India

India has the topographical diversity. This includes the Great Himalayas, the Northern Plain, the Thar Desert, the coastal plains and the Peninsular Plateau. The reasons for variation in the topography could be:

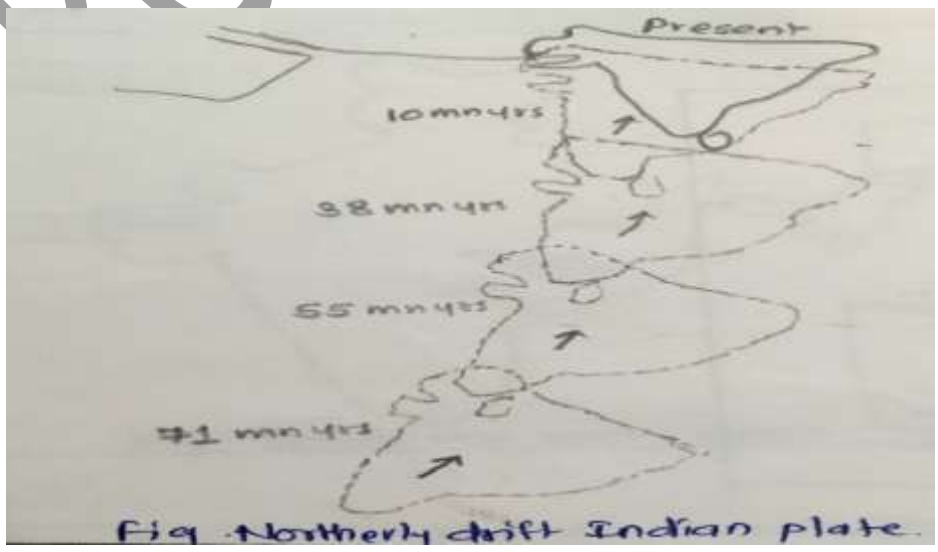
1. Differences in the rock formations. These landmasses have been formed in different geological time periods.
2. Number of processes such as weathering, erosion and deposition has modified these features to their present forms.

India is a country of physical diversity. There are high mountain peaks in some areas while in others lie the flat plains formed by rivers. On the basis of physical features, India can be divided into following six divisions:

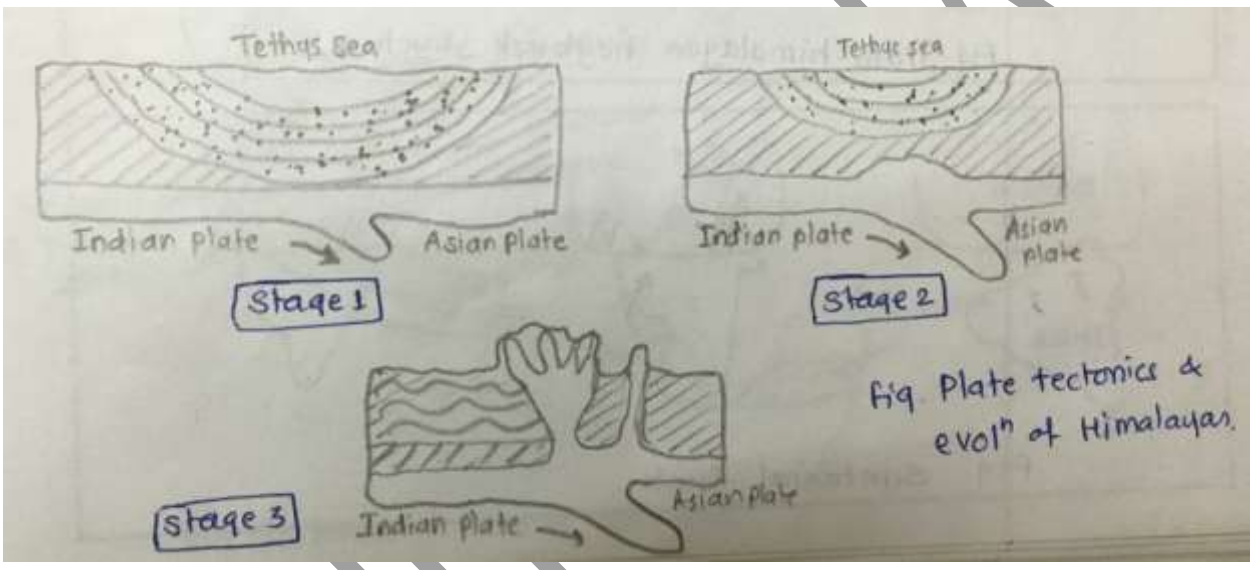
1. The Himalayan mountains
2. The Northern Plains
3. The Peninsular Plateau
4. The Indian Desert
5. The Coastal Plains
6. The Islands.

The Himalayan Mountain

Origin:



According to Plate Tectonics theory, the Himalayas are the product of the convergence of the Asiatic plate in the north and the Indian plate in the south. Some 70 million years ago, the Indian plate started moving towards the Asian plate and the Tethys Sea in between these two plates began to contract due to the movement of Indian and Asian plates towards each other. Since the Indian plate was made up of denser material than the Asian plate, the former began to subduct under the latter causing lateral compression of the marine sediments in the bed of the Tethys which led to the formation of Himalayas.



This upheaval is believed to have occurred in three successive phases giving rise to three important ranges of the Himalayas as follows:

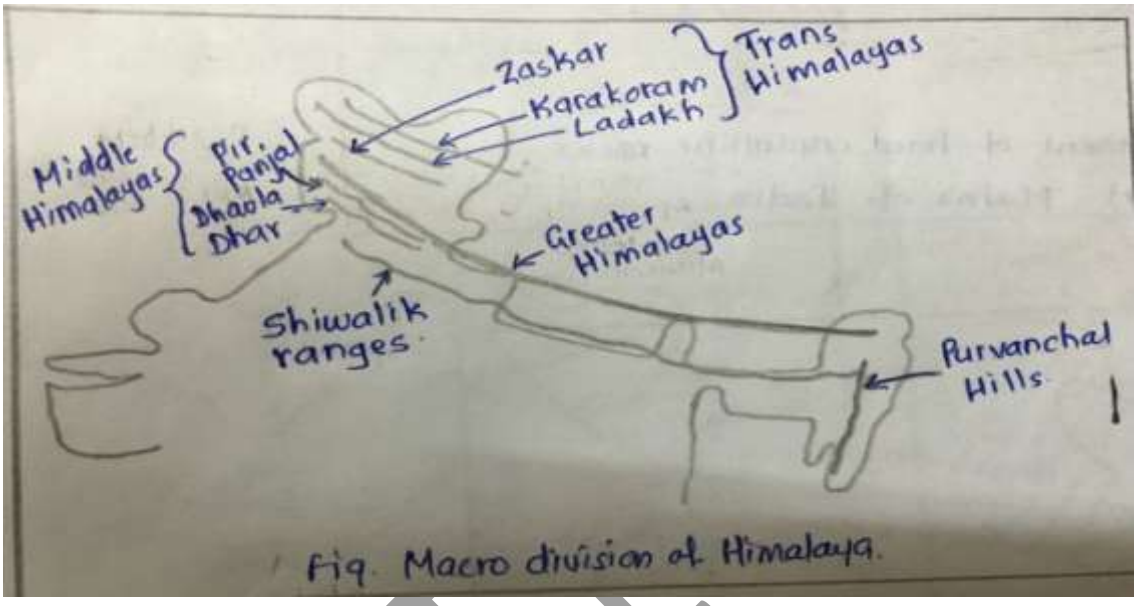
1. The Himalayas
2. The Trans Himalayas
3. The Purvanchal hills

