

**FIRST EDITION**

# **INDIAN GEOGRAPHY**



और एक दिन अचानक किसी  
result की pdf में मुस्कुराता  
हुआ तुम्हारा roll number तुम्हारे  
सारे संघर्षों, सारी परेशानियों और  
प्रश्नों का जवाब देगा 🏆  
तुम बस खामोशी से लगे रहो,  
आएगा दिन ।



# INDIA & ITS LOCATION

**Location:**  
Northern Hemisphere,  
central part of South Asia.

Standard Meridian of  
India is 82° 30'E

Tropic of Cancer (23°  
30'N) passes through the  
center of India.

Surrounded by the Indian  
Ocean to the south.

Bay of Bengal to the east,  
and the Arabian Sea to  
the west.



## INTERNATIONAL BOUNDARIES



	<b>BANGLADESH</b>	(4,096.7 km)
	<b>CHINA</b>	(3,488 km)
	<b>PAKISTAN</b>	(3,323 km)
	<b>NEPAL</b>	(1,751 km)
	<b>MYANMAR</b>	(1,643 km)
	<b>BHUTAN</b>	(699 km)
	<b>AFGHANISTAN</b>	(106 km)

### ● BANGLADESH

- West Bengal
- Assam
- Meghalaya
- Tripura
- Mizoram





## CHINA (LAC)

- LAC: Ladakh
- Himachal Pradesh
- Uttarakhand
- Sikkim
- Mc.mahon line: Arunachal Pradesh

**Johnson Line**  
Shows Aksai chin in India.

**Mc Donald Line**  
Shows Aksai chin in China.



## NEPAL

- Uttarakhand
- Uttar Pradesh
- Bihar
- West Bengal
- Sikkim

## PAKISTAN

- LOC: Jammu and Kashmir
- Ladakh
- Redcliff line: Punjab
- Rajasthan
- Sir creek: Gujarat



## BHUTAN

- Sikkim
- West Bengal
- Assam
- Arunachal Pradesh



## AFGHANISTAN

Durand line: (Jammu & Kashmir, which is currently under Pakistani administration as part of Gilgit-Baltistan since 1947).



## MYANMAR

- Arunachal Pradesh
- Nagaland
- Manipur
- Mizoram

- Time difference b/w easternmost & westernmost part of India is 120mins.

- Assam & U.P. shares boundary with maximum no. of states.
- Sonbhadra is the only district in India which borders four states.
- The intersection of Tropic of cancer & IST: Chhattisgarh.

## FUN FACT

# INDIA STATE AND UNION TERRITORIES



# INDIAN SUBCONTINENT

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INDIA



BANGLADESH



NEPAL



BHUTAN

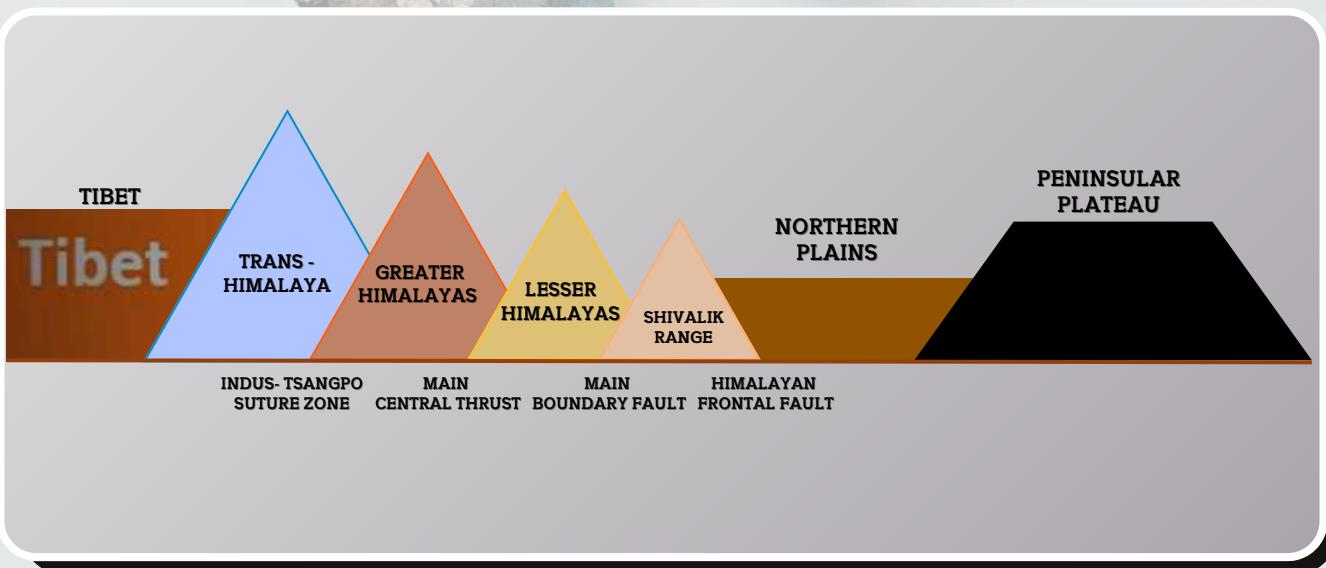


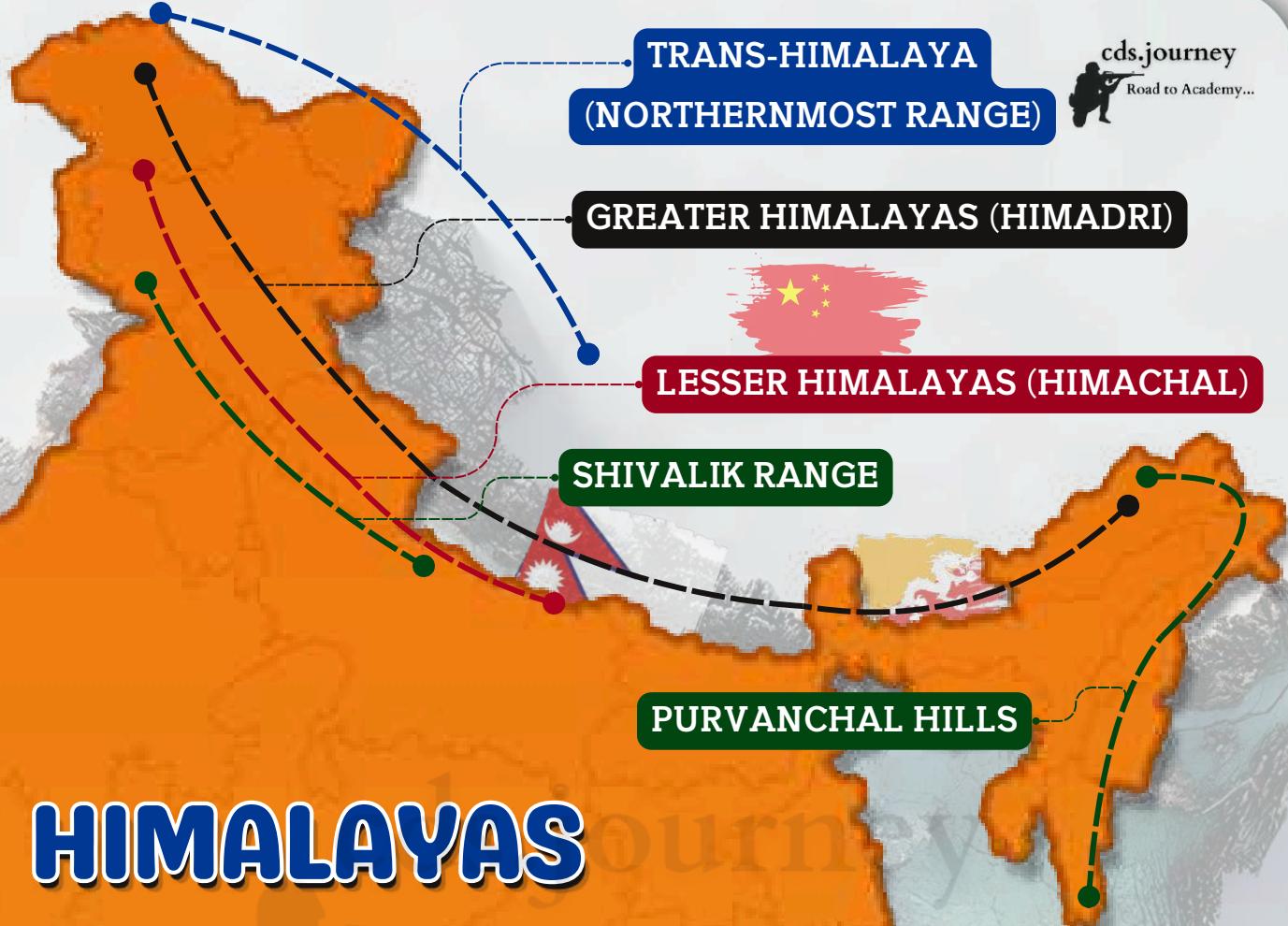
MALDIVES



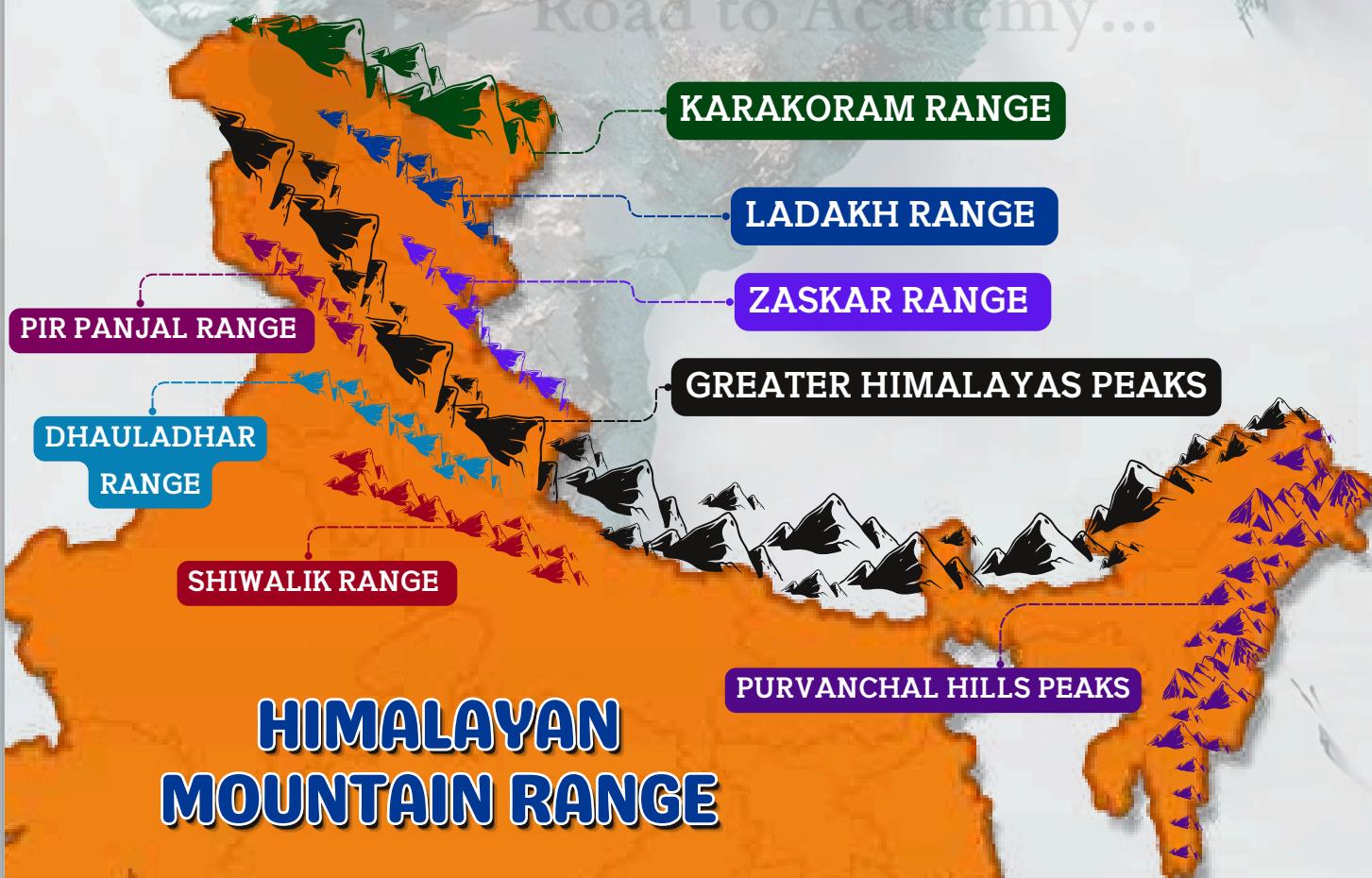
SRI LANKA

## PHYSICAL DIVISION

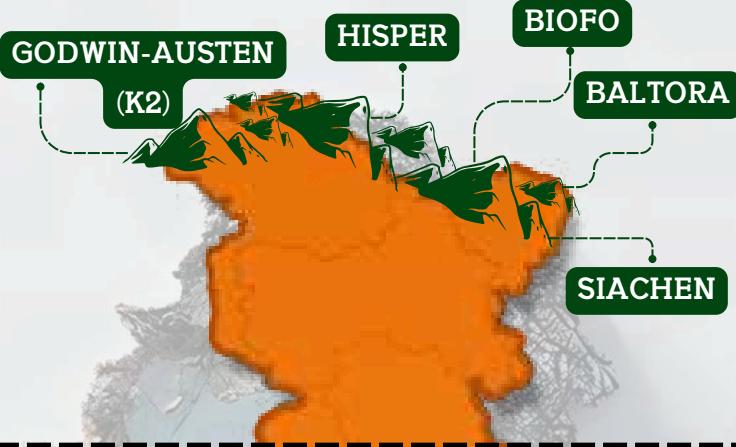




# HIMALAYAS



# HIMALAYAN MOUNTAIN RANGE



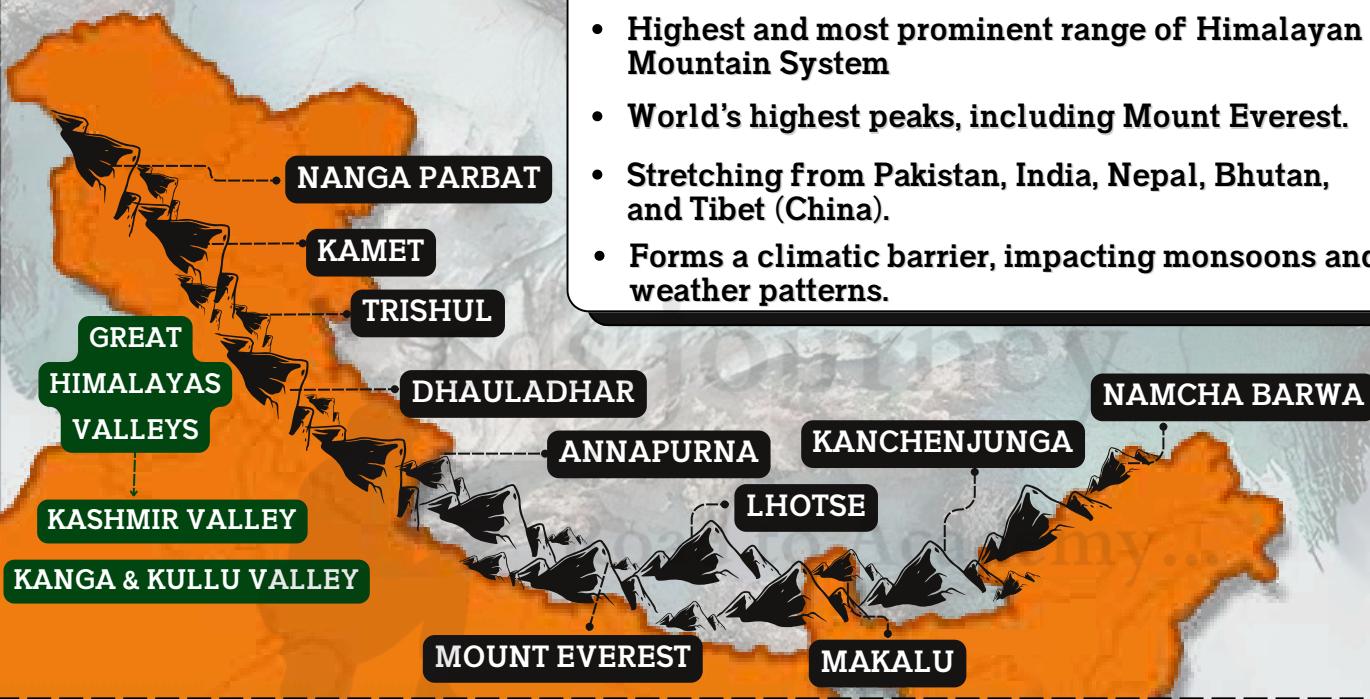
## TRANS HIMALAYA

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- States/ UT : Ladakh, J&K, Himachal Pradesh.
- Avg. elevation - 3000m.
  - Mountain Ranges:
  - Karakoram range
  - Ladakh range.
  - Zanskar range.
  - Kailas range.

## GREAT HIMALAYAS

- Highest and most prominent range of Himalayan Mountain System
- World's highest peaks, including Mount Everest.
- Stretching from Pakistan, India, Nepal, Bhutan, and Tibet (China).
- Forms a climatic barrier, impacting monsoons and weather patterns.

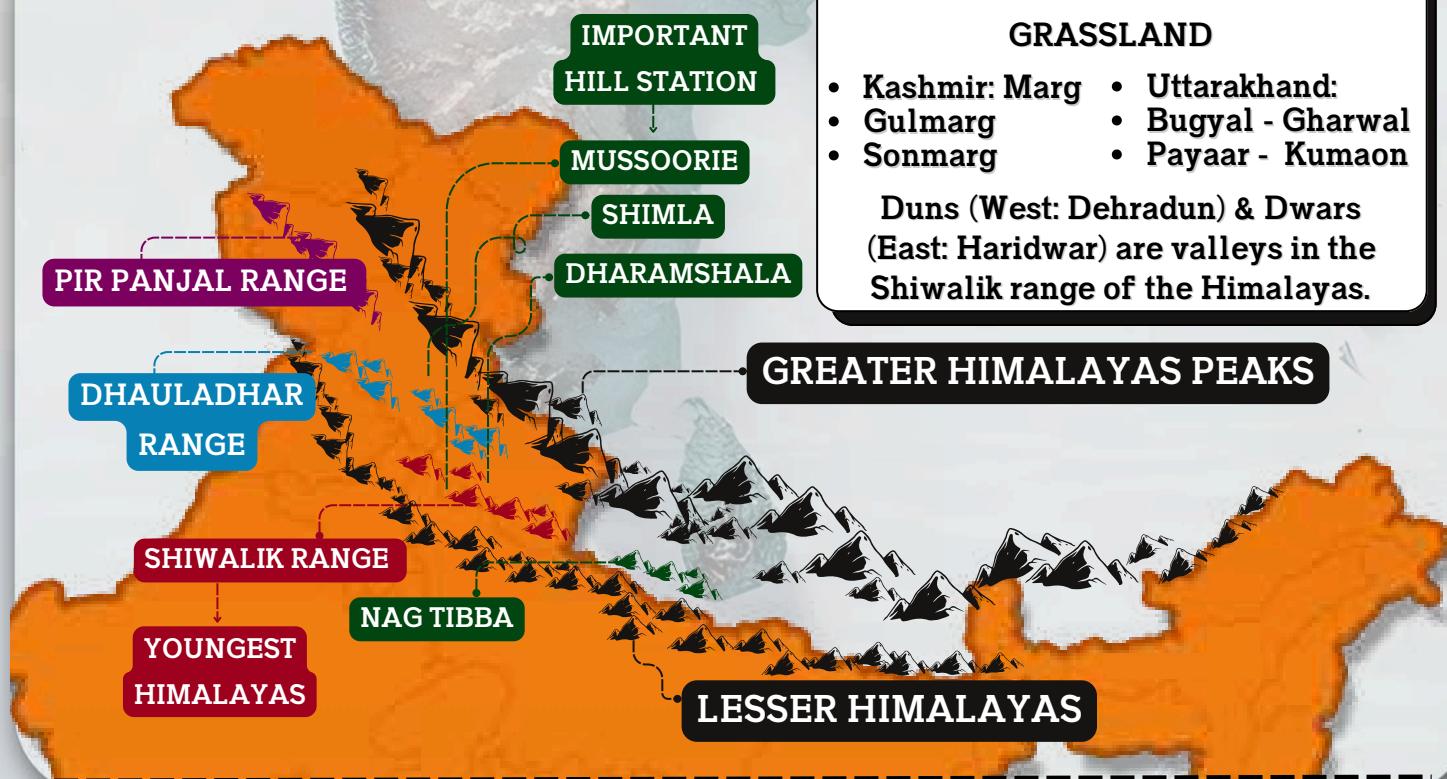


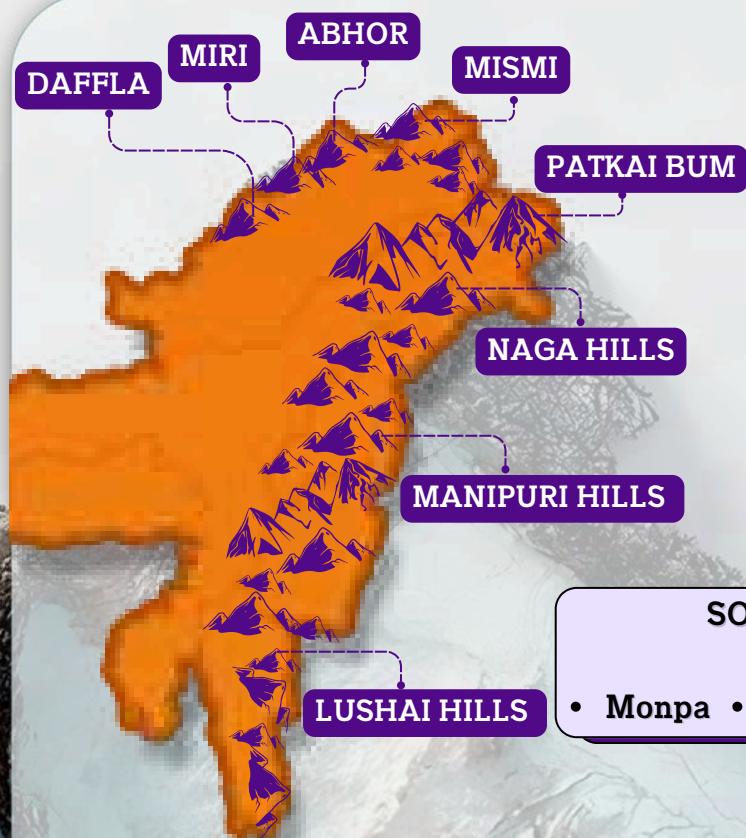
## LESSER HIMALAYAS

### GRASSLAND

- Kashmir: Marg
- Gulmarg
- Sonmarg
- Uttarakhand:
  - Bugyal - Gharwal
  - Payaar - Kumaon

Duns (West: Dehradun) & Dwars (East: Haridwar) are valleys in the Shiwalik range of the Himalayas.





## PURVANCHAL HILLS

- Mizoram: also known as molassis basin.

### HIGHEST PEAKS OF STATE: NORTH

- Kangto (Kanggardo) - Arunachal
- Mt. Saramati - Nagaland
- Mt. Tempu (Mt.Iso) - Manipur
- Phawngpui (Blue mt.)- Mizoram

### SOUTH

### SOME OF THE PROMINENT ONES FROM WEST TO EAST ARE:

- Monpa • Dafla • Abhor • Misi • Nishi • Nagas

### BHABAR

- Narrow belt (8-16 km wide) along the foothills of the Shiwaliks.
- Composed of coarse pebbles and boulders deposited by rivers.
- Highly porous; rivers disappear underground.

### BHANGAR

- Older alluvial soil, forming the higher part of the Northern Plains.
- Contains kankar (calcareous nodules), making it less fertile.
- Lies above floodplain and is well-drained.

### BHABAR

### TERAI

### TERAI

- Lies south of the Bhabar belt and is marshy and swampy.
- Rivers re-emerge from underground, making the region fertile.
- Home to dense forests & wildlife reserves like Jim Corbett National Park.

### BHANGAR

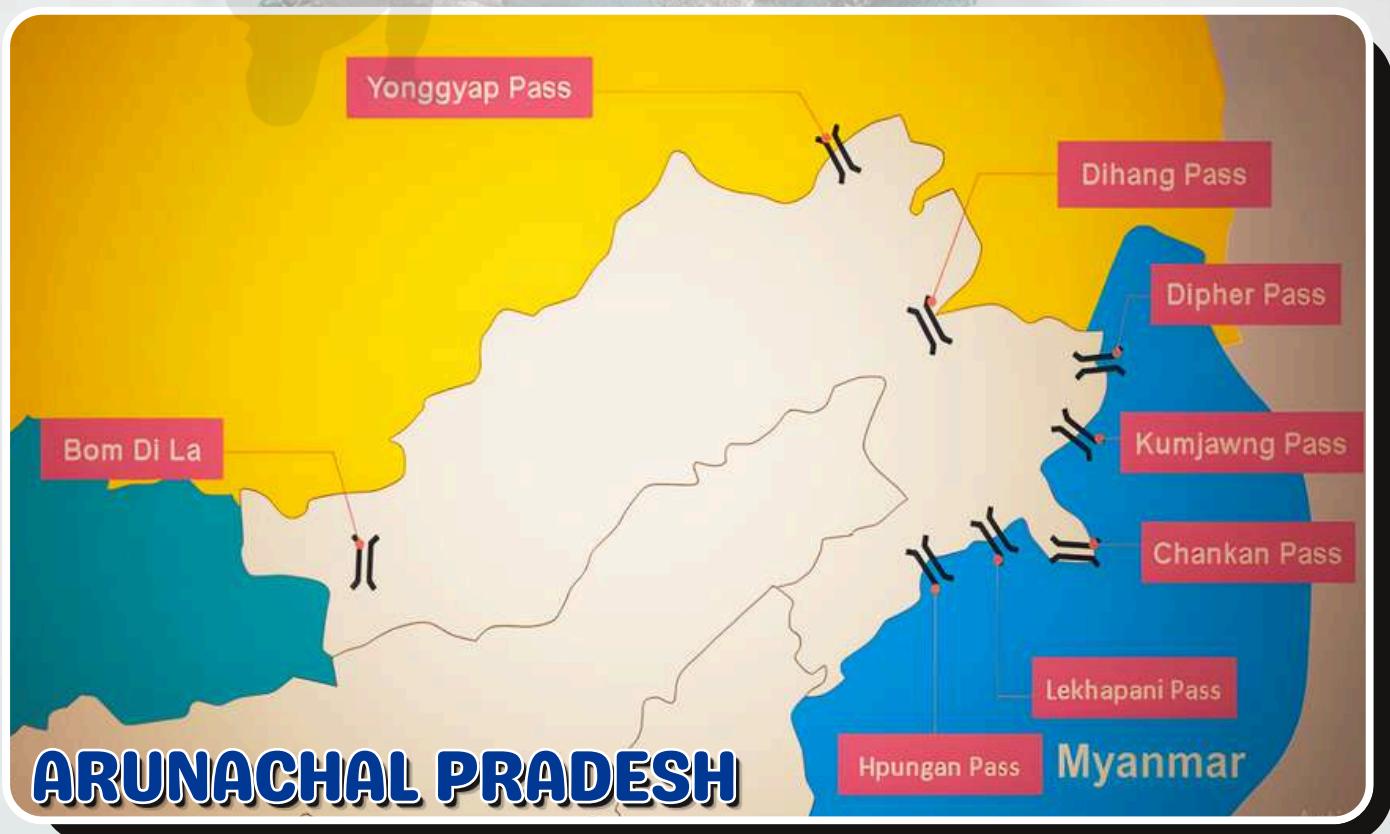
### KHADAR

### RIVER VALLEY

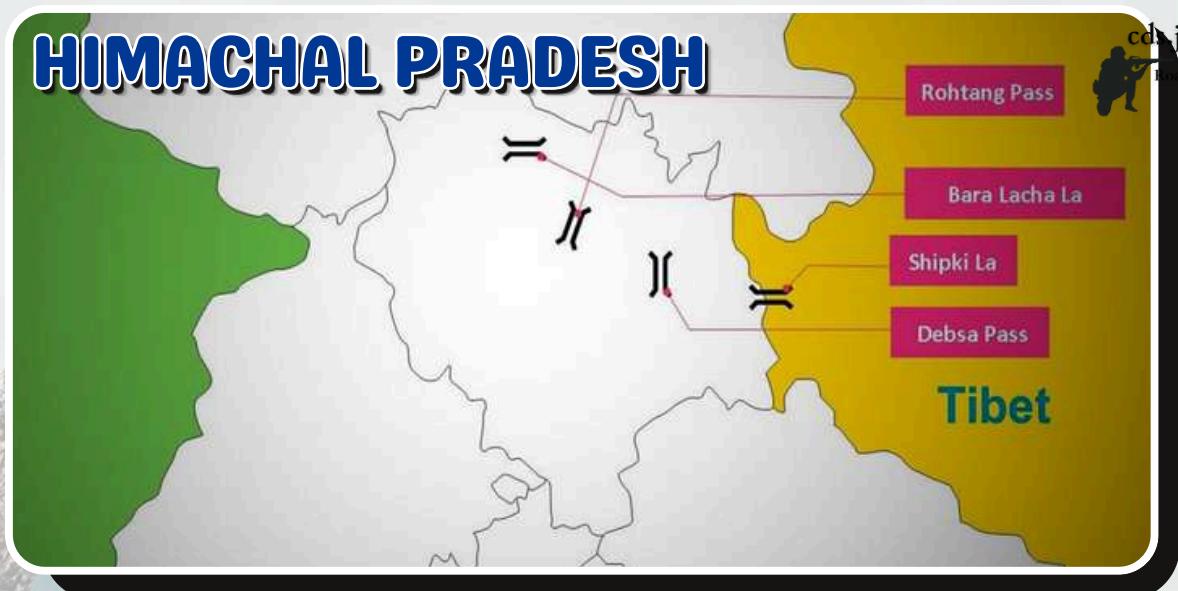
### KHADAR

- Newer alluvial deposits found in the floodplains of rivers.
- More fertile than Bhangar, ideal for agriculture.
- Frequently replenished by river floods.

