DR SANGEETA SACHAN

GEOGRAPHY OF INDIA

MA SEMESTER 4

PAPER 1

INDIA : LOCATION SHAPE AND SIZE

GEOLOGY OF INDIA

MAIN PHYSIOGRAPHIC REGIONS

DRAINAGE SYSTEMS

CLIMATE AND CLIMATIC REGIONS

INDIA

India has a unique culture and is one of the oldest and greatest civilizations of the world. It stretches from the snow-capped Himalayas in the north to Sun drenched coastal villages of the south and the humid tropical forests on the south-west coast, from the fertile Brahmaputra valley in its east to the Thar Desert in the west.

LOCATION

India is located latitudinally in the Northern Hemisphere and longitudinally in the Eastern Hemisphere. It extends from 8°4′ north and 37°6′ North in length (latitudes). And between 68°7′ East and 97°25′ East in width (longitudes). Because of this great longitudinal extent, the difference in local time between eastern and western extremes of our country is about two hours.The local time along **82° 30' E longitudes** is taken as 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.

SHAPE AND SIZE

India has a **coastline of 7516.6 km** of total land frontier 15200 km and **Tropic of Cancer** passes almost middle through its crossing over the states of **Gujarat, Rajasthan, Madhya Pradesh, Chhattisgarh, Jharkhand, Paschim Bangal, Tripura and Mizoram.**

The country can be divided into six zones mainly North, South, East, West, and Central and Northeast zone. It has 29 states and seven union territories.

INDIA : BORDERS

McMahon Line

Named after the British Indian Army officer Lieutenant Colonel Sir Arthur Henry McMahon, who was also an administrator in British India, the McMahon line is a demarcation that separates

Tibet and the north-east India. Colonel McMahon had

proposed this line as the boundary between Tibet, China, and India at the Shimla Convention of 1914. It was accepted by Tibetan authorities and British India, and is now acknowledged by the Republic of India as the official boundary. China, however, disputes the validity of the McMahon line. It claims that Tibet isn't a sovereign government, and therefore any treaty made with Tibet stands invalid.

Radcliffe Line

Radcliffe Line divided British India into India and Pakistan. It is named after the architect of this line, Sir Cyril Radcliffe, who was also the chairman of the Boundary Commissions. The Radcliffe Line was drawn between West Pakistan (now Pakistan) and India on the western side and between India and East Pakistan (now Bangladesh) on the eastern side of the subcontinent.

Durand Line

Boundary line between India and Afghanistan demarcated by Sir Mortimer Durand, a British diplomat in the year 1896 is known as the Durand Line. It separated British India and Afghanistan.

After partition, Pakistan inherited this line. However, a short section of the Afghanistan border

is shared with the Indian state of Jammu and Kashmir.

Line of Actual Control (LAC)

Line of Actual Control is the demarcation line between India and China which separates the India controlled territory from the China-controlled territory in the former princely state of Jammu and Kashmir. In 1962, the two countries were embroiled in a war. China attacked India and captured the Aksai Chin area. In 1963, China declared ceasefire but did not leave the area. Now, the ceasefire line is known as the LAC. This line is not actually recognised as international boundary, as by virtue of Instrument of Accession, entire state of Jammu and Kashmir legally and constitutionally became an integral part of India.