The Himalayan Mountains:

Himalayas are the young fold mountains. This is the highest mountain range of the world. They run from west-east direction from **Indus to Brahmaputra** along the northern boundary of India **covering a distance of 2500km.** Their **width varies from 400km in the west and 150km in the East.** These mountainsare tectonic in origin, dissected by fast flowingrivers which are in their **youthful stage**. Various landforms

like **gorges, V-shaped valleys, rapids, waterfalls**, etc. are indicative of this stage.The Himalayas may be divided into three parallel ranges:

- Greater Himalayas or Inner Himalayas or Himadrior Bahirgiri
- Middle Himalayas or Lesser Himalayas or Himachal
- Outer Himalayas or Shiwaliks.



The Trans-Himalayan ranges:

- These are the initially uplifted mountains that have **predominance of volcanic rocks.**
- These ranges have a typical **hogback structure** that means gentle sloping northern face and steep southern face.
- The **Zaskar, the Ladakh, the Kailash and the Karakoram** are the main ranges of the trans-Himalayan system.
- It stretches for a distance of **1000km east-west direction** and its **average elevation is 3000m** above the sea level.
- The **Nanga Parbat (8126 m)** is an important range which is in The Zaskar Range, K_2 which is the highest mountain in the Indian union and second highest mountain in the world is also there in Transhimalayas.
- The **average width of this region is 40 km** at the extremities and **about 225 km in the central part.**

- The **Kailas Range** (Gangdise in Chinese) in western Tibet is an offshoot of the Ladakh Range. **The highest peak is Mount Kailas** (6714 m). **River Indus originates** from the northern slopes of the Kailas range.

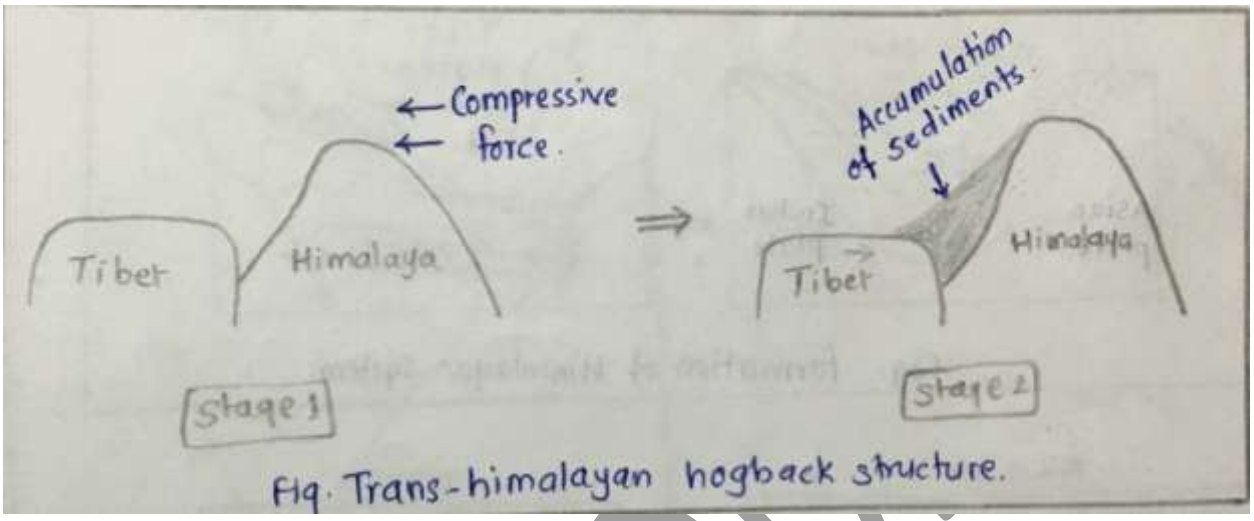


Fig. Trans-himalayan hogback structure.

The Greater Himalayas or Himadri:

- The Greater Himalayas comprises of the northern most ranges and peaks. It has an **average height of 6000 m** and **width lies between 25 km.**
- It is the **most continuous range.** It is snow bound and many glaciers descend from this range.
- The folds in this range are asymmetrical with steep south slope and gentle north slope giving **'hog back'** topography.
- Terminates abruptly at the **syntaxial bends**. One in the **Nanga Parbat** in north-west and the other in the **Namcha Barwa** in the north-east.
- It has high peaks like **Mt. Everest, Kanchenjunga, Makalu, Dhaulagiri etc**. having a height of more than 8000 metres. **Mt. Everest (8848 m)** in Nepal is the highest peak of the world. Kanchenjunga in Sikkim is the highest peak of the Himalayas, in India.
- High Mountain passes also exist in this range, namely, Bara Lacha-La, Shipki-La, Nathu-La, Zoji-La, Bomdi-La etc. The Ganga and Yamuna rivers originate from this Himalayas.

The lesser or middle Himalayas or Himachal:

- The **altitude of this range lies between 1000 and 4500 m** and the **average width is 50km**.
- The Prominent ranges in this are **PirPanjal, Dhaula Dhar and Mahabharata** ranges. Other ranges are **Nagtiba, Mussouries and Kumaon.** It comprises of many famous hill stations like **Shimla, Dalhousie, Darjeeling, Chakrata, Mussoorie, Nainital etc.**
- It also comprises of famous valleys like Kashmir, Kullu, Kangra etc.
- The **Kashmir valley which is about 150km long and 80km wide** lies between the PirPanjal& the Zaskar ranges & are also famous for Karewa formations, which are useful for the cultivation of *Zafran*, a local variety of saffron. (Karewas are thick deposits of glacial clay and other material embedded with moraine.)
- The Kashmir valley lies in the temperate zone with an alluvial soil rich in nitrogen and organic matter. There are different types of soils in the valley which include the silt (Gurti), loam (Bahil), sandy (Sekil), vegetable soil, karewa soil and peaty (Nambal soil)
- Altitude determines the degree of coolness, precipitation and summer temperature. The valley receives an average rainfall of about 65cm.
- In the valley of Kashmir, winter is chilling cold and lasts from December to March with minimum temperature falling down up to -2ºC and maximum rise up to 14ºC. There are strong winds, snowfall, and rainfall during this period. Warmer weather starts in April and lasts till November with the maximum temperature of 36ºC and minimum of 14ºC.

