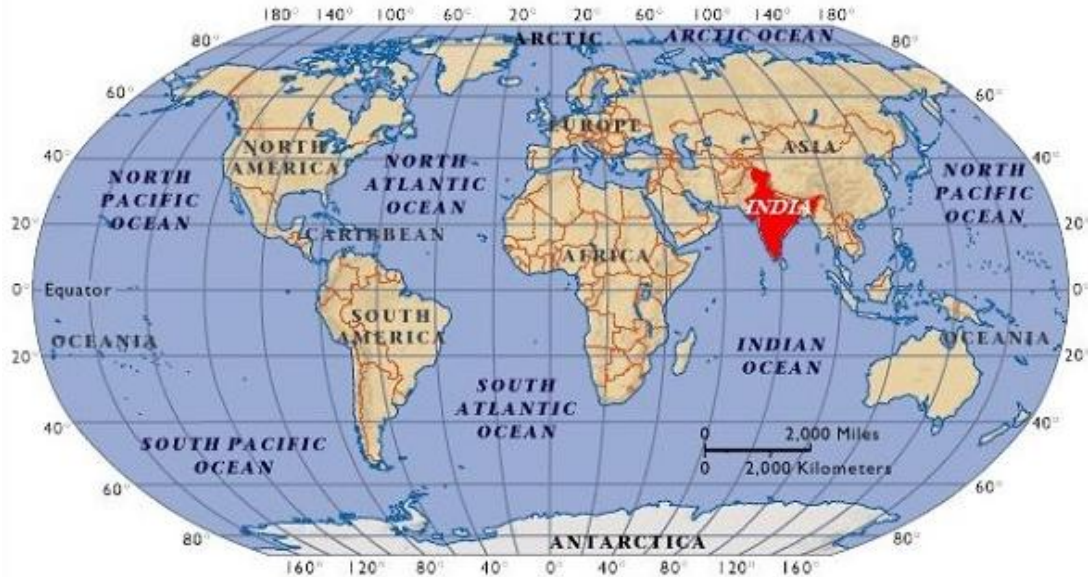


## Introduction of India and Time Zone of India

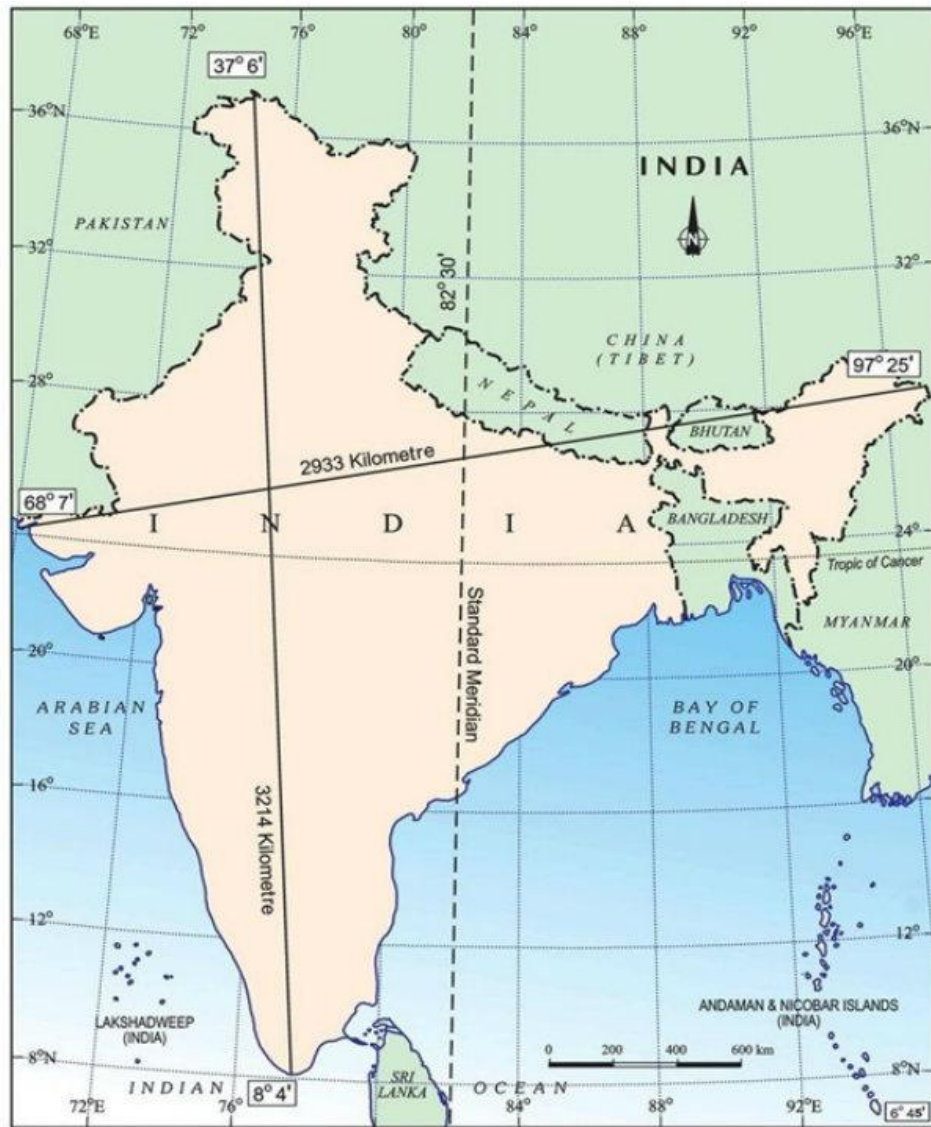
- India is located entirely in the **northern hemisphere**; specifically in the south-central part of the continent of Asia.



Source: [www.pgimn.org](http://www.pgimn.org)

### India - Size

- With an area of 3.28 million square km, India is the Seventh largest country of the world.
- The **six** largest countries of the world in decreasing order are Russia, Canada, USA, China, Brazil, and Australia.
- India accounts for about **2.4 percent** of the total geographical area of the world.
- India has a total land boundary of about **15,200 km**.
- The coastline of India stretches along the Bay of Bengal in the east and the Arabian Sea in the west (as shown in the map given above).
- From Gujarat (westernmost) to Arunachal Pradesh (easternmost), because of this difference, there is a time difference of **two hours** between Gujarat and Arunachal Pradesh.



- The sun rises in Arunachal Pradesh about two hours earlier as compared to Jaisalmer in Rajasthan.
- The maximum length of the mainland from north to south is about **3214 km**.
- The maximum length of the mainland from east to west is about **2933 km**.
- India's total length of coastline is **6,100 km** of its mainland and after including Andaman and Nicobar, and Lakshadweep islands, it is about **7,516 km**.
- India's territorial limit further extends towards the sea up to **12 nautical miles** (i.e. about 21.9 km) from the coast.

### Indian Standard Meridian

- **Meridian** crossing through the **Mirzapur** city of Uttar Pradesh is taken as India's Standard Meridian.
- Indian Standard Time is ahead of Greenwich Mean Time by **5 hours and 30 minutes**.
- Tropic of cancer passes through Gujarat, Madhya Pradesh, Chhattisgarh, Jharkhand, West Bengal, Tripura, and Mizoram.
- The difference in latitudinal extent influences the duration of day and night.

### India and Neighbors

- India has total **29 States**, **6 Union Territories**, and **1 National Capital Territory**.
- India is bounded by young fold mountains (the Great Himalaya) in the North and North-East.

- Throughout the history, India's connections with other parts of the world has been heavily influenced by waterways and also the mountain passes.
- India shares its international boundaries with Afghanistan and Pakistan in the North-West; China, Tibet (China), Nepal, and Bhutan in the North and NorthEast; and Myanmar and Bangladesh in the East.
- Island countries Sri Lanka and Maldives are India's neighbors across the sea.
- Sri Lanka is an island nation located off the southern coast of India in South Asia and it is bordered by the Indian Ocean. India and Sri Lanka are separated by a thin water body called the **Palk Strait**.
- Maldives is a chain of islands located south-west of Sri Lanka and India in the Indian Ocean.