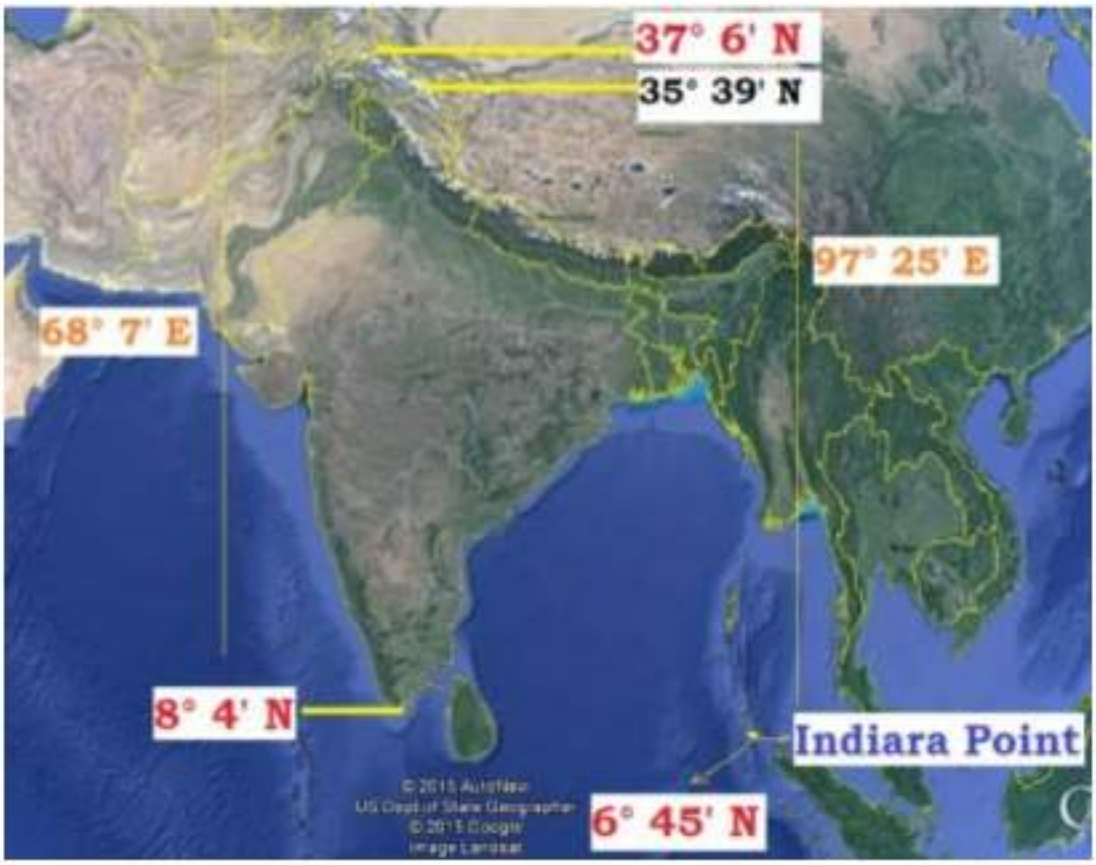
Line of Control (LOC)

The military controlled line between India and Pakistan in the former princely state of Jammu and Kashmir is named as the Line of Control (LOC). It was originally known as the Ceasefire Line. After

the Simla Agreement signed on July 3, 1972, the Ceasefire Line was renamed as the LOC. This line is not actually recognised as international boundary, as by virtue of Instrument of Accession, entire state

of Jammu and Kashmir legally and constitutionally became an integral part of India.

India As A Geographical Unit



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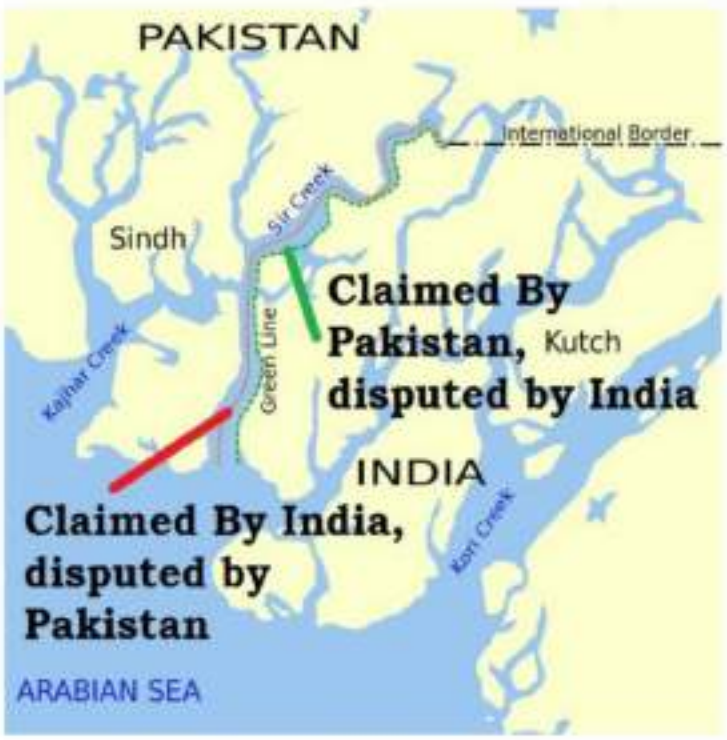