# PASSES



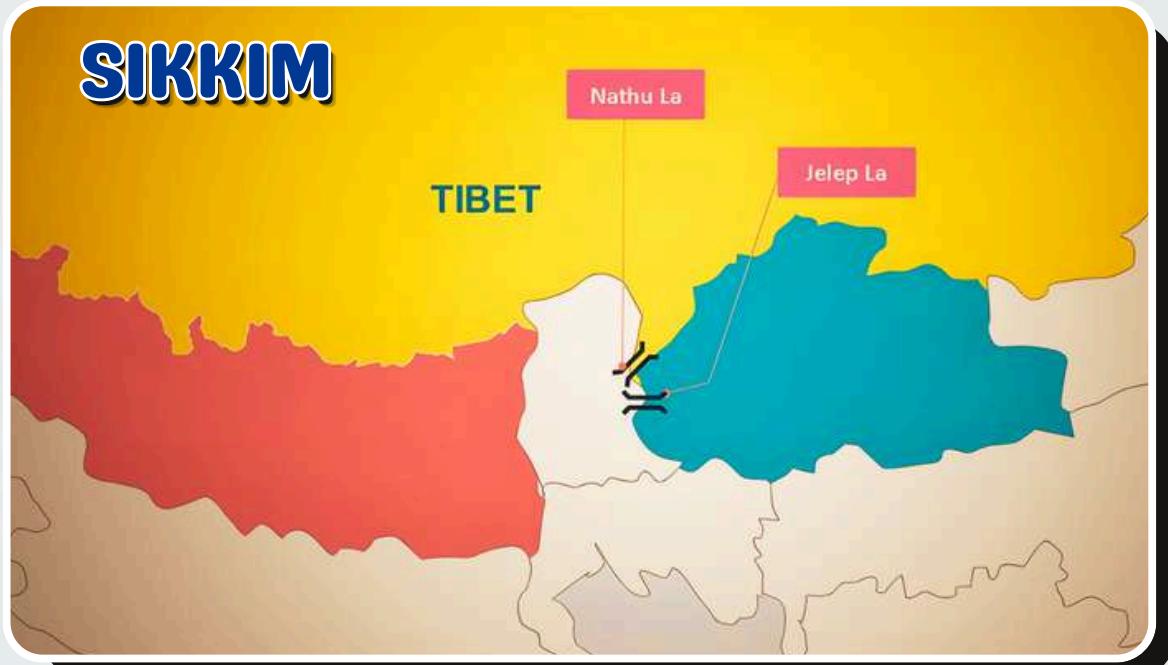
# HIMACHAL PRADESH



# UTTARAKHAND

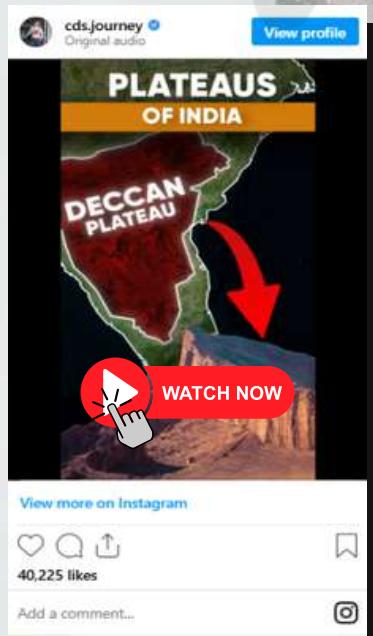
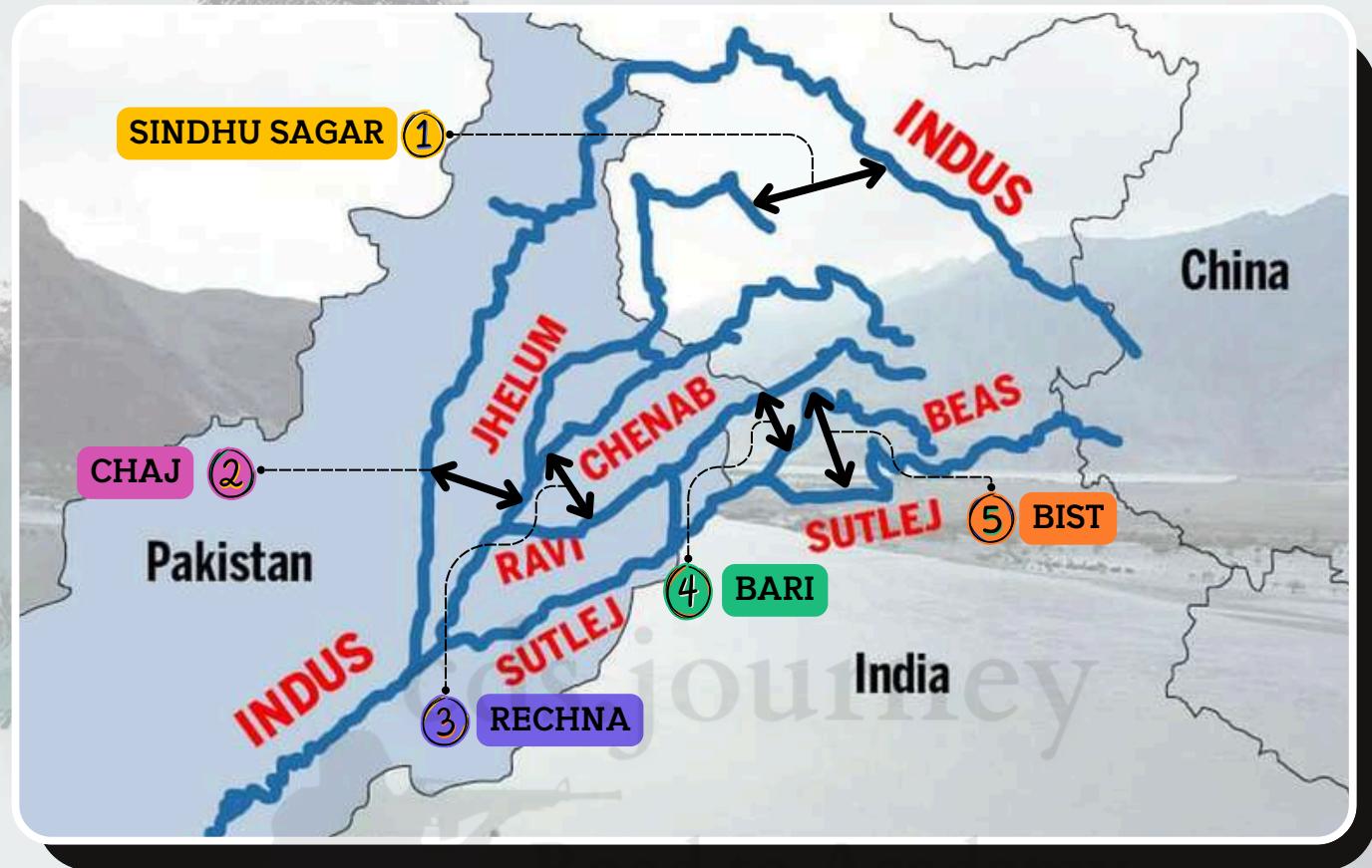


# SIKKIM



# DOAB

- Doab is a fertile land area between two converging rivers, typically found in northern India.
- Sindh Sagar Doab, which lies b/w Indus River & Jhelum River.



# INDIA

## Mountain Ranges

HIGHEST PEAKS



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ARAVALI INDIA'S OLDEST

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ALL ABOUT WESTERN GHATS

1600 KM

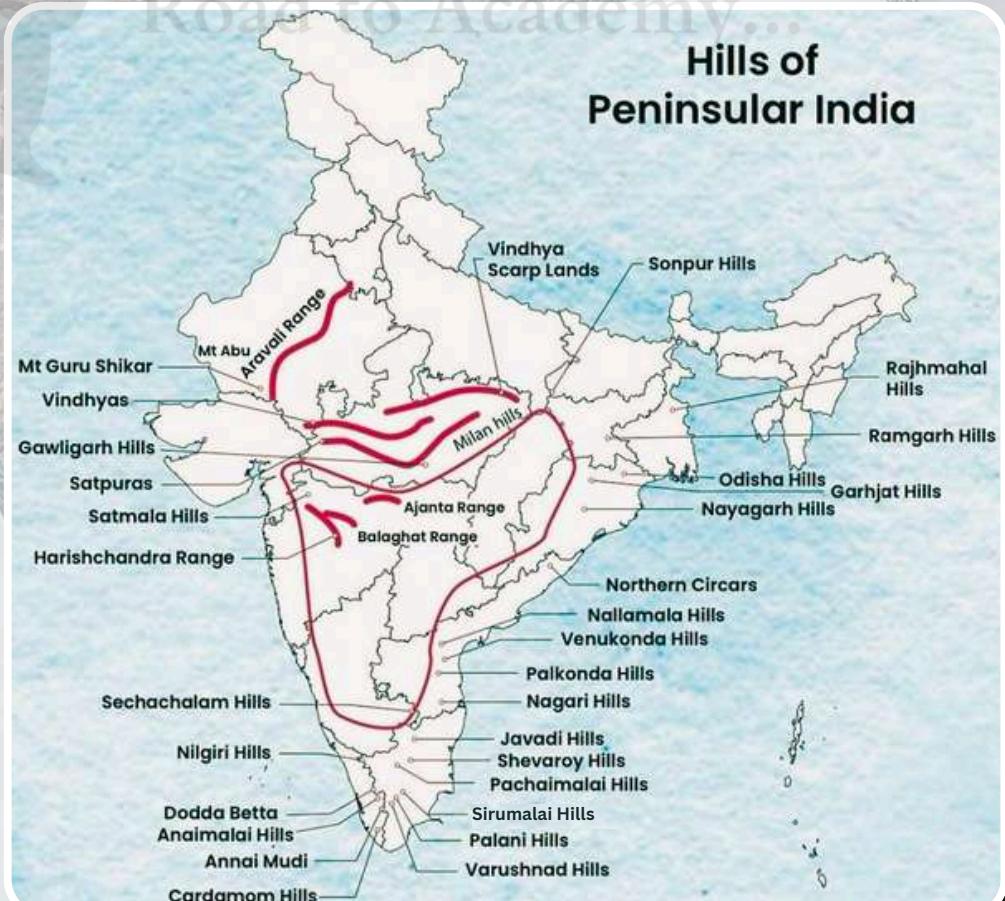
WESTERN GHATS

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# ARAVALLI RANGE

- Highest peak: Guru Shikhar, located in Mount Abu, Rajasthan.



- Oldest fold mountain range in India.
- Residual mountains are eroded remnants of old mountains.
- Extends from Southwest (Gujarat) to Northeast (Delhi-Haryana).
- Gradually reduces in elevation as it moves northeast.
- Mount Abu is the only hill station in Rajasthan
- Jarga Hills are located in Udaipur.

- Highest Peak: Sadbhavna Shikhar (752 m), Madhya Pradesh.

# VINDHYAN RANGE



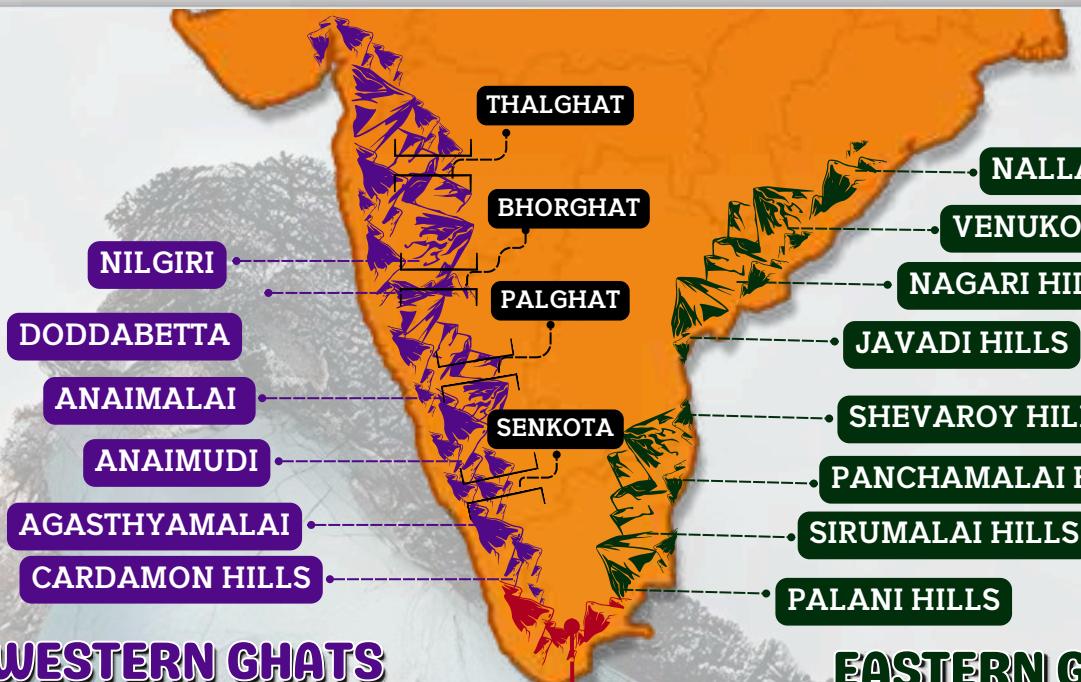
- Stretches across central India (Madhya Pradesh, U.P., Chhattisgarh, Gujarat, Rajasthan, Bihar).
- Runs parallel to the Satpura Range, separating the Indo-Gangetic Plain from the Deccan Plateau.
- Old, eroded mountain range made of sedimentary rocks.
- Low hills, with an average height of 300-600 meters.
- Chambal, Betwa, Ken, Tons, and Son Rivers originate from or flow through the range.

# SATPURA RANGE



- Other peaks: Pachmarhi, Mahadeo Hills, and Amarkantak Plateau.
- Stretches across Madhya Pradesh, Maharashtra, and Chhattisgarh.
- Lies south of Vindhya Range, separating Narmada & Tapti river basins.
- Gradually reduces in elevation as it moves northeast.
- Narmada, Tapti, Son, and Mahanadi originate from or flow through range.

- Highest peak: Dhoopgarh, Madhya Pradesh (Younger than Vindhyas).



## WESTERN GHATS



- Highest peak: Anamudi (2,695 m), located in Kerala.

- Stretches along the western coast of India, covering Gujarat, Maharashtra, Goa, Karnataka, Kerala, and Tamil Nadu.
- Extends from the Tapti River (north) to Kanyakumari (south).
- Home to Evergreen, Deciduous, and Montane forests.
- UNESCO World Heritage Site, Famous hill stations: Ooty, Mahabaleshwar.
- Endemic species like Lion-tailed macaque, Malabar civet, and Nilgiri Tahr.

### MAJOR RIVERS:

- West-flowing: Sharavati, Kali, Netravati, Periyar (short but swift).
- East-flowing: Godavari, Krishna, Kaveri (long and navigable).

## EASTERN GHATS



- Highest peak: Jindhagada Peak, Andhra Pradesh.

- Stretches along the eastern coast of India, covering Odisha, Andhra Pradesh, Telangana, Tamil Nadu, and Karnataka.
- Runs parallel to the Bay of Bengal but is discontinuous and eroded by east-flowing rivers.
- Older than the Western Ghats.
- Home to deciduous forests with species like teak, sal, and sandalwood.

### WILDLIFE RESERVES:

- Simlipal National Park (Odisha)
- Papikonda National Park (A.P)
- Seshachalam Hills (A.P)

### MAJOR RIVERS:

- East-flowing: Mahanadi, Godavari, Krishna, Kaveri, Penna.

## INDIA COASTAL PLAINS

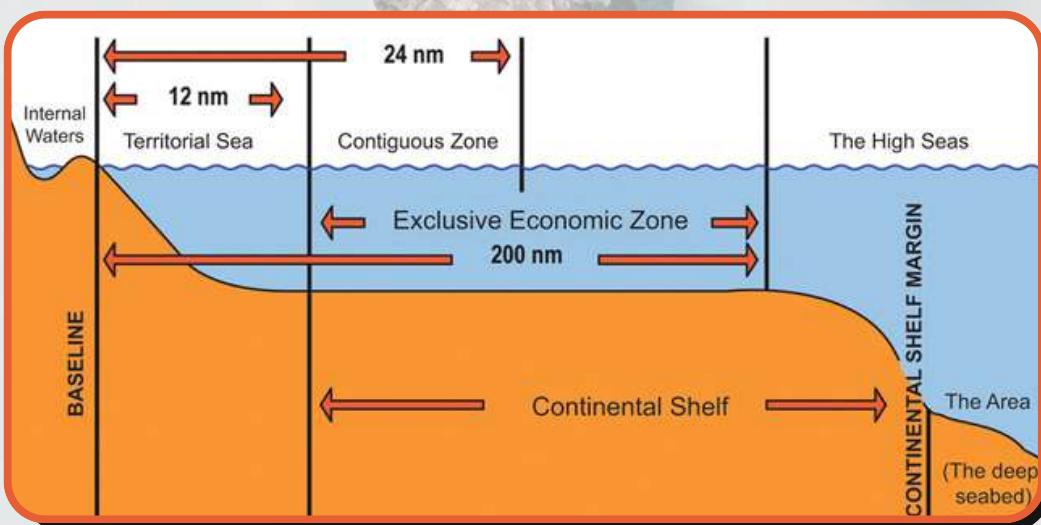
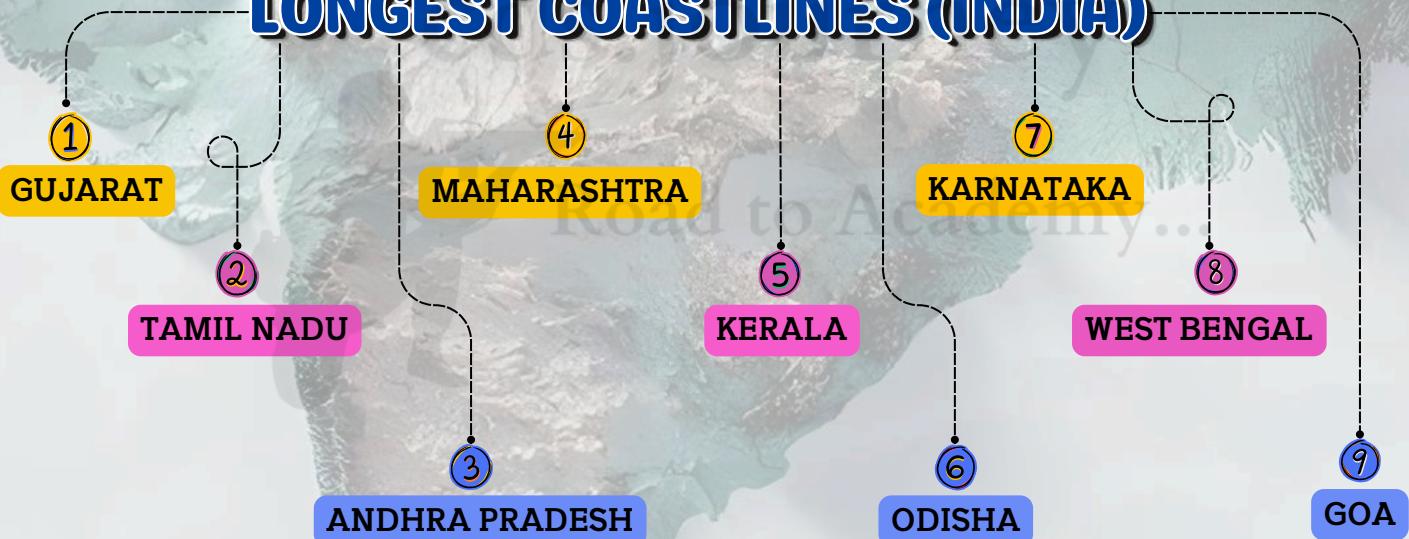
### LEGEND

- Western Coastal Plain
- Eastern Coastal Plain

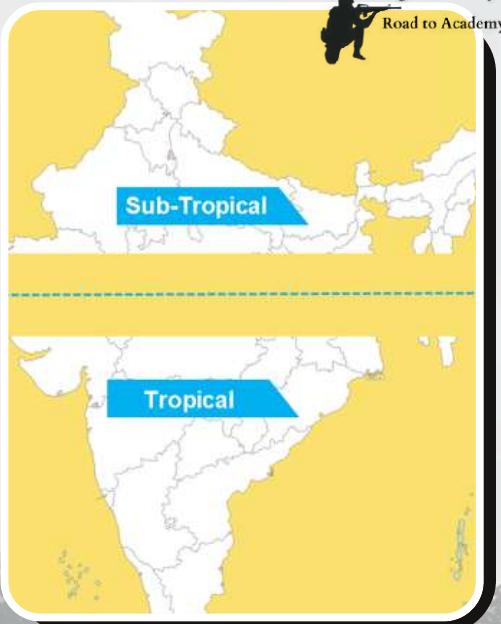
INDIA HAS A TOTAL OF 7516.6 KM OF COASTLINE

2094 km of island territories and 5422 km of mainland coastline.

## LONGEST COASTLINES (INDIA)



## MARITIME ZONES



- India covers an area of 32,87,263 sq. km
- 7<sup>th</sup> largest country in the world

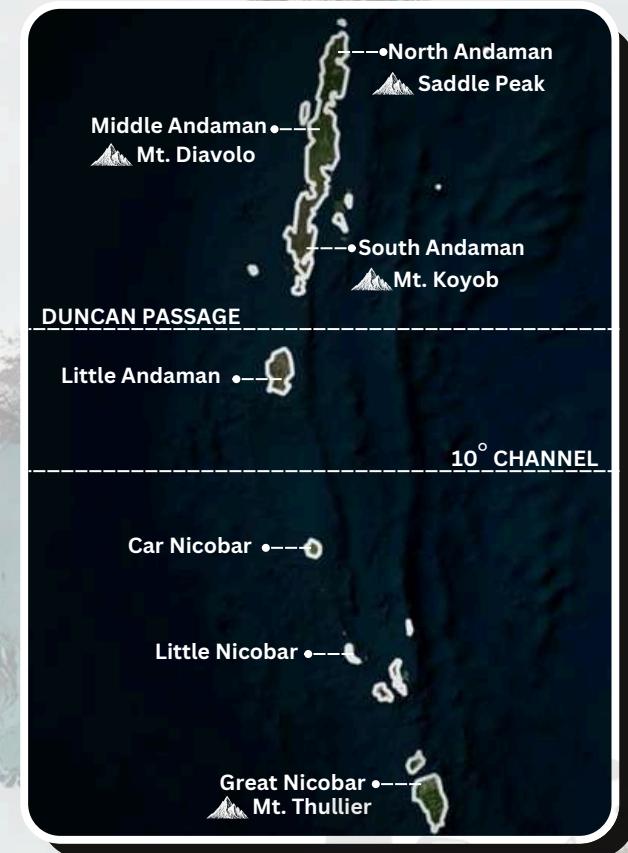
## LARGEST COUNTRIES BY LAND AREA



## MOST POPULOUS COUNTRIES

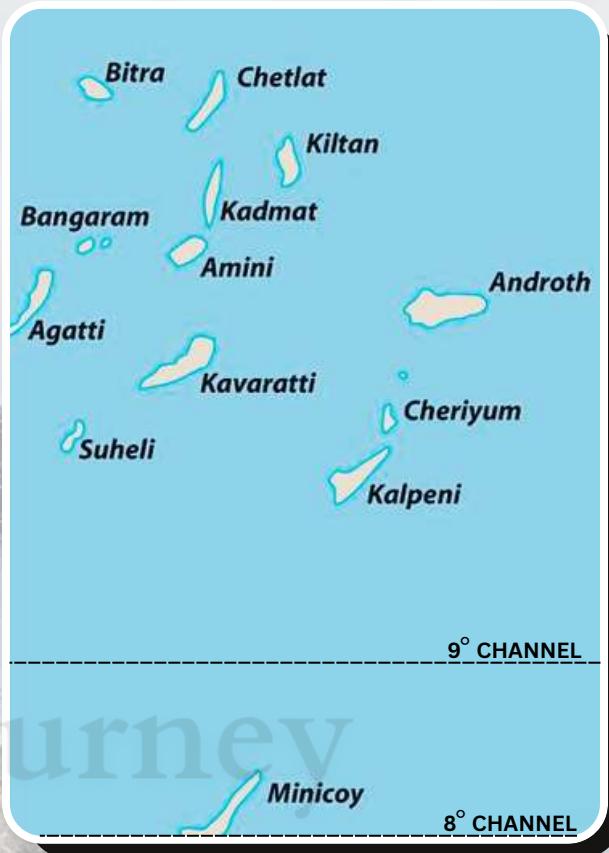


# ANDAMAN AND NICOBAR ISLANDS



# LAKSHADWEEP ISLANDS

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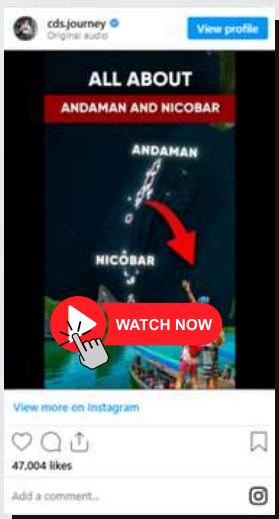
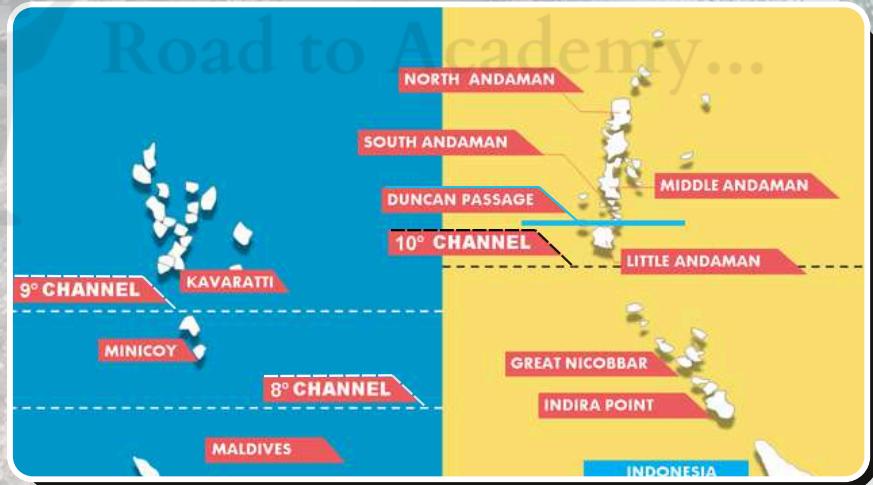
HIGH TO LOW

Saddle Peak

Mt. Thullier

Mt. Diavolo

Mt. Koyob



8 Degree Channel separates the Minicoy Island from Maldives.

9 Degree Channel separates Lakshadweep from Minicoy

Duncan Passage separates South Andaman from Little Andaman.

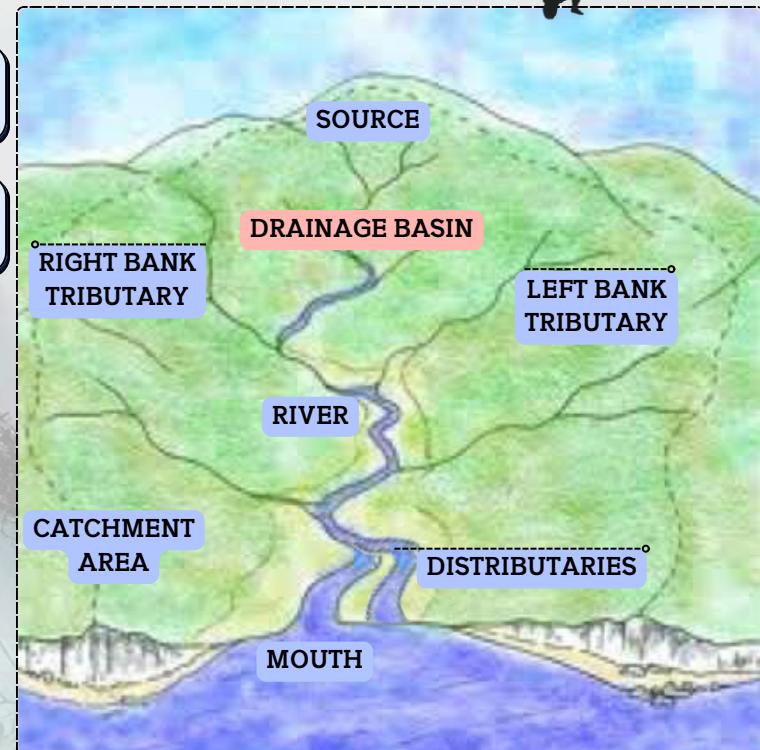
10 Degree Channel separates the Andaman from Nicobar Islands.