The Outer Himalayas or the Shiwaliks:

- It is the outer most range of the Himalayas and also known as Manak Parbat in ancient times.
- The altitude varies between **600-1500 meters** and the width lies between **15km to 50 km.**

- Runs for a distance of 2,400 km from the **Potwar Plateau** to the **Brahmaputra valley**.
- They are almost unbroken chain of low hills except for a gap of 80-90 km which is occupied by the valley of the **Teesta River and Raidak River**.
- Shiwalik range from North-East India up to Nepal are covered with thick forests but the forest cover decreases towards west from Nepal (The quantum of rainfall decreases from **east to west** in Shiwaliks and Ganga Plains).
- The southern slopes are steep while the northern slopes are gentle thus it forms the **hogback structure**.
- They have low hills like **Jammu Hills**, etc. The valleys lying between Shiwalik and Lesser Himalayas (Himachal) are called **'Duns'** like Dehra Dun, Kotli Dun and Patli Dun.

Formation of Shiwaliks

- Shiwaliks were formed last of all the ranges (2-20 million years ago).
- The Shiwaliks are consolidated sands, gravels and conglomerate deposits [Alluvial fans] which were brought by the rivers flowing from the higher ranges.
- These deposits were **folded and hardened** due to compression offered by the northward movement of Indian plate.

The Purvanchal hills:

- Eastern Hills or The Purvanchal is the southward extension of Himalayas running along the north-eastern edge of India.
- At the **Dihang gorge**, the Himalayas take a sudden southward bend and form a series of comparatively low hills which are collectively called as the Purvanchal.
- Mizoram is known as **LAND OF ROLLING MOUNTAINS, i.e**it has huge number of mountains. Formation of most the mountains are accompanied by formation of**foreland basin** or in simple terms valley type depression which

runs parallel to mountains. These depressions get accumulated with **unconsolidated deposits** known as molasses basin.

- It comprises Mishmi, Patkai, Naga, Mizo hills which are located in eastern side.

The Northern Plains:

The great plains of India are one of the most fertile regions of the world. It is an aggradational plain formed by the depositional work of three major rivers system viz. the Indus, the Ganges & the Brahmaputra. It is the largest alluvial tract of the world. Formation of the northern plains can be explained in the following diagram.

It is almost accepted fact that Northern plains has been formed as a result of a deep depression lying between the peninsular & the Himalayan region by the depositional work of the rivers coming from these two landmasses.

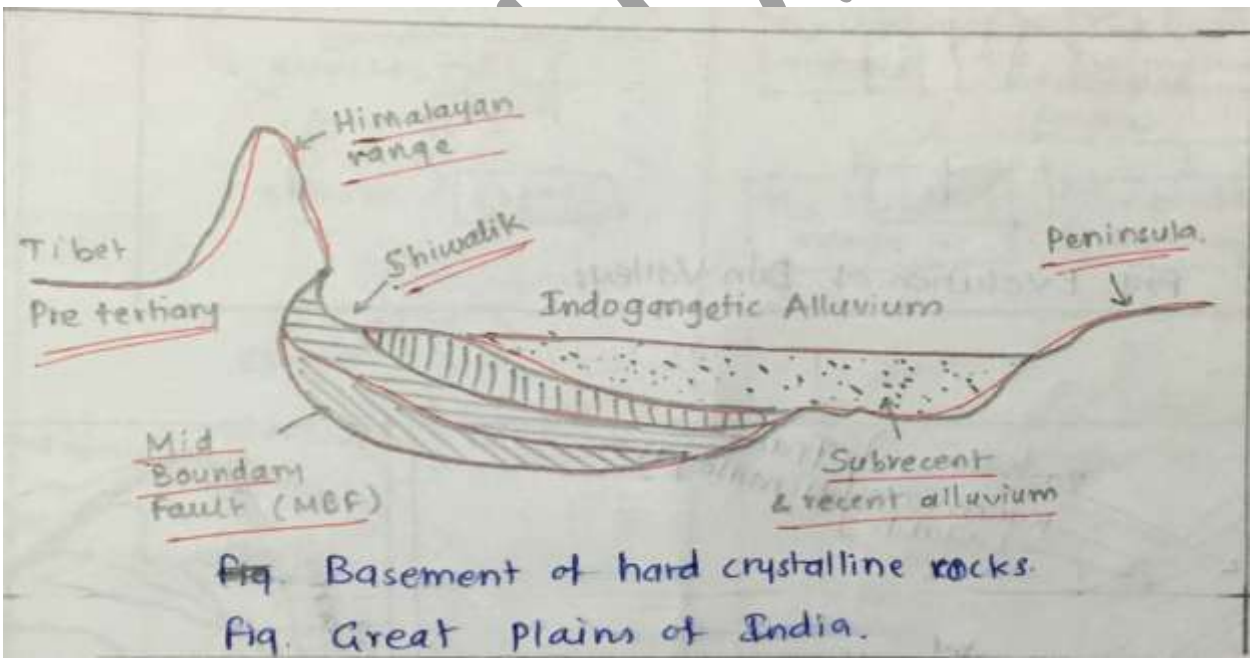


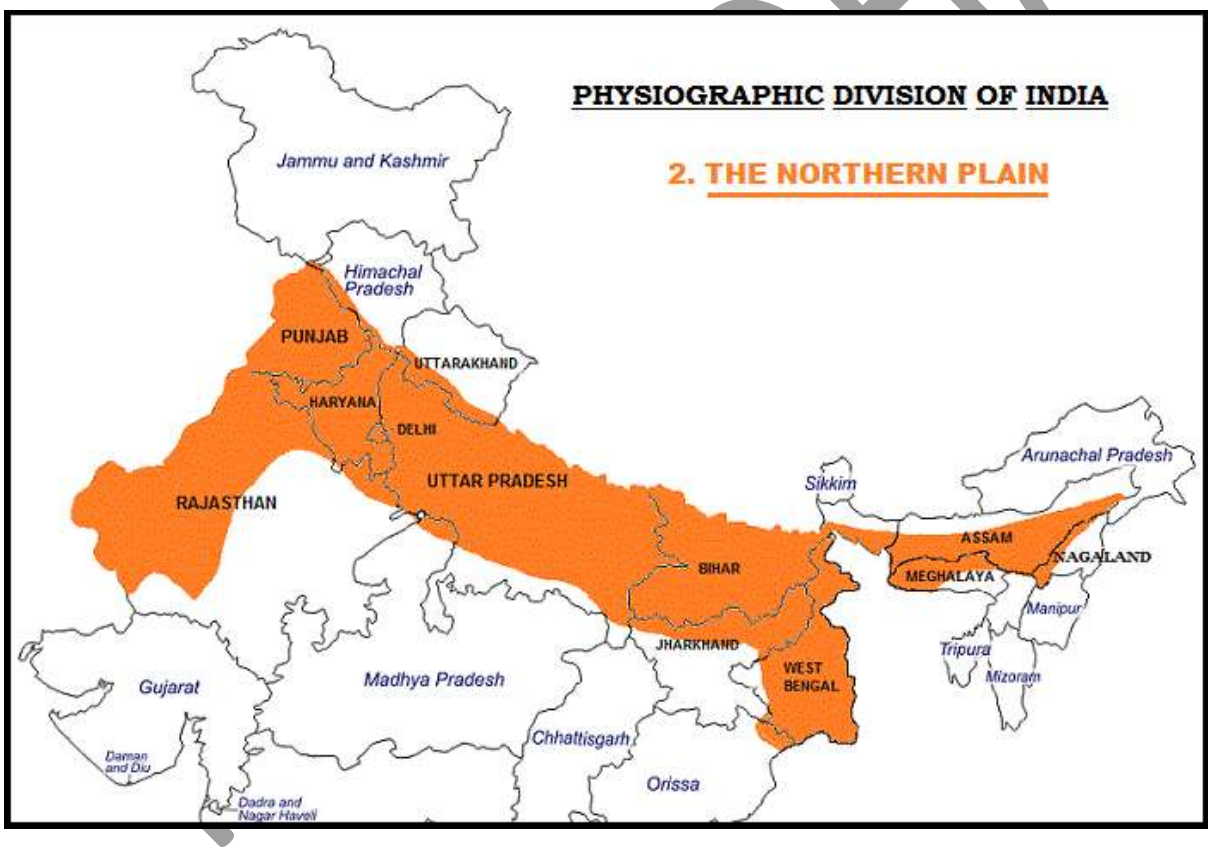
Fig. Great Plains of India.