GEOLOGY OF INDIA

Indian Rock System

Geologically India is divided into multiple rock strata which were formed at different stages of India's geological history.

Rock System of India

The rock system of India is broadly divided into the systems mentioned below:

- Archean rock system
- Dharwar rock system
- Cuddapah rock system
- Vindhyan rock system
- Dravidian rock system
- Aryan rock system
- Carboniferous rock system
- Jurassic rock system

- Cretaceous rock system
- Tertiary rock system
- Quarternary rock system

Archean rock system

- This is the oldest rock system of Indian subcontinent dating back to about 4 billion years. (pre-Cambrian rocks)
- They serve as the basement complex or the foundation rocks for other rock systems.
- They are found in the Aravalli hills, Deccan plateau and the northeast of India.
- They mostly contain gneisses (granite, gabbro etc.) and schists (crystalline rocks such as mica, chlorite, talc etc.)
- These rocks are formed when magma underneath the earth's surface solidified and hence they are devoid of any fossils (Azoic)
- Because of their volcanic origin, they are crystalline and consist of sheet-like layers (foliated).

- These rocks are abundant in metallic as well as non-metallic minerals such as iron, manganese, copper, bauxite, gold, lead, mica, graphite etc.

Dharwar rock system

- Formed between 2.5 billion to 1.8 billion years, these are the oldest metamorphic rocks of India.
- They are formed due to the metamorphosis of the sediments formed out of the Archean rocks.
- Since they were first studied in the Dharwar region of Karnataka, they were named so. They are mainly found in the Aravallis, Chotanagpur plateau, Meghalaya and Tamil Nadu
- They are rich in metallic minerals such as iron, manganese, gold, copper etc. They are considered to be the storehouses of metallic minerals and hence have a high economic significance.

- Dharwar rocks are divided into various series based on the region in which they are found and the type of metal contained in them. For instance, Champions series (Kolar - gold), Champaner series (Baroda - marble), Chilpi series (Balaghat - copper) etc.

Cuddapah rock system

- Mainly found in the Cuddapah region of Andhra Pradesh, they are also found in Delhi, Rajasthan, Chhattisgarh, the lesser Himalayas etc.
- They were formed when sedimentary rocks like sandstone, limestone etc., and clay were deposited in synclinal folds (between two mountain ranges)
- They are rich in metamorphic rocks such as shale, slate, quartzite etc. Even though metallic minerals like iron ore were found, they were of poor quality.

Vindhyan rock system

- comprises of very old sedimentary rocks, hence are devoid of metallic minerals.
- They are mainly found in the Vindhyan mountain ranges, extending from Rajasthan to Bihar.
- They are diamond-bearing regions with Panna and Golconda diamonds being mined here.
- Though they are devoid of metallic minerals, they are abundant in building materials such as red sandstone, limestone, glass making sandetc.

The Cuddapah and Vindhyan rock systems are together known as the Purana rock system. They are formed by the erosion and deposition of Archean and Dharwar rocks, the process is believed to have taken place between 1400-600 million years ago. They are mostly sedimentary in nature.