# DRAINAGE SYSTEM

NETWORK OF WATER CHANNELS FLOWING IN A SPECIFIC DIRECTION

FACTORS INFLUENCING DRAINAGE PATTERNS:

- Rock Shape and Structure: Determines erosion resistance & water flow patterns.
- Physiographic Slope: Controls the speed and direction of water movement.
- Water Volume: Affects river size, flow velocity, and erosive power.
- Flow Duration: Dictates whether a river is seasonal or perennial.



CATCHMENT AREA:

- River drains the water collected from a specific area.

BASIN:

- Catchment area of a large river system

WATERSHED:

- Catchment area of a small river system

## RIVERS

HIMALAYAN RIVER:

- Origin - Himalaya (Youth Stage)
- Longer (Perennial) have high water volume.
  - Formed by: (Depositional)
  - Ox-bow lakes
  - Flood plains
  - Delta
  - Braided Channels
- Formed by: (Erosional)
- V-shaped valleys
- Rapids
- Waterfalls



PENINSULAR RIVER:

- Origin - Plateau & Hills (Old Stage)
- Shorter (Seasonal) have low water volume.
  - Depends on Monsoon.
  - Formed by: Board
  - Shallow Valleys

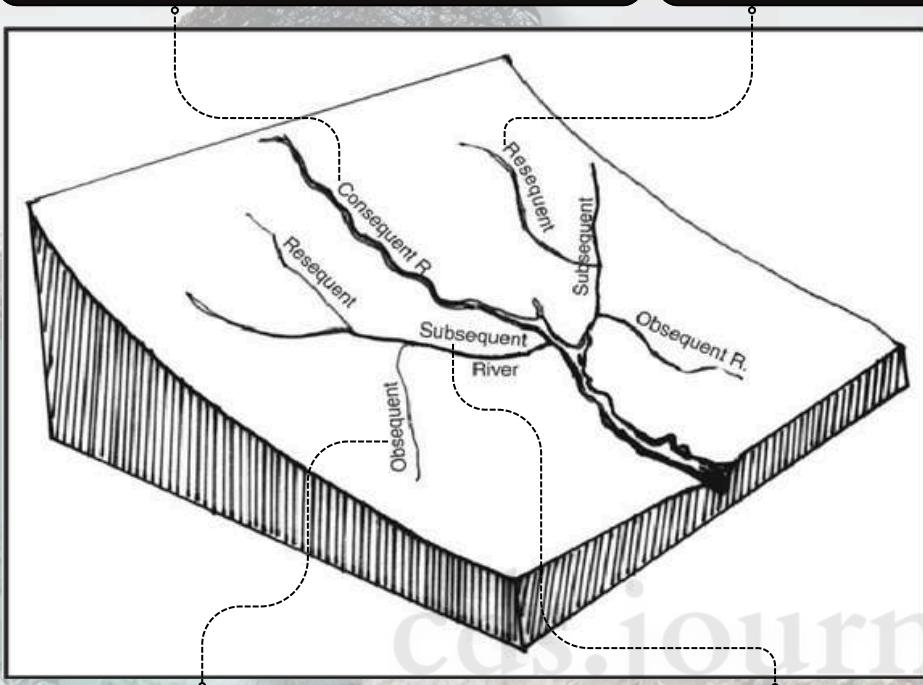


### CONSEQUENT DRAINAGE:

- FOLLOW THE GENERAL DIRECTION OF SLOPE.
- MOST OF THE RIVERS OF PENINSULAR INDIA ARE CONSEQUENT RIVERS

### RESEQUENT DRAINAGE:

A RESEQUENT RIVER FLOWS IN THE SAME DIRECTION AS THAT OF THE INITIAL CONSEQUENT DRAINAGE.



### CONCORDANT DRAINAGE

IN CONCORDANT DRAINAGE PATTERN, THE PATH OF THE RIVER IS HIGHLY DEPENDENT ON THE SLOPE OF THE RIVER AND TOPOGRAPHY

### ANTECEDENT DRAINAGE INCONSEQUENT DRAINAGE.

- OLDER THAN THE EXISTING LAND ITSELF.
- EX: INDUS, SUTLEJ, BRAHMAPUTRA, & OTHER HIMALAYAN RIVERS

### OBSEQUENT DRAINAGE:

OBSEQUENT DRAINAGE CONSISTS OF STREAMS FLOWING OPPOSITE TO THE ORIGINAL SLOPE DUE TO EROSION.

### SUBSEQUENT DRAINAGE:

MAY FORM AT RIGHT ANGLES TO THE SUBSEQUENT RIVERS AND FLOW OPPOSITE TO THE DIRECTION OF FLOW OF THE ORIGINAL CONSEQUENT RIVER

### DENDRITIC

Tree-like pattern where tributaries join main river at various angles, common in uniform rock structures.

### TRELLIES

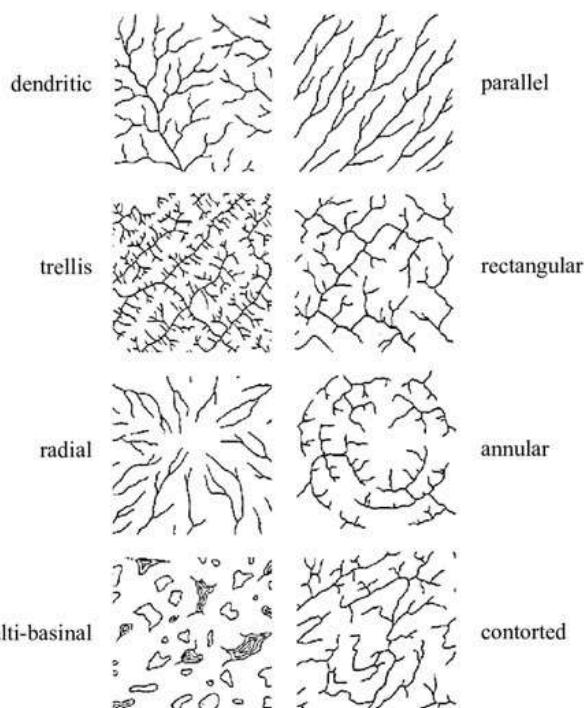
Tributaries join the main river at nearly right angles, typically in folded terrain with alternating hard & soft rock layers.

### RADIAL

Streams flow outward from a central high point, like a volcano or dome.

### MULTI - BASINAL

Disconnected drainage basins due to uneven terrain or geological barriers.



### PARALLEL

Streams run parallel due to steep slopes or elongated landforms.

### RECTANGULAR

Streams form right-angle bends due to jointed or faulted rock structures.

### ANNULAR

Circular drainage around a structural dome or basin with concentric rock layers.

### CONTORTED

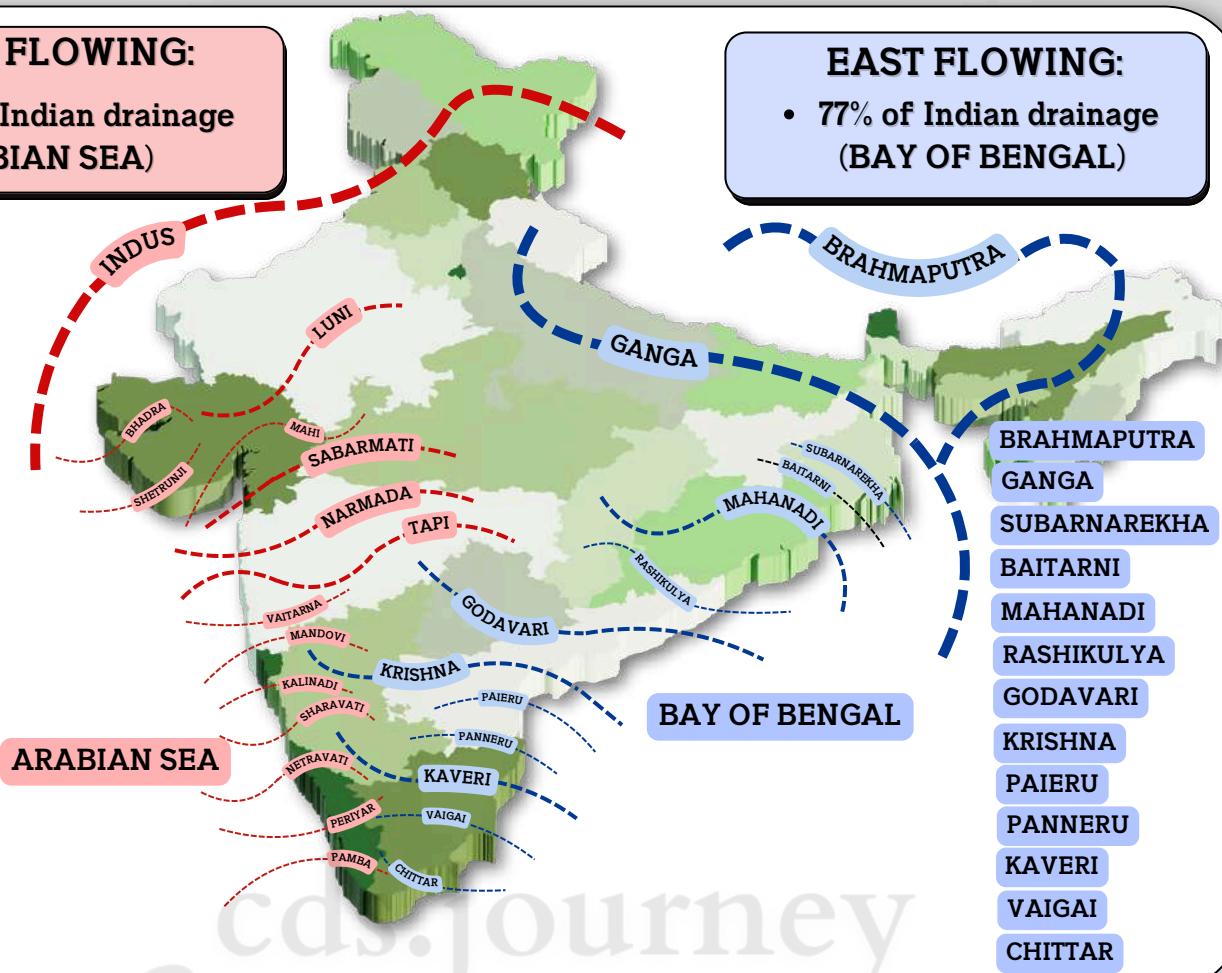
Highly irregular drainage due to complex geological folding and faulting.

## DRAINAGE PATTERNS

## WEST FLOWING:

- 23% of Indian drainage (ARABIAN SEA)

INDUS  
BHADRA  
LUNI  
SHETRUNJI  
SABARMATI  
MAHI  
NARMADA  
TAPI  
VAITARNA  
MANDOVI  
KALINADI  
SHARAVATI  
NETRAVATI  
PERIYAR  
PAMBA



## TOP 10 LONGEST RIVERS IN INDIA

### BY LENGTH:

- GANGA RIVER: 2,525 KM
- GODAVARI RIVER: 1,465 KM
- KRISHNA RIVER: 1,400 KM
- YAMUNA RIVER: 1,376 KM
- NARMADA RIVER: 1,312 KM
- INDUS RIVER: 1,111 KM
- BRAHMAPUTRA RIVER: 916 KM
- MAHANADI RIVER: 851 KM
- CAUVERY (KAVERI) RIVER: 800 KM
- TAPI (TAPTI) RIVER: 720KM

## RIVERS

## CATCHMENT AREA

PENNER	55,213 sq. km
BRAHMANI	39,033 sq. km
MAHI	34,842 sq. km
SABARMATI	21,674 sq. km
SUBAMAREKHA	19,296 sq. km
PALAR	17,870 sq. km
BAITAMI	12,789 sq. km
BHARATHAPUZHA	5,397 sq. km
PERIYAR	5,243 sq. km
KALINADI	5,179 sq. km
DHANDHAR	2,770 sq. km
SHARAVATI	2,029 sq. km

## DESERT RIVERS IN INDIA:

- LUNI RIVER: RAJASTHAN
- RUPEN RIVER: RAJASTHAN
- SARASWATI RIVER: HARYANA, RAJASTHAN
- BANAS RIVER: RAJASTHAN
- GHAGGAR RIVER: HARYANA, PUNJAB, RAJ.
- MACHHU RIVER: GUJARAT

- AYODHYA - SARYU
- FEROZPUR - SATLUJ
- HYDERABAD - MUSI
- JABALPUR - NARMADA
- JAMMU - TAWI
- SURAT - TAPI
- MIRZAPUR - GANGA
- BANGALORE - VRISHABHAVATI



# INDUS RIVER

BOKHAR CHU  
GLACIER  
(LAKE MANSAROVAR  
IN KAILASH RANGE)



## INDUS

- Originate: Bokharchu glacier, Kailash range (Tibet)
- Length: 2880 km (Tibet, India, Pakistan, Afghanistan)
- Tibet: Singi Khamban
- Sutlej: Longest tributary
- Chenab: Largest tributary

## INDUS BASIN

- Jammu & Kashmir
- Ladakh
- Himachal Pradesh
- Punjab
- Haryana
- Rajasthan
- Chandigarh

## INDUS TRIBUTARIES

- (LONGEST TO SHORTEST)
- Sutlej River - 1450 km
  - Chenab River- 974km
  - Jhelum River - 725 km
  - Ravi River - 720 km
  - Beas River - 470 km

## JHELUM

- Originate: Verinag (J & K, Pir Panjal)
- City-Srinagar, URI, Baramulla
- Wular lake (freshwater lake)
- Jhelum Joins Chenab Near Jhang (Pak.)
- Mangla Dam

## CHENAB

- Largest tributary, Length: 974 km
- Salai Dam
- Originates: Lahaul-Spiti region of Himachal Pradesh
- Formed by two streams: Chandra & Bhaga
- Chandra River (originating from the Chandratal Lake)
- Bhaga River (originating from the Baralacha La Pass)
- Confluence at Tandi, Chenab also known as ChandraBhaga

## BEAS

- Originate: Rohtang Pass, H.P ( Beas Kund)
- Joins Sutlej at Harike in Punjab
- Shortest tributary, Length: 465 km
- Pong Dam

## SUTLEJ

- Longest tributary, Length: 1450 km
- Originates: Rakas Lake, near Mount Kailash in the Tibet
- Enter through Shipkila Pass in India
- Antecedent River: Before formation of Himalayas
- Bhakra Nangal Dam

## RAVI

- Originate: Bara Bhangal, Kangra district in H.P
- Does not directly join Indus, merges with the Chenab
- Eventually joins the Indus River
- Ranjit Sagar Dam

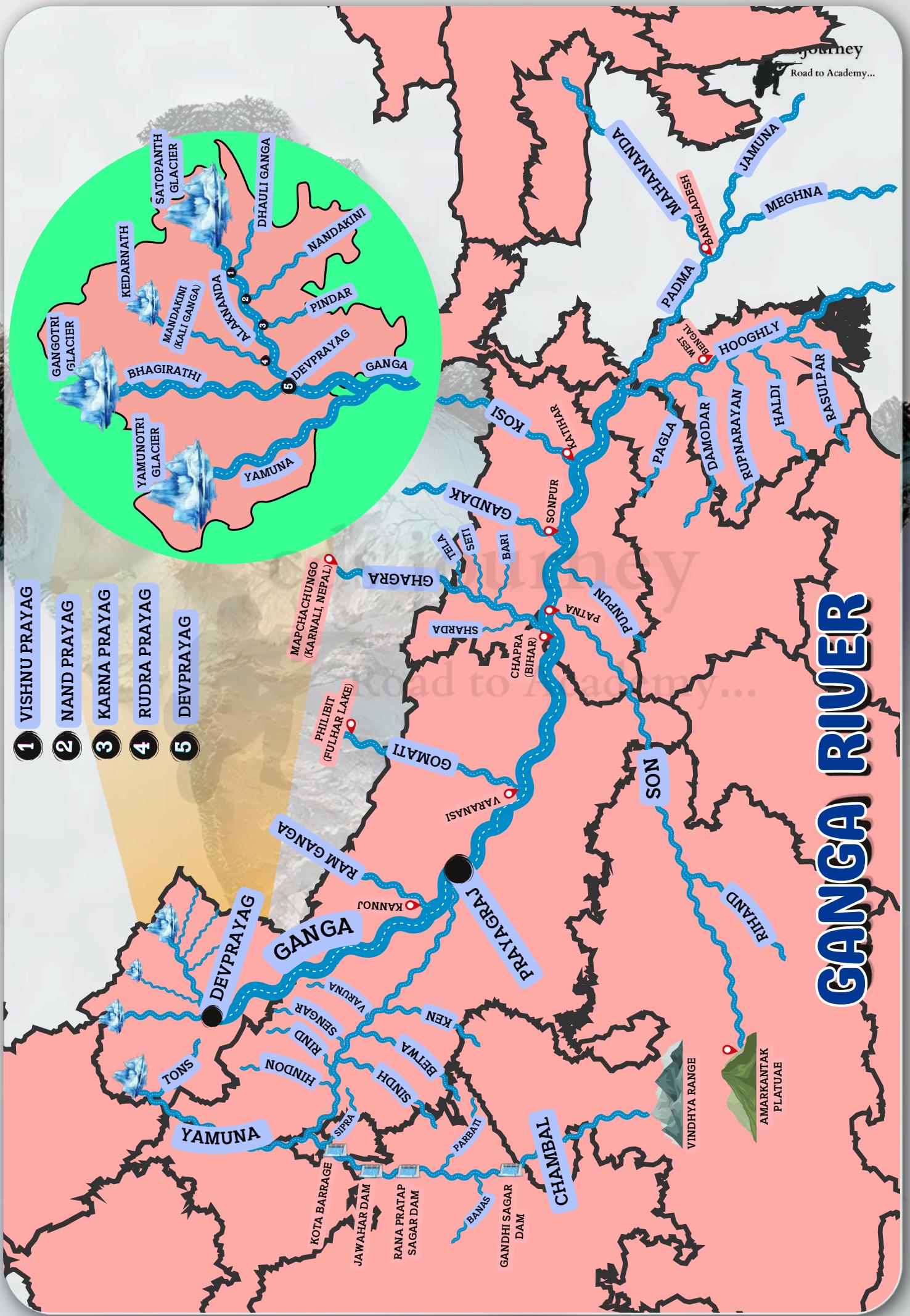
## INDUS WATERS TREATY (1960)

- |                           |                          |
|---------------------------|--------------------------|
| • Eastern Rivers (India): | • Western Rivers (Pak.): |
| • Ravi                    | • Indus                  |
| • Sutlej                  | • Jhelum                 |
| • Beas                    | • Chenab                 |



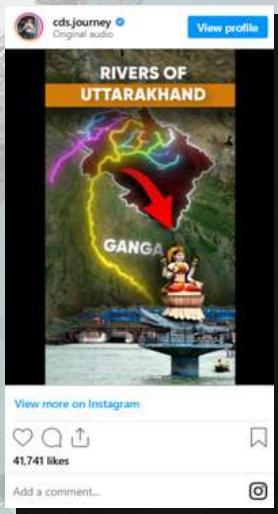
# GANGA RIVER

- 1 VISHNU PRAYAG
  - 2 NAND PRAYAG
  - 3 KARNA PRAYAG
  - 4 RUDRA PRAYAG
  - 5 DEVPRAYAG



## GANGA STATES

- Uttarakhand (Origin: Gangotri Glacier)
- Uttar Pradesh
- Bihar
- Jharkhand
- West Bengal (Ends at Bay of Bengal)



## RIGHT BANK

- Yamuna (Largest right-bank tributary)
- Son
- Punpun

## LEFT BANK

- Ramganga
- Gomti
- Ghaghara
- Gandak
- Kosi
- Mahananda

## GANGA BASIN

- Uttarakhand
- Uttar Pradesh
- Madhya Pradesh
- Rajasthan
- Bihar
- Jharkhand
- West Bengal
- Haryana
- Chhattisgarh
- Himachal Pradesh
- Delhi

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## DAMS

- Tehri Dam: Bhagirathi River (Uttarakhand) Highest dam in India
- Ramganga Dam: Ramganga River (UK)
- Kosi Project: Kosi River (Bihar)
- Rihand Dam: Rihand River (Uttar Pradesh)
- Bansagar Dam: Son River (Madhya Pradesh)

## YAMUNA RIVER

- Originate: Yamunotri Glacier, Uttarakhand
- Merges with the Ganga at Triveni Sangam, Prayagraj U.P
- Ganga River: Largest tributary

## YAMUNA STATES

- Uttarakhand
- Himachal Pradesh
- Haryana
- Delhi
- Uttar Pradesh

## YAMUNA BASIN

- Uttarakhand
- Himachal Pradesh
- Haryana
- Delhi
- Uttar Pradesh
- Rajasthan
- Madhya Pradesh

## RIGHT BANK

- Chambal (Largest right-bank tributary)
- Sindh
- Betwa
- Ken
- Tons

## LEFT BANK

- Hindon
- Rind
- Sengar
- Varuna

## HOOGHLY RIVER

- Flows through West Bengal, passing through Kolkata.
- Eventually emptying into the Bay of Bengal

## SON STATES

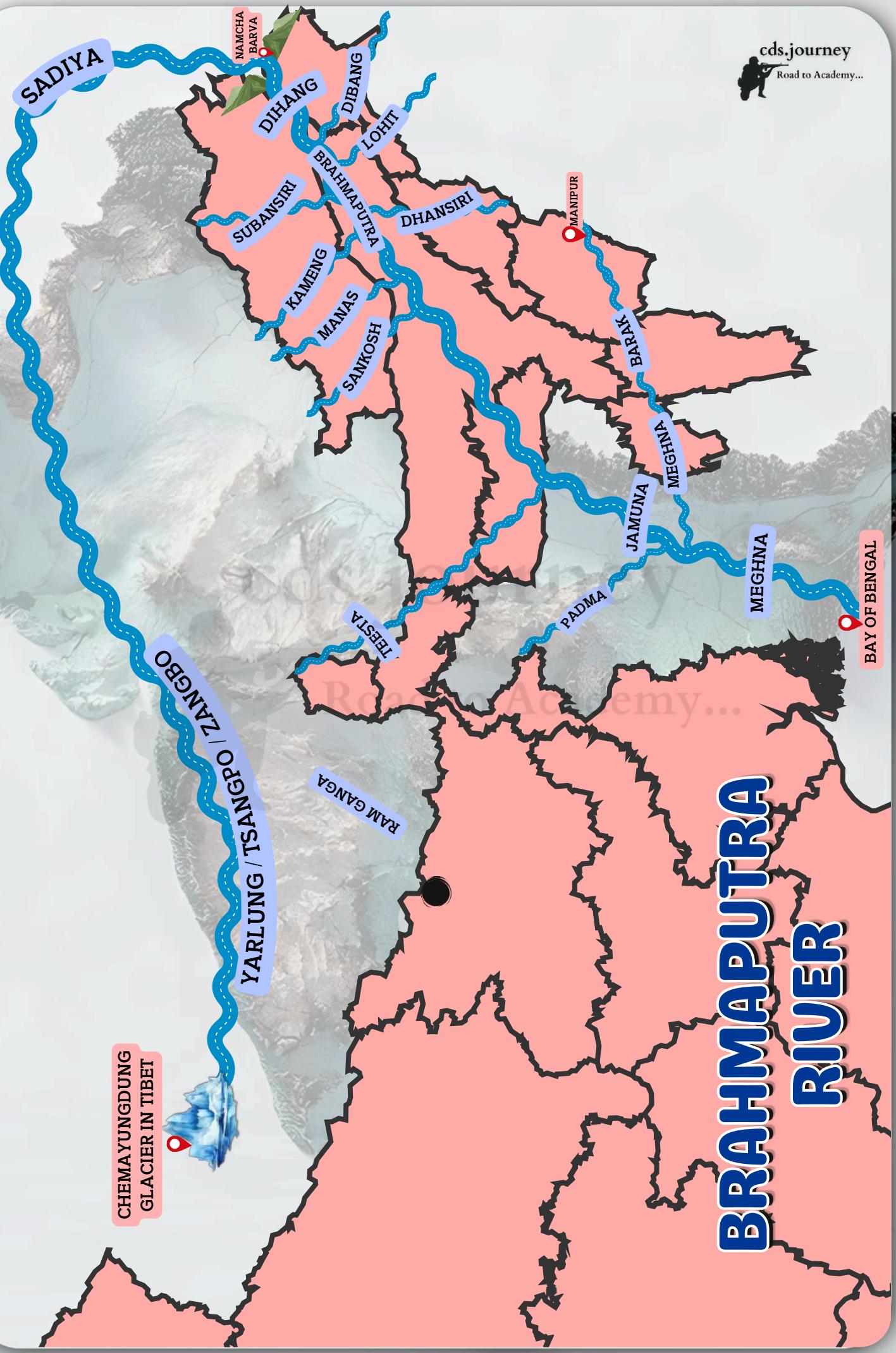
- Origin: Amarkantak Plateau, M.P
- Joins Ganga, Patna
- Madhya Pradesh
- Uttar Pradesh
- Bihar

## CHAMBAL STATES

- Origin: Vindhya Range, M.P
- Famous for badland topography.
- Joins Yamuna, Uttar Pradesh.
- Madhya Pradesh
- Rajasthan
- Uttar Pradesh

## RIGHT BANK

- Pagla
- Damodar
- Rupnarayan
- Haldi
- Rasulpur



## BRAHMAPUTRA

### STATES

- Arunachal Pradesh: Enters India as Dihang
- Assam: Becomes Brahmaputra River
- West Bengal

## RIGHT BANK

- Subansiri (Largest right-bank tributary)
- Kameng
- Manas
- Sankosh
- Teesta

## BARAK RIVER

- Starts in Manipur joins Meghna in Bangladesh

### MAJOR TRIBUTARIES

- Dhaleshwari
- Jiri
- Singla
- Longai

## GODAVARI

- Second-longest river in India (after Ganga)
- "Dakshina Ganga" (Ganga of the South)
- Origin: Maharashtra & flows eastward into Bay of Bengal

## GODAVARI

### STATES

- Maharashtra
- Telangana
- Andhra Pradesh
- Chhattisgarh
- Odisha

## RIGHT BANK

- Pravara
- Manjira
- Maner

## LEFT BANK

- Penganga
- Wardha
- Wainganga
- Pranhita
- Sabari
- Indravati

## GODAVARI



## GODAVARI

### BASIN

- Maharashtra
- Telangana
- Andhra Pradesh
- Chhattisgarh
- Madhya Pradesh
- Odisha
- Karnataka
- Puducherry

## PERIYAR

LONGEST RIVER IN KERALA, 244 KM LONG.  
KNOWN AS THE LIFELINE OF KERALA  
AS IT IS A PERENNIAL RIVER.

## PERIYAR RIVER

- Origin: Western Ghats, Kerala
- Longest river in Kerala, 244 km
- Mouth: Arabian Sea (at Vembanad Lake, Kochi)
- AKA: The Lifeline of Kerala



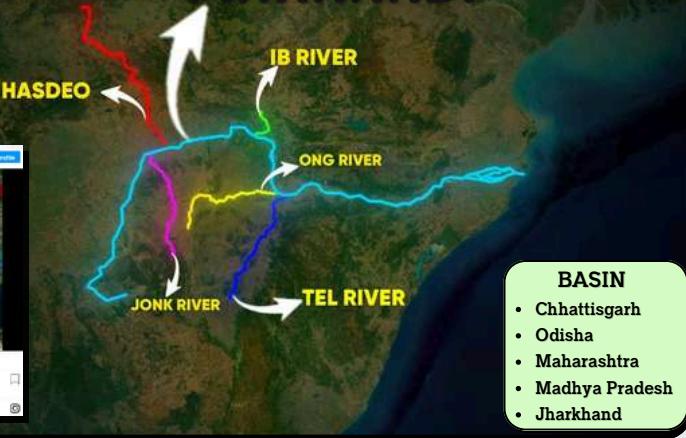
## BRAHMAPUTRA

### BASIN

- Arunachal Pradesh
- Assam
- Meghalaya
- Nagaland
- Sikkim
- West Bengal



# MAHANADI



## MAHANADI

- Origin: Sihawa Hills, Dhamtari District, Chhattisgarh
- Flows Through: Chhattisgarh & Odisha
- Length: 858 km
- Mouth: Bay of Bengal (near Paradeep, Odisha)
- Hirakud Dam (Odisha)
- Ravishankar Sagar Dam (Chhattisgarh)
- Hasdeo Bango Dam (Chhattisgarh)

## KRISHNA RIVER

- Origin: Mahabaleshwar, Maharashtra (Western Ghats)
- Flows Through: Maharashtra, Karnataka, Telangana, A.P
- Length: 1,400 km
- Mouth: Bay of Bengal (near Hamsaladeevi, Andhra Pradesh)
- Tungabhadra: (Largest tributary)
- Nagarjuna Sagar & Srisailam Dam (Telangana/Andhra Pradesh)
- Krishna Raja Sagar Dam (Karnataka)

## KRISHNA



## CAUVERY (KAVERI)

### CAUVERY



- Origin: Tala Kaveri, Western Ghats, Karnataka
- Flows Through: Karnataka, Tamil Nadu
- Length: 805 km
- Mouth: Bay of Bengal (near Poompuhar, Tamil Nadu)
- Mettur Dam (Tamil Nadu)
- Kabini Dam (Karnataka)
- Hemavati Dam (Karnataka)

- Origin: Amarkantak Plateau, M.P (Maikal Hills, Satpura Range)
- Flows Through: M.P, Maharashtra, Gujarat
- Length: 1,312 km
- Mouth: Arabian Sea (Near Bharuch, Gujarat)

- Sardar Sarovar Dam (Gujarat)
- Indira Sagar Dam (Madhya Pradesh)
- Omkareshwar Dam (Madhya Pradesh)
- Tawa Dam (Madhya Pradesh)

## NARMADA



- Madhya Pradesh
- Maharashtra
- Gujarat
- Chhattisgarh

### SABARMATI

- Origin: Aravalli Range, Rajasthan
- Flows Through: Rajasthan, Gujarat
- Length: 371 km
- Mouth: Arabian Sea (near the Gulf of Khambhat, Gujarat)

- Narmada Canal (Sardar Sarovar Dam)
- Sabarmati Riverfront Development Project (Ahmedabad)

### TAPI

- Origin: Satpura Range, M.P
- Flows Through: M.P, Maharashtra, Gujarat
- Length: 724 km
- Mouth: Arabian Sea (Gulf of Khambhat, Gujarat)

- Ukai Dam (Gujarat)
- Purna Dam (Maharashtra)
- Girna Dam (Maharashtra)

## RIVER TRANSPORTATION

### SUSPENSION

Fine , light material is carried along by the river.