# Coastal Boundary of India and Water Stretch

## Area and boundaries of India

Following are the India Area and Boundaries details :-

1. India stretches 3,214 km from N to S & 2933 km from E to W.
2. Area :- 32,87,263 sq. km. Accounts for 2.4 % of total world area and 16 % of the population .
3. Mainland India has a coastline of 6,100 km. Including the Lakshadweep and Andaman and Nicobar, the coastline measures about 7516. km.
4. In India, total land mass is

Plains :- 43.3 %

Plateaus :- 27.7 %

Hills :- 18.6 %

Mountains:- 10.7 %

5. In the south, on the eastern side, the Gulf of Mannar & the Palk Strait separate India from Sri Lanka

6. Total land neighbours of India are 7 .

These are

Pakistan

Afghanistan

China

Nepal

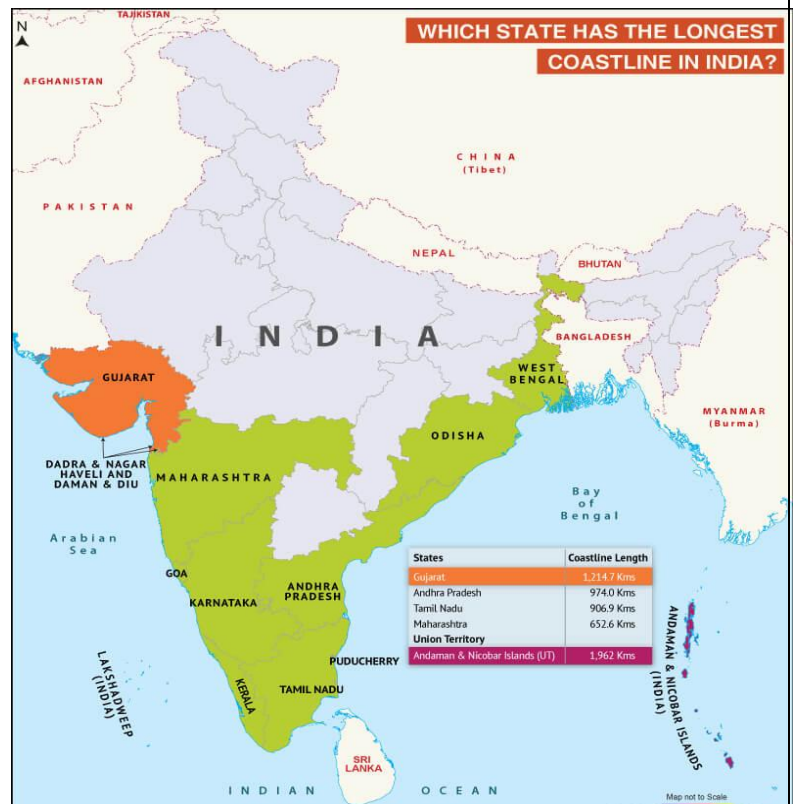
Sri Lanka

Bhutan

Bangladesh and

Myanmar

7. Indias Islands include the Andaman & Nicobar Islands in Bay of Bengal & Lakshadweep, Minocoy & Amindive Islands in the Arabian Sea

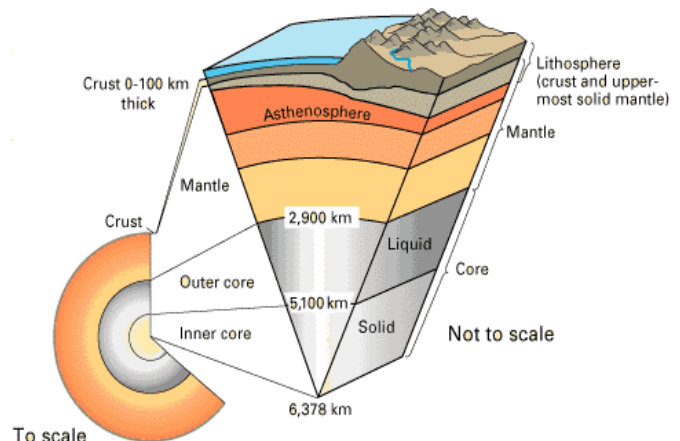


## Structure of The Earth

- The Crust
- The Mantle
- The Core

### The Crust

- The crust is the outermost solid part of the earth.
- It is fragile in nature.
- The thickness of the crust varies under the oceanic and continental areas.
- Oceanic crust is thinner as compared to the continental crust.
- The continental crust is thicker in the areas of major mountain systems.
- The crust made up of heavier rocks having a density of 3 g/cm<sup>3</sup>.
- The kind of rock seen in the oceanic crust is basalt.



- The mean density of material in the oceanic crust is 2.7 g/cm<sup>3</sup>.

### **The Mantle**

- The portion of the interior beyond the crust is called the mantle.
- It is in a solid state.
- It has a density higher than the crust portion.
- The thickness ranges from 10-200 km.
- The mantle extends from Moho's discontinuity to a depth of 2,900 km.
- The asthenosphere is the upper portion of Mantle.
- It is the chief source of magma that finds its way to the surface during volcanic eruptions.
- The crust and the uppermost part of the mantle are called lithosphere.

### **The Core**

- The core-mantle boundary is positioned at the depth of 2,900 km.
- The inner core is in the solid state whereas the outer core is in the liquid state.
- The core is made up of very heavy material mostly constituted by nickel and iron. Hence it is also called the "nife" layer.



## Indian Sub Continent and Strait

1. The **Geological Structure of India** is very diverse because an Indian rock belongs to different geologic periods, dating as far back as the **Euarchean Era**. Its geographical land area can be classified into **Archaean System; Dharwar System, Cuddapah System; Vindhyan System; Gondwana System, Deccan Trap; Tertiary System; Quarternary System**.
2. India is located latitudinally in the Northern Hemisphere and longitudinally in the Eastern Hemisphere. It extends from  $8^{\circ}4'$  north and  $37^{\circ}6'$  North in length (latitudes). And between  $68^{\circ}7'$  East and  $97^{\circ}25'$  East in width (longitudes). Because of this great longitudinal extent, the difference in local time between the eastern and western extremes of our country is about two hours.
3. The local time along  **$82^{\circ} 30' E$  longitudes** is taken as the standard time of India i.e. **Indian Standard Time (IST)**. This meridian is known as the Standard Meridian of India. It has an area of 3.28 million square km. It is the seventh-largest country in the world. It accounts for nearly 2% of the world's total area. It is situated in the northern hemisphere.
4. India has a **coastline of 7516.6 km** of total land frontier 15200 km and **Tropic of Cancer** passes almost through its middle crossing over the states of **Gujarat, Rajasthan, Madhya Pradesh, Chhattisgarh, Jharkhand, West Bengal, Tripura and Mizoram**.
5. India lies largely on the Indian Plate, the northern portion of the Indo-Australian Plate, whose continental crust forms the Indian subcontinent Physical divisions, are marked by natural configuration. India is divided into six physiographic divisions on basis of the varied physiographic features: units as follows: **Northern and North-eastern Mountain; Northern Plain; Peninsular Plateau; Indian Desert; Coastal Plains; and Islands**.
6. The **Himalayas** are one of the **youngest fold mountain ranges** in the world of tectonic origin and comprise mainly sedimentary rocks. They stretch from the Indus River in the west to the Brahmaputra River in the east. It consists of three parallel ranges such as **Himadri (Greater Himalayas), Himachal (Lesser Himalaya), and Shiwaliks (Outer Himalaya)**.
7. **Himadri (Greater Himalayas)**: It has an average elevation of 6100m includes some of the highest peaks and some of the important passes like **Jelep La** in the Chumbi Valley in Sikkim and **Shipki La** in the Sutlej Valley. **Mt. Everest or Sagarmatha**, the highest peak of the world, lies in Nepal.
8. **Himachal (Lesser Himalaya)**: It has an average height of 3700-4500 m. The important ranges are **Dhauladhar, Pir Panjal, Nag Tibba and Musoorie**. Important hill resorts are **Shimla, Ranikhet, Almora, Nainital and Darjiiling Valley plains** and '**Doon or Doar**' are special features of this range bordering the outer Himalayas.
9. **Shiwaliks (Outer Himalaya)**: It is recent origin with an average elevation of 900-1200 m, giving a hogback appearance with relatively steeper slope towards the south.
10. **Trans Himalayan Zones** lies to the North of the Great Himalayas bordering Tibet. Some important ranges of this zone are **Karakoram, Ladakh, and Zaskar**. This is the largest snow field outside the polar region.