- Indo-Gangetic-Brahmaputra Plain is the **largest alluvial tract of the world**.
- It stretches for about **3,200 km** from the mouth of the Indus to the mouth of the Ganga. Indian sector of the plain accounts for **2,400 km.**

- The northern boundary is well marked by the **Shiwaliks** and the southern boundary is a wavy irregular line along the northern edge of the Peninsular India.
- The western border is marked by **Sulaiman and Kirthar ranges**. On the eastern side, the plains are bordered by Purvanchal hills.
- The width of the plain varies from region to region. It is widest in the west where it stretches for about 500 km. Its width decreases in the east.

Regional division of the northern plains:

The northern plains can be divided into following East-West division-



1. The Rajasthan Plain:

The Aravali Range runs across the state from the southwest peak **Guru Shikhar** (Mount Abu), which is 1,722 m in height, to **Khetri** in the northeast. This range divides the state into 60% in the northwest of the range and 40% in the southeast. The northwest tract is sandy and unproductive with little water but

improves gradually from desert land in the far west and northwest to comparatively fertile and habitable land towards the east. The area includes the Thar Desert.

It has its origin due to climatic factors. It is situated in high pressure tropical zone as well as due to absence of significant orographic feature & also Aravalis are in SW-NE direction which are parallel to monsoon winds, it is a large desert region. Some scientists also believe that it is formed after receding sea.

Physiographically, Rajasthan plains are more or less flat formed of desert soil comprising of sand.

Subdivisions: According to its diversity of relief there are three subdivisions:

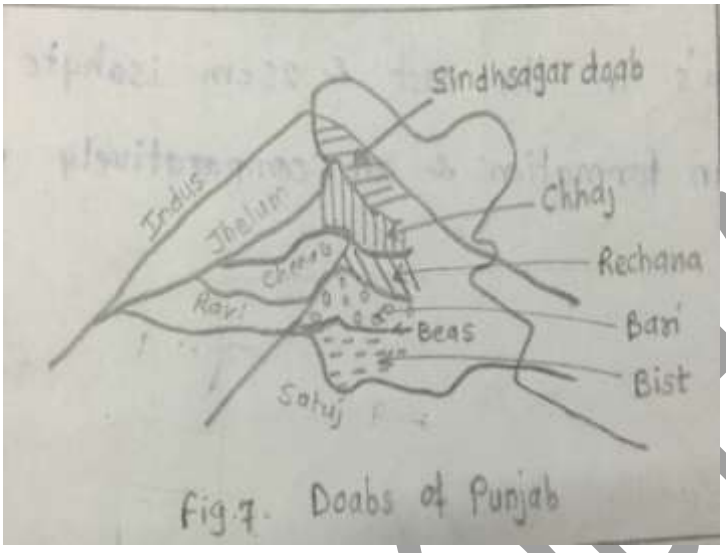
1. **Marusthali:** It is a desert with shifting sand-dunes. It is located in the west. The region to the extreme west covered with, rocks, sands and dunes is known as Marusthali. The dunes here are locally known as Dhrian' and the blow-out depressions are known as 'Dhand'.

2. **Bagar:** It is a grass land. The region just east of Marusthali, i.e., along Luni valley, grasslands with little sand, is known as Bagar. With the irrigation for Rajasthan canal, marked development of agriculture has started here.

3. **Rohi:** The fertile flood plains of small streams originated from western slope of Aravalli is known as Rohi. It is located to the east of Bagar.

2. The Punjab-Haryana Plain:

These are fertile regions and are made up of doabs i.e. land between two rivers. The doabs can be shown as follows.



The depositional process by the rivers, continuing since long has united these doabs & has provided rich alluvial fertile soil for the agriculture. But after the Green Revolution the excess use of chemical fertilizers and little maintenance has led to the problem of soil salinisation in this region.

3. The Ganga Plain:

This is the largest unit of Northern plains & is divided into 3 parts as follows-

- The Upper Gangetic plains
- The Middle Gangetic plains

- The Lower Gangetic Plains
- The Brahmaputra Plains

The Upper Gangetic Plains:

This region extends from **Yamuna to Ghaggar** river basin. It consists of Rohilkhand Plain, Tarai-Bhabhar belt, meandering river courses, sandy stretches etc. Here problem of flooding is quite persistent.

The Middle Gangetic Plains:

This plain is drained by **Ghagra, Gandak and Kosi** rivers. They flow sluggishly in this flat land which forms levees, oxbow lakes, marshes etc. Rivers such as Kosi in this plain frequently changes course which results in flooding. ThusKosi is also known as sorrow of Bihar.

The Lower Ganga Plain:

The average gradient of this plain is 2cm/km. It forms the largest delta of the world aka **Ganga-Brahmaputra delta.** Further, large part of the coastal delta is covered by thick mangrove tree known as Sundarbans. Some of the important islands formed in this region are Sagar Island, New Moore Island, Lothian Island etc.

The Brahmaputra Plains:

The tributaries of Brahmaputra coming out from north abruptly debouch upon the main valley & form number of alluvial fans. The region has large marshy tracts & the alluvial fans have formed the tarai or semi tarai conditions.

The Peninsular Plateau:

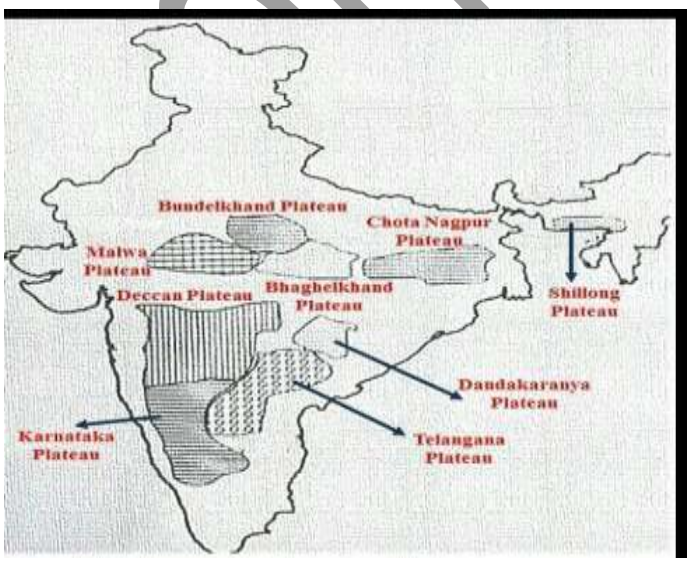
Peninsula is a body or piece of land enclosed on three sides by water, coming out from a larger body of land. Peninsular India is a **tableland made up of old crystalline, igneous and metamorphic rocks.** It is roughly triangular in shape with its northern boundary is an irregular line running from Kachchh along the western flank of the Aravali Range near Delhi and then roughly parallel to the Yamuna and the Ganga as far as the Rajmahal Hills and the Ganga delta. Apart from these, the

KarbiAnglong and the Meghalaya Plateau in the northeast and Rajasthan in the west are also extensions of this block.