### TRACTION

Large boulders and rocks are rolled along the river bed.

### SOLUTION

Minerals are dissolved in the water and carried along in the solution.

### SALTATION

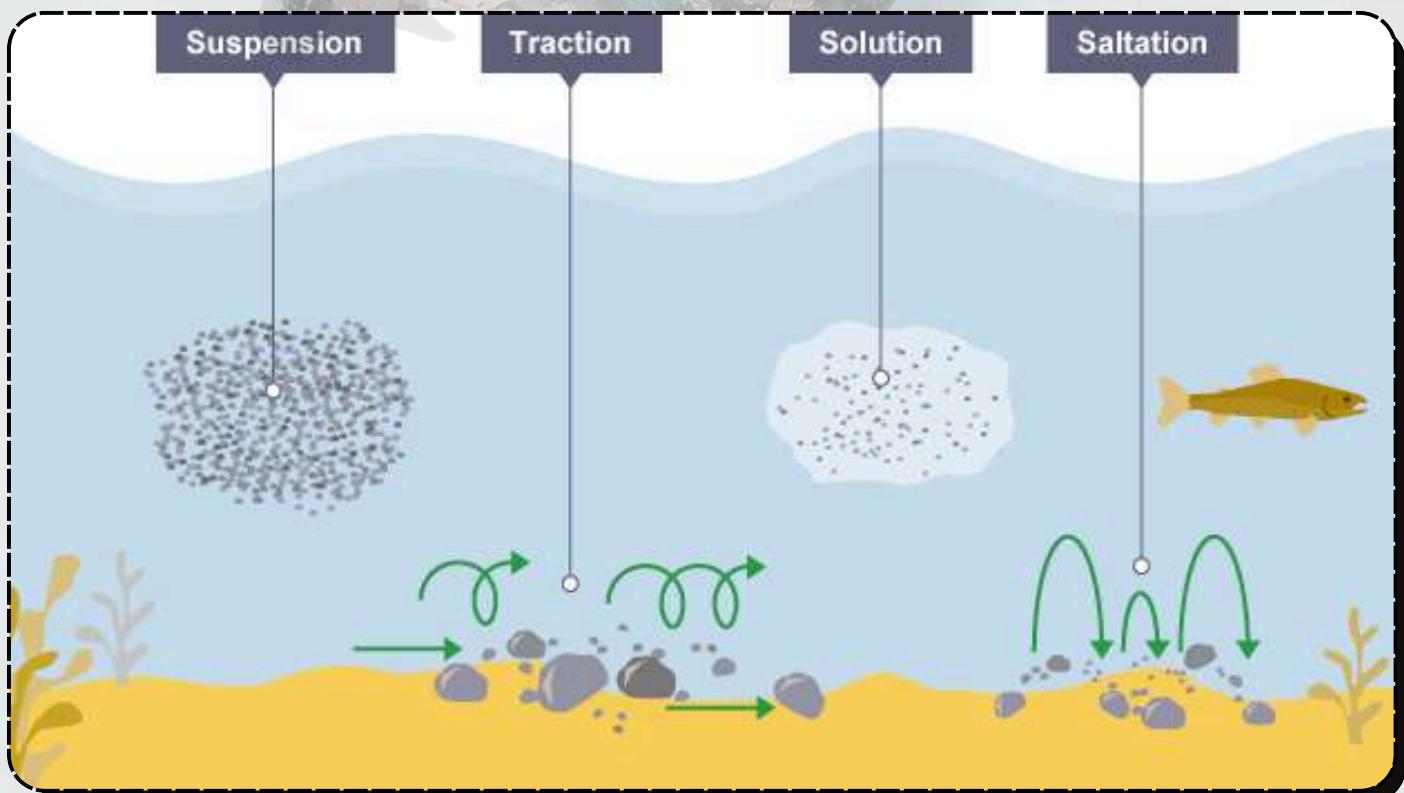
Small pebbles and stones are bounced along the river.

Suspension

Traction

Solution

Saltation





# WATERFALLS

Waterfalls	Rivers	States
Dudhsagar	Mandavi	Goa
Kunchikal	Varahi	Karnataka
Gersoppa (Jog )	Sharavati	Karnataka
Barkana	Sita	Karnataka
Kiliyur	Periyaaru	Tamil Nadu
Thalaiyar	Manjalar	Tamil Nadu
Duduma	Machhkund	Odisha
Gokak	Ghatprabha	Karnataka
Shivsamudram	Kaveri	Karnataka
Hundru	Subarnarekha	Jharkhand
Barehipani	Budhabalanga	Odisha
Nohkalikali	Umngot	Meghalaya
Kapildhara	Narmada	MP
Vasundhara	Alaknanda	Uttarakhand
Dhuandhar	Narmada	MP
Chitrakote	Indravati	Chhattisgarh
Kynrem	Umwai	Meghalaya
Athirappilly	Chalakudy	Kerala

- 1** Kunchikal waterfalls
- 2** Barehipani waterfalls
- 3** Nohkalikai waterfalls
- 4** Nohsngithiang / Mawsmai
- 5** Dudhsagar waterfalls

# TYPES OF WATERFALLS



## PLUNGE

Fast moving water descends vertically, losing contact with the bedrocks surface.

## PUNCHBOWL

Water descends in a constricted form and then spreads out in a wider pool.

## BLOCK

Water descends from a relatively wide stream or river.



## CATARACT

Most powerful of all waterfalls, has the strongest water currents.

## HORSETAIL

Descending water maintains some contact with bedrocks.

## CASCADE

Water descends a series of rock steps.



## TIERED

- aka Multi-step waterfalls.
- Consists of a series of consecutive waterfalls each with its own plunge pools.



# LAKES

## CLASSIFICATION OF LAKES ON THE BASIS OF THEIR NUTRIENT CONTENT:

### OLIGOTROPHIC LAKES

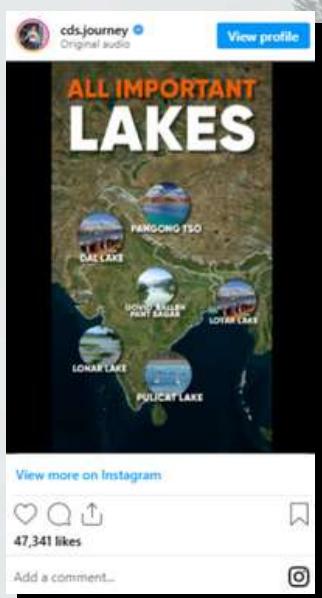
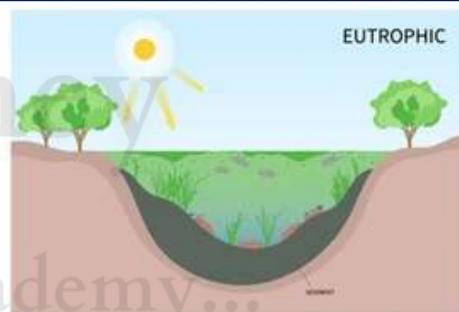
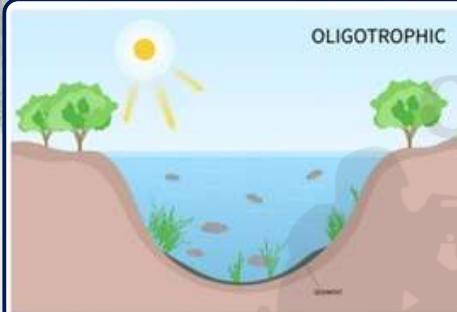
- Low in nutrients levels
- Very little consumption of oxygen
- Nice clean water
- Small population of algae, zooplanktons, aquatic weeds, bacteria and fish
- Deep with cold water
- Sandy or rocky bottom

### MESOTROPHIC LAKES

- Moderate in nutrients levels
- Intermediate level of productivity.
- Moderately clear water
- Intermediate between oligotrophic & Eutrophic stages
- Plant and animal species present in moderate numbers.

### EUTROPHIC LAKES

- Rich in nutrients
- Oxygen is absent
- Green or murky water
- High plankton
- Depth of the lake shallower



LAKES	TYPE	STATE
Ashtamudi	Lagoon	Kerala
Dal Lake	Residual	J & K
Tsomgo	Glacial	Sikkim
Bhimtal	Tectonic	Uttarakhand
Gohna	Landslide	Uttarakhand
Lonar	Crater	Maharashtra
Purbasthali	Fluvial	West Bengal
Gangabal	Glacial	J & K
Vembanad	Lagoon	Kerala
Barapani	Artificial	Meghalaya
Kolleru	Freshwater	Andhra Pradesh
Khecheopalri	-	Sikkim
Loktak	Freshwater	Manipur
Wular Lake	Tectonic	J & K
Sambhar	Saline	Rajasthan
Chilika	Lagoon	Odisha

# LAKES

## SALINE LAKES

- SAMBHAR LAKE
- PULICAT LAKE
- CHILKA LAKE
- PANGONG TSO
- LONAR LAKE

## FRESHWATER

- WULAR LAKE
- DAL LAKE
- LOKTAK LAKE
- BARAPANI
- KOLLERU
- NAINITAL
- BHIMTAL

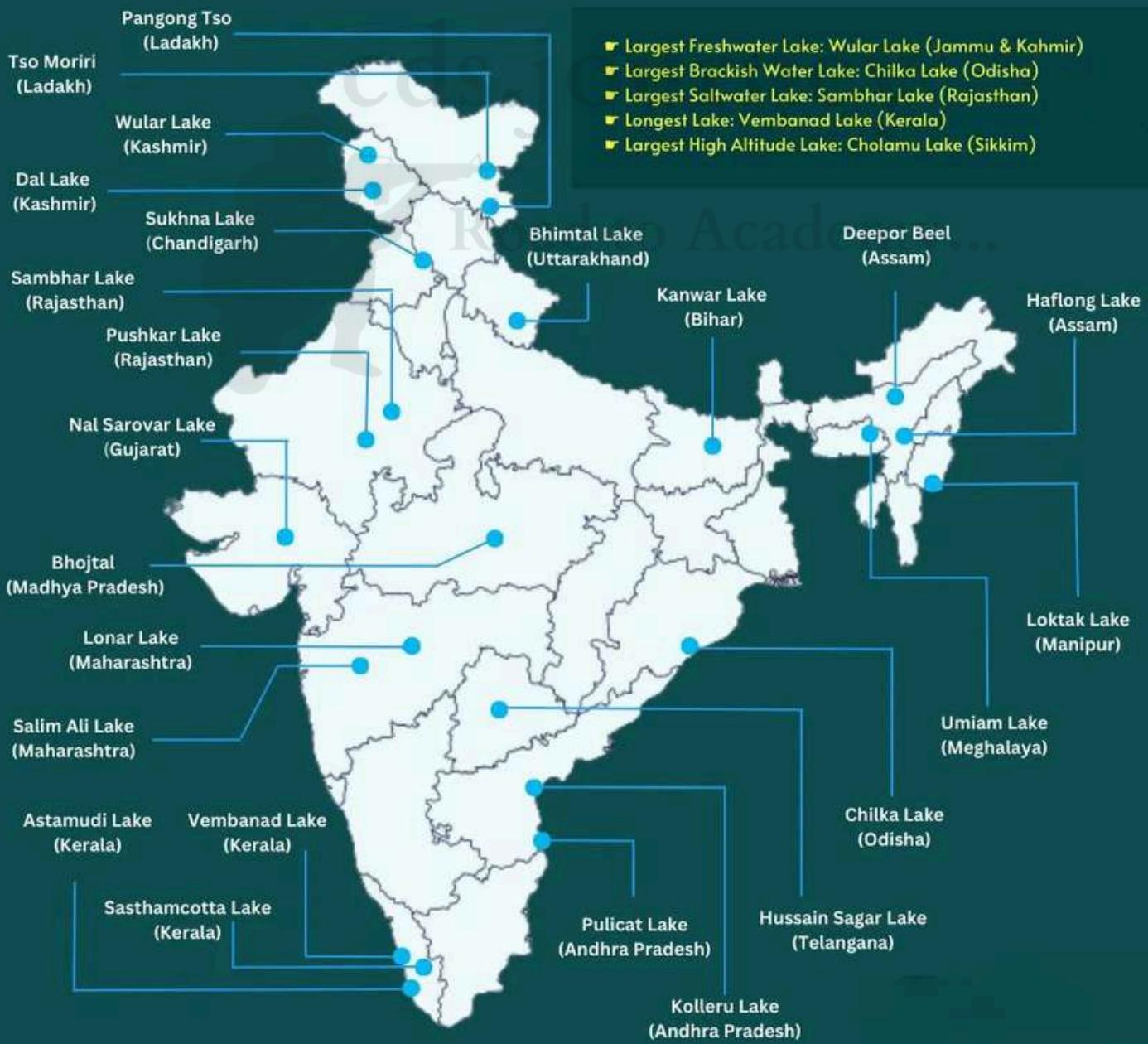
## GLACIAL LAKES

- GANGBAL LAKE
- TSOMGO LAKE
- ROOPKUND
- CHANDRATAL
- HEMKUND

## ARTIFICIAL

- GOVIND VALLABH SAGAR
- DHEBAR LAKE
- BHOJtal
- HIMAYAT SAGAR
- PUSHKAR LAKE
- PINCHOLA LAKE

# IMPORTANT LAKES IN INDIA





# SOILS OF INDIA

Indian Council of Agricultural Research (ICAR) has classified Indian soil based on their Nature & character as per [USDA] soil Taxonomy.

## FORMATION OF SOIL DEPENDS ON

PARENT MATERIAL

CLIMATE

TOPOGRAPHY

ORGANISM

TIME PERIOD

### Culturable Waste Land

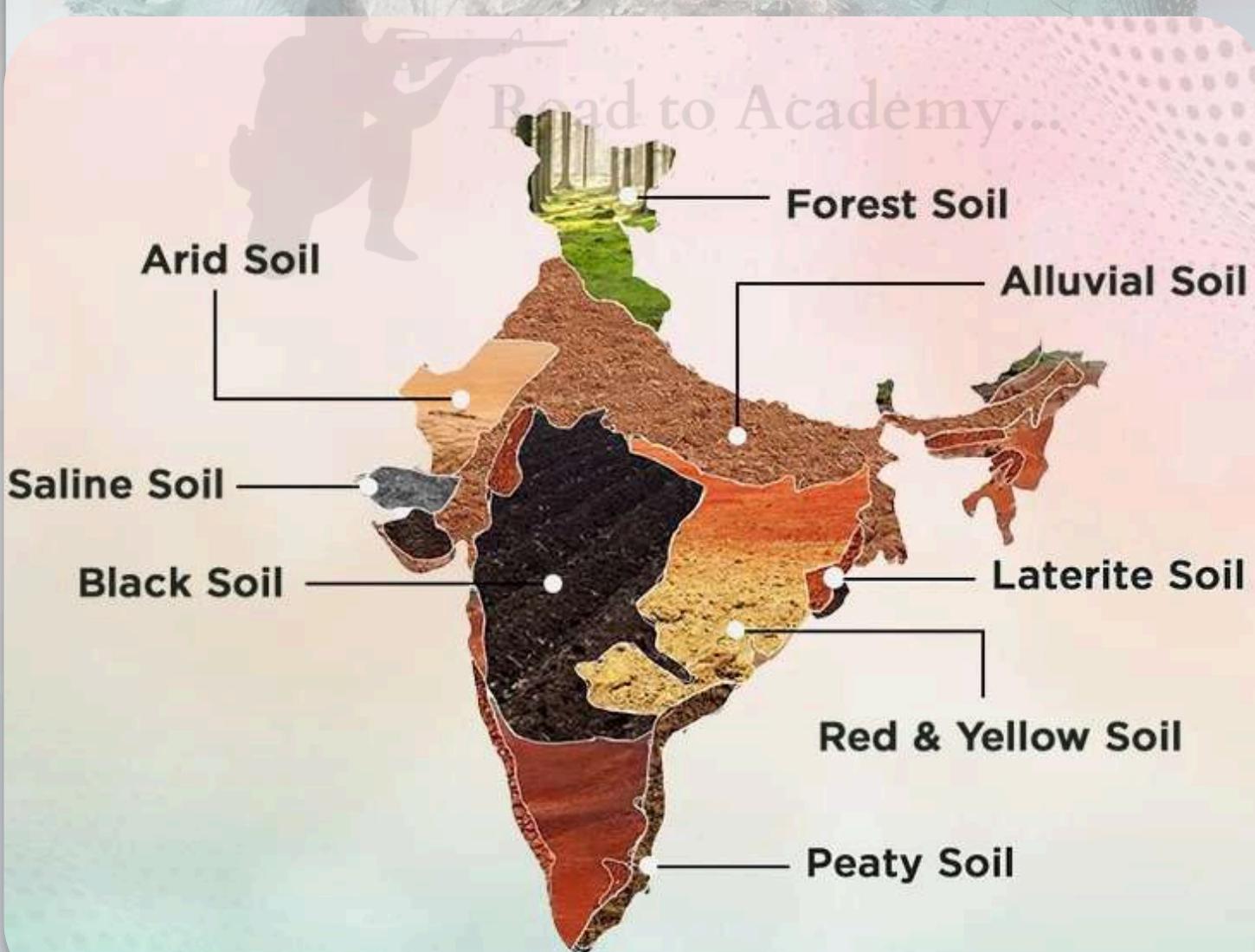
Left uncultivated for more than five agricultural year.

### Current Fallow Land

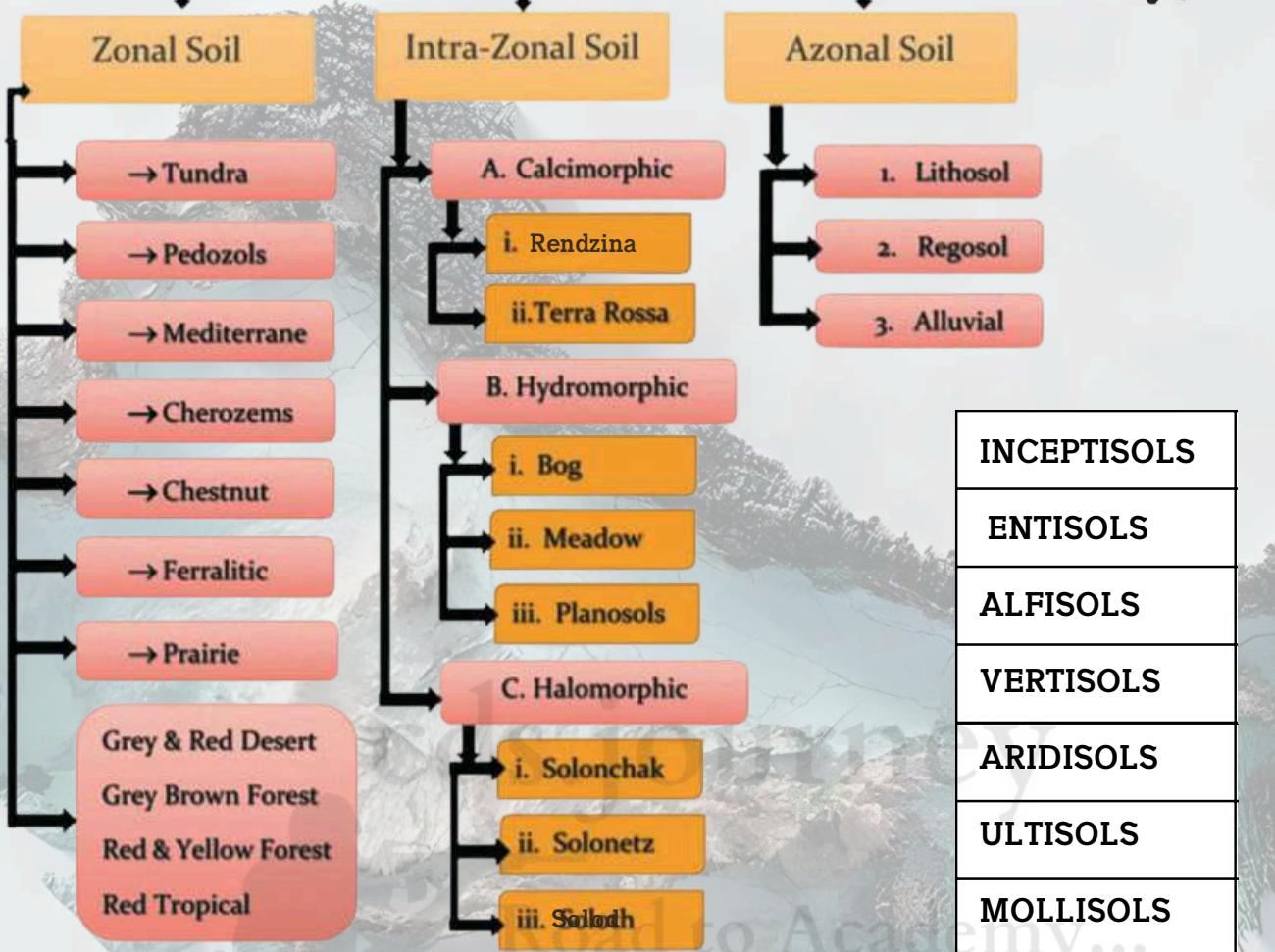
This is the land which is left without cultivation for one or less than one agricultural year.

### Fallow other than current fallow

Cultivable land left uncultivated for more than a year but less than five years.



# Soil Classification



**BASED ON TEXTURE, MAIN SOIL TYPES ARE IDENTIFIED AS:**

### **Loam Soil**

- Loamy soil is a mixture of sand, clay and silt.
- Contains nutrients for plants to grow strong.
- Allows water to drain evenly.



### **Clay**

- Clay particles are the finest of all the soil particles.
- Particles stick together readily and form a sticky or gluey texture when wet or dry.



### **Sand**

- Particles consists of weathered rock.
- Extensively used as construction material.
- Very low nutritional value & poor water-holding capacity



### **Silt**

- Silt is a sediment material with an intermediate size b/w sand & clay.
- Carried by water during flood, forms a fertile deposit on valleys floor.



## ALLUVIAL SOIL



- aka Depositional Soil
- RICH IN: Potash, Lime
- POOR IN: Phosphorus, Nitrogen and humus.
- FOUND IN (40%): Indo-Gangetic plains & deltas of east coast.
- COLOR: Light grey to ash grey.



PULSES



WHEAT



MAIZE



SUGARCANE



PADDY

- Described on the basis of age:

Old Alluvial Soil  
(BHANGAR)

New Alluvial Soil  
(KHADAR)

## BLACK SOIL

- RICH IN: Potash, Lime, Magnesium, Iron, and aluminum
- POOR IN: Phosphorus, Nitrogen and humus.
- FOUND IN: Deccan (Maharashtra, Madhya Pradesh, northern parts of Karnataka, parts of Gujarat, Telangana, and Tamil Nadu.)
- KNOWN: Regur soil and Black cotton soil.
- Sticky, Clayey, Deep & Impermeable.
- Capacity to hold moisture.
- Narma long staple cotton.
- Self Ploughing.



COTTON



MILLETS



TABACCO



PULSES



CITRUS

## RED AND YELLOW SOIL

cds.journey  
Road to Academy...



- RICH IN: Potash.
- POOR IN: Nitrogen, Phosphorus, Humus.
- FOUND IN: Odisha, Chhattisgarh, Maharashtra, Southern Karnataka, Tamil Nadu, Madhya Pradesh, and Rajasthan.
- RED COLOR: Due to ferric oxide.
- Low rainfall area, porous structure.
- Yellow color: Hydration of ferric oxide.

## LATERITE SOIL



CASHEW NUTS

## ARID AND DESERT SOIL



- COLOR: Red to Brown.

- Lack moisture and Humus, Nitrogen insufficient and Phosphate content is normal.
- FOUND IN: Characteristically developed in Western Rajasthan.
- NATURE: Sandy highly salt content.

## FOREST SOIL



- They are loamy and silty on valley sides & coarse-grained in the upper slopes.
- In the snow-bound areas of Himalayas, experience denudation.
- Acidic with low humus content.
- The soils found in the lower valleys are fertile.

## PEATY AND MARSHY SOIL

- RICH IN: Humus.
- COLOR: Black
- NATURE: Acidic

- Heavy rainfall & High humidity.

- Good growth of vegetation.

- Occurs widely in the northern part of Bihar, southern part of Uttaranchal and the coastal areas of West Bengal, Orissa and Tamil Nadu.

- Large quantity of dead organism matter accumulates in area.



## SALINE SOIL ( USARA SOILS )

- NATURE: Infertile
- RICH IN: Sodium, Potassium, Magnesium



- POOR IN: Nitrogen, Calcium

- Sandy to loamy structure range.

- Saline soils are more widespread in western Gujarat, deltas of eastern coast & in Sunderban areas of West Bengal.

- Occur in arid and semi-arid regions, and in areas with poor drainage.

# Organic Horizon (O)

- Organic horizon is made mostly of decomposing plant matter known as humus.
- This layer varies in size, and not all soil profiles include an organic layer.

## Topsoil Horizon (A)

- This horizon is made of both minerals & humus.
- Great place for plants & other organisms to live.
- Most fertile layer, ideal for plant growth.



Organic Horizon (O)



Topsoil Horizon (A)



Subsoil Horizon (B)



Parent Horizon (C)



Bedrock Horizon (R)

## Parent Horizon (C)

- Consists of partially weathered parent rock.
- Plays a crucial role in providing water and nutrients to the upper layers through weathering.

## Subsoil Horizon (B)

Horizon B is rich in mineral matter that has been leached from the horizons above it.

## Bedrock Horizon (R)

- Composed of unweathered rock and it is not technically part of the soil.
- Lowest layer of soil and is made up of tightly bound, unbreakable rock



# CROPS

## FOOD CROPS

### FINE GRAIN CROPS



Smaller in size and often used for human consumption.



WHEAT



RICE



OATS

### COARSE GRAIN CROPS



Larger, more fibrous, often used as animal feed or in brewing.



JOWAR



RAGI



BAJRA  
(MILLETS)



RICE (PADDY)



SUGARCANE



COFFEE

### EXCESS RAINFALL CROPS

BANANA



JUTE



TEA





SUGARCANE

COTTON



TOBACCO

## CASH CROPS

Grown for sale rather than personal consumption.

RUBBER



JUTE



COCOA



TEA

**GREEN TEA**  
UNFERMENTED LEAVES  
**BLACK TEA**  
FERMENTED LEAVES



COFFEE

## PLANTATION CROPS

Grown on a large scale for commercial purposes, often in tropical regions.



RUBBER



BANANA



COCONUT



FARMERS ADVISED TO ADD  
GYPSUM TO SOLVE THE  
PROBLEM OF SALINITY IN SOIL.



RICE (PADDY)



JOWAR



BAJRA



WHEAT

## RAINFED CROPS

Depend entirely on natural rainfall for their water supply, without irrigation.



MILLET

## PERMANENT CROPS



COFFEE



RUBBER



TEA

## FIBRE CROPS



COTTON



JUTE



COIR



HEMP



PEA



RED GRAM



BLACK GRAM



GREEN GRAM



SOYABEAN

## LEGUMINOUS CROPS

Pulses are protein-rich crops.

## KHARIF CROPS



(MONSOON CROPS)  
(June–September)

Grown during the rainy season.

Hot and humid weather with substantial rainfall.



COTTON



RICE



JUTE



JOWAR



BAJRA



SOYABEAN



GROUNDNUT



MAIZE

## RABI CROPS



(WINTER CROPS)  
(October–March)

Sown after the monsoon in winter.

Dry and cold weather.



WHEAT



GRAM



BARLEY



MUSTARD

## ZAID CROPS



(SUMMER CROPS)  
(April–June)

Grown in short season b/w Rabi and Kharif

Warm, dry weather and irrigation.