11. The **Northern Plains** are formed by the alluvial deposits brought by the rivers – **the Indus, the Ganga and the Brahmaputra**. These plains extend approximately 3,200 km from the east to the west. The average width of these plains varies between 150-300 km. The maximum depth of alluvium deposits varies between 1,000-2,000 m. From the north to the south, these can be divided into three major zones: **the Bhabar, the Tarai and the alluvial plains**.

12. The **Indian Desert** is located to the north-west of the Aravali hills lies the Great Indian Desert. It is a land of undulating topography dotted with longitudinal dunes and barchans. This region receives low rainfall below 150 mm per year; hence, it has an arid climate with low vegetation cover. It is because of these characteristic features that this is also known as **Marusthali**.

13. **The Plateau of India** is roughly triangular in shape with its base parallel to the Ganga Valley and its apex pointing towards the southern tips of the country. It is hard old mass of igneous and metamorphic rocks being part of the tectonic plate called the **Gondwanaland**.

14. **Peninsular Plateau** is bordered by the Western Ghats in the west, Eastern Ghats in the east and the Satpura, Maikal range and Mahadeo hills in the north. Western Ghats are locally known by different names such as the **Sahyadri in Maharashtra, Nilgiri hills in Karnataka and Tamil Nadu and Anaimalai hills and Cardamom hills in Kerala**.

15. **The Eastern Ghats Mountain Ranges** are extending from Orissa to Tamil Nadu. It is more eroded than the Western Ghats. It is drained by the **Godavari and the Krishna River**. **Vishakhapatnam Peak** is the highest peak of this range. **Mahendragiri** is the second highest peak of this range. It continues as the **Javadi and Shevaroy** hills in the south-west of Chennai, beyond which they merge with the Western Ghats.

16. **The Western Ghat Mountain Range or Sahyadri Range** is the India's largest mountain range after the Himalayas, which extend from the Tapi river valley to the Nilgiri. It is divided into two parts- **the North Sahyadri and the south Sahyadri**. This range is the home of many hill stations like **Matheran, Lonavala-Khandala, Mahabaleshwar, Panchgani, Amboli Ghat, Kudremukh and Kodagu**.

17. **The Western Ghats Coastal Plain** extends from Surat to Kanyakumari which is divided into four parts: **Gujarat Plain**- Coastal area of Gujarat; **Konkan Plain**- between Daman and Goa; **Kannad Plain**- between Goa and Mangalore; and **Malabar Plain**- between Mangalore and Kanyakumari.

18. **The Eastern Coastal Plains** lies between the Eastern Ghats and the sea coast from the Subarnarekha River to Kanyakumari. As compared to the Western Coastal Plain It is wider because the rivers like Godavari, the Krishna and the Kaveri formed the delta over there. The continental shelf extends up to 500 km into the sea, which makes it difficult for the development of good ports and harbours. In Eastern Coastal plain, there is the Kolleru Lake which situated in the delta region of the Godavari and the Krishna Rivers. **Chilka Lake and Pulicat Lake** is the best example of lagoon which is also found in this region.

19. There are two **major island groups in India** – one in the Bay of Bengal and the other in the Arabian Sea.

20. The **Bay of Bengal island groups** consists of about 572 islands/islets. These are situated roughly between 6°N-14°N and 92°E -94°E. The two principal groups of islets include the Ritchie's archipelago and the Labyrinth Island. The entire group of island is divided into two broad categories – the Andaman in the north and the Nicobar in the south. They are separated by a water body which is called the 10° channel.

21. The **islands of the Arabian Sea** include **Lakshadweep and Minicoy**. These are scattered between 8°N-12°N and 71°E -74°E longitude. These islands are located at a distance of 280 km-480 km off the Kerala coast. The entire island group is built of coral deposits. There are approximately 36 islands, of which 11 are inhabited. Minicoy is the largest island with an area of 453 sq. km. The entire group of islands is broadly divided by the **11° channel**, north of which is the Amini Island and to the south of the Canannore Island.

### Straits

- Straits play an important role in Seaborne trade for commercial shipping.
- Straits play a vital role in the oil producing region.
- They play an important role in geo-politics.
- Straits have played an essential role in human civilization since millennia.
- They play an important role in economic and military matters.



#### Gulf of Katchh

- Separate Katchh & Kathiawar Peninsula
- Max. potential for tidal energy
- Famous ports : Kandla, Mundra, Okha, Salaya

#### Gulf of Khambat

- Forms mouth of various rivers, namely, Narmada, Tapi, Mahi, Sabarmati

#### Gulf of Mannar

- Separates India & Srilanka, Located at south east of Tamil Nadu
- Asia's 1<sup>st</sup> oceanic biodiversity protection region & a biosphere reserve
- Famous port Tuticorin lies along its coast
- Its environment is likely to be hampered by Setusamundram project

#### Palk Bay

- b/w India & Srilanka, & home to proposed Setusamundram project



- 
- b/w India & Srilanka, Palk strait has coral formation
  - Setusamundram project to connect Palk strait with Gulf of mannar

### **Palk Strait**

## International Boundary with State

The Indian subcontinent, or simply the subcontinent, is a physiographical region in **South Asia**. It is situated on the Indian Plate and projecting southwards into the Indian Ocean from the Himalayas. Geopolitically, the Indian subcontinent generally includes Bangladesh, Bhutan, India, Nepal, Pakistan and Sri Lanka, as well as the Maldives.

Neighbouring Country	Bordering States
Afghanistan	Jammu and Kashmir (POK Part)
Bangladesh	West Bengal, Mizoram, Meghalaya, Tripura, and Assam
Bhutan	Arunachal Pradesh, Assam, Sikkim, and West Bengal
China	Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, and Arunachal Pradesh
Myanmar	Arunachal Pradesh, Manipur, Mizoram, and Nagaland
Nepal	Sikkim, West Bengal, Bihar, Uttar Pradesh, and Uttarakhand
Pakistan	Jammu and Kashmir, Punjab, Gujarat, and Rajasthan
Sri Lanka	Separated from India by Gulf of Mannar
Maldives	The south-west part of the Indian Ocean below the Lakshadweep Island



- **Afghanistan**

Border Length- 106 km

Official Languages – Dari, Pashto

Currency – Afghan Afghani

States/ Provinces – 34 Provinces

Located in Central Asia, Afghanistan has an area of about 6,52,230 sq km. Major dependence of this country's economy is on agriculture. The prominent religion that is followed by the people in Afghanistan is Islam, and the main industrial activities include manufacturing of cotton textiles, woven carpets, handicrafts and woollens.

- **China**

Border Line – 3488 km

Official Language – Mandarin

Currency – Chinese Yuan

States/ Provinces – 26 Provinces

The world's most populated country, China, spreads over an area of about 95,96,960 sq km. The country is one of the world's fastest-growing economies. India and China hold cordial relations, but there are certain disputes which lead to strained relations between the two countries.



Doklam (or Zhonglan or Donglong) is a disputed area between China and Bhutan just like Jakarlung and Pasamlung. It is an area with a plateau and a valley which lies on the Bhutan-China border, near India.

The area of Doklam carries huge military advantage and if it falls into the hands of China, it will not only compromise the security of Bhutan but also of India.

If China comes in control of the Doklam, it will get the high ground which would enable it to completely crush Bhutan in case of a war.