Dravidian rock system

- It was formed during the Paleozoic era i.e., 600-300 million years ago. Also known as the Carboniferous rocks, these are found in the extra-Peninsular regions of the Himalayas and the Gangetic plain
- They are abundant in fossils, and this period saw the beginning of coal formation.
- Carboniferous coal is of a higher quality, though it is not found abundantly in India.

Aryan rock system

- They began to be formed since the Carboniferous period. From the Gondwana rock system, Jurassic system, Deccan trap and Tertiary period, this rock system is made up of diverse kinds of rocks.

Gondwana rock system

- This system is named after the huge carbon deposits contained within them. This makes them the largest source of coal in India,

containing up to 98 percent of our coal deposits.

- The Gondwana rocks are mainly found in Ranigunj, Jharia regions of Jharkhand, Damodar valley, Pench valley in Chhattisgarh and Madhya Pradesh, Godavari valley in Telangana and the Rajmahal hills of West Bengal.
- They are divided into two main series of rocks viz., Damuda and Panchet.
- Apart from coal, they are also a source of metallic minerals such as iron, manganese, antimony, uranium etc.
- They are named after the Gond tribe (indigenous people mainly found in the Telangana and Andhra Pradesh regions).
- These are sedimentary deposits which were accumulated in the synclinal troughs on an older plateau surface.
- The process began during the Permian period i.e., 250 million years ago

Jurassic rock system

- This period witnessed marine transgressions on both west and east coasts. This led to shallow water deposits in Rajasthan and the Kutchch region on the west and Guntur and Rajahmundry areas of Andhra Pradesh.
- Prominent deposits in this rock system include limestone, shale, sandstone etc.

Cretaceous rock system

- This was formed when the Indian plate came over the Reunion hotspot in the Indian Ocean while travelling north towards the Eurasian plate, after breaking up from the Gondwana plate.
- The continuous outpouring of magma, from the fissures over the Indian plate led to the formation of a layered structure called the Deccan Traps. These are formed by the flow of magma over the solidified rock systems/cooled magma in layers.

- Basaltic lava covered an area of 5 lakh sq.km. encompassing the regions like Kutchch, Saurashtra, Maharashtra, Malwa plateau and north Karnataka.
- The thickness of the Deccan traps decreases from west to east, with around 3000m in the west to just 150m in the east, and around 800m in the south.
- Due to the forces of weathering and erosion, this rock system gave birth to a new soil variety known as the Black Cotton soil or Regur.

Tertiary rock system

- These rocks belong to the Cenozoic era, formed around 60 million years ago
- The Himalayan uplift took place at around the same town
- Important rock systems include Karewas of Kashmir, Bhangra and Khadar of the Gangetic plains etc.

Quarternary rock system

- They were formed during the Pleistocene and the process continued in the Eocene.
- Since they are of recent origin, they have good organic content (fossils)
- These are largely found in the plains of north India (Satluj-Ganga-Brahmaputra plains) and also in the Karewas of Kashmir valley.