WATERMELON



GOURDS



PUMPKIN



VEGETABLES



PEAS



RICE (PADDY)

First Staple Food

China: The Largest Rice Producer in the World

West Bengal: The Largest Rice Producer in India

Varieties of rice: Aus, Aman, and Boro

Kharif crops: Wet & warm tropical humid area

Grown in: River valleys, coastal plain, delta

**China: The Largest wheat Producer in the World**

**Uttar Pradesh: The Largest Producer in India**

**Moderate Rainfall: 75cm to 100cm**

**Rabi crops, requires Cold climate**

**N:P:K ratio of 4:2:1**



**WHEAT**

**Second Staple Food**



**Major Producers: USA, China, Brazil, India**

**States: Karnataka, A.P, Bihar, Maharashtra, M.P**

**Kharif crops: Food, Fodder, Starch, Ethanol**

**Warm Temperature: 21 to 27° Celsius**

**MAIZE**

**Irrigation Needs**

**Major Producers: Russia, Germany, Canada**

**States: Rajasthan, U.P, M.P, Haryana, Punjab**

**Harvesting Time: April-May in India**

**Rabi crops: cool & dry conditions, Temp. 12-15°C**

**Uses: food, animal fodder, brewing (beer)**



**BARLEY**

**Drought Resistance**



**Major Producers: India, China, USA, Brazil, Pak.**

**States: Gujarat, Maharashtra, Telangana, A.P, M.P**

**Light to moderate rainfall (50-100 cm)**

**Kharif crops: Warm temperature 21-30°C**

**Narma: Long Staple cotton**

**COTTON**

**Drought Tolerant**

**Major Producers:** India, Nigeria, China, Niger

**States:** Rajasthan, Karnataka, Maharashtra, U.P

**Hot & less fertile:** Low rainfall (40–50 cm)

**Kharif crops:** Short duration (3 months)

**Types:** Bajra, Ragi, Sorghum (Jowar)



## MILLET

**Drought Resistance**



**Major Producers:** India, Nepal, Ethiopia, Uganda

**States:** Karnataka, A.P, Tamil Nadu

**Moderate rainfall (50–75 cm)**

**Kharif crops:** Cool & dry conditions

**Nutrition:** Calcium, High fiber, Gluten-free

## RAGI

**Drought Tolerant**



**Major Producers:** India, Bangladesh, China

**States:** West Bengal, Bihar, Assam, Odisha, A.P

**Moderate to heavy rainfall (150–250 cm)**

**Kharif crops:** Warm temp. 24–35°C high humidity.

**Harvesting Time:** 120–150 days after sowing

## JUTE

**Biodegradable**



**Major Producers:** Brazil, India, China, Thailand

**States:** U.P, Maharashtra, Karnataka, Tamil Nadu

**Rainfall:** 75–150 cm, Dry areas: Irrigation

**Kharif crops:** Hot & humid conditions (21–35°C)

**Sugar production (jaggery, white & brown sugar)**

## SUGARCANE

**Needs Irrigation**

**Major Producers:** Brazil, Vietnam, Colombia

**States:** Karnataka, Kerala, T.N (Western Ghats)

**Grows under shade trees, rainfall (150-250 cm)**

**Plantation crop: Cool to warm temp.(15-28°C)**



## COFFEE

**TYPES:**

Arabica (Superior)

Robusta (Stronger)

Liberica

**1st came Portuguese (1508)**



**Major Producers:** China, India, Brazil, USA

**Cultivation Regions:** Tropical & subtropical region

**Moderate rainfall (50-100 cm)**

**Commercial cash crop: warm temp. (20-30°C)**

## TOBACCO

**Major Producers:** Thailand, Indonesia, Vietnam

**Kerala:** Largest producer, first rubber plantation

**Year-round rainfall more than 200 cm**

**Plantation crop: Hot, humid conditions**

**"Cash crop- latex extracted from the tree processed into various rubber products**



## RUBBER

**Deforestation**

**Requires high humidity & specific soil conditions**



**Major Producers:** China, India, Kenya, Sri Lanka

**Assam:** Largest producer, first tea plantation

**Moderate rainfall (150-300 cm)**

**Plantation crop: cool temperatures (10-30°C)**

## TEA

**Caffeine, Tannin**

**States: West Bengal (Darjeeling), Tamil Nadu**



## COCONUT

Irrigation

Major Producers: Indonesia, Philippines, India

States: Karnataka, Tamil Nadu, Kerala,

Plantation crop: Hot, humid conditions

Major economic resource for tropical regions

# SHIFTING CULTIVATION

Slash-and-Burn Agriculture

land is cleared by burning vegetation

Used for a few years, left fallow to regenerate

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NAME	COUNTRIES
ROCCA	BRAZIL
LADANG	INDONESIA/MALAYSIA
MILPA	MEXICO/CENTRAL AMERICA
CAINGIN	PHILIPPINES
RAY	VIETNAM
TAMRAI	THAILAND
CONUCO	VENEZUELA
CHENA	SRI LANKA
MASOLE	CONGO,ZAIRE(C.AFRICA)
TAUNGYA	MYANMAR
HAY	LAOS

NAME	STATE
JHUM	NORTHEAST
POONAM	KERALA
PODU	A.P, ODISHA
BEEWAR	M.P
MASHAN	M.P
PENDA	M.P
BEERA	M.P

## GRASSLAND

NAME	STATE
MARG	KASHMIR
BUGYAL	UTTARAKHAND
KHAJJAR	HIMACHAL P.
UKHRUL	MANIPUR
SARAMATI	NAGALAND
DZUKOU	MANIPUR & NAGALAND

## DRYLAND FARMING



Less than 75cm rainfall.

Ex: Ragi, Moong, Gram, Gaur, Bajra

## SUBSISTENCE FARMING



Farmers grow crops mainly for their own consumption.

## MIXED FARMING



Equal emphasis is laid on crop cultivation and animal husbandry.

## INTENSIVE FARMING



High-yield farming with maximum input on small land areas.

## WETLAND FARMING



Excess rainfall.

Ex: Rice, Jute, Sugarcane

## COMMERCIAL FARMING



Large-scale farming for profit using modern techniques.

## ORGANIC FARMING



Farming without synthetic chemicals, using natural fertilizers.

## EXTENSIVE FARMING



Large-scale farming with minimal input per unit of land.

# REVOLUTIONS IN INDIA

## RED REVOLUTION

Meat, Tomato Production



## SILVER FIBRE REVOLUTION

Cotton Production



## YELLOW REVOLUTION

Oil Seed Production



## RAINBOW REVOLUTION

An integral development program of agriculture, horticulture, forestry, sugarcane, fishery, poultry & animal husbandry.

## WHITE REVOLUTION

Dairy, Milk Production



## BLUE REVOLUTION

Fish Production



## GOLDEN REVOLUTION

Overall Horticulture, Honey, Fruit Production

## GREY REVOLUTION

Fertilizers



## ROUND REVOLUTION

Potato Production



## SILVER REVOLUTION

Egg Production



## PROTEIN REVOLUTION

Higher Production (Tech. driven 2nd Green revolution)

## BLACK REVOLUTION

Petroleum Production



## BROWN REVOLUTION

Leather, Cocoa Production



## GOLDEN FIBRE REVOLUTION

Jute Production



## GREEN REVOLUTION

Food Grains



## PINK REVOLUTION

Onions/Prawn/ Drugs/Pharmaceuticals



# VEGETATION OF INDIA



## VEGETATION TYPES DEPENDS ON PRECIPITATION

### EVERGREEN RAIN FOREST

200 cm & more (apx.)

### DRY DECIDUOUS FOREST

70 to 100cm (apx.)

### DESERT (ARID) FOREST

Below 25cm (apx.)

### MOIST DECIDUOUS FOREST

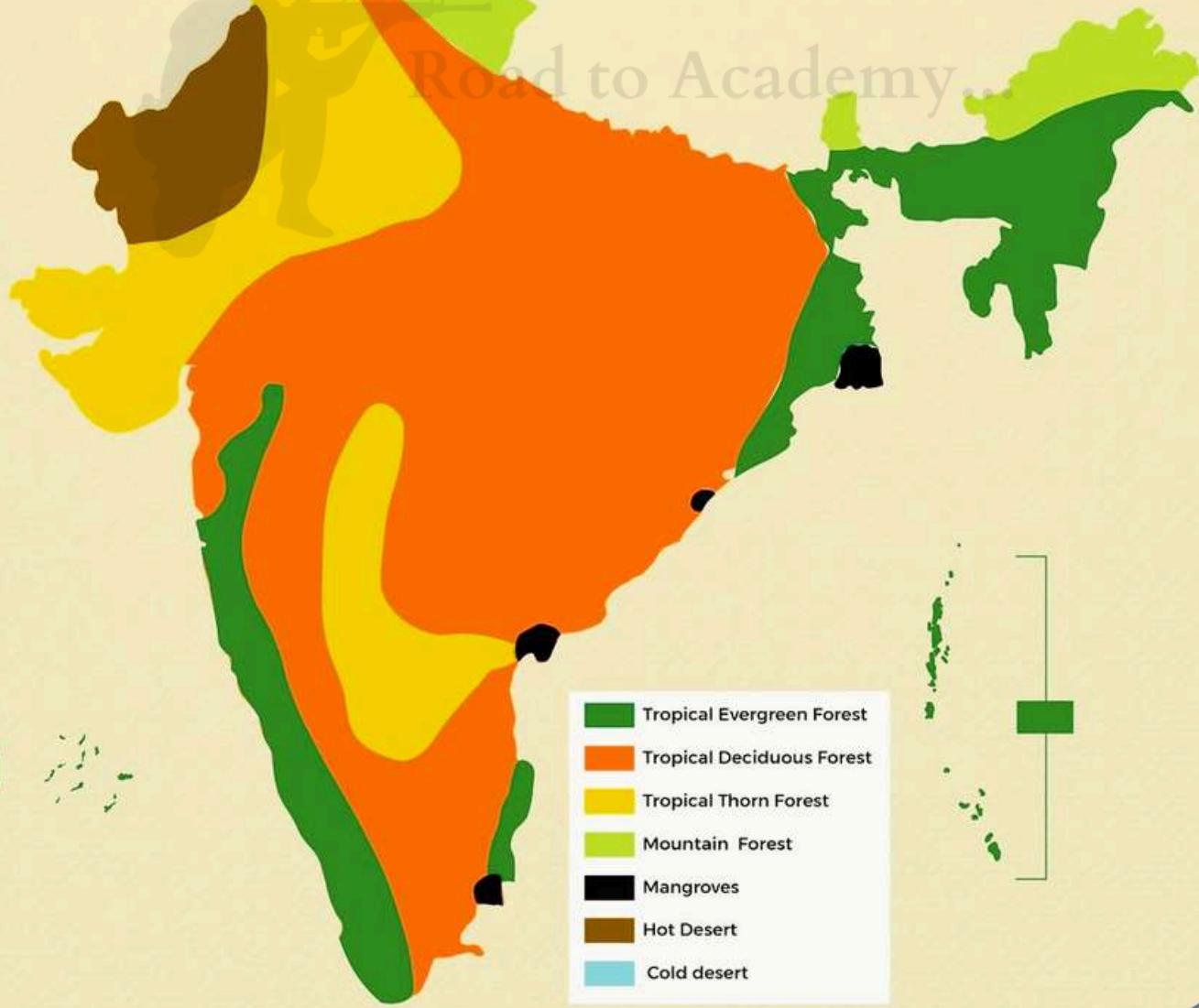
100 to 200 cm (apx.)

### SEMI ARID FOREST

25 to 50cm (apx.)

## INDIA

### Natural Vegetation





## TROPICAL EVERGREEN FOREST

Temperature: 25° to 27°C

Maximum tree diversity, rainfall more than 200cm

Trees do not shed their leaves, dense green canopy.

Well Stratified, Trees reach great height 60m or above)

Western Ghats (Western side), Purvanchal hills, Andaman & Nicobar



ROSEWOOD



MAHOGANY



AINI



EBONY



## SEMI-EVERGREEN FOREST

Temperature: 25° to 27°C

Transition between evergreen and deciduous forests

Some trees shed their leaves during dry months

Rainfall: 200 cm approx, less dense canopy

Western Ghats, Northeast India (Assam, A.P, Meghalaya)



WHITE CEDAR



RUBBER



HOLLOCK



BAMBOO



KAIL



## TROPICAL (MOIST) DECIDUOUS FOREST

Temperature: Avg. 27°C

Shed their leaves for short period during dry season

Rainfall: 100 to 200cm, less dense canopy

Western Ghats (Eastern slope), Foothills of Himalayas, Odisha



SEMUL



SANDALWOOD



TEAK



SAL



SHISHAM



AMLA



KUSUM



MAHUA



Transition b/w moist deciduous and thorny forests

Trees shed their leaves during summer

Rainfall: 70 to 100cm

Found in rainier areas of Peninsula and plains of UP and Bihar.

## TROPICAL (DRY) DECIDUOUS FOREST

Temperature: Avg. 27°C



AMALTAS



TENDU

AXLEWOOD



PALAS



BEL



KHAIR



Thorny trees, bushes, xerophytic plants

Plants remain leafless for most part of the year  
(expression of scrub vegetation).

Rainfall: Less than 50cm (drought-resistant)

Rajasthan, Gujarat, Haryana, Punjab, parts of M.P



BABOOL



BER



NEEM



KHAIR



KHEJRI



PALAS



Also called Wetland forest

## LITTORAL FORESTS

Shore of sea & lake

## SWAMP FORESTS

Delta of Ganga, Mahanadi, Cauvery, Godavari, Krishna

## LITTORAL AND SWAMP FORESTS

The country's wetlands have been grouped into eight categories:

Reservoirs of the Deccan Plateau in the south together with the lagoons and other wetlands of the southern west coast

Freshwater marshes of the Gangetic Plain

Vast saline expanses of Rajasthan, Gujarat, and the Gulf of Kutch

Floodplains of the Brahmaputra; marshes and swamps in the hills of northeast India and the Himalayan foothills

Freshwater lakes and reservoirs from Gujarat eastwards through Rajasthan (Keoladeo National Park) and Madhya Pradesh

Lakes and rivers of the montane region of Kashmir and Ladakh

Delta wetlands and lagoons of India's east coast (Chilika Lake)

Mangrove forest and other wetlands of the island arcs of the Andaman and Nicobar Islands



Rainfall: 150 to 300cm, mountainous regions

Chinar and walnut trees: Kashmir handicrafts

Southern mountain forests: Western Ghats, Vindhya, Nilgiris



PINES



SAL



OAK



CHESTNUT

## MONTANE FORESTS

Cooler temperatures  
(11° - 14° C)

Alpine trees found in high-altitude (3000 - 4000m)



FIR



RHODODENDRON



PINES



JUNIPER

## TUNDRA

( above 4000m )

Mosses , Lichens

## ALPINE & PASTURE

( 3000-4000m )

Junipers , Pines

## SUBALPINE FORESTS

( 2000- 3000m )

Blue pine & Spruce

## WET TEMPERATE

Evergreen broad leaf trees

( 1000-2000m )

Oak , Chestnut,  
Deodar

## DECIDUOUS FORESTS

Found in the foothills of the Himalayas

( upto 1000m )

Sal, Teak,  
Shisham

7% of world's mangrove forest cover in India



Grows along coast Marshes, Tidal creeks, Mud flats, Estuaries

Highly developed in Andaman & Nicobar Islands and  
Sunderbans of West Bengal.

Other significant areas: Mahanadi, Krishna and Godavari deltas.

## MANGROVE FOREST

Temperature: 25 - 35°C



KRISHNA GODAVARI MANGROVES



SUNDERBANS

# INDIA HAS FOUR BIODIVERSITY HOTSPOTS



HIMALAYAS



WESTERN GHATS



INDO-BURMA REGION



SUNDALAND  
(A&N ISLANDS)

## FACTORS AFFECTING BIODIVERSITY



CLIMATE CHANGE



POLLUTION

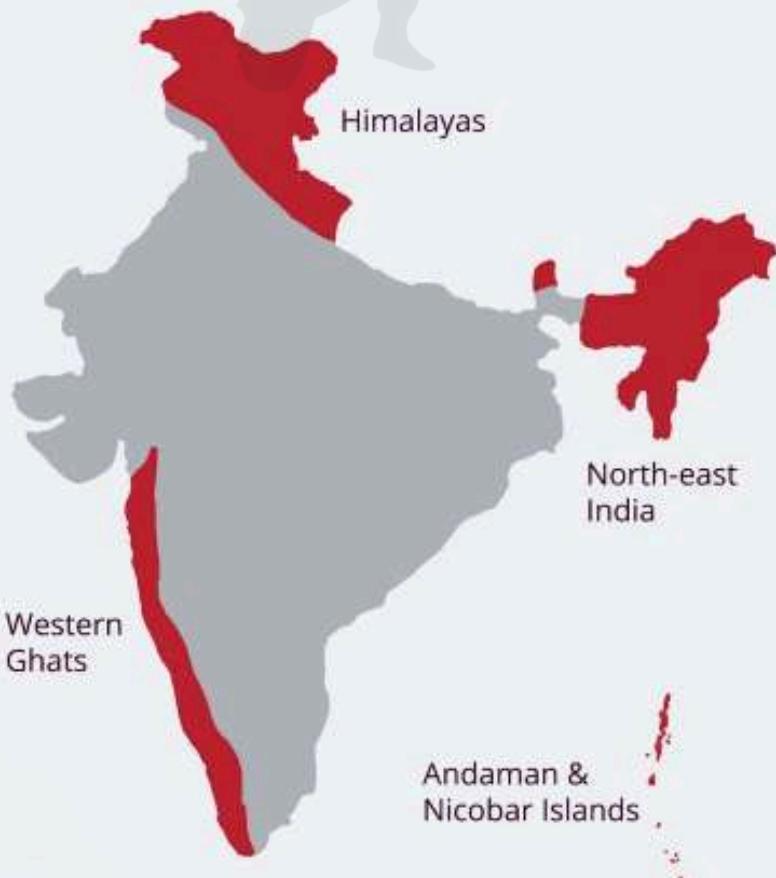


OVEREXPLOITATION



HABITAT LOSS

## INDIA'S BIODIVERSITY HOTSPOTS IN BRIEF



Total number of biodiversity hotspots:

4

Total combined geographical area-

24.46%

## FOREST ACT 1878

### DIVIDED FORESTS OF INDIA

#### RESERVED FORESTS

- Completely state government controlled forests.
- Most restricted

#### PROTECTED FORESTS

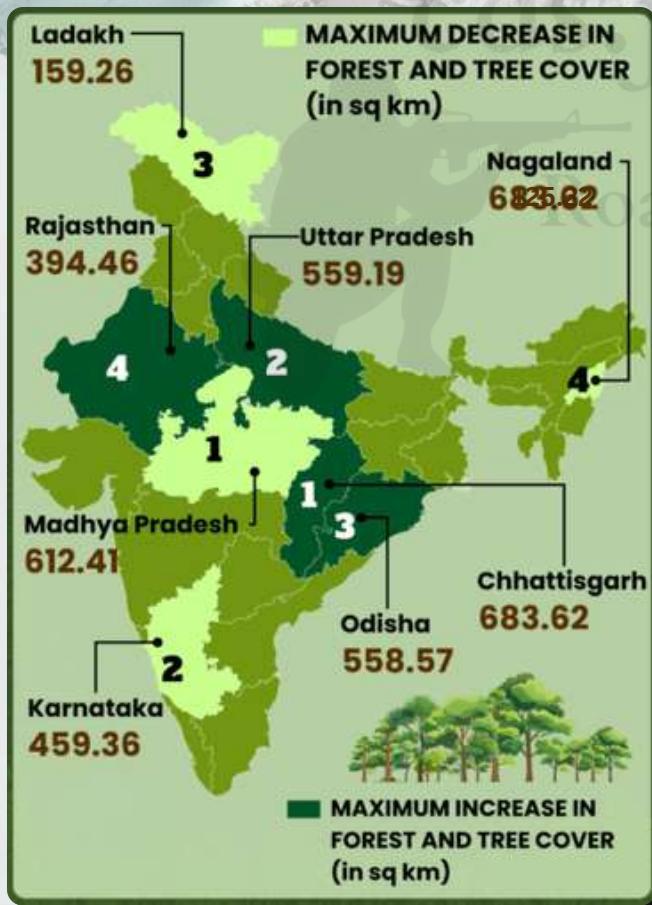
- Partly state government controlled.
- No restriction on entry.
- Native tribal people live here.

#### VILLAGE FORESTS

- State govt. may assign any village community.
- Open forest for tribals & villagers.

### FOREST ACT 1927 (AMENDED)

- Aimed to regulate the movement of forest produce and duty leviable forest produce.
- To consolidate & reserve the areas having forest cover or significant wildlife



### INDIA STATE OF FOREST REPORT 2023 (ISFR 2023)

Published biennially (every two years) by the Forest Survey of India (FSI) since 1987.

TOTAL FOREST & TREE COVER: 8,27,357 sq km  
(25.17 %) of the geographical area of the country

FOREST COVER: 7,15,343 sq km  
(21.76%)

TREE COVER: 1,12,014 sq km  
(3.41%)

MANGROVE COVER: 4,992 sq km



#### AREA WISE LARGEST FOREST AND TREE COVER



MADHYA PRADESH



ARUNACHAL PRADESH



MAHARASHTRA



#### FACTS

As compared to assessment of 2021, there is an increase of 1445 sq km in the forest and tree cover of the country which includes 156 sq km increase in the forest cover and 1289 sq km increase in tree cover.



## AREA WISE FOREST COVER



MADHYA PRADESH



ARUNACHAL PRADESH



CHHATTISGARH

## % WISE FOREST COVER



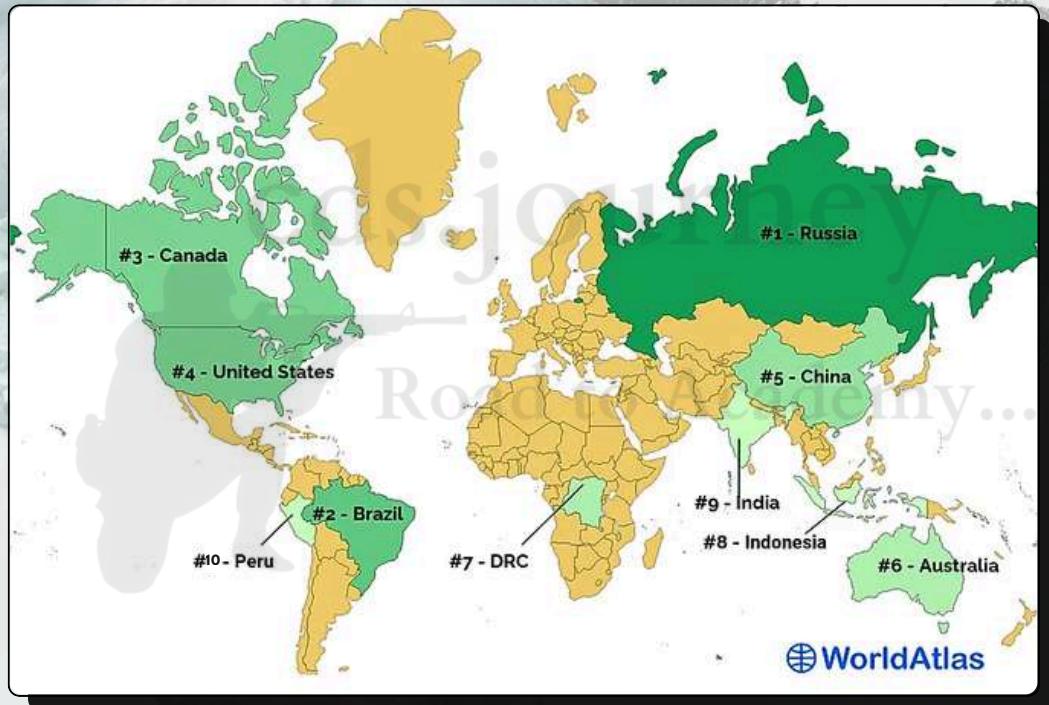
LAKSHADWEEP



MIZORAM



ANDAMAN & NICOBAR ISLAND



## LARGEST COUNTRIES BY FOREST AREA



① RUSSIA



② BRAZIL



③ CANADA



④ USA



⑤ CHINA



⑥ AUSTRALIA



⑧ INDONESIA



⑦ D.R. OF CONGO



⑩ PERU



⑨ INDIA



# BIOSPHERE RESERVE



UNESCO'S Man and Biosphere (MAB) Programme.

OBJECTIVES

CONSERVATION

LOGISTICS

DEVELOPMENT

Biosphere reserve

UNESCO  
Biosphere reserve

## Biosphere Reserves in India

Cold Desert  
Himachal Pradesh

\*Nanda Devi  
Uttarakhand

Kachchh  
Gujarat

\*Pachmarhi,  
Panna  
Madhya Pradesh

\*Achanakmar-  
Amarkantak  
Chhattisgarh,  
Madhya Pradesh

\*Nilgiri  
Karnataka

\*Agasthyamala  
Tamil Nadu & Kerala

\*Khangchendzonga  
Sikkim

Manas, Dibru  
Saikhowa  
Assam

Dehang  
Debang  
Arunachal  
Pradesh

\*Nokrek  
Meghalaya

\*Sunderbans  
West Bengal

Simlipal  
Odisha

Seshachalam  
Andhra Pradesh

\*Gulf of Mannar  
Tamil Nadu

\*Great Nicobar  
Andaman &  
Nicobar Islands

## **NILGIRI BIOSPHERE RESERVE**



BANDIPUR NATIONAL PARK

MUKURTHI NATIONAL PARK

SILENT VALLEY NATIONAL PARK

MUDUMALAI TIGER RESERVE

WAYANAD WILDLIFE SANCTUARY

## **SIMILIPAL BIOSPHERE RESERVE**

HADGARH WILDLIFE SANCTUARY

KULDIHA WILDLIFE SANCTUARY

SIMILIPAL TIGER RESERVE



## **SUNDARBANS BIOSPHERE RESERVE**



SUNDERBANS NATIONAL PARK

SUNDERBANS TIGER RESERVE

LOTHIAN ISLAND WILDLIFE SANCTUARY

SAJNEKHALI WILDLIFE SANCTUARY

HALLIDAY ISLAND WILDLIFE SANCTUARY

## **PANCHMARHI BIOSPHERE RESERVE**

BORI WILDLIFE SANCTUARY

PACHMARHI WILDLIFE SANCTUARY

SATPURA NATIONAL PARK



## **KHANGCHENJUNGA BIOSPHERE RESERVE**

KHANGCHENDZONGA NATIONAL PARK

MAENAM WILDLIFE SANCTUARY

## KACHCHH BIOSPHERE RESERVE



WILD ASS SANCTUARY

BANNI GRASSLANDS RESERVE

NARAYAN SAROVAR SANCTUARY

KUTCH BUSTARD SANCTUARY

CHARI-DHAND WETLAND CONSERVATION

## COLD DESERT

CHANDRA TAAL

KIBBER WILDLIFE SANCTUARY

PIN VALLEY NATIONAL PARK



## AGASTHYAMALAI BIOSPHERE RESERVE



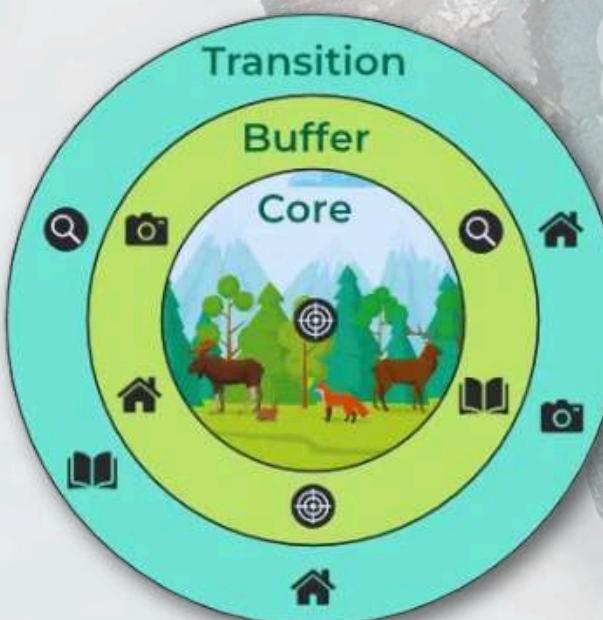
SHENDURNEY WILDLIFE SANCTUARY

KALAKKAD MUNDANTHURAI TIGER RESERVE

PEPPARA WILDLIFE SANCTUARY

NEYYAR WILDLIFE SANCTUARY

## ZONES OF BIOSPHERE RESERVE

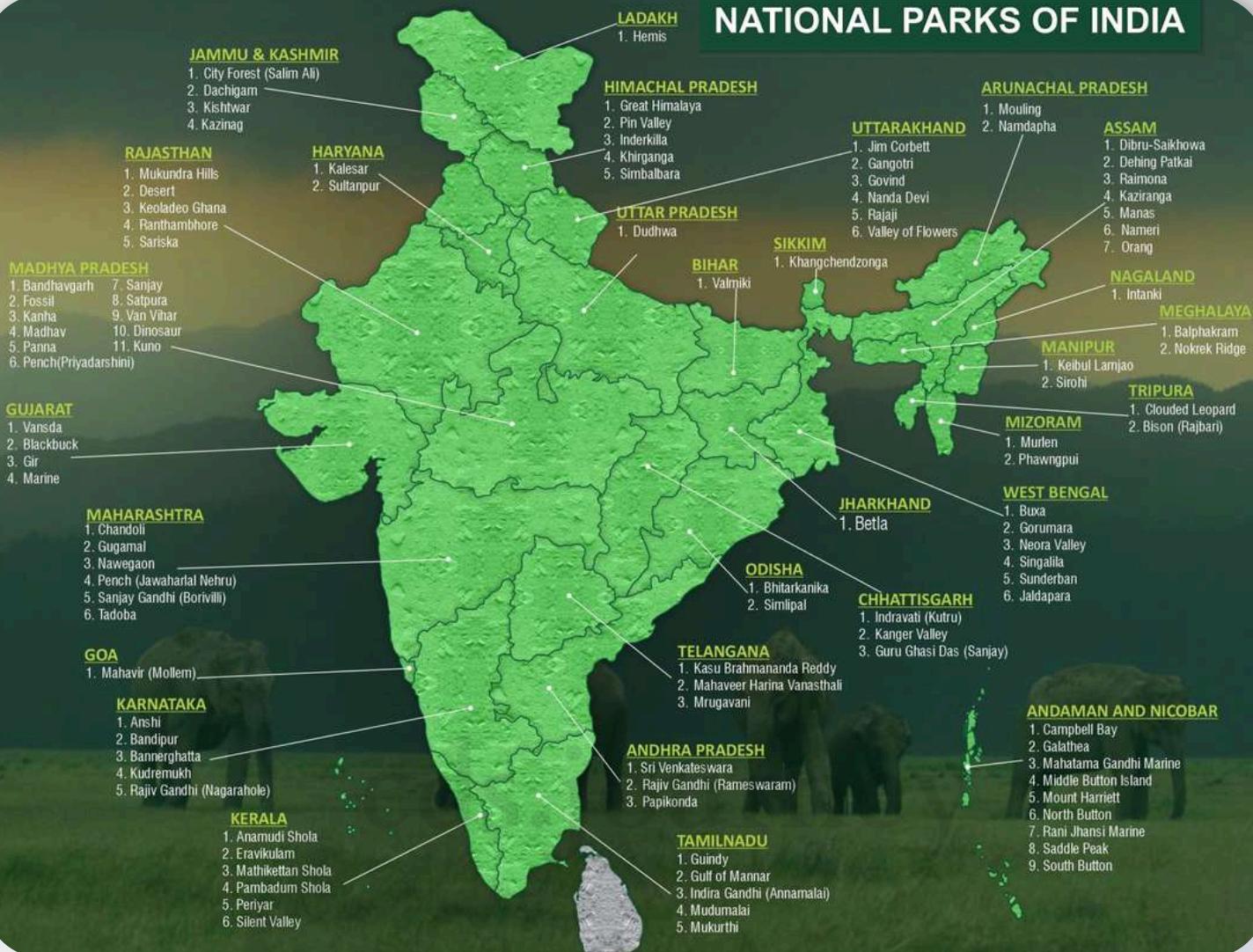


- **Transition Zone:** Outermost area where sustainable human activities like farming and settlements occur.