The **average elevation** of the peninsular plateau ranges from **100m in the north and 1000m in the south.** The plateau is rich in mineral resources such as manganese, iron, mica, coal, bauxite, gold and copper.

It is believed that due to the force exerted by the north-eastwardly movement of the Indian plate at the time of the Himalayan origin, a huge **fault was created between the Rajmahal hills and the Karbi-Meghalaya plateau.** Later, this depression was filled up by the depositional activity of numerous rivers. Today the Meghalaya and KarbiAnglong plateau remains detached from the main peninsular block.

The peninsula having an average elevation of 600-900 m is divided by Narmada – Tapiinto 2 parts viz. Central highland & Deccan plateau.



The Central Highlands

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

Aravallis

Aravallis Range literally meaning 'line of peaks' running approximately 800 km from northeast to southwest across states of Rajasthan, Haryana, and Gujarat and Pakistan's provinces of Punjab and Sindh. The northern end of the range continues as isolated hills and rocky ridges into Haryana state, ending in Delhi. The famous Delhi Ridge is the last leg of the Aravalli Range, which traverses through South Delhi and terminates into Central Delhi. The southern end is at Palanpur near Ahmadabad, Gujarat. The highest peak is Guru Shikhar in Mount Abu. Rising to 1722 meters, it lies near the southwestern extremity of the range, close to the border with the Gujarat. The city of Udaipur with its lakes lies on the south slope of the range in Rajasthan. Numerous rivers arises amidst the ranges including, Banas River, Luni River, Sakhi, Sabarmati River. The Great Boundary Fault (GBF) separates the Aravallis from the Vindhyan Mountains.

Malwa Plateau

The Malwa region occupies a plateau in western Madhya Pradesh and south-eastern Rajasthan with Gujarat in the west.

- The region includes the Madhya Pradesh districts of Dewas, Dhar, Indore, Jhabua, Mandsaur, Neemuch, Rajgarh, Ratlam, Shajapur, Ujjain, and parts of Guna and Sehore, and
- Rajasthan districts of Jhalawar and parts of Banswara and Chittorgarh.
- The plateau is bound in north-east by the Hadoti region, in the north-west by the Mewar region, in the west by the Vagad region and Gujarat. To the south and east is the Vindhya Range and to the north is the Bundelkhand upland. The average elevation of the plateau is 450-500 m.

The western part of the Malwa Plateau is drained by the Mahi River, while the Chambal River drains the central part, and the Betwa River and the headwaters of the Dhasan and Ken rivers drain the east. The Shipra River is of historical importance

because of the Simhasth mela, held every 12 years. Other notable rivers are Parbati, Gambhir and Choti Kali Sindh.

- The Vindhya Range marks the southern boundary of the plateau, and is the source of many rivers of the region.

Vegetation in the Malwa Plateau is tropical dry forest, with scattered teak. The Malwa plateau is considered to be an extension of the Deccan Traps and was formed at the end of Cretaceous period. Black, Brown and Bhtatori or stony soil is abundant in the Malwa Plateau. The black soil requires less irrigation because of its high capacity for moisture retention. The other two soil types are lighter and have a higher proportion of sand.

Vindhyan Range

- The Vindhyan Range, overlooking the Narmada valley, rises as an escarpment (a long, steep slope at the edge of a plateau or separating areas of land at different heights) flanking the northern edge of the Narmada-Son Trough (the rift through which the Narmada river flows)(trough is opposite of ridge. It is a narrow depression).
- It runs more or less parallel to the **Narmada Valley** in an east-west direction from **Jobat in Gujarat to Sasaram in Bihar** for a distance of over 1,200 km.
- The general elevation of the Vindhyan Range is 300 to 650 m. The highest peak is Sadbhawana Shikhar aka Kalumar Peak (752m AMSL). It lies in the area of Panna Hills.
- Most parts of the Vindhayan Range are composed of horizontally bedded sedimentary rocks of ancient age. {Rock System}
- The Vindhyas are continued eastwards as the **Bharner** and **Kaimur hills**.
- This range acts as a watershed between the Ganga system and the river systems of south India and also extends up to **Gujarat in the west, MP in centre, Uttar Pradesh in the north and Chhattisgarh in the east.**
- The rivers **Chambal, Betwa** and **Ken** rise within 30 km of the Narmada.

Vindhyachal Plateau

The Vindhyachal plateau lies to the north of the central part of the range. The cities of Bhopal, the capital of Madhya Pradesh, and Indore lie on this plateau, which rises higher than the Indo-Gangetic plain to its north.

Satpura Range

The Satpura range parallels the Vindhya Range to the north, and these two east-west ranges divide Indian Subcontinent into the Indo-Gangetic plain of northern India and the Deccan Plateau of the south. Satpura range rises in eastern Gujarat state near the Arabian Sea coast, running east through the border of Maharashtra and Madhya Pradesh to the east till Chhattisgarh.

- The Narmada River originates from north-eastern end of Satpura& runs in the depression between the Satpura and Vindhya ranges, draining the northern slope of the Satpura range and southern slopes of Vindhyan range, running west towards the Arabian Sea.
- The Tapti River originates from eastern-central part of Satpura, crosses the range in the center & further runs at the southern slopes of Satpura towards west meeting the Arabian Sea at Surat, draining central & the southern slopes of the Satpura Range.
- Mount Dhupgarh or Dhoopgarh is the highest point in the Satpura Range and in Madhya Pradesh, India. Located near Pachmarhi, it has an elevation of 1,350 metres.

The Chhotanagpur Plateau

Chhotanagpur Plateau covers much of Jharkhand state. It also covers the adjacent parts of **Odisha, West Bengal, Bihar and Chhattisgarh**. The Indo-Gangetic plain lies to the north and east of the plateau, and the basin of the Mahanadi River lies to the south. The total area of the Chhotanagpur Plateau is approximately 65,000 square kilometres. This Plateau consists of three steps. **The highest step is in the western part of the plateau, ranging from 3,000 -3500 feet. The next part contains larger portions of the old Ranchi and Hazaribagh districts and some parts of old Palamu district**, before these were broken up into smaller administrative units. The

general height is 2,000 feet. The lowest step of the plateau is at an average level of around 1,000 feet, covering the old Manbhum and Singhbhum districts.