- **Myanmar**

Border Line – 1643 km

Official Language – Burmese

Currency – Burmese Kyat

Myanmar, also known as Burma, officially known as The Republic of the Union of Myanmar is situated in East Asia. One of the neighbors of India Myanmar shares its border with the Indian states of Nagaland, Mizoram, Arunachal Pradesh, and Manipur. Myanmar has an area of 6,76,578 sq km and is the largest of the Mainland Southeast Asian states. Naypyidaw is the capital of Myanmar. The military is now back in charge and has declared a year-long state of emergency. Military commander-in-chief Min Aung Hlaing has taken power. He has long wielded significant political influence, successfully maintaining the power of the Tatmadaw – Myanmar's military – even as the country moved towards democracy.

- **Bangladesh**

Border Line – 4096.7 Km

Official Language – Bengali

Currency – Bangladeshi Taka

Neighbors of India, Bangladesh shares one of the longest borders in the world. The capital of Bangladesh is Dhaka. Indian states of Assam, Mizoram, Tripura, Meghalaya, and West Bengal share their border of Bangladesh. Bangladesh is the eighth-most populous country in the world (161 million) and also one of the most densely populated countries in the world. Bangladesh was initially a part of Pakistan and was known as East Pakistan but after the 1971 Liberation War took place, it gained independence.

- **Bhutan**

Border Line – 699 km

Official Language – Dzongkha

Currency – Ngultrum

Bhutan is situated to the north of India. It is officially known as The Kingdom of Bhutan and shares a border with the Indian states of Arunachal Pradesh, Sikkim, Assam, and West Bengal. It is also a landlocked country and has an area of 38,394 sq km. The capital of Bhutan is Thimphu. The country has a constitutional monarchy. The major contributors to the economy of the country are Hydropower, agriculture, forestry, and tourism. Bhutan is the smallest neighboring country of India.

- **Nepal**

Border Line – 1751 km

Official Language – Nepali

Currency – Nepalese Rupee

Nepal, officially known as the Federal Democratic Republic of Nepal is a landlocked country. Nepal is located to the north of India. In terms of area, Nepal is the 93rd largest country in terms of land with an area of 1,47,181 sq km. The capital of Nepal is Kathmandu which is also the largest city in the country. Nepal has eight of the ten tallest mountains in the world world, including the highest point on Earth, Mount Everest. Tourism is one of the biggest contributors to the country's economy. Nepal shares borders with Uttarakhand, Uttar Pradesh, Sikkim, West Bengal, and Bihar.

- **Pakistan**

Border Line – 3323 km

Official Language – Urdu

Currency – Pakistani Rupee

Pakistan is located to the west of India and is one of the India border countries. Pakistan has a coastline along the Arabian Sea and the Gulf of Oman. The total land area of Pakistan is 7,96,095 sq km. The Indian states which share a border with Pakistan include Gujarat, Rajasthan and Punjab, and the Union Territory of Jammu and Kashmir. Pakistan separated from India after India got its independence from British rule. Pakistan celebrates its Independence Day on August 14, 1947. After the Independence, Pakistan was formed into two territories i.e. East Pakistan and West Pakistan. These two territories were geographically and culturally apart from each other. After a long conflict between these two, in 1971 a civil war occurred, as the result of which Bangladesh was formed. West Pakistan lying on the northwest of India became the Republic of Pakistan and East Pakistan became Bangladesh.

- **Sri Lanka**

Border Line – Sea Border

Official Language – Sinhala, Tamil

Currency – Sri Lankan Rupee

Sri Lanka officially known as the Democratic Socialist Republic of Sri Lanka lies near the southern area of India and is separated by Palk Strait. Sri Lanka has two capital, the commercial capital of the country is Colombo where on the other hand Sri Jayewardenepura Kotte is its legislative capital of the country. The president is the chief of state and the head of government in the country. It is located in the Indian Ocean to the southwest of the Bay of Bengal and to the southeast of the Arabian Sea. Being an island nation, Sri Lanka is a choice of many and makes a pleasant tourist destination in the world.

- **Maldives**

Border Line – Sea Border

Official Language – Dhivehi

Currency – Maldivian Rufiyaa

The Maldives is an island nation situated in the southwest of India officially the Republic of Maldives. Area wise it is one of the smallest countries in the world. It is spread over 298 sq km only. The Maldives has more than a thousand coral islands. The Maldives is a presidential republic and the president is the head of the state. The capital of Maldives is Male.



## Ram Setu and the Himalaya

### Ram Setu

- Ram Sethu is also known as Adam's Bridge or Nala Sethu. It is a 48 km chain of limestone shoals between Pamban Island known as Rameswaram Island on the coast of Tamil Nadu, India, and Mannar Island on the coast of Sri Lanka.
- The bridge separates the Gulf of Mannar (south-west) from the Palk Strait (northeast).
- The bridge holds religious significance. A bridge is mentioned in Ramayana, that Lord Ram and his army built to reach Lanka. The location of the Lanka of the Ramayana has been widely interpreted as being current day Sri Lanka and bridge as Ram Sethu.
- The Geological Survey of India (GSI) in its study under 'Project Rameswaram' indicates that the islands of Rameswaram in India and Talaimannar in Sri Lanka was exposed between 7,000 and 18,000 years ago; and by including the dating of corals the GSI stated that the Adam's Bridge was formed about 500-600 years ago.
- The existence of the Ram Setu has been mentioned in the Hindu mythology *Ramayana*, but there has been no scientific proof yet that it is a man-made bridge. The bridge was reportedly passable on foot up to the 15th century. Temple records seem to suggest that Adam's Bridge or the Ram Setu was completely above sea level till 1480. It was due to natural calamities that it was completely immersed in the shallow sea.



### Sethusamudram Shipping Canal Project:

- It is a shipping canal project proposed by the UPA government in 2005. The project aims to link the Arabian Sea with the Bay of Bengal. For this, a channel passing through the

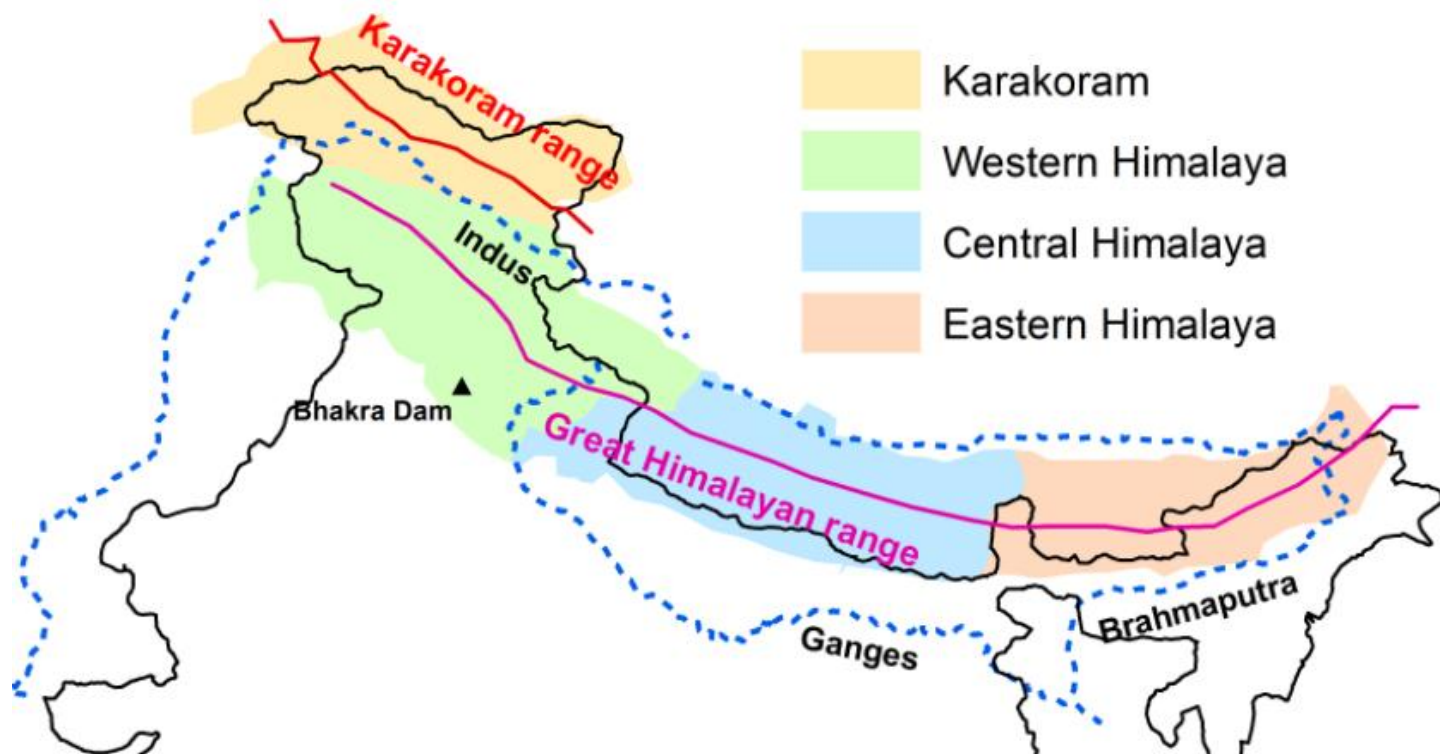
limestone shoals of Ram Setu was to be dredged in the Sethusamudram sea between Tamil Nadu and Sri Lanka.

