 million years old)	The system is well developed in Dharwar-Bellary-Mysore belt of Karnataka, Jharkhand (Ranchi-Hazaribagh), MP, Chattisgarh, Odisha and Aravalli belt between Jaipur and Palanpur in Rajasthan.	Gold, Marble, Precious and semi-precious stones.
Purana Rocks (1400-600 million years)	Cuddapah System	Cuddapah and Kurnool dist. Andhra, Chattisgarh, Rajasthan and lesser Himalayas	
	Vindhyas	Vindhayan Mountain Range	Diamond, Red sandstone, Construction stone
Dravidian Rocks (600-300 million years)	Cambrian Rocks	Named after Cambria, the latin name for Wales in Great Britain. They are best developed in North-West Himalayan region.	They are fossiliferous sandstones underlain by clayey salt.
	Carboniferous Rocks -upper carboniferous -middle carboniferous -lower carboniferous	Carboniferous in geology means coal bearing. Coal formation started in carboniferous age.	Limestone and dolomite. Anthracite coal is found.

		Upper- Mount Everest Middle- Kashmir, Spiti Valley, Shimla and Himalayas Lower- Pir Panjal trap, kumaun region	
Aryan Rocks	Gondwana	Odisha, Bihar, Jharkhand, Andhra Pradesh, Chattisgarh	Good Quality Coal (Bituminous and Anthracite), iron, kaolin, fire clay, sandstone and grits.
	Deccan trap (Cretaceous) (146-65 million years)	During this period, enormous quantity of basaltic lava was poured out to the surface assuming great thickness. Found in Gujarat, Maharashtra, MP, Chattisgarh, Northern Andhra and North-West Karnataka.	Quartz, bauxite, Magnetite, agate and semi-precious stones
	Tertiary (60-7 million years)	Found in complete Himalayan formation. In peninsular region, they are found in the coast of Kutch, Kathiawar, Konkan, Malabar, Nilgiris and the eastern Ghats.	It has been called the age of mammals because of the abundance of fossils in these deposits.
	Quaternary	It started around 12000 years ago since the withdrawal of the last glaciations. The northern plains of India came into being during this period.	Since most of the particles are loose and recent, some recent fossils are found. Oil and gas deposits are also found.

Note: A direct question on geological history is highly unlikely. However, you might get an objective question in prelims on this. For example:

Q.) Arrange the following rock formations according to their age in decreasing order:

1. **Aryan**
2. **Dravidian**
3. **Purana**
4. **Archean**

Select the code from the following:

a) **1>2>3>4**
b) **4>3>2>1**
c) **3>4>2>1**
d) **3>2>1>4**

Q.) Solution (b)

Note: You can also use this information in questions related to resources and location of industries and can earn a brownie mark.

This is the end of the chapter on Indian Physiography. Hope you all were able to understand and visualize all the locations and formations.

Geography is a subject of maps and diagrams. The more you'll practice, the better you'll get at it.

Try to locate all the locations on the map of India so that you can remember the relative position of these formations. Also try to link these physical features with the economic development of India and mark important economic activities and type of industries in these regions.

All the Best!