The Chhotanagpur Plateau is composed of *Archaean granite and gneiss rocks with patches of Dharwar* and Damuda series of the Gondwana Period, and the lava flow of the Cretaceous Period. The western higher plateau of the Chhotanagpur Plateau is called Pat region. It is believed to be composed of Deccan lava. The largest part of the Chhotanagpur Plateau is called **Ranchi Plateau**. **Damodar River originates here and flows through a rift valley.** Damodar basin forms a trough between the Ranchi and Hazaribagh plateaus resulting from enormous fractures at their present edges, which caused the land between to sink to a great depth and incidentally preserved from denudation the Karanpura, Ramgarh and Bokaro coalfields. The plateau is covered with a variety tropical and subtropical dry broadleaf forests of which Sal forest is predominant. The plateau is home to the Palamau Tiger Reserve. Chhotanagpur plateau is **a store house of minerals like mica, bauxite, copper, limestone, iron ore and coal.** The Damodar valley is rich in coal and it is considered as the prime centre of coking coal in the country. Massive coal deposits are found in the central basin spreading over 2,883 km2. The important coalfields in the basin are Jharia, Raniganj, West Bokaro, East Bokaro, Ramgarh, South Karanpura and North Karanpura.

Karbi-Meghalya plateau

Karbi-Meghalya plateau is in fact an extension of the main Indian peninsular plateau and are originally two different plateaus – KarbiAnglong plateau and Meghalya plateau. It is believed that due to the force exerted by the north-eastwardly movement of the Indian plate at the time of the Himalayan origin, a huge fault was created between the Rajmahal hills and the Karbi-Meghalaya plateau. Later, this depression was filled up by the depositional activity of numerous rivers. Today the Maghalaya and KarbiAnglong plateau remains detached from the main Peninsular block. This area receives maximum rainfall from the South-West monsoon.

The Deccan Plateau

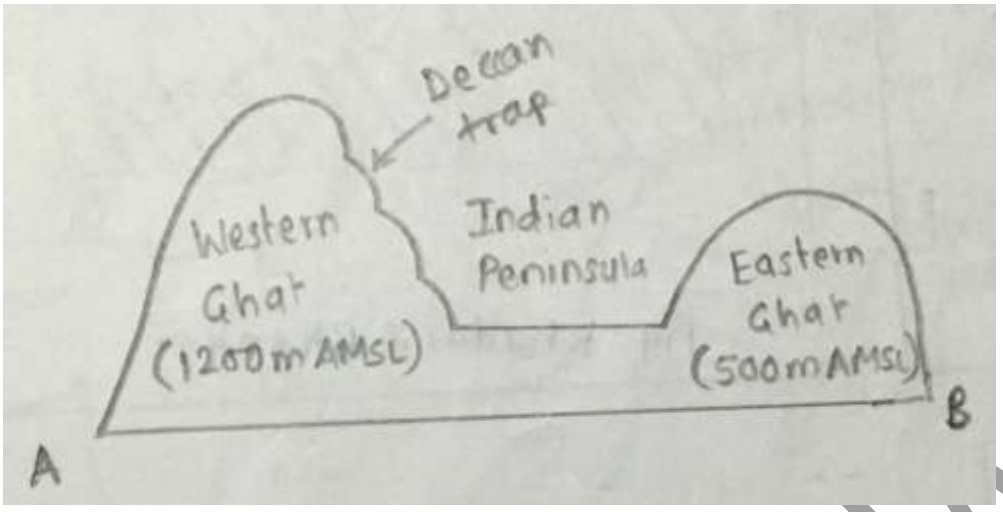
The Deccan Plateau, the entire southern peninsula of India south of the Narmada River, marked centrally by a high triangular tableland. The plateau is bounded on the east and west by the Ghats, escarpments that meet at the plateau's southern tip. Its northern extremity is the Satpura Range. The Deccan's average elevation is about 2,000 feet (600 metres), sloping generally eastward. Its principal rivers—the Godavari, Krishna, and Kaveri (Cauvery)—flow from the Western Ghats eastward to the Bay of Bengal. The plateau's climate is drier than that on the coasts and is arid in places.

The plateau is believed to be an ancient remnant of the Earth's original continent, Gondwanaland. The continuous weathering and erosion over the period of time has led to exposure of various mineral resources on this plateau.

Eastern Ghats

The **Eastern Ghats** followed Aravallis in sequence of formation. It runs almost parallel to the east coast of India from Mahanadi to Vaigai River.They run from West Bengal through Orissa and Andhra Pradesh to Tamil Nadu in the south passing some parts of Karnataka.They are eroded and cut through by the four major rivers of southern India, the **Godavari, Mahanadi, Krishna, and Cauvery.** Its chain is highly broken and detached hills with **Jindhagada Peak(1690)** in Andhra Pradesh being the highest peak.The climate of the higher hill ranges is generally cooler and wetter than the surrounding plains and the hills are home to **coffee plantations** and enclaves of **dry evergreen forest** in TN. The area between the Nallamala and Seshachalam Hills is well known for the **red sandal**.

Still farther southwest, beyond the Krishna River, the Eastern Ghats appear as a series of low ranges and hills, including the Erramala, Nallamala, Velikonda, and Palkonda. Southwest of the city of Chennai (Madras), the Eastern Ghats continue as the Javadi and Shevaroy hills, beyond which they merge with the Western Ghats.



Near the Godavari river, there is break in the Eastern Ghats where Gondawana rocks are present. They consist of 80-90% of Indian coal.

Western Ghats

The Western Ghats, also called the Sahyadri, are a north-south chain of mountains or hills that mark the western edge of the Deccan plateau region. They rise abruptly from the coastal plain of the Arabian Sea as an escarpment of variable height, but their eastern slopes are much more gentle. The Western Ghats contain a series of residual plateaus and peaks separated by saddles and passes. The hill station (resort) of Mahabaleshwar, located on a laterite plateau, is one of the highest elevations in the northern half, rising to 4,700 feet (1,430 metres). The chain attains greater heights in the south, where the mountains terminate in several uplifted blocks bordered by steep slopes on all sides. Those include the Nilgiri Hills, with their highest peak, Doda Betta (8,652 feet [2,637 metres]); and the Anaimalai, Palni, and Cardamom hills, all three of which radiate from the highest peak in the Western Ghats, Anai Peak (AnaiMudi, 8,842 feet [2,695 metres]). The Western Ghats receive heavy rainfall, and several major rivers—most notably the Krishna (Kistna) and the two holy rivers, the Godavari and the Kaverihave their headwaters there.

Western Ghats are not true mountains, but are the faulted edge of the Deccan Plateau. They have believed to have formed during the break-up of the super continent of Gondawana some 150 million years ago. Thus they are Block Mountains.