- However, the project was not implemented after opposition by environmental groups as well as by the BJP. They said that the project would damage the Ram Setu.



## The Himalaya

1. The Himalayas is one of the youngest fold mountains in the world and it is a major mountain system of the Asian continent.
2. It extends from Pamir knot in Tajikistan to the east and in India from Jammu and Kashmir to Arunachal Pradesh.
3. It is not a single mountain range but consists of many parallel ranges.
4. The southernmost range is known as Siwalik range (Shiwalik) and is the youngest of all the ranges.
5. Next to Shiwalik lies the Lesser Himalayas, Greater Himalayas and Trans Himalayan ranges from south to north. These ranges are young to old respectively.
6. These Mountain ranges are further divided into Western Himalayas (Kashmir Himalayas), Central Himalayas (Kumaun Himalayas) and Eastern Himalayas (Assam Himalayas).



## **Division of Himalaya**

### **Greater Himalaya:**

- It is also known as Inner Himalaya or Central Himalaya or Himadri means Abode of God. These mountains are located in the south of the Trans Himalayas and their average height is 6100 m, width is 25 km, and the average length is 2500 km.
- The Greater Himalayas are the highest peaks in the world. These mountain peaks start from Nanga Parbat and extend till Namcha Barwa.
- The world's most important peaks are found in the Greater Himalayas such as Mount Everest, Kanchenjunga, Nanga Parbat, Namach Barwa, Cho Oyu, Lhotse, Makalu, Akaulu, Lhotse, Annapurna, Nanda Devi, Kamet, Gurla Mandhata, Badrinath, etc...
- Different passes are also found in the Greater Himalayas like Zoji-la, Burji-la, Bara-lacha-la, etc...

### **Middle Himalaya:**

- The Middle Himalayas is also known as Lower Himalayas, Lesser Himalayas, or Himachal.
- Middle Himalayas is present in the South of the Greater Himalayas. It has spread from Jammu and Kashmir to Arunachal Pradesh.
- Their average height is from 1300m to 5100m.
- Pir Panjal, Nag Tibba, Dhauladhar, Mussoorie, Mahabharata range are some of the important ranges of the Middle Himalayas.
- Hill stations like Kullu, Manali, Shimla, Ranikhet, Mussoorie, Almora, Darjeeling, etc... all come in the Middle Himalayas.
- There are some pastoral lands on the south of the Middle Himalayas, which are known by different names in different places. It is known as Merg in Kashmir like Gulmerg, Sonmerg, Tanmerg, etc... and Bugyal and Payar in Himachal and Uttarakhand.

### **Lesser Himalayas**

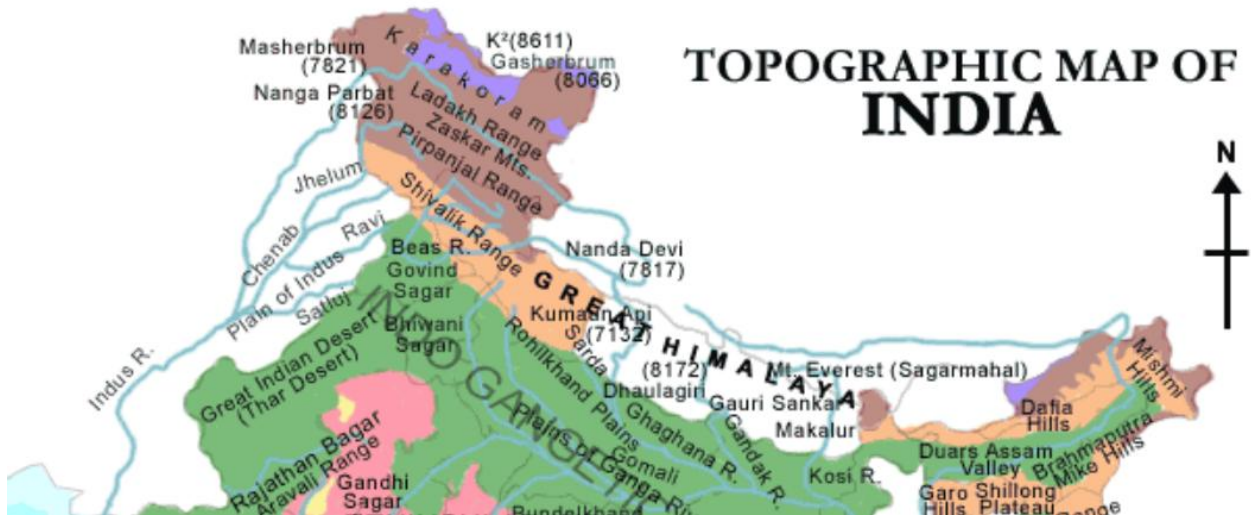
The height of mountains in this range is between 3700 and 4500 metres hence is also referred to as the Lesser Himalayas! In other words, the Himachal is made up of altered rocks. The Pir Panjal is the longest range in the Lesser Himalayas. The Dhauladhar and the Mahabharat are other ranges famous for their beauty.

### **Trans Himalaya:**

The Trans Himalayas is the northernmost part of the Himalayas. Some part of it is in Tibet and China, hence it is also called Tibetan Himalaya.

Karakoram, Ladakh, Kailash, and Zaskar are the main mountain ranges of the Trans Himalayas.

The Trans Himalayas are part of the Eurasian Plate. Any plate is made up of part of the lithosphere crust and the upper part of the mantle.



### The Shiwaliks

The altitude varies between 900 to 1100 m and the width varies between 10 to 50 km. The longitudinal valleys lying between the Himachal and Shiwaliks are called 'Dun' for ex. DehraDun, Kotli Dun and Patli Dun.

### Eastern hills and mountains

The Brahmaputra marks the eastern border of the Himalayas. Beyond the Dihang gorge, the Himalayas bend sharply towards south and form the Eastern hills or Purvanchal. These hills run through the north eastern states of India & are mostly composed of sandstones for ex. Patkai Hills, Naga Hills, Manipuri Hills and Mizo Hills.



## Vindhya and Satpura Mountains

### Shivalik Mountain Range:

- Shivalik Range is present in the south of the Middle Himalayas and has an average length of 2400m, an average height of 1200m, and an average width of 40kms.
- It starts from Potwar, Jammu and Kashmir and extends to the Brahmaputra river valley of Arunachal Pradesh.
- This mountain is built in the last, so this mountain is the youngest. Because these mountains are made later, they stop the rivers and after some time the river crosses them after cutting them.
- Because of this, **Temporary Lakes** are formed there. As rivers are flown by cutting these mountains, **plains** were formed here which are called **Duns**.
- In the West, they are called Duns and in the East, they are called Duars. The southern part of the Shivalik ranges comes in Punjab and Haryana and there is a very dense forest and there is a lot of rainfall here which is called Chos.