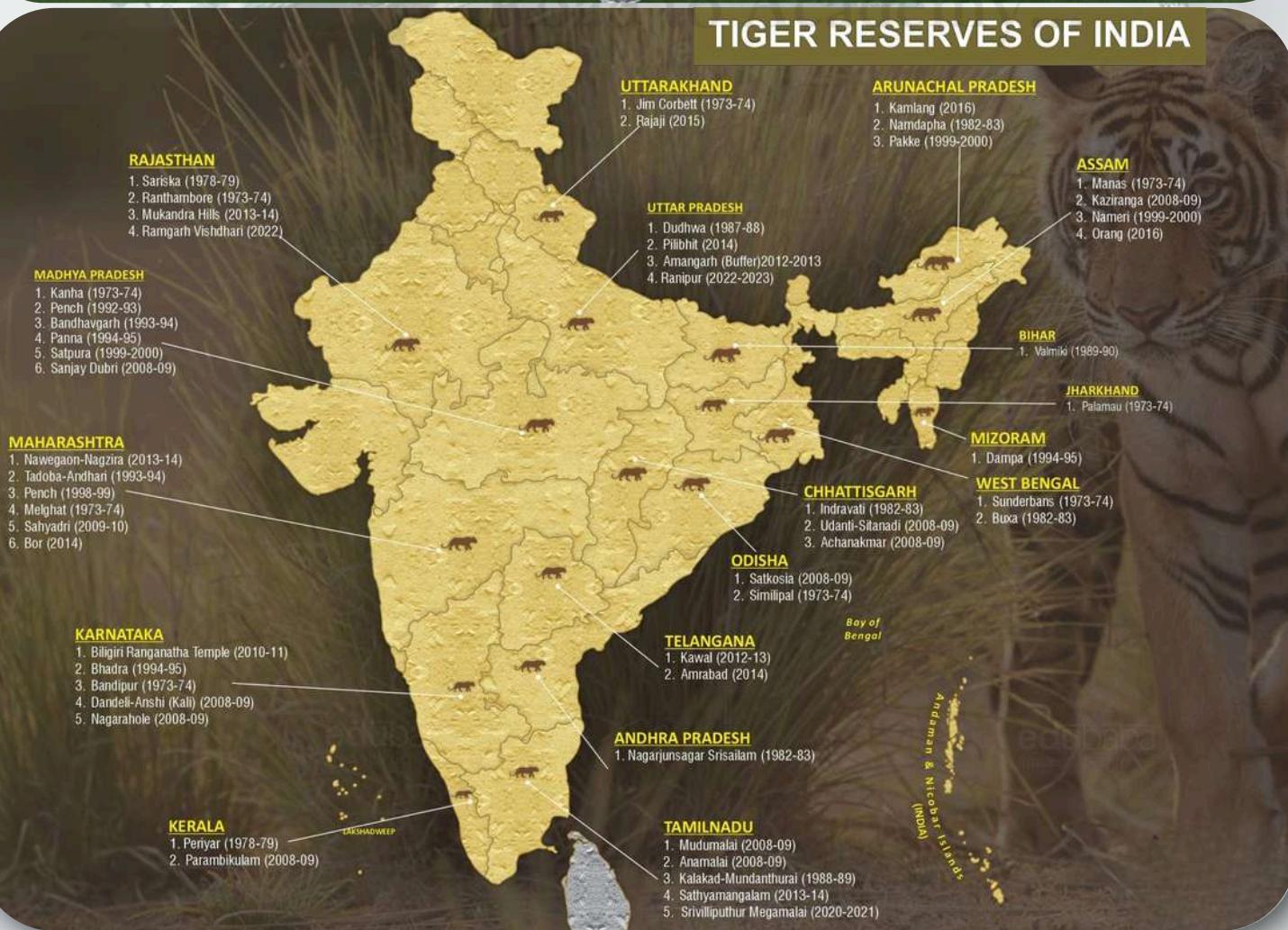
- **Buffer Zone:** Surrounds the core, allowing limited human activities like research and ecotourism.

- **Core Zone:** Strictly protected area for conservation of biodiversity.

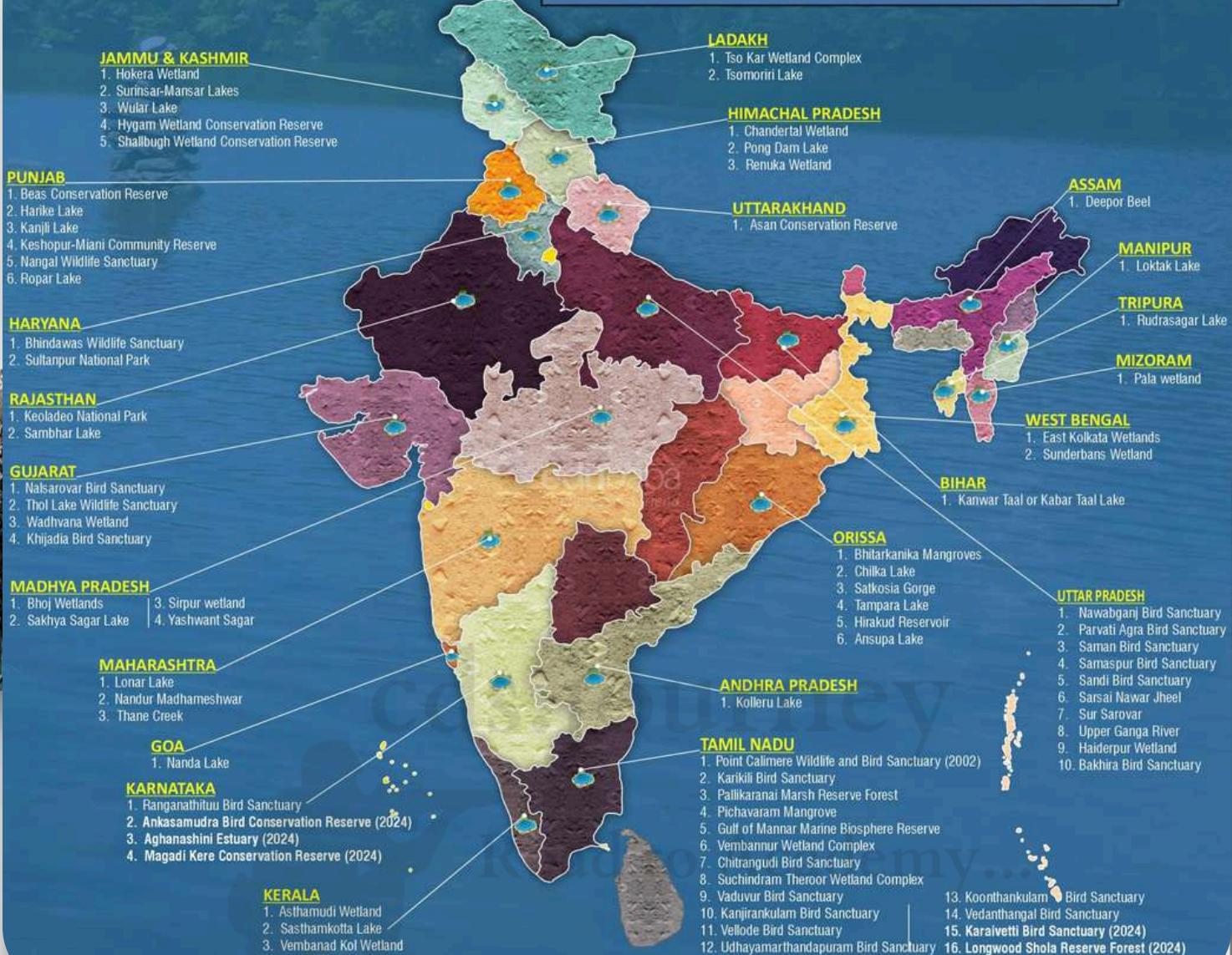
# NATIONAL PARKS OF INDIA



# TIGER RESERVES OF INDIA



# Ramsar Wetland Sites in India : 2024



SHARE YOUR DAILY TARGETS 9198151228

Next number will be yours   
have faith in yourself,  
Be consistent to your  
commitment... 

Update your daily targets on  
 9198151228. 

8 AIR 1 IN THREE YEARS



Arjun  
Afcat Entry

Arpit  
CDS Entry

Harshit  
CDS Entry

Shefali  
NCC Entry

Aaishaniya  
AFCAT Entry

Samyak  
SSC Entry

Tushar  
CDS Entry

Gayatri  
SSC Tech Entry

सर नीचे बस अपनी मेहनत।

# INDIAN CLIMATOLOGY

## FACTORS RESPONSIBLE FOR SOUTH-WEST MONSOON FORMATION:

INTENSE HEATING OF TIBET PLATEAU (L.P) IN SUMMER

H.P FORMATION IN SOUTHERN INDIAN OCEAN

## FACTORS RESPONSIBLE FOR ONSET:

TROPICAL EASTERLY JET

SHIFT IN THE POSITION OF ITCZ

## INTENSITY OF MONSOON DEPEND ON:

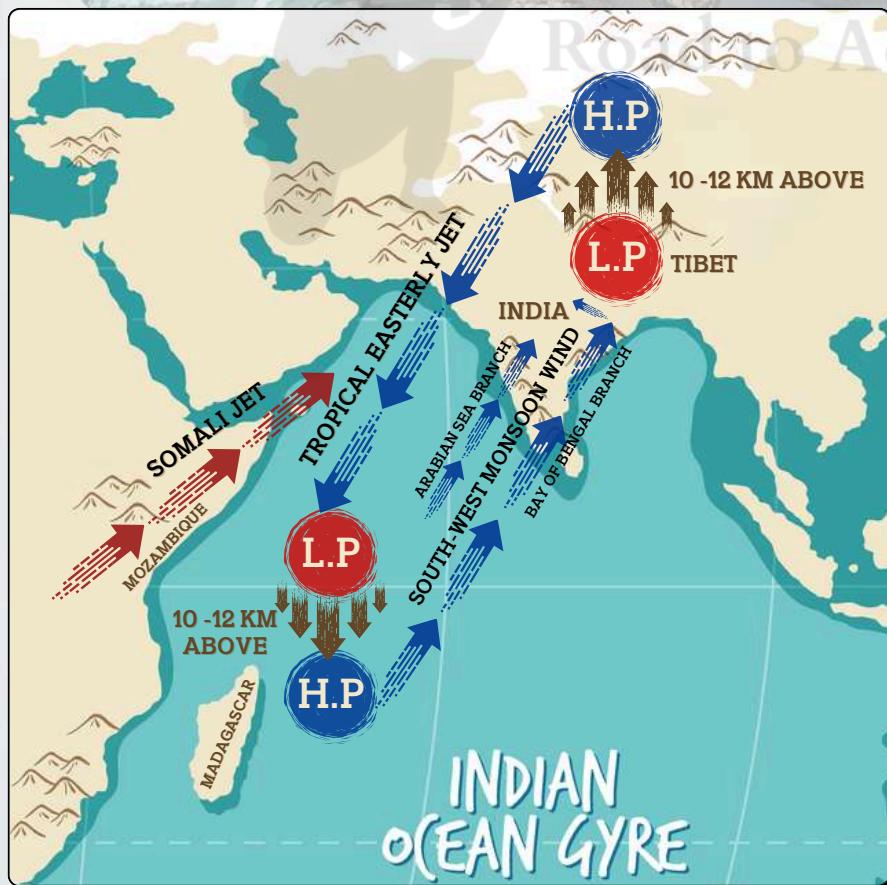
STRENGTH OF L.P.

SOMALI JET

EL NINO

LA NINA

## SOUTH-WEST MONSOON WIND



Arabian Sea Branch and Bay of Bengal Branch meet Amritsar, Punjab.

- Brings heavy rainfall to South Asia, particularly India, b/w June & September.

- Moves in a south-west to north-east direction due to Coriolis effect.

- Intense heating of the Indian subcontinent during summer creates a low-pressure zone.

- High-pressure winds from the Indian Ocean rush towards the land.

- The winds pick up moisture over the ocean, leading to heavy rains.

## BRANCHES OF MONSOON

- Arabian Sea Branch - Brings heavy rainfall to the Western Ghats (Kerala, Karnataka, Maharashtra).

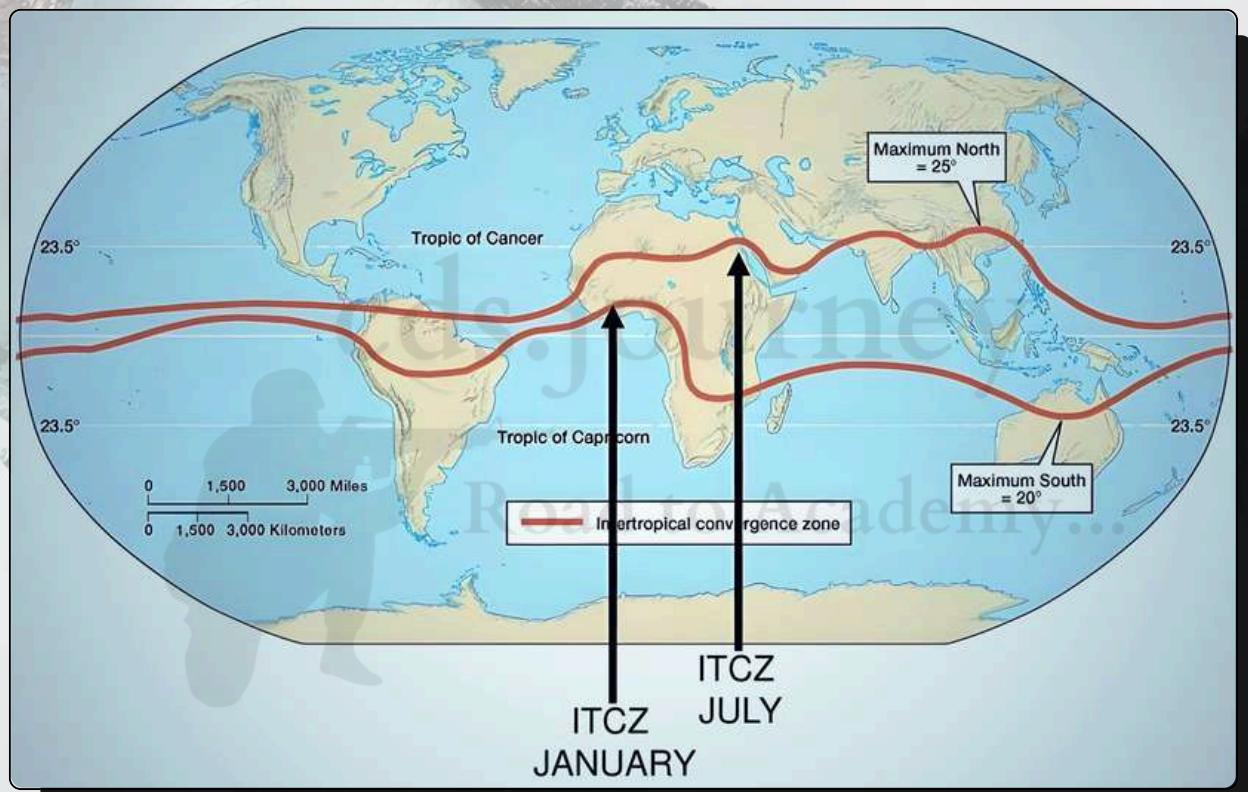
- Bay of Bengal Branch - moves towards Eastern India (West Bengal, Odisha, Northeast), then to North India.

### SOMALI JET

- Low-level, fast-moving wind current over the Arabian Sea.
- Transports moisture-laden winds towards India.
- Strengthening the Southwest Monsoon.
- Flows between 5°N and 15°N latitude, (June–September)

### TROPICAL EASTERLY JET (TEJ)

- Strong upper-level wind current that flows from east to west in the tropical regions.
- Found between 5°N to 20°N latitude, flows over South Asia and Africa.
- Help in Southwest monsoon, heavy rainfall in India.
- In June, Easterly Jet Stream flows over southern part of peninsula.



### INTER-TROPICAL CONVERGENCE ZONE (ITCZ)

- Narrow belt of low pressure, near the equator trade winds from both hemispheres converge.
- Near the equator (5°N - 5°S) but shifts north or south depending on the season.
- Summer - ITCZ moves Northward
- Winter - ITCZ moves Southward
- Rising warm air, cloud formation, and heavy rainfall
- (June–September), moves northward over India, influencing the Southwest Monsoon.

**Did you know?**

### HIGH RAINFALL IN INDIA

- More than 200cm rainfall
- West coast of Western Ghats
- Hills of Meghalaya ( Khasi & Jaintia Hills)
- Andaman and Nicobar islands



## LA NIÑA AFFECTS THE SOUTHWEST MONSOON IN INDIA

- Stronger Monsoon: La Niña generally enhances the Indian Southwest Monsoon (June–September).
- Increased Rainfall: Leads to above-normal rainfall in most parts of India, benefiting agriculture.

### WEATHER IMPACTS:

- More cyclones in the Bay of Bengal
- Colder winters in North India
- La Niña can cause drought conditions in Peru



## EL NIÑO AFFECTS THE SOUTHWEST MONSOON IN INDIA

- Weakened Monsoon: Weakening the Indian Southwest Monsoon, leading to droughts in India.
- Warm water shifts from the western Pacific (near Australia) to the eastern Pacific (near South America).

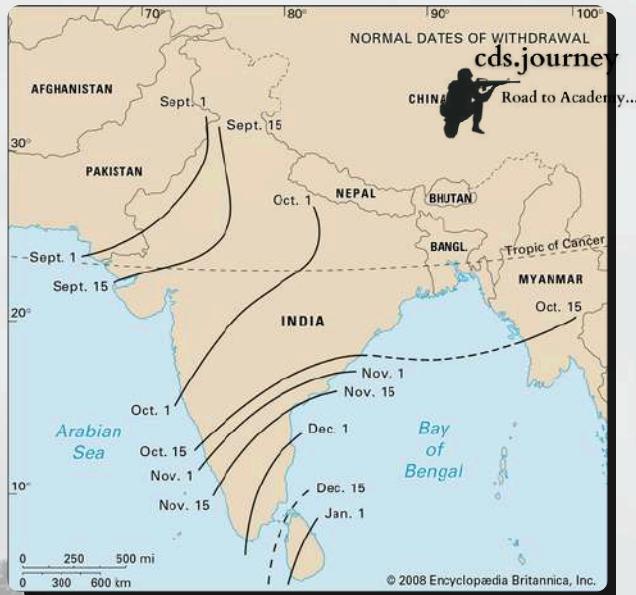
Appears every 3 to 7 years

- Distortion of equatorial atmospheric circulation
- Irregularities in the evaporation of seawater
- Reduction in plankton, reduced fish in the sea



## WESTERN DISTURBANCES

- Extratropical storms originating in the Mediterranean region.
- Winter Rainfall in North India: Punjab, Haryana, Delhi, Uttar Pradesh, Rajasthan.



## NORTHEAST (RETREATING) MONSOON

- Occurs between October and December.
- When the Southwest Monsoon withdraws and winds shift direction.
- Affects mainly Tamil Nadu, Andhra Pradesh, and Puducherry.

# FAMOUS LOCAL THUNDERSTORMS IN INDIA



# ARRIVAL OF MONSOON IN INDIA

## AREAS WITH SCANTY RAINFALL IN INDIA



## AREAS WITH HEAVY RAINFALL IN INDIA

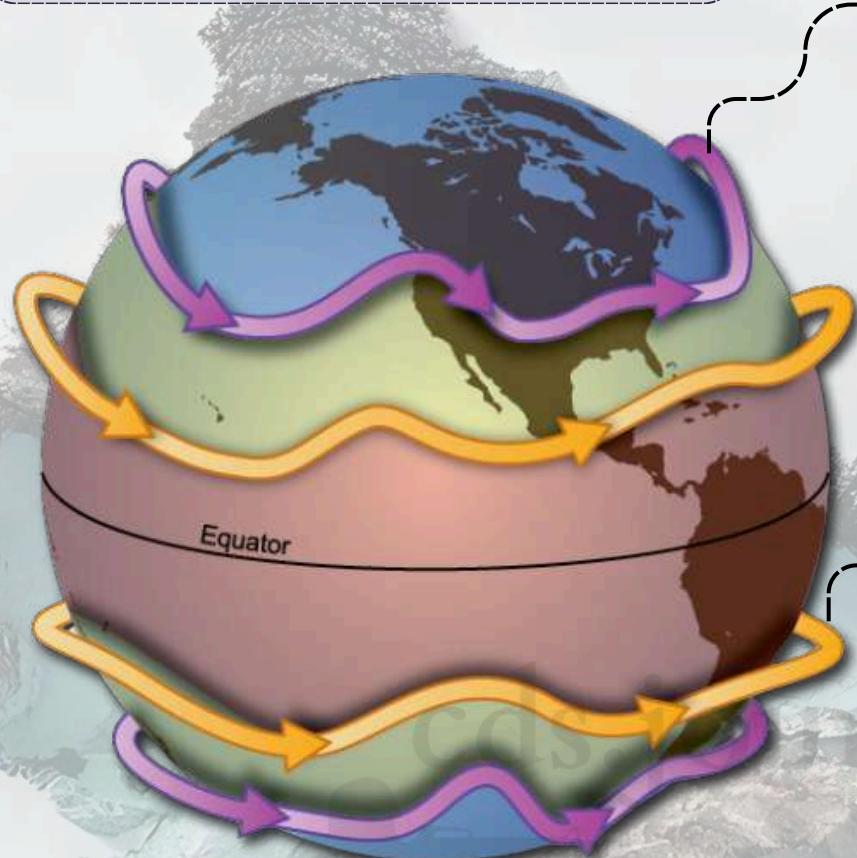


### MEDITERRANEAN CLIMATE

MODERATE TEMPERATURE RANGE WITH WARM, DRY SUMMERS AND MILD, WET WINTERS

SHARE YOUR DAILY TARGETS 9198151228

# JET STREAMS



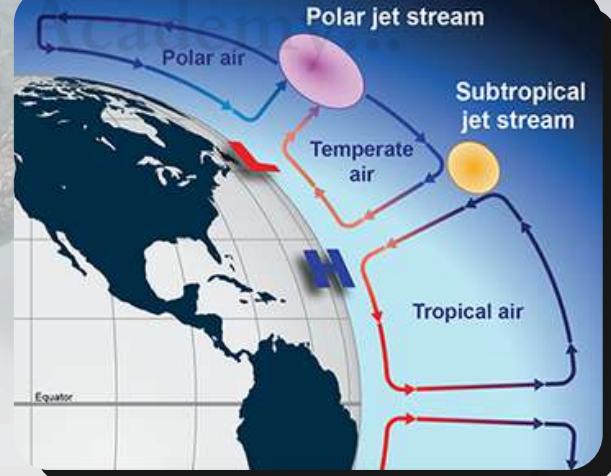
## POLAR JET STREAM

- MORE STRONGER THAN SUBTROPICAL WESTERLY JET.
- BECAUSE TEMPERATURE DIFFERENCE BETWEEN WINDS COMING FROM  $30^{\circ}$  AND  $90^{\circ}$  IS COMPARATIVELY HIGHER
- MORE MEANDERING IS FOUND IN POLAR JET STREAMS

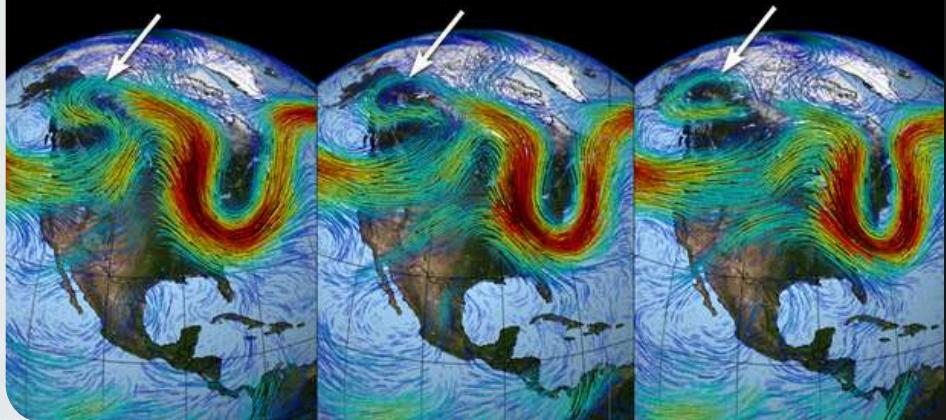
## SUBTROPICAL WESTERLY JET

- PRESENT IN WINTER, INFLUENCES WESTERN DISTURBANCES,
- BRINGING RAIN & SNOWFALL TO NORTH INDIA.

- JET STREAMS ARE NARROW BANDS OF FAST-MOVING WINDS IN THE UPPER TROPOSPHERE (9 - 16 KM ALTITUDE).
- THEY BLOW FROM WEST TO EAST AND INFLUENCE WEATHER AND CLIMATE GLOBALLY.
- CAN CAUSE HEATWAVES, COLD WAVES, CYCLONES, AND SUDDEN WEATHER CHANGES.
- STRONG JET STREAMS INFLUENCE AVIATION, INCREASING OR DECREASING FLIGHT SPEEDS.