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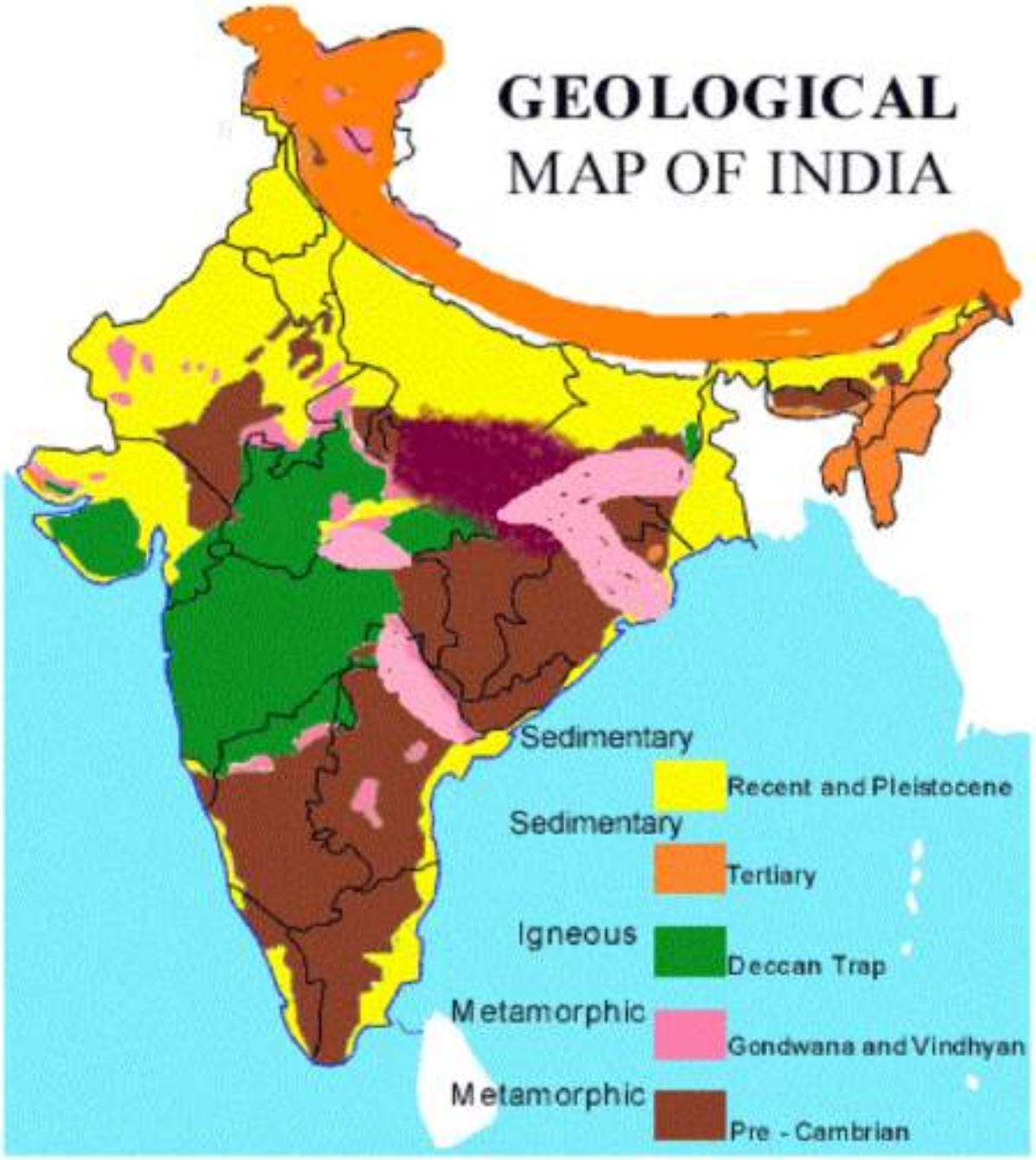

Paper 1

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MAIN PHYSIOGRAPHIC REGIONS OF INDIA

Considering all its features, the sub-continent is classified into the following regions:

The Northern Mountains

The northern boundary of India is created by the northern mountain ranges known as Himalayas that form the natural border between India and Tibet. The Himalayan range is divided into Pir Panjal Range, Zanskar Range, Ladakh Range, Dhaula Dhar Range and East Karakoram Range. Apart from the Himalayan, other ranges are Siwalik Range lying in the outer Himalayas, Karakom Range, Patkai Range lying at the eastern part of India at the Burma border, Vindhya Range covering parts of central India, Satpura Range covering parts of central India being parallel to Vindhya Range, Aravalli Range

covering areas of Haryana and Rajasthan states, the Western Ghats and the Eastern Ghats.