### Peninsular India

One of the major physiographic elements of the **Peninsular India** is the Aravali range running in a north-east to south-west direction for 800 km between Delhi and Palanpur (near Ahmedabad) in Gujarat. The Aravalis represent the relict of the world's oldest mountain formed as a result of folding at the close of the Archaean era.

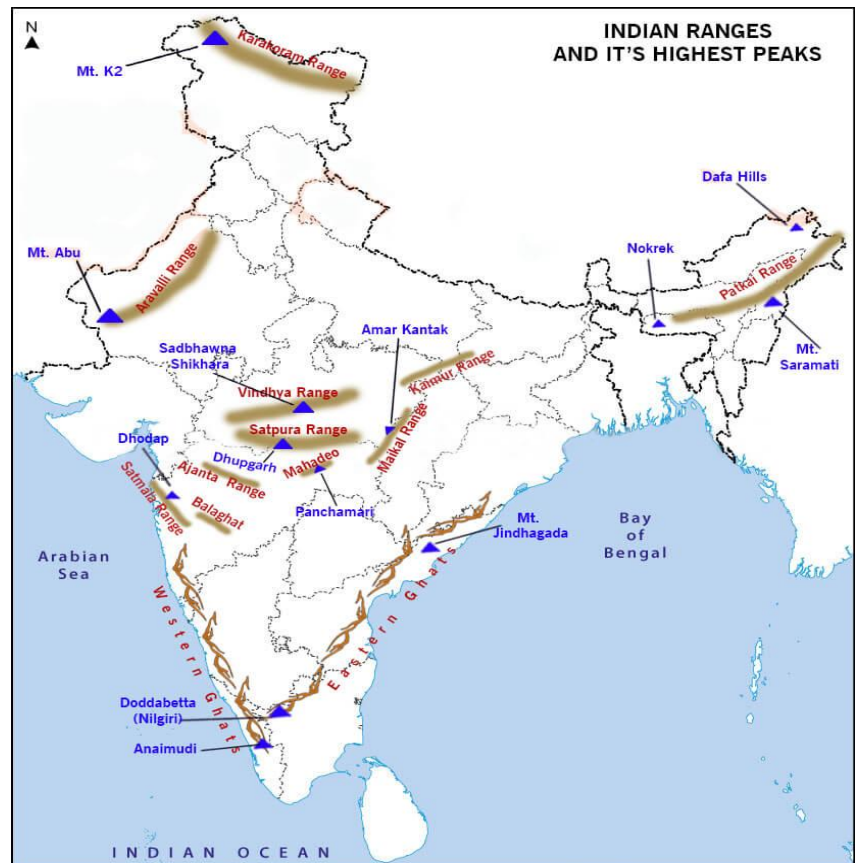
### Satpura Range

The Satpura Range is a range of hills in central India. The range rises in eastern Gujarat running east through the border of Maharashtra and Madhya Pradesh and ends in Chhattisgarh. The 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.

The Narmada River originates from north-eastern end of Satpura in Amarkantak, and runs in the depression between the Satpura and Vindhya ranges, draining the northern slope of the Satpura range, running west towards the Arabian Sea.

### Vindhya Range

Broken range of hills forming the southern escarpment of the central upland of India. From Gujarat state on the west, it extends about 675 miles (1,086 km) across Madhya Pradesh state to abut on the Ganges (Ganga) River valley near Varanasi, Uttar Pradesh. The mountains form the southern edge of the Malwa Plateau and then divide into two branches: the Kaimur Range, running north of the Son River into western Bihar state, and the southern branch, running between the upper reaches of the Son and Narmada rivers to meet the Satpura Range in the Maikala Range (or Amarkantak Plateau).

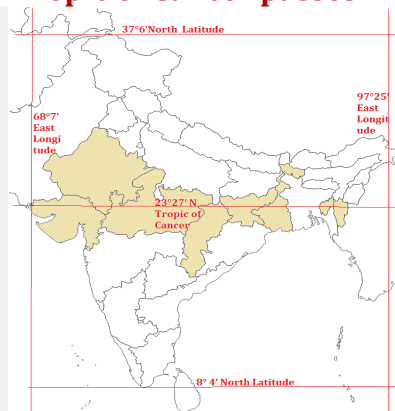


The Vindhya Range, at an elevation from 1,500 to 3,500 feet (450 to 1,100 metres), gives rise to the main southern tributaries of the Ganges-Yamuna system, including the Chambal, Betwa, Ken, and Tons rivers. Because of their horizontal sandstone structure, the mountains tend to be flat-topped and plateaulike. The 2nd-century-CE Greek geographer Ptolemy called them the Vindius. The range is regarded as marking the border between northern and peninsular India.

### **What is Tropic of Cancer ?**

Tropic of Cancer is basically  $23^{\circ}26'13.2''$  N ( $23^{\circ}27'$  N roughly) latitude which is located north of equator. It is the maximum latitude (most northern) at which sun can be seen directly overhead. This phenomenon is observed on Summer Solstice when northern hemisphere is maximum tilted towards sun to receive maximum sun light. Summer Solstice occurs on 21st June. The symmetrically opposite latitude in southern hemisphere is called Tropic of Capricorn. The one interesting fact about Tropic of cancer is that its position is not fixed and keeps changing by  $0.468''$  seconds of latitude (15 meters) every year.