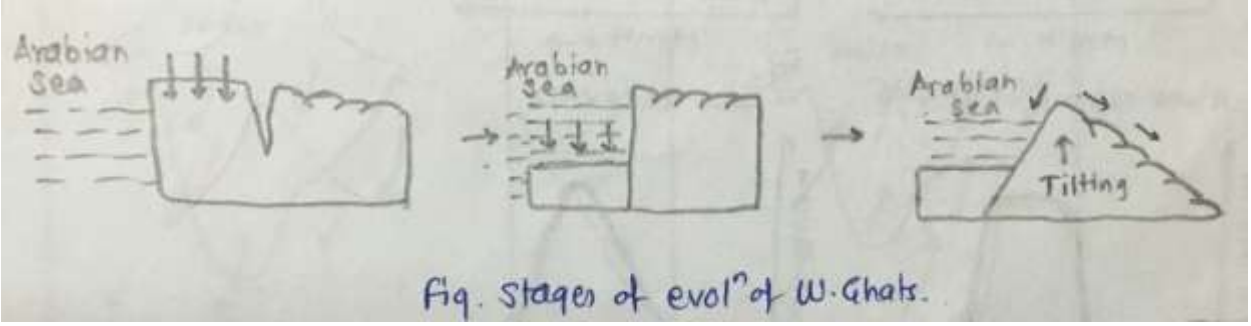


Fig. Stages of evol^n of W. Ghats.

It is a UNESCO World Heritage Site and is one of the eight "hottest hot-spots" of biological diversity in the world.

The range starts near the border of Gujarat and Maharashtra, south of the Tapti river, and runs approximately 1600 km through the states of Gujarat,Maharashtra, Goa, Karnataka, Kerala and Tamil Nadu ending at Kanyakumari, at the southern tip of India.

The Biligiri Hills, which run east from the Western Ghats to the River Kaveri, form a forested ecological corridor that connects the Eastern and Western Ghats. Both hills also meet at **Nilgiri Hills.**

They are known by different local names,

- Maharashtra, Goa and Karnataka – Sahyadri
- Karnataka near Mysore – Bili girirangana Betta
- Tamil Nadu – NilgiriMalai
- Tamil Nadu& Kerala – Anamalai Hills and Cardamom Hills

Coastal Plains of India

- India has a coastline of **7516.6 Km [6320 km of mainland coastline + coastline of 1197 Indian islands]** touching 13 States and Union Territories (UTs).
- The straight and regular coastline of India is the result of faulting of the Gondwanaland during the Cretaceous period. {**Continental Drift**}
- As such the coast of India **does not offer many sites for good natural harbours.** However, the western coast of India is more suitable for the ports than the eastern coast due to its more depth.

East Coast of India

- Lies between the Eastern Ghats and the Bay of Bengal.
- It extends from the Ganga delta to Kanyakumari.
- It is marked by deltas of rivers like the Mahanadi, the Godavari, the Krishna and the Cauvery.
- **Chilka lake** and the **Pulicat lake (lagoon)** are the important geographical features of east coast.

Regional Names of the East Coast of India

- In Orissa (Odisha) it is known as **Utkal coast**.
- From the southern limit of the Utkal plain, stretch the **Andhra coast**.
- In the south of the Andhra plain is the **Tamil Nadu coast.**
- The Tamil Nadu coast and parts of Andhra coast together are known as **Coramandal Coast** or **PayanGhat**[False Divi Point in AP (Krishna River Delta) in the north to Kanyakumari in the south.].

West Coast of India

- The west coast strip extends from the **Gulf of Cambay (Gulf of Khambhat)** in the north to **Cape Comorin (Kanyakumari)** with an average width of around 65km. It is quite narrow in the middle and broader in the northern and southern parts.
- Starting from north to south, it is divided into (i) the Kuchchha Peninsula (ii) the **Konkan coast**, (iii) the **Karnataka coast** and (iv) the **Kerala cost**.
- It is made up of alluvium brought down by the **short streams** originating from the Western Ghats.
- It is dotted with a large number of **coves (a very small bay), creeks (**a narrow, sheltered waterway such as an inlet in a shoreline or channel in a marsh**) and a few estuaries**. {Marine Landforms}
- The **estuaries, of the Narmada and the Tapi** are the major ones.
- The Kerala coast (**Malabar Coast**) has some **lakes, lagoons and backwaters**, the largest being the **Vembanad Lake**.

Regional Names of the West Coast of India

- **Konkan coast = Maharashtra coast and Goa coast;**
- **Malabar Coast = Kerala and Karnataka coast.**

1. The Kuchchh Peninsula

It was an island surrounded by seas and lagoons. However they are later filled by the Indus river which flows through this area. Some scholars consider Kuchchh Kathiawar as a part of Peninsular plateau. However they are truly part of west coastal plains.

Due to scarcity of rain and flowing surface water, the work of the wind is felt everywhere and this has given rise to arid and semi arid landscape. Coastal sand dunes, sandy plains, interrupted with bare rocky hills are the chief physiographic features.

All along the Kuchchh there lies a broad level salt soaked plain. This is the Great Rann. Its southern continuation , known as the Little Rann lies on the coast and south east of Kachchh. This area is flooded by Banas and Luni rivers during rainy season. Some places here are actually below sea level and are inundated by high tides. Most of the area is formed of sun baked dark silt encrusted with salt.

2. Kathiawar Peninsula

It lies to the south of the Kuchchh. It is encircled on the east and north east by the Little Rann and the Nal Basin. The central part of a highland of Mandav Hills from which small streams radiate in all directions. Mt. Girnar, the highest point is supposed to be of volcanic origin. The Gir Range, famous for Gir Lions, is located in the southern part of Kathiawar peninsula.

3. The Gujarat Plain

It lies east of Kuchchh and Kathiawar and slopes towards the west and south west. It is more like an intrusion of Indo-Gangatic conditions into the peninsula. Formed by the rivers Narmada, Tapi, Mahi and Sabarmati, the plain includes the southern part of Gujarat and the coastal areas of Gulf of Khambat. The eastern part of this plain is made of sediments and is fertile enough to support agriculture, but greater part near

the coast is covered by wind blown loess which has given rise to semi arid landscape.A chain of saline marshes near the coast is prone to floods during the high tides.

4. The Konkan Plain

It extends from Daman to Goa. It has some features of marine erosion including cliffs, shoals, reefs and islands in the Arabian Sea. Mumbai was an island but the part of the sea lying between the mainland and the islands are reclaimed to connect it with mainland. The Thane creek of the Ulhas river around Mumbai is an important embayment which provides an excellent natural harbour on the southern side of the island. The Konkan coast also has series of small bay and coves. Behind coastal belt, there is a series of parallel ridges of 400 to 600m in which rivers like Vaitarni , Ulhas and Amba have lower courses more or less parallel to the coast.

5. The Karnataka Coastal Plain

It is from Goa to Manglore. It is a narrow plain which is being crossed by numerous spurs projecting from the Ghats. Running like a ridges these spurs attains the height of more than 600m near the Ghats. At some places the streams originating in the Western Ghats descend along steep slopes and make waterfalls. Gersoppa or Jog waterfall on Sharavati rivers is one such example.

6. The Kerala Plain

It is a low lying plain and at no place its height exceeds 30m. The existence of lakes, lagoons, backwaters, spits etc. is a significant characteristic of Kerala coast. The backwaters, locally known as Kayals are the shallow lagoons or inlets of the sea, lying parallel to the coastline. The largest among these is the Vembanad lake is about 75km long and 5 to 10 km wide and gives rise to 55km long spit. This and several other lagoons joined together by canals to provide excellent inland waterways from mouth of Ponnai in the north to Thiruvananthapuram in the south.