### HOW JET STREAMS ARE RESPONSIBLE FOR CYCLONES



THE PRESSURE BELTS KEEP SHIFTING AND BECAUSE OF THEM THE PRESSURE ALSO KEEPS SHIFTING

# KÖPPEN CLIMATE CLASSIFICATION

## FIVE MAIN GROUPS OF THE KÖPPEN CLIMATE CLASSIFICATION

### ON THE BASIS OF TEMPERATURE



#### A - TROPIC

Avg. temp. in coldest month 18°C or higher



#### C - WARM TEMPERATURE

Avg. temp. in coldest months below 18°C



#### D - COLD SNOW FOREST CLIMATE

Avg. temp. in coldest months -3°C or less



#### E - COLD CLIMATES

Cold due to elevation all months below 10°C

### ON THE BASIS OF PRECIPITATION



#### B - DRY CLIMATE

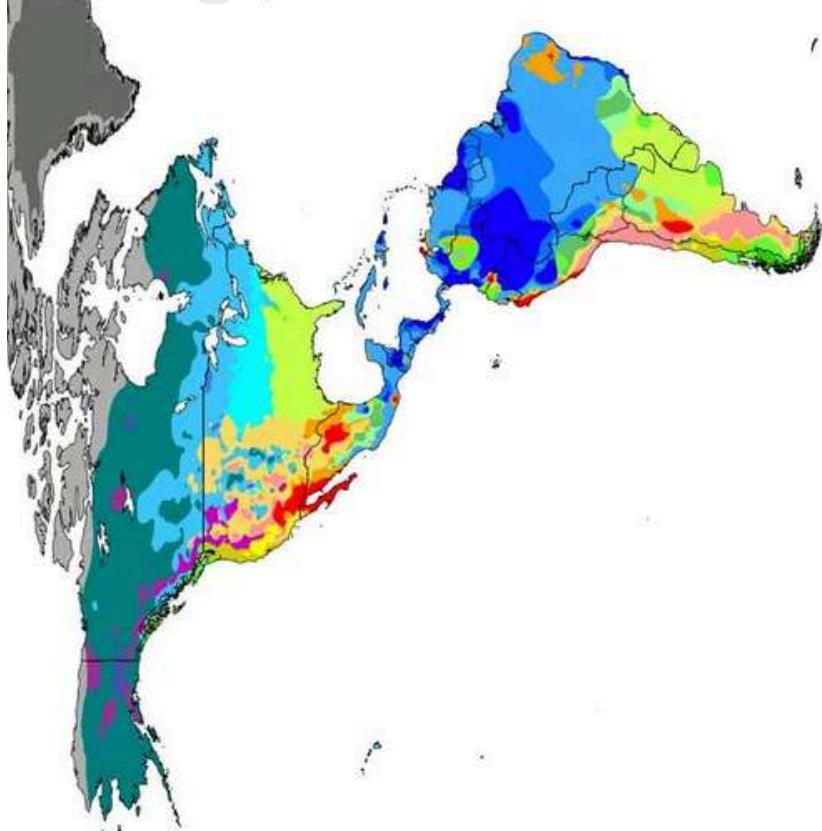
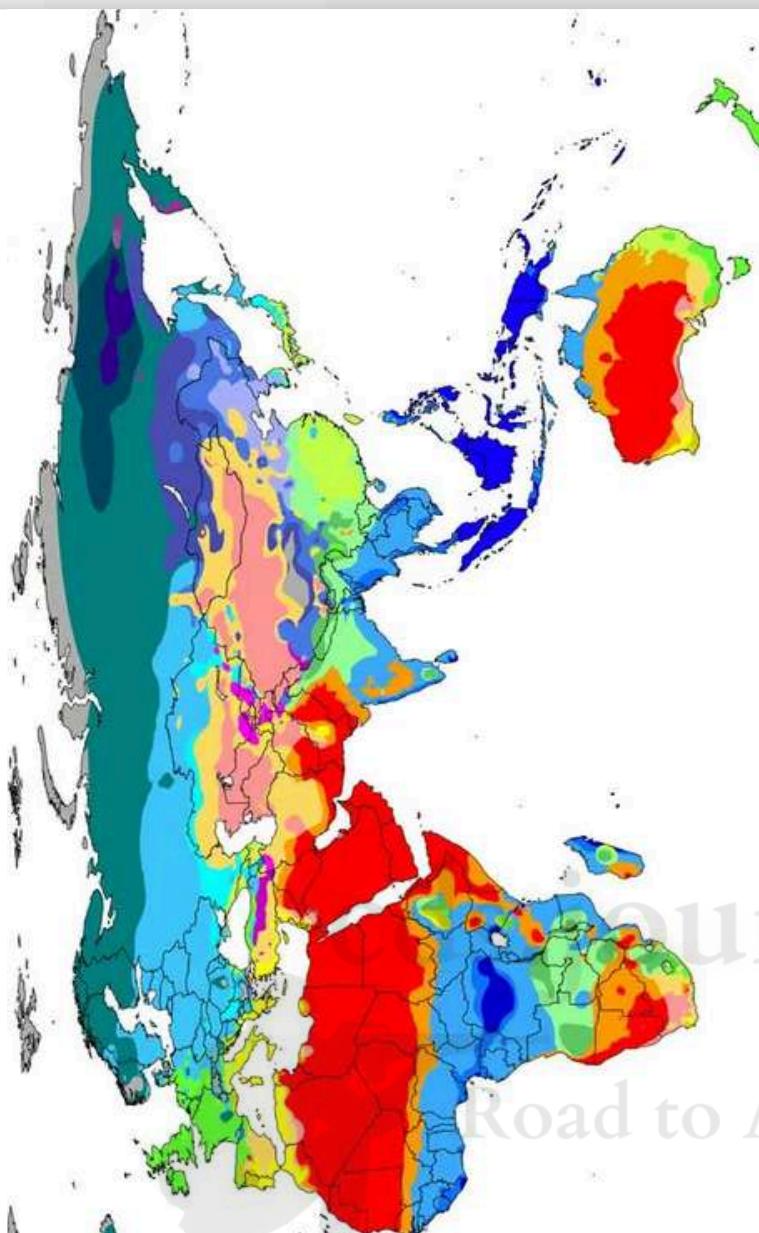
More Evaporation > Less Precipitation

S  
(Semi - arid)

W  
(Desert - arid)



GROUP	TYPE	Letter Code	CHARACTERISTICS
A Tropical Humid Climate	Tropical wet	Af	No dry season
	Tropical monsoon	Am	Monsoonal, short dry season
	Tropical wet and dry	Aw	Winter dry season
B Dry Climate	Subtropical steppe	BSh	Low-latitude semi arid or dry
	Subtropical desert	BWh	Low-latitude arid or dry
	Mid-latitude steppe	BSk	Mid-latitude semi arid or dry
	Mid-latitude desert	BWk	Mid-latitude arid or dry
C Warm temperate (Midlatitude) Climates	Humid subtropical	Cfa	No dry season, warm summer
	Mediterranean	Cs	Dry hot summer
	Marine west coast	Cfb	No dry season, warm and cool summer
D Cold Snow forest Climates	Humid continental	Df	No dry season, severe winter
	Subarctic	Dw	Winter dry and very severe
E Cold Climates	Tundra	ET	No true summer
	Polar ice cap	EF	Perennial ice
H - Highland	Highland	H	Highland with snow cover



Af	BWh	Csa	Cfa	Dfa	Dwa	Dsa	Dfb	Dwb	Dsc	Dsd	Dwd	Dfd	ET	EF
Am	BWk	Csb	Cfb	Dsb	Dsa	Dsb	Dfb	Dwb	Dsc	Dsc	Ddc	Dfd		
Aw		Cwa	Cwb	Dwa	Dsa	Dsb	Dfb	Dwb	Dsc	Dsc	Ddc	Dfd		
		Cfc	Cwc	Dfa	Dsa	Dsb	Dfb	Dwb	Dsc	Dsc	Ddc	Dfd		
		BSk	BSh	Dfa	Dsa	Dsb	Dfb	Dwb	Dsc	Dsc	Ddc	Dfd		



## GROUP A : TROPICAL HUMID CLIMATES

- Between Tropic of Cancer and Tropic of Capricorn.
- Hot and humid climate, high rainfall



### TROPICAL WET CLIMATE (Af)

- High temp. & rainfall all year
- Rainfall exceeds evaporation
- Found near the equator
- Ex: Amazon Basin, Western Equatorial Africa

### TROPICAL MONSOON CLIMATE (Am)

- High temp. wet & dry season
- Heavy rainfall in summer
- Found in coastal region
- Ex: Indian sub-continent, Northern Australia

### TROPICAL WET AND DRY CLIMATE (Aw)

- Shorter: Wet season
- Longer: Dry season (drought)
- Less rainfall than Af & Am
- Ex: South of Amazon forest (Brazil), Paraguay (S. America)



## GROUP B : DRY CLIMATES

- Very low rainfall

- Extending over large latitudes from 15° - 60° north & south of equator
- Low latitudes, 15° - 30° N & S, they occur in the area of subtropical high pressure belt
- Middle latitudes, 35° - 60° N & S, confined to the interior of continents



### SUBTROPICAL STEPPE (BSh)

### SUBTROPICAL DESERT (BWh)

- Semi-arid with moderate, unreliable rainfall
- Hot summers, mild winters, with grasslands
- Found in transition zones between deserts and humid regions (Sahel, U.S. Great Plains)

- Extremely hot and dry with little rainfall
- Clear skies, intense daytime heat, cool nights
- Found in major deserts like (Sahara, Arabian, and Australian deserts)



- Governed by topography, (elevation rather than latitude)

- Precipitation varies based on slope, wind direction, altitude

- Supports diverse vegetation zones (e.g., montane, alpine)

## GROUP H : HIGHLAND CLIMATES

- Temperature decreases with altitude

- Found in major mountain ranges (Himalayas, Rockies, Andes)

### GROUP C: WARM TEMPERATE (MID-LATITUDE) CLIMATES



- Warm summers with mild winters
- Between 30° - 50° latitude, on eastern & western continental margins



#### HUMID SUBTROPICAL CLIMATE (Cfa)

- Rainfall all year (75-150 cm)
- Summer(27°C): Thunderstorms
- Winter(5°-12°C): frontal rainfall
- Eastern U.S., China, Japan, Argentina, coastal South Africa, eastern Australia

#### MEDITERRANEAN CLIMATE (Cs)

- Hot, dry summers 25°C
- Mild, rainy winters 10°C
- Annual rainfall: 35-90 cm
- Mediterranean region, California, Chile, Australia's coasts

#### MARINE WEST COAST CLIMATE (Cfb)

- Moderate temperature all year
- Summer: 15°-20°C, Winter: 4°-10°C
- Rainfall all year (50-250 cm)
- Northwestern Europe, west coast of N. America, S. Chile, New Zealand

### GROUP D : COLD SNOW FOREST CLIMATES



- Large continental areas,(40°-70° N) in Europe, Asia, North America
- Long, harsh winters and short summers



#### COLD CLIMATE WITH HUMID WINTERS (Df)

- Cold, snowy winters with a short frost-free season.
- Large annual temperature range with abrupt weather changes.
- Found in poleward of Marine West Coast and Mid-Latitude Steppe climates.

#### COLD CLIMATE WITH DRY WINTERS (Dw)

- Extremely low winter temperatures (below freezing for up to 7 months)
- Pronounced winter anticyclones cause dry, frigid winters & monsoon-like summer winds
- Low annual precipitation (12-15 cm), mostly in summer
- Found mainly in Northeastern Asia with severe winters



## GROUP E: POLAR CLIMATES

- Found poleward of 70° latitude in the Arctic and Antarctic regions
- Extremely cold temperatures with long winters and short summers



### TUNDRA CLIMATE (ET)

- Polar region, no trees in tundra climate
- Summer - very long duration of daylight
- Permafrost Region: sub soil permanently frozen
- North Arctic Circle • South Antarctica circle



### TUNDRA

- Denoted by - E
- Temp. -50° C
- Frost
- No Plants
- At Poles
- Animals

### TAIGA

- Denoted by - D
- Temp. -10° C
- Snow
- Plants
- Away from Poles
- Animals

### SAVANNA

- Also known as Sudan climate
- Tropical wet & Dry climate, Temp. 18°C -30°C
- B/w equatorial forest & trade wind deserts
- Two seasons: winter & summer
- Largest savanna in Africa near equator
- Rainfall 80 - 160 cm

### EXAMPLES



MOSSES

FLOWERING PLANTS



LICHENS



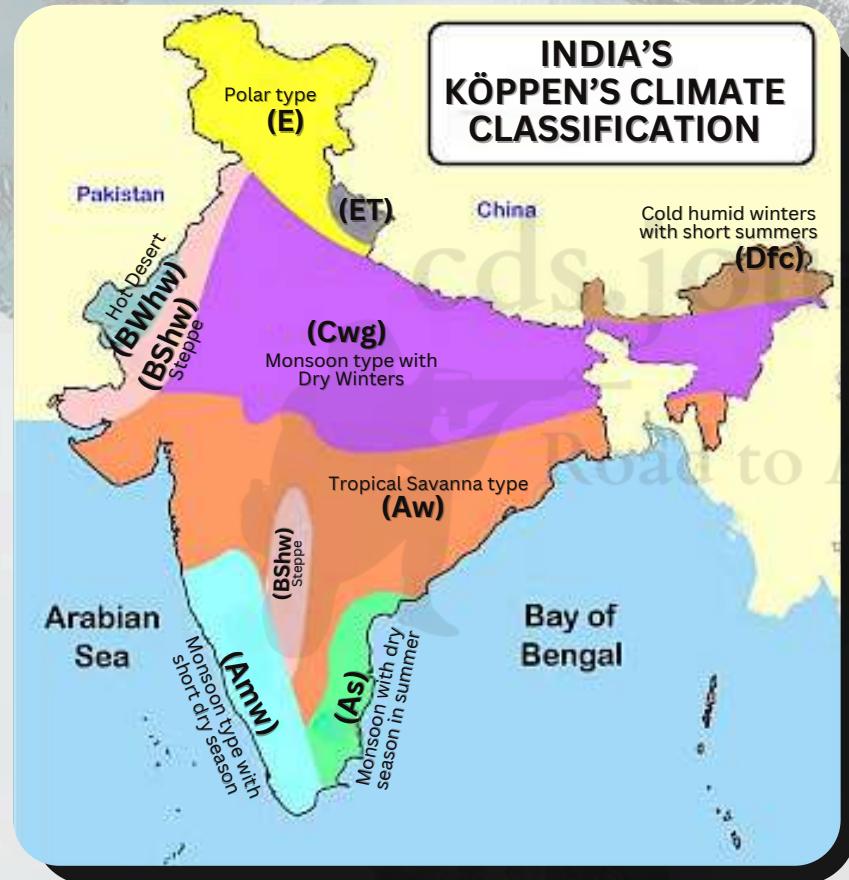
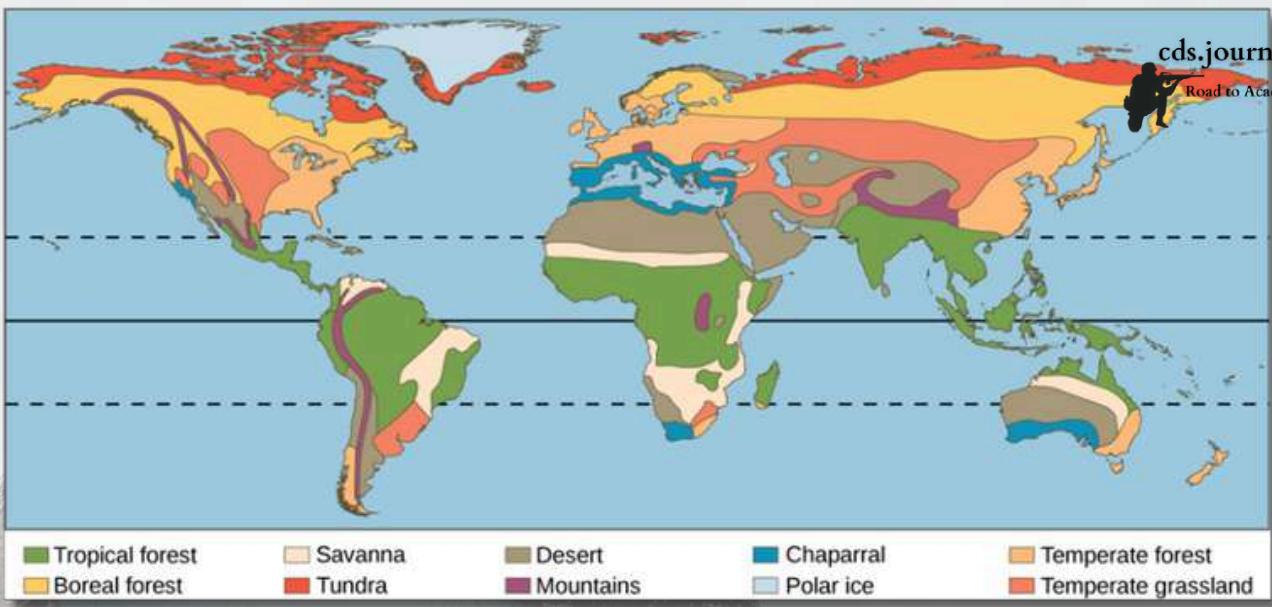
WILLOWS



COTTON GRASS

### COUNTRIES WITH TUNDRA CLIMATE

1. ALASKA
2. NORTHERN CANADA
3. GREENLAND
4. ICELAND
5. NORTHERN SCANDINAVIA
6. NORTHERN RUSSIA
7. ANTARCTICA



TYPE OF CLIMATE	CODE	AREAS
MONSOON TYPE WITH SHORT DRY SEASON	Amw	West coast of India south of Goa
MONSOON WITH DRY SEASON IN SUMMER	As	Coromandel coast of Tamil Nadu
TROPICAL SAVANNA TYPE	Aw	Most of the Peninsular plateaus, south of the Tropic of Cancer
SEMI-ARID STEPPE CLIMATE	BShw	North-western Gujarat, some parts of western Rajasthan & Punjab
HOT DESERT	BWhw	Extreme western Rajasthan
MONSOON WITH DRY WINTER	Cwg	Ganga plain, eastern Rajasthan, northern Madhya Pradesh, most of North-east India
COLD HUMID WINTER WITH SHORT SUMMER	Dfc	Arunachal Pradesh
POLAR TYPE	E	Jammu and Kashmir, Himachal Pradesh and Uttarakhand

# TRANSPORT SYSTEM



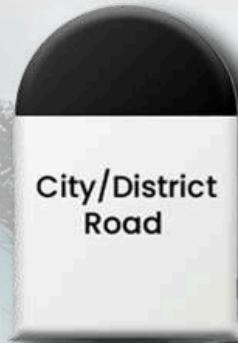
- India has the second-largest road network in the world
- India has the fourth-largest railway system globally
- Longest highway: NH44
- Shortest highway: 327 B



National Highway



State Highway



City/District Road



Rural Road

CONNECT MAJOR CITIES ACROSS COUNTRY

CONNECT CITIES WITHIN A STATE

CONNECT DISTRICT CENTERS

INTEGRATED ROAD NETWORK



## RAIL TRANSPORT

- 1853: First train in India, Mumbai to Thane (34 km).
- 1929: First electric train, Deccan Queen (Bombay to Pune).
- Fastest: Vande Bharat Express, max speed 180 km/h.
- 27th September, 1825: First train ran between Stockton & Darlington in England.
- India has the 4th largest railway network globally
- Uttar Pradesh has the largest railway network in India.
- Mumbai CST is the busiest railway station in India.
- The Railway Coach Factory is located in Kapurthala, Punjab

At present there are 17 Railway Zones and 68 Divisions in the country. The details are given below:

S.NO.	RAILWAY ZONES	Headquarter	DIVISIONS
1.	Central Railway	Mumbai	Mumbai (CST), Bhusawal, Nagpur, Solapur, Pune.
2.	Eastern Railway	Kolkata	Asansol, Howrah, Malda, Sealdah.
3.	East Central Railway	Hajipur	Danapur, Dhanbad, Mughalsarai, Samastipur, Sonpur.
4.	East Coast Railway	Bhubaneswar	Khurda Road, Sambalpur, Waltair.
5.	Northern Railway	New Delhi	Ambala, Delhi, Lucknow, Moradabad, Ferozpur.
6.	North Central Railway	Allahabad	Allahabad, Agra, Jhansi.
7.	North Eastern Railway	Gorakhpur	Lucknow, Izzatnagar, Varanasi.
8.	Northeast Frontier Railway	Guwahati	Katihar, Alipurduar, Rangiya, Lumding, Tinsukia.
9.	North Western Railway	Jaipur	Ajmer, Bikaner, Jaipur, Jodhpur.
10.	Southern Railway	Chennai	Chennai, Madurai, Palghat, Trichy, Tiruvandrum, Salem.
11.	South Central Railway	Secunderabad	Guntakal, Guntur, Hyderabad, Nanded, Secunderabad, Vijayawada.
12.	South Eastern Railway	Kolkata	Adra, Chakradharpur, Kharagpur, Ranchi.
13.	South East Central Railway	Bilaspur	Bilaspur, Nagpur, Raipur
14.	South Western Railway	Hubli	Bangalore, Hubli, Mysore
15.	Western Railway	Mumbai	Mumbai (Central), Vadodara, Ratlam, Ahmedabad, Rajkot, Bhavnagar.
16.	West Central Railway	Jabalpur	Bhopal, Jabalpur, Kota.
17.	Metro Railway	Kolkata	Not applicable.



# 17 RAILWAY ZONES IN INDIA



# INDIA'S NATIONAL HIGHWAYS

Old National Highway Number	New National Highway Number	Serial No. in NH Act, 1956	States/UTs Through which it Passes
NH 1 A and NH 1 D	NH 1	1	Jammu & Kashmir
NH 1 B	NH 244	144	Jammu & Kashmir
NH 2	NH 19 (Golden Quadrilateral)	63	Bihar, Delhi, Haryana, Jharkhand, Uttar Pradesh, West Bengal
NH 2A	NH 519	66	Uttar Pradesh
NH 2B	NH 114	40	West Bengal
NH 3	NH 60	188	Maharashtra
NH 50			
NH 223	NH 4	12	Andaman & Nicobar Islands
NH 4 A	NH 748	165	Goa, Karnataka
NH 4 B	NH 348	161	Maharashtra
NH 5	NH 16 (Golden Quadrilateral)	49	Andhra Pradesh, Odisha, Tamil Nadu, West Bengal
NH 6			
NH 60			
NH 217			
NH 30	NH 319	65	Bihar
NH 35	NH 112	37	West Bengal
NH 39	NH 129	98	Assam, Nagaland
NH 47	NH 544	147	Kerala, Tamil Nadu
NH 47 A	NH 966 B	205	Kerala
NH 47 C	NH 966 A	204	Kerala
NH 55	NH 110	34	West Bengal
NH 56	NH 731	110	Uttar Pradesh
NH 79	NH 156	184	Rajasthan
NH 152	NH 127 A	87	Assam
NH 38 & NH 153	NH 315	45	Assam, Arunachal Pradesh

Old National Highway Number	New National Highway Number	Serial No. in NH Act, 1956	States/UTs Through which it Passes
NH 7	NH 135	123	Madhya Pradesh, Uttar Pradesh
NH 7 A	NH 138	131	Tamil Nadu
NH 8	NH 48 (Golden Quadrilateral)	157	Delhi, Gujarat, Haryana, Karnataka, Maharashtra, Rajasthan, Tamil Nadu
NH 8 A	NH 41	139	Gujarat
NH 8 C	NH 147	154	Gujarat
NH 8 D	NH 151	171	Gujarat
NH 9	NH 65	196	Andhra Pradesh, Maharashtra, Karnataka, Telangana
NH 11	NH 21	73	Rajasthan, Uttar Pradesh
NH 11 A	NH 148	158	Rajasthan
NH 12	NH 45	336	Madhya Pradesh, Chhattisgarh
NH 18	NH 40	136	Andhra Pradesh, Tamil Nadu
NH 4			
NH 21	NH 5	13	Haryana, Chandigarh, Himachal Pradesh, Punjab
NH 22			
NH 95			
NH 23	NH 320	71	Jharkhand
NH 24	NH 530	102	Uttar Pradesh



## AIRWAYS IN INDIA

- 1931: JRD Tata completed India's first solo flight from Mumbai to Karachi.
- 1935: Tata Airlines began operations between Mumbai & Thiruvananthapuram, later expanding to Mumbai-Delhi in 1937.
- 1953: Private airlines were nationalized, leading to the formation of Indian Airlines and Air India.
- 1995: The Airports Authority of India was established to manage airports across the country.
- Global Position: India is the 3rd largest civil aviation market in the world.
- Training Institutes: The Airports Authority of India manages the Civil Aviation Training College in Allahabad and the National Institute of Aviation Management and Research in Delhi.

# PIPELINE

- Naharkatia - Nunmati - Barauni: First crude oil pipeline, moves oil from Assam to Barauni refinery.
- Mumbai High-Mumbai: Double pipeline carrying crude oil and natural gas from the Arabian Sea to Mumbai.
- Ankleshwar - Koyali: Transports crude oil from Ankleshwar in Gujarat to the Koyali refinery.
- Salaya-Koyali-Mathura: A 2660 km pipeline supplying crude oil to refineries in Koyali, Mathura, Panipat, and Jalandhar.
- Hazira - Vijaypur - Jagdishpur: India's longest gas pipeline, supplying gas to power and fertilizer plants.
- Jamnagar-Loni LPG: One of the World's longest LPG pipelines, moving LPG from Jamnagar to Loni near Delhi.



BHARATMALA PARIYOJANA IS MAINLY FUNDED BY THE CENTRAL GOVERNMENT AND RESOURCE MOBILIZATION IS DONE BY THE MINISTRY OF ROAD TRANSPORT & HIGHWAY



SAGARMALA - MINISTRY OF SHIPPING, GOI, GOVERNMENT OF INDIA.

AIMS TO DEVELOP INDIA'S COASTLINE AND MARITIME SECTOR.

# GOLDEN QUADRILATERAL

- DELHI TO KOLKATA
- KOLKATA TO CHENNAI
- MUMBAI TO DELHI
- CHENNAI TO MUMBAI

The total length of the Golden Quadrilateral is 5,846 kilometers

NH 16: Longest route from Kolkata to Chennai



# EAST-WEST AND NORTH-SOUTH CORRIDOR

## NORTH-SOUTH CORRIDOR (NSC):

- SRINAGAR TO KANYAKUMARI, (APPROX. 4,000 KM)

## EAST-WEST CORRIDOR (EWC):

- PORBANDAR TO SILCHAR, (APPROX. 3,300 KM)

CORRIDORS INTERSECT AT JHANSI, MADHYA PRADESH  
MAKING IT THE LOGISTICAL CENTER OF INDIA.

Total Length of East-West and North-South Corridors: 7,300 km

Longest route:  
North-South Corridor

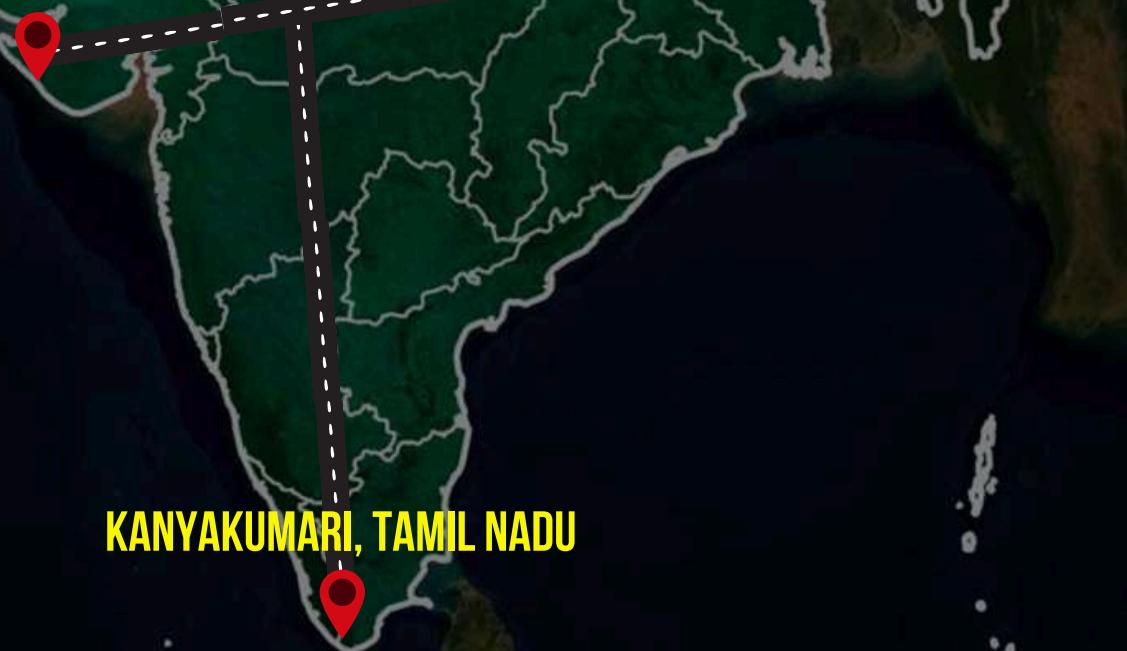
SRINAGAR, J & K

- NORTH-SOUTH: 13 STATES
- EAST-WEST: 7 STATES

SILCHAR, ASSAM

PORBANDAR, GUJARAT

KANYAKUMARI, TAMIL NADU



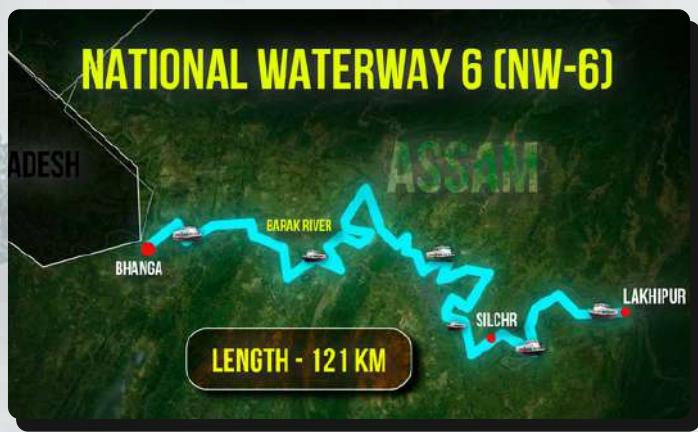
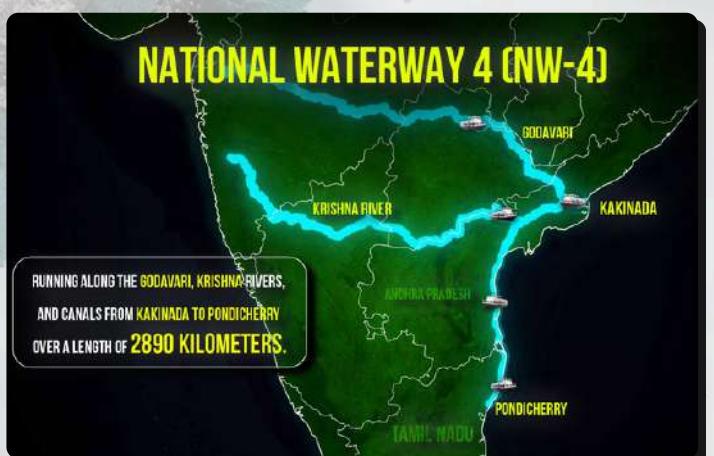
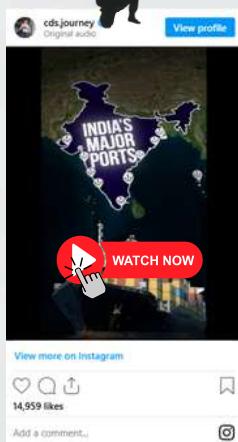
# WATERWAYS OF INDIA



The Central Inland Water Transport Corporation has its headquarters in Kolkata.