### **Map of Indian States through which Tropic of Cancer passes**

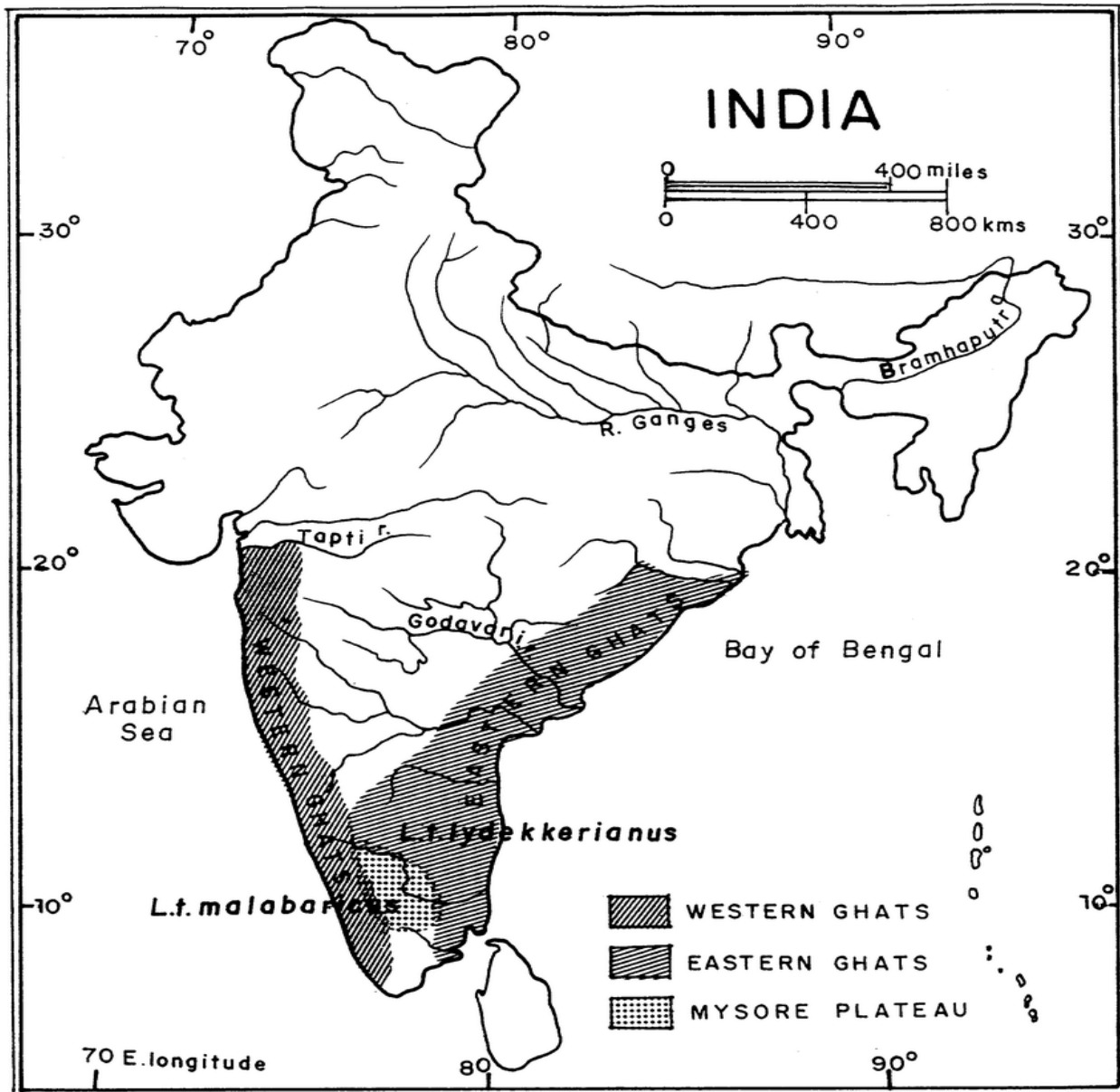


Map of Indian States on Tropic of Cancer

## Western and Eastern Ghat

### The Western Ghats and Eastern Ghats

The Deccan plateau of India is one of the main landmasses and is studied as one of India's physiographic divisions. It is bordered by the Western Ghats on its west and the Eastern Ghats on its east. The Western Ghats are continuous mountain ranges called Sahyadri; While the Eastern Ghats are discontinuous mountain ranges.



### Western Ghats

The WESTERN GHATS Which are also known as the Sahyadri Mountains, from the western edge of the Deccan Plateau. The Western Ghats lie parallel to the western coast. They are continuous and can be crossed through passes only.

- The Ghats start from the south of the Tapti River near the border of Gujarat and Maharashtra and extend up to nearly 1,600 km.
- The states of Gujarat, Maharashtra, Goa, Karnataka, Kerala and Tamil Nadu are covered by the Ghats.
- The average height of the Western Ghats is approximately 900 m.
- In Maharashtra – Kalsubai 1,646 m (5,427 ft), Mahabaleshwar 1,438 m (4,710 ft) and Harishchandragarh 1,424 m (4,691 ft);

- In south-west Karnataka, Kudremukh at 1,862 m;
- In Kerala- Anaimudi (2695 m) are the highest peaks of the Western Ghats.
- The height of the Western Ghats progressively increases from north to south. The highest peaks include the Anaimudi (2,695metres) and the Doda Betta (2,637 metres).Mahendragiri (1,501 metres) is the highest peak in the Eastern Ghats.
- The southern part of the Western Ghats mountain ranges harbour the Nilgiri hills, which serve as the meeting point of the Western and Eastern Ghats.
- There are a number of gaps and passes in the Western Ghats, notable among them being The Pal Ghat, The Thal Ghat and the Bhore Ghat. The widest gap in the range, the Pal Ghat Gap (Palakkad Gap), joins Tamil Nadu to Kerala.
- The slopes facing the west in the Ghats receive much more rain than those facing the east. The Western Ghats cause orographic rain by forcing the rain bearing moist winds to rise along the western slopes of the Ghats.
- The Western Ghats serve as the most important watershed for peninsular India.
- The Western Ghats are called Ecological hotspot of India. It is one of the hottest spots in the world.
- It is sometimes called the Great Escarpment of India.

### **Eastern Ghats**

- The Eastern Ghats run almost parallel to the east coast of India leaving broad plains between their base and the coast.
  - It is a chain of highly broken and detached hills starting from the Mahanadi in Odisha to the Vagai in Tamil Nadu. They almost disappear between the Godavari and the Krishna.
  - They neither have structural unity nor physiographic continuity. Therefore these hill groups are generally treated as independent units.
  - It is only in the northern part, between the Mahanadi and the Godavari that the Eastern Ghats exhibit true mountain character. This part comprises the Maliya and the Madugula Konda ranges.
  - The peaks and ridges of the Maliya range have a general elevation of 900-1,200 m and Mahendra Giri (1,501 m) is the tallest peak here.
  - The Madugula Konda range has higher elevations ranging from 1,100 m and 1,400 m with several peaks exceeding 1,600 m. Jindhagada Peak (1690 m) in Araku Valley Arma Konda (1,680 m), Gali Konda (1,643 m), and Sinkram Gutta (1,620 m) are important peaks.
  - Between the Godavari and the Krishna rivers, the Eastern Ghats lose their hilly character and are occupied by Gondwana formations (KG Basin is here).
  - The Eastern Ghats reappear as more or less a continuous hill range in Cuddapah and Kurnool districts of Andhra Pradesh where they are called as Nallamalai Range {Naxalite hideout in AP} with a general elevation of 600-850 m.
  - The southern part of this range is called the Palkonda range.
  - To the south, the hills and plateaus attain very low altitudes; only Javadi Hills and the Shevroy-Kalrayan Hills form two distinct features of 1,000 m elevation.
  - The Biligiri Rangan Hills in Karnataka (at its border with Tamil Nadu) attain a height of 1,279 m.
  - Further south, the Eastern Ghats merge with the Western Ghats.
  - Geologically they are Precambrian fold mountains and the younger contemporary to Aravalli.
- 
- Presently they are highly dissected, fragmented and appear as hills of denudation running roughly along the eastern coast
  - Average Elevation – 150-300m ( Very low)
  - They are made of different rock systems.
  - Khondalite series is the major rock system, found in the central part of AP, Orissa.
  - Southern Part in TN has Granitic Gneiss.

- Peninsular rivers have carved out wide U shaped valleys. Thus, these mountains are scattered.
- In TN, they are called Shevaroy Hills, Javadi Hills.
- In AP, they are called Palkonda range, Vellikonda range and Nalamallai hills
- It is called Northern Circars b/w Godavari and Mahanadi basin, which are the highest part of the Eastern Ghats.
- In Orissa, the highest point is Mahendragiri in Ganjam District.
- These mountains are hardly watershed, thus no rivers except R.Indravati emerge from the Eastern Ghats.