The Eastern Coastal Plains

It extends from Subarnarekha river along West Bengal-Odisha border to Kanniyakumari. The major part of the plain is formed out of alluvial deposits. In contrast to the western coastal plains, these are extensive plains with an average width of 120km. This plain is known as Northern Circars between Mahanadi and Krishna Rivers and Carnatic between Krishna and Cauvery Rivers.

1. The Utkal Plains

It includes Mahanadi delta with Cuttack at its head. There is thick layer of alluvium covering this delta. The most prominent physiographic feature of this plain is Chilka lake in the south of the Mahanadi delta. It is the second biggest lagoon in the world.

2. The Andhra Plain

It extends up to Pulicat lake. This lake has been barred by a long sand spit known as Sriharokota Island. The most significant feature of this plain is the delta formation by the rivers Godavari and Krishna. In fact these two deltas have merged with each other and have formed a single physiographic unit. Andhra plain is a straight coast and badly lacks good harbours with the exception of Vishakhapatnam and Machilipatnam.

3. The Tamil Nadu Plain

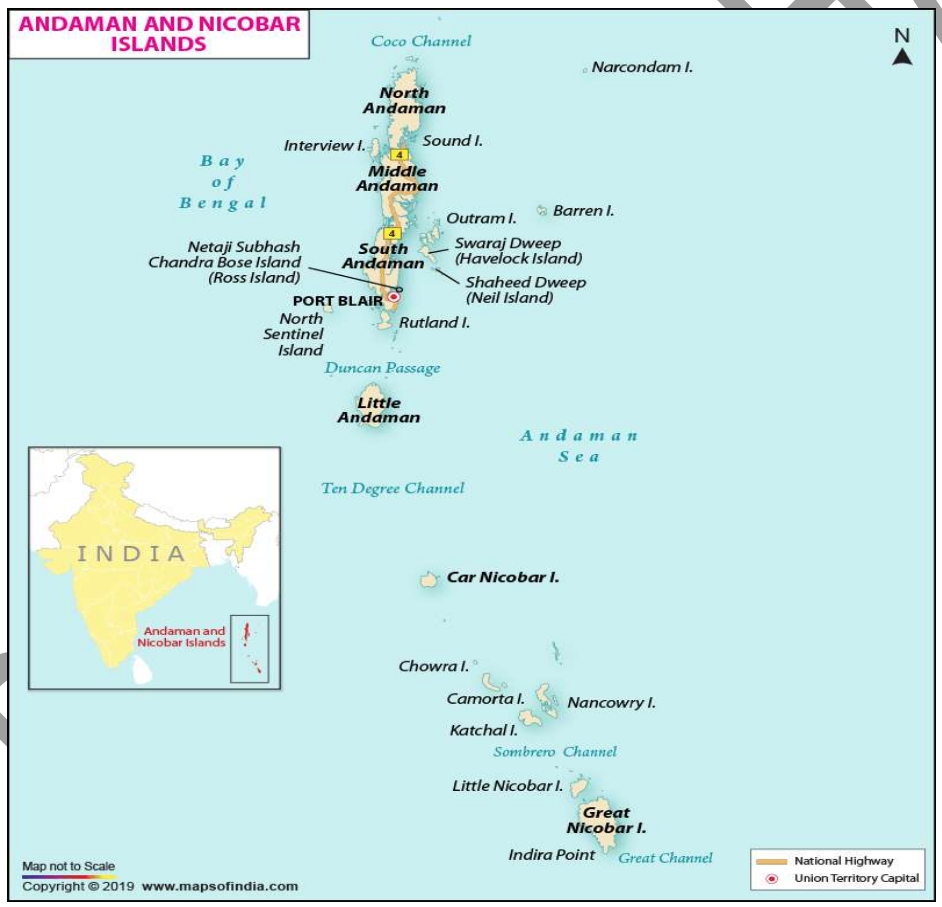
Its average width is 100km. The most important feature of this plain is the Cauvery delta where the plain is 130km wide. The fertile soil and large scale irrigation facilities have made the Cauvery delta the granary of South India.

The Islands

- The major islands groups of India are Andaman and Nicobar Archipelago (A chain of islands similar in origin) in Bay of Bengal and Lakshadweep islands in Arabian Sea.
- Andaman and Nicobar Islands were formed due to **collision between Indian Plate and Burma Minor Plate [part of Eurasian Plate][Similar to formation of Himalayas].**

- Andaman and Nicobar Islands are southward extension of **ArakanYoma range [Myanmar][ArakanYoma in itself is an extension of Purvanchal Hills**].
- Lakshadweep Islands are **coral islands**. These islands are a part **Reunion Hotspot volcanism.**
- Other than these two groups there are islands in Indo-Gangetic Delta [they are more a part of delta than islands] and between India and Sri Lanka [Remnants of Adams Bridge; formed due to submergence].

Andaman and Nicobar Islands



- This archipelago is composed of 572 big and small islands.
- The Great Andaman Islands are divided into three main islands i.e. **North, Middle** and **South.**
- **Duncan passage** separates Great Andaman from Little Andaman.

- The Great Andaman group of islands in the north is separated by the **Ten Degree Channel, Andaman Sea** from the Nicobar group in the south.
- **Port Blair**, the capital of Andaman Nicobar Islands lies in the South Andaman.
- 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.
- Recently government has renamed 3 islands in Andaman i.e. Ross Island is renamed as Netaji Subhash Chandra Dweep, the Neil Island is renamed as Shaheed Dweep, and the Havelock island is renamed as Swaraj Dweep.
- 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 [these are the only active volcanoes in India][There are no active volcanoes in main land 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

- In the Arabian Sea, there are three types of islands.
    - **Amindivi Islands**

    - **Cannanore Islands**
    - **Minicoy Island**
- At present these islands are collectively known as Lakshadweep.
- The Lakshadweep Islands are a group of 25 small islands.
- They are widely scattered about 200-500 km south-west of the Kerala coast.
- **Amendivi Islands** are the northern most while the **Minicoy Island is the southernmost**.
- All are tiny islands of coral origin {Atoll} and are surrounded by **fringing reefs**.
- The largest and the most advanced is the **Minicoy Island** with an area of 4.53 sq. km.
- 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.**
- **Laccadive** is separated from **Minicoy Island** by **Nine degree channel**.

New Moore Island

- It is a small uninhabited offshore sandbar landform {Marine Landforms} in the Bay of Bengal, off the coast of the Ganges-Brahmaputra Delta region.
- It emerged in the Bay of Bengal in the aftermath of the **Bhola cyclone in 1970**. It keeps on emerging and disappearing.
- Both **India and Bangladesh claimed sovereignty over it because of speculation over the existence of oil and natural gas in the region**.
- The issue of sovereignty was also a part of the larger dispute over the **Radcliffe Award** methodology of settling the maritime boundary between the two nations.
- Recent verdict of PCA(Permanent Court of Arbitration) has awarded New Moore Island to India.