The Inland Waterways Authority of India is headquartered in Noida.

The National Inland Navigation Institute is located in Bihar.



**INLAND (RIVERINE) PORT**  
Located away from sea, E.g. Kolkata

**OUTLAND PORT**  
Built in deep water

# POR TS OF INDIA

INDIA HAS 13 MAJOR SEAPORTS

AND 205 NOTIFIED MINOR AND

INTERMEDIATE PORTS.

**KANDLA PORT**

Also Known as Deen Dayal Port

**MUMBAI PORT**

Largest & Most Imp Port of India  
Natural Deep Water Harbour

**JAWAHAR LAL NEHRU PORT**

Largest Container Port of India

**MARMUGAO PORT**

Lies on South of Zuari's Mouth  
Natural Harbour

**MANGALORE PORT**

**KOCHI PORT**

Also Known as VO Chidambaramar Port  
Also a Naval Base  
Queen Of Arabian Sea & Natural Harbour

**ENNORE PORT**

Also Known as Kamarajar Port  
1st Corporate Port of India

**CHENNAI PORT**

Largest Port in Bay of Bengal  
Artificial Harbour

**VISAKHAPATNAM PORT**

**PORT BLAIR PORT**

13th & Youngest Major port of India

**TUTICORIN PORT**

Also Known as VO Chidambaramar Port  
Locate in Gulf of Mannar

**KOLKATA & HALDIA PORT**

Riverine Port  
Also Known as Shyama Prasad Mukherjee Port  
Oldest Operating Port

**PARADEEP PORT**

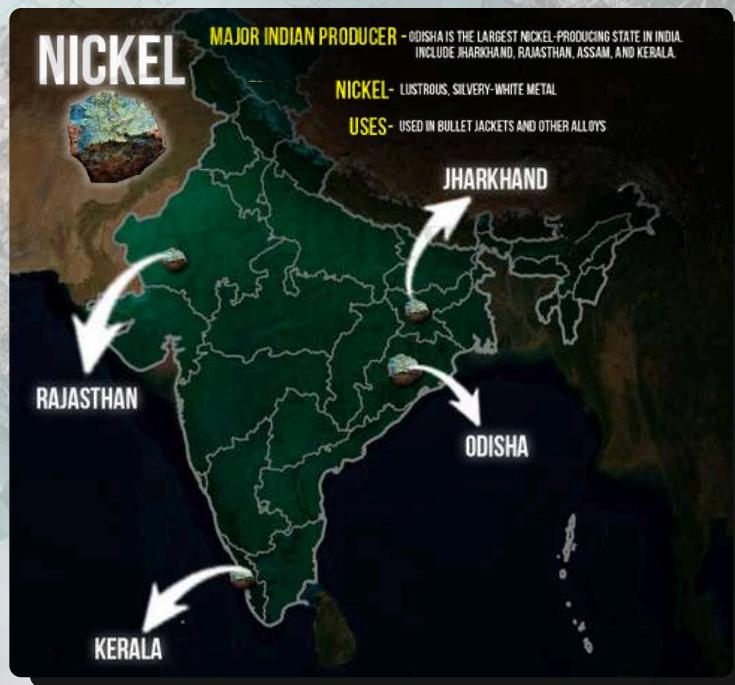
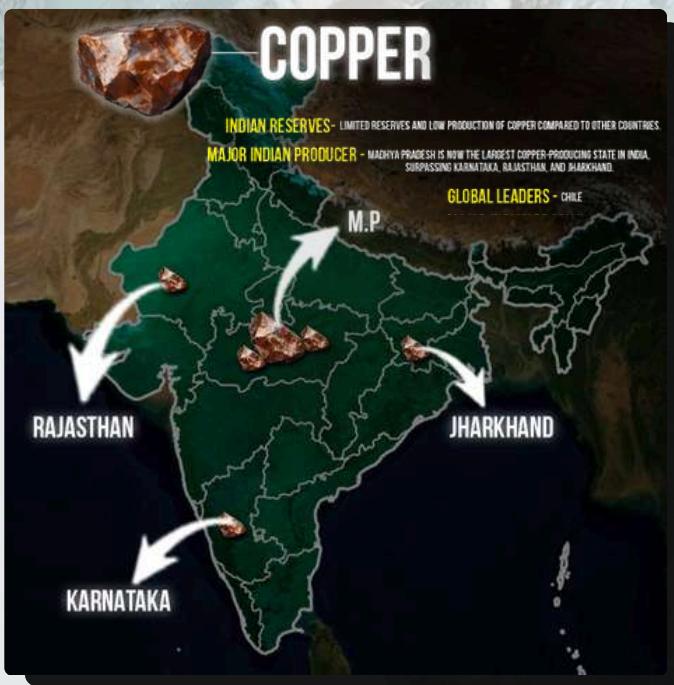
**PORT BLAIR PORT**

**PORT BLAIR PORT**

13th & Youngest Major port of India



# MINERALS



# BAUXITE



USES - ESSENTIAL ORE USED TO PRODUCE ALUMINUM. IT IS AN OXIDE OF ALUMINUM.

GLOBAL LEADER - AUSTRALIA

MAJOR INDIAN PRODUCER - ODISHA IS THE LARGEST BAUXITE-PRODUCING STATE IN INDIA. IN ODISHA IT IS FOUND IN KALAHANDI AND KENDUJHAR.

JHARKHAND

M P

ODISHA

# LEAD



USES - IN INDUSTRIES AND IT ALSO USED IN SINKING.

MAJOR INDIAN PRODUCER - RAJASTHAN ACCOUNTS FOR ABOUT 94% OF INDIA'S TOTAL LEAD PRODUCTION. OTHER STATES TAMIL NADU, AND ANDHRA PRADESH.

SIGNIFICANT MINES - THE ZAWAR AND DEBARI MINES IN UDAIPUR, RAJASTHAN.

ORE - GALENA

RAJASTHAN

ANDHRA PRADESH

TAMIL NADU

# TUNGSTEN



PRIMARILY USED IN ELECTRIC BULB FILAMENTS DUE TO ITS HIGH MELTING POINT.

RAJASTHAN  
27%

MAHARASHTRA  
9%

KARNATAKA  
42%

ANDHRA PRADESH  
17%

BIHAR  
44%

# GOLD

IMPORTANT GOLD FIELDS - THE KOLAR GOLD FIELD, HUTTI GOLD FIELD, AND RAMGIRI GOLD FIELD ARE THE MOST SIGNIFICANT GOLD FIELDS IN INDIA.

RAJASTHAN  
25%

KARNATAKA  
21%

FOUND IN - THE SANDS OF SEVERAL RIVERS, KNOWN AS ALLUVIAL GOLD.  
TOP PRODUCER - CHINA

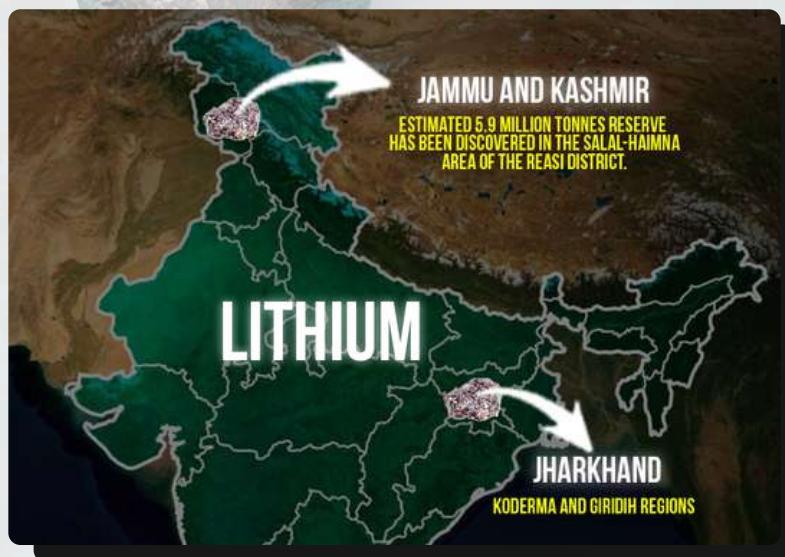
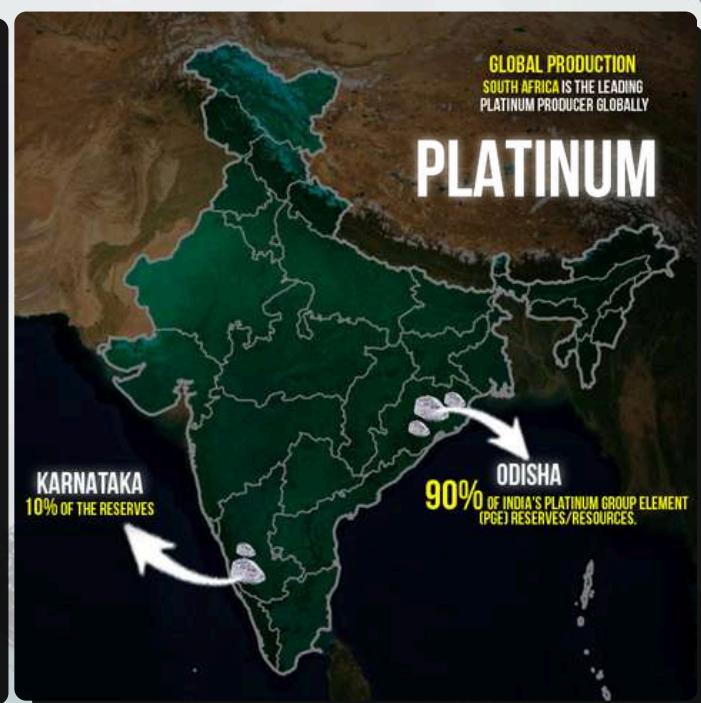
# ATOMIC MINERAL

INDIA HAS HUGE RESERVES OF ATOMIC MINERALS.

KERALA

THORIUM IS DERIVED FROM MONAZITE SAND

ANDHRA PRADESH  
LARGEST URANIUM-PRODUCING STATE IN INDIA



# ENERGY RESOURCES

## SOURCES OF RESOURCES

### CONVENTIONAL SOURCES



COAL



FIREWOOD



PETROLEUM



ELECTRICITY



STRAW



DRIED DUNG

### NON-CONVENTIONAL SOURCES



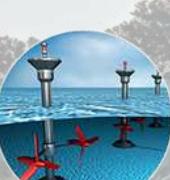
WIND ENERGY



URBAN WASTE ENERGY



BIO ENERGY



TIDAL ENERGY



SOLAR ENERGY

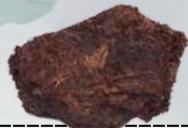


- Also known as BLACK GOLD

## COAL

### TOP MANUFACTURERS

USA, RUSSIA, AUSTRALIA, CHINA, INDIA



PEAT  
(Low Carbon Content)



LIGNITE (Brown coal)  
(Low Carbon Content)



ANTHRACITE  
(Highest Quality)



BITUMINOUS  
(Middle-Rank Coal)

### TOP MANUFACTURERS (INDIA)

ODISHA, JHARKHAND, CHHATTISGARH, WEST BENGAL, MP

# PETROLEUM AND MINERAL OIL



- Petroleum is a fossil fuel mined from sedimentary rocks of the Earth

- Electricity Generation: Approximately 80% of India's electricity is generated from fossil fuels

- Location: Petroleum is predominantly found in the continental shelf

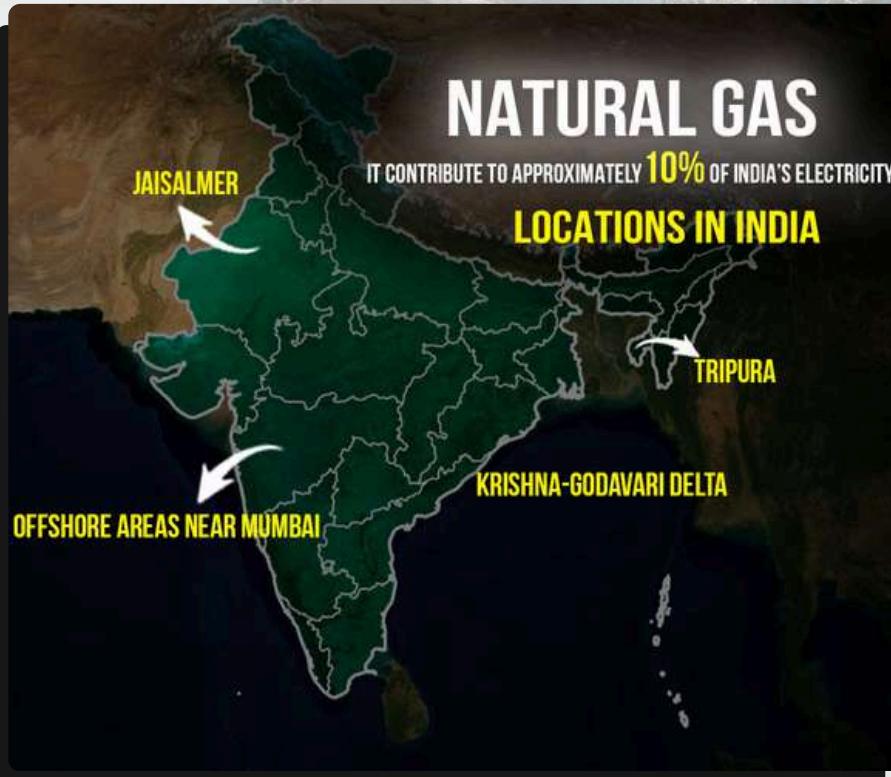
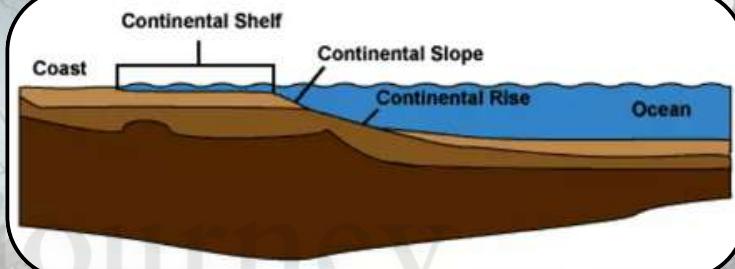
- India's First Oil Refinery was established in 1901 in Digboi, Assam.

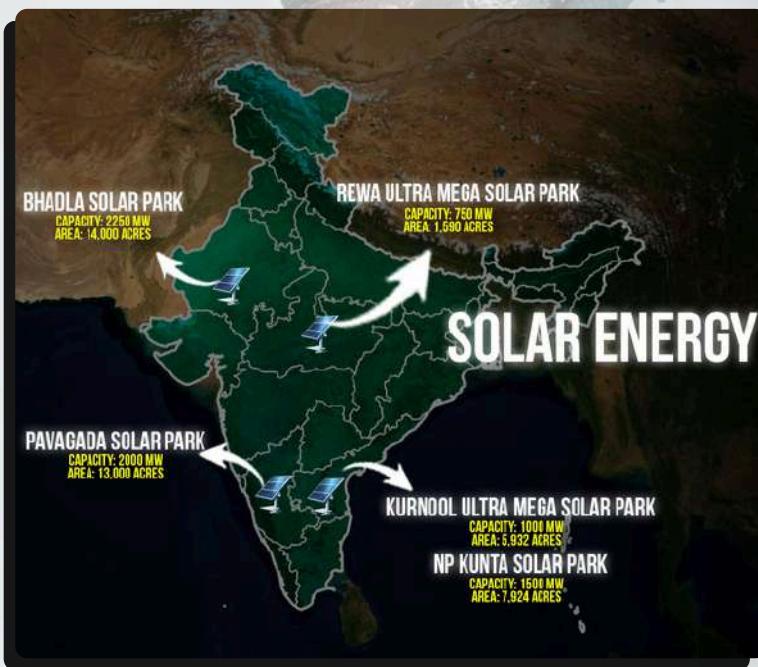
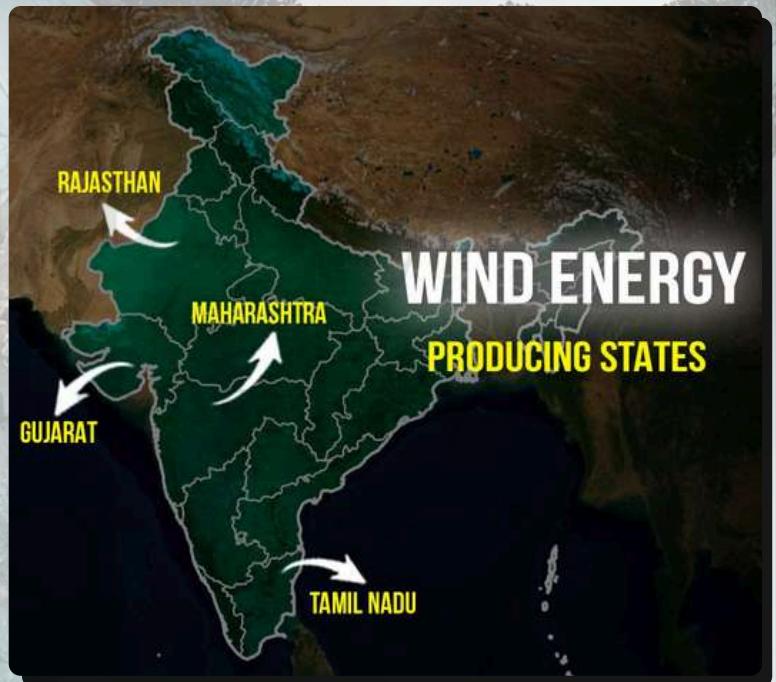
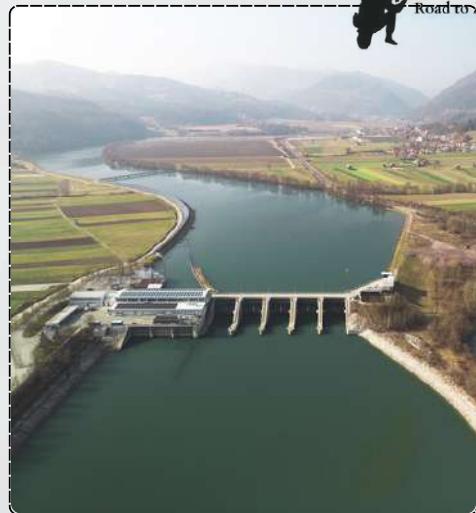
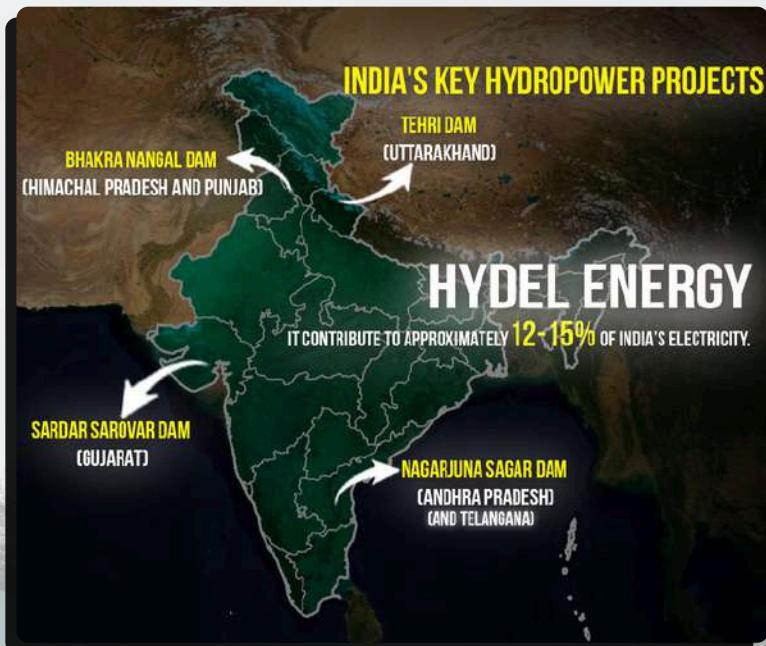
ASSAM: 16%

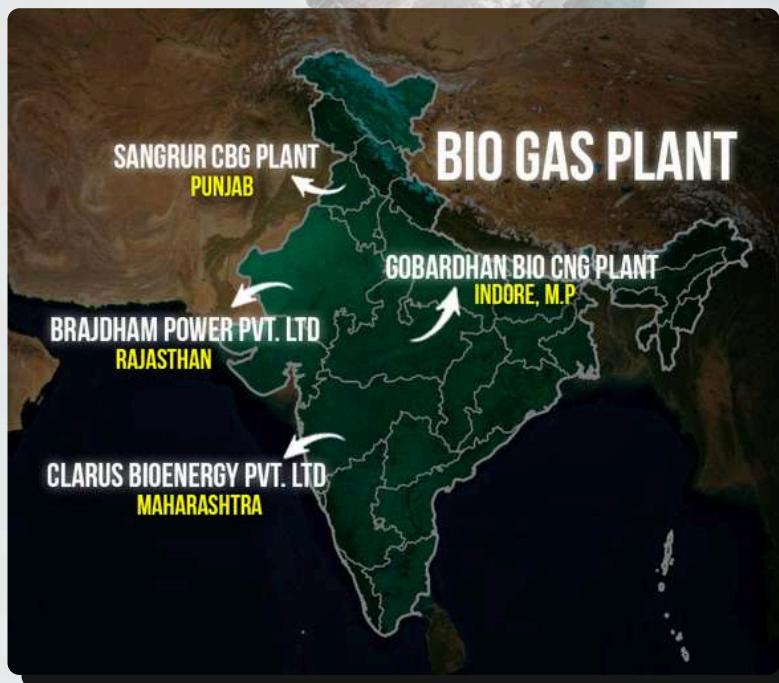
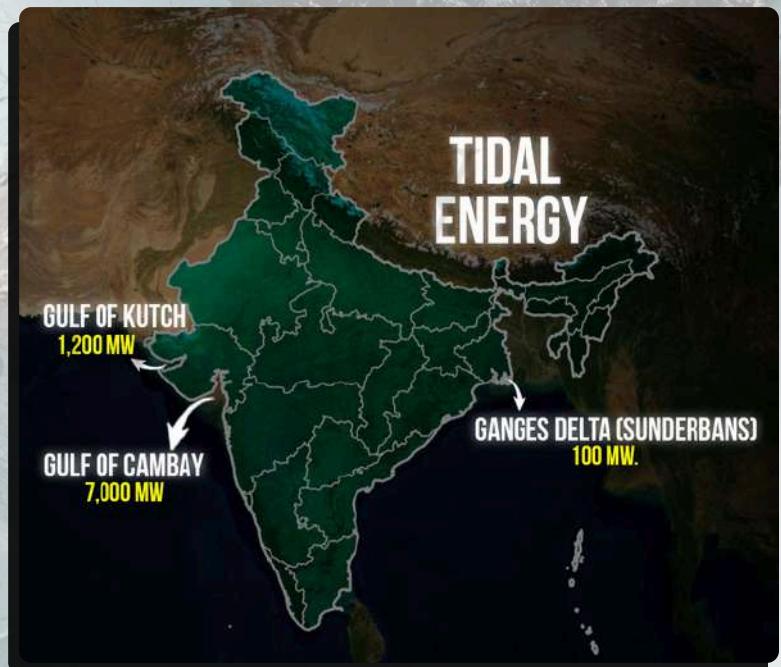
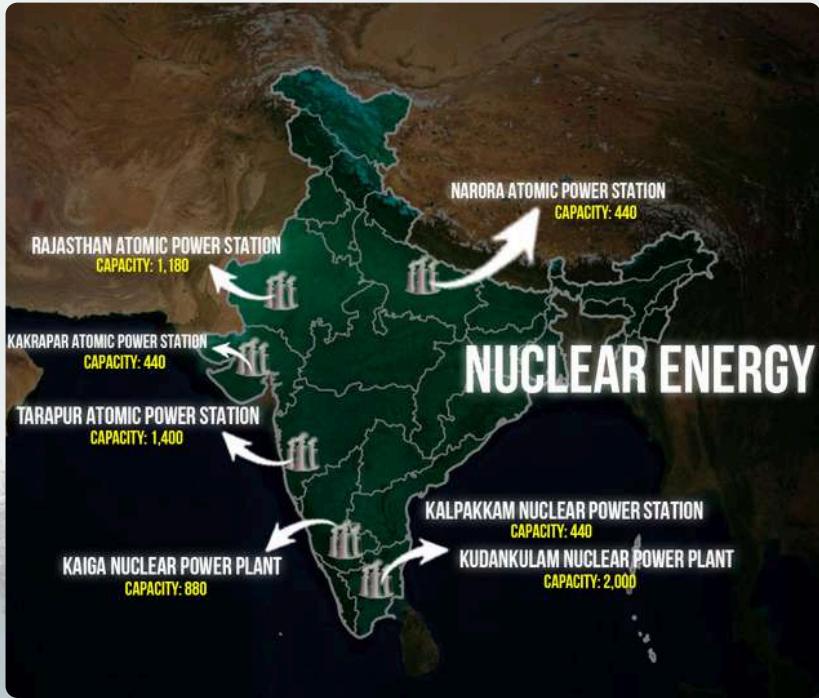
GUJARAT: 18%

MUMBAI: 63%

Established in 1954 in Tarapur, Mumbai

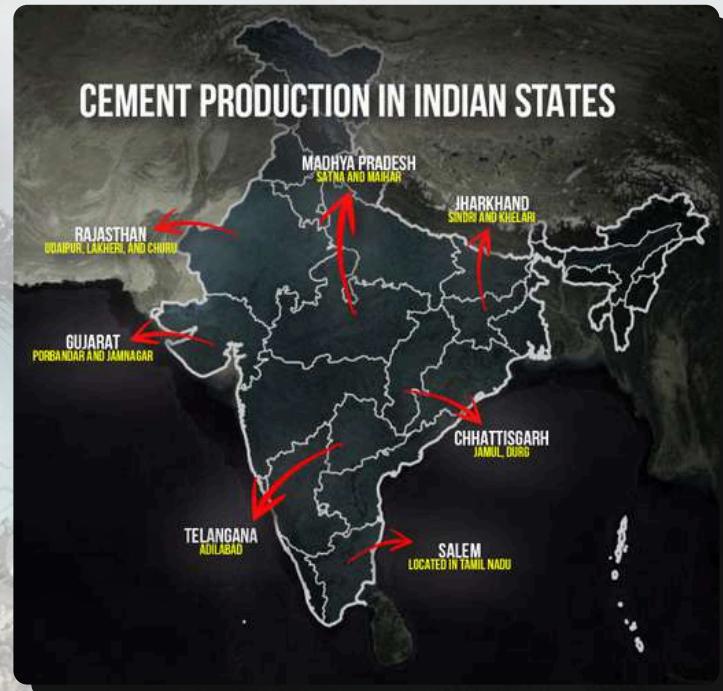








# INDUSTRIES IN INDIA



- INDIA IS THE LARGEST PRODUCER OF RAW JUTE AND JUTE PRODUCTS AND RANKS SECOND IN JUTE GOODS EXPORT AFTER BANGLADESH.
- THE FIRST MODERN JUTE MILL IN INDIA WAS ESTABLISHED IN 1855 AT RISHRA, NEAR KOLKATA, WEST BENGAL.

## JUTE INDUSTRY

### JUTE MILLS ACROSS MAJOR STATES:

WEST BENGAL  
BIHAR  
UTTAR PRADESH  
ANDHRA PRADESH  
ASSAM  
ODISHA

## RAIL EQUIPMENT MANUFACTURING IN INDIA

### KEY RAIL EQUIPMENT MANUFACTURING FACILITIES

1. CHITTARANJAN LOCOMOTIVE WORKS – WEST BENGAL
2. DIESEL LOCOMOTIVE WORKS – VARANASI, UTTAR PRADESH
3. TATA ENGINEERING LOCOMOTIVE WORKS – JHARKHAND
4. INTEGRAL COACH FACTORY – TAMIL NADU

## SHIPBUILDING INDUSTRY

SHIPBUILDING IS A GROWING INDUSTRY IN INDIA, SUPPORTING VARIOUS TYPES OF SHIP MANUFACTURING.

1. SEA BLUE SHIPYARD LTD – KOCHI
2. COCHIN SHIPYARD LIMITED – KOCHI
3. MAZAGON DOCK LIMITED – MUMBAI
4. HINDUSTAN SHIPYARD LIMITED – VISAKHAPATNAM
5. GARDEN REACH SHIPBUILDERS AND ENGINEERS – KOLKATA
6. GOA SHIPYARD LIMITED – VASCO DA GAMA, GOA

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For CDS & NDA (1) 2025

1640 SELECTIONS IN NDA & CDS (2) 2024

2119 SELECTIONS IN AFCAT (2) 2024

सर नीचे, बस अपनी मैहनत।