### Difference between Western Ghats vs Eastern Ghats

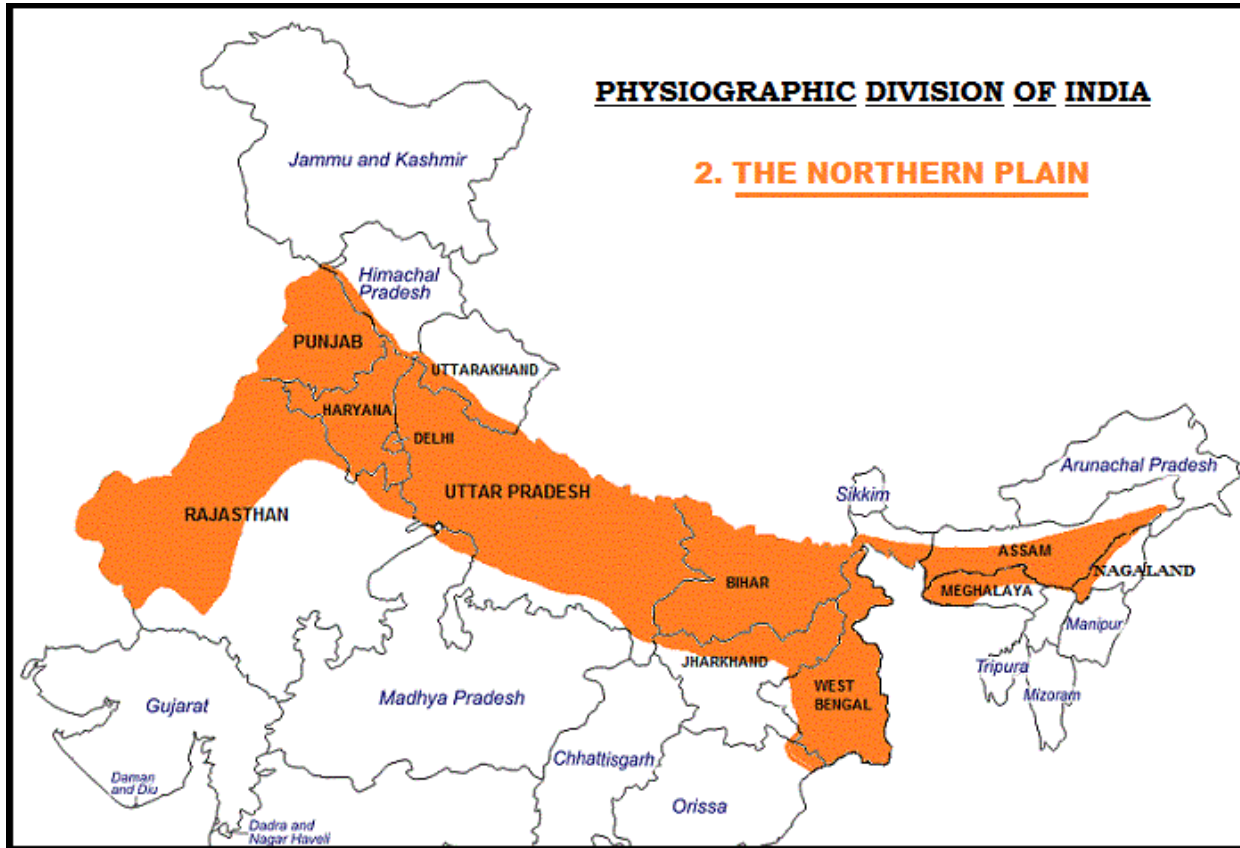
Western Ghats	Eastern Ghats
600 – 1200m, still higher in South	150-300 m
Rock System – Chernochete	Gneiss, Khondalite, Dharwar
Due to tilting, further upliftment The most important watershed in southern India – all east-flowing rivers emerging Treppen – Like formation, look like block mountains in the west	Further subdued  Poor Watershed  Ancient fold mountains and presently mountains of denudation
Densely Forested Laterite Soils found	Less Forested – Mostly dry deciduous to moist deciduous  Red Sandy soil
100cm isohyte is the crest of Western Ghats. It rains 150cm+ all along the west coast	Rainfall



# Plains of India and Deccan Plateau

## **Plains of India**

The northern plain of India is formed by three river systems, i.e. the Indus, the Ganga and the Brahmaputra; along with their tributaries. The northern plains are the largest alluvial tract of the world. These plains extend approximately 3200 km from west to east. The average width of these plains varies between 150 and 300 km.



1. The Northern Plains are formed by three Himalayan rivers – Indus, Ganga and Brahmaputra
2. The great Northern Plains lie to the south of the Himalayas and stretch from Punjab in the west to Assam in the east.
3. The plains cover almost the whole of Punjab, Haryana, Uttar Pradesh, West Bengal, Delhi, parts of Bihar and Assam
4. The Plains are made of fine silt deposited by the rivers which is called alluvium. The deposit of alluvium makes these plains very fertile.
5. The three important rivers basins in India are

- The Satluj River Basin
- The Ganga River Basin and
- The Brahmaputra River Basin

6. Punjab and Haryana lie in the Satluj basin. Most of India's Wheat comes from the Satluj basin. Hence this area is called the 'Wheat Basket of India'.

7. The Bhakra Dam built on the Satluj River is the highest dam in India.

8. The Ganga River originates as Bhagirathi from the Gangotri glacier. Many tributaries join the main river from its right and left bank

9. A delta is low lying flat land near the sea where the river deposits its sediment.

10. The Ganga and Brahmaputra form the world's largest Delta before draining into Bay of Bengal. This delta is known as Sunderban delta.
11. The river Brahmaputra originates in Tibet, where it is called Tsangpo.
12. The Northern Plains region is one of the most fertile regions of our country.
13. This region is one of the most thickly populated regions in the world. More than 40 % of India's population lives in this area.
14. This region supplies food grains to many of the central and southern states. That's why Northern Plain is called the 'Food bowl of India'.
15. The farmers of Delhi and Uttar Pradesh grow mainly wheat and sugarcane. Other crops grown here are rice, jowar, Bajra, Barley, gram, oilseed, etc. The major crops grown in Bihar and West Bengal are rice and jute.
16. Many industries like iron and steel, leather, cement, paper, jute, hosiery, etc. have been set up in this region.
17. Some of the important industrial cities in this region are Delhi, Agra, Kanpur, Ludhiana, Ambala, Chandigarh, Patna, Kolkata, etc.
18. The industries around the river Ganga are polluting the environment.

## Deccan Plateau

The Deccan Plateau is one of the broad divisions of the Peninsular Plateau. The Deccan Plateau is a triangular landmass that lies to the south of the river Narmada. The Satpura range flanks its broad base in the north while the Mahadev, the Kaimur hills and the Maikal range form its eastern extensions.

1. Deccan Plateau lies in the south of Narmada River.
2. The direction of slope of the plateau is southwest to northeast.
3. It is bounded by the Western Ghats in the west and by the Eastern Ghats in the east.
4. The plateau is extremely large and consists of different ecosystems with a different type of vegetation, climate and animals.
5. The plateau receives very little rainfall because the mountains of Western Ghats are very tall, and they block the moisture from the southwest monsoon.
6. The climate of the region is tropical in most of its area. Tropical climate means average temperature throughout the year is 15 to 25 degree Celsius and has one wet and one dry season.
7. The thick dark black or regur soil is found in this region which is suitable for cultivation of cotton.
8. The major crops of the area include rice, sorghum, cotton, tobacco, oilseeds, cereals, pulses and sugar cane.
9. The Deccan plateau helps India to protrude in the Indian Ocean.
10. It helps India to relate to Africa, Europe and West Asia through the Western Coast and with East Asia and Australia through the Eastern Coast.



# Islands of India

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.

## Reunion Hotspot Volcanism

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 Arakan Yoma range [Myanmar][Arakan Yoma in itself is an extension of Purvanchal Hills].

Lakshadweep Islands are coral islands. These islands are a part Reunion Hotspot volcanism. [Both these concepts are explained in previous posts]

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 or Rama's Bridge or Rama Setu; formed due to submergence].

## Andaman Islands:

The Andaman is divided into three major islands i.e. North Andaman, Middle Andaman, and South Andaman.

The Little Andaman and South Andaman are separated by Duncan passage.

The largest island of the Andaman group is Middle Andaman and the smallest island is Ross Island.

The highest peak of Andaman is the saddle peak which is 727 meters high.

The capital of the Andaman and Nicobar group is Port Blair that lies in the South Andaman.

All the Andaman islands are combined called Greater Andaman and are separated by 10 Degree channel from the Nicobar group in the south.

The coco strait is lies between the North Andaman and Coco Island of Myanmar.



## Nicobar Islands:

The Nicobar group of islands contains islands such as Car Nicobar, Middle Nicobar, and Great Nicobar from North to South.

Great Nicobar is the southernmost island and Car Nicobar is the northernmost island.

The largest island of the Nicobar group is Great Nicobar and the smallest island is PiloMillo.

The highest peak of Nicobar is Mount Thullier.

The grand channel lies between the Great Nicobar island and the Sumatra islands of Indonesia.

The Barran and Narcondam island present north of Port Blair is the active volcanoes in India.

### The Arabian sea groups of Islands

- In the Arabian Sea, there are three types of islands.
1. **Amindivi Islands** (consisting of six main islands of Amini, Keltan, Chetlat, Kadmat, Bitra and Perumul Par).  
*[don't have to remember all these names]*
  2. **Laccadive Islands** (consisting of five major islands of Androth, Kalpeni, **Kavaratti**, Pitti and Suheli Par.