The Indo-Gangetic Plains

The plains named after the rivers flowing through them - Indus and Ganges, cover northern and eastern parts of India, stretching to cover some parts of Pakistan, Nepal and Bangladesh also. These rivers form tributaries that network the entire region. These tributaries are Yamuna, Chambal, Gomti, Sutlej, Kosi, Ravi, Beas, Chenab, Ghaghara and Tista. These rivers make the soil fertile and apt for farming which is widely practiced all over. This has led to tremendous increase in population with time. The plains are divided into four belts namely, the Bhabar belt, the Terai belt, the Bangar belt and the Khadar belt. The crops produced in these belts are wheat, rice, cotton, sugarcane, and maize.

The Thar Desert

It is ranked as the seventh biggest desert in the world that covers most of the Rajasthan and neighboring states of Haryana, Punjab and Gujarat. It also crosses the borders to touch Pakistan where it is known as Cholistan desert. Its some parts are attributed by sand dunes and some have rocks. The area receives very little rainfall and just one river that flows through it is known as Luni. The vegetation in the area includes small trees, herb and shrubs. The sandy nature of the soil makes it get eroded quite often, due to speedy winds that blow with full force in the region. Understanding the need of plantation in the region to avoid erosion, the Indira Gandhi Canal scheme was started in 1965 to irrigate the land. The common source of income for the people here is animal husbandry and agroforestry.

The Central Highlands

The highlands of central India are divided into three plateaus, the Deccan Plateau located between the western and eastern ghats, the Malwa Plateau at the western parts of India including states like Rajasthan,

Gujarat and Madhya Pradesh, and the Chota Nagpur Plateau covering eastern states of India like Bihar, Jharkhand, Chattisgarh and Odisha. The Chota Nagour Plateau is rich in coal and metal ores and is divided into Ranchi plateau, Hazaribagh plateau and Koderma plateau. The Ranchi plateau is characterized by numerous falls. The Hazaribagh plateau is a part of Hazaribagh region, the lower part of which is known as Koderma plateau.

The Eastern and Western Coastal Plains

These plains lie at the eastern parts of India spreading from the state Tamil Nadu to West Bengal. With rivers like Mahanadi, Kaveri , Krishna and Godavari flowing through them, Chilika Lake runs alongside them. The plains are divided into six regions – Coromandel Coast of Tamil Nadu, Kanyakumari Coast at the southern-tip of India, Krishna-Godavari delta at southeast of Vijaywada, Mahanadi delta in Odisha, and the south Andhra Pradesh coastal plain that covers the major parts of Eastern Ghat and Bay of Bengal. These coastal regions normally stay humid with frequent rainfall. Tall coconut palms adorn

the eastern coastline, apart from the crops grown here. Fishing is the major occupation of the locals here.

As the name suggests, they lie at the areas of Western Ghats forming the coastal parts of that are flanked by the Arabian Sea. They cover Gujarat, Maharashtra, Goa, Karnataka and Kerala. Narmada, Zuari, Tapi and Mandovi are rivers that flux through them. The plains are divided into Konkan and Malabar Coasts. The Konkan coast runs through 700 kms, covering parts of the Karnataka, Goa and Maharashtra. The Malabar coast covers 845 kms, stretching from Karnataka to the extreme south tip Kanyakumari through Kerala. All of the Malabar coast receives heavy rainfall that makes it suitably irrigated enough for farming.

The Islands

There are two main groups of islands – Andaman and Nicobar islands and Lakshadweep islands that are recognized as Union Territories (UT). Apart from them, Daman and Diu are also known as UT; they almost touch the mainland unlike Andaman and Nicobar and

Lakshadweep. Andaman islands are composed of 572 tiny islands that serve as a great tourist attraction. The Nicobar islands are not accessible for the tourists. Inhabited by native tribes, their beaches stay deserted yet beautiful owing to lovely colors added to the waters by a variety of corals. The Lakshadweep islands comprise of 35 tiny islands that stand in the Laccadive Sea, just 200 to 400 kms from Kerala, the southwestern coast of India.

All these natural wonders make India, the most gifted land on Earth. The inquisitive nature of man led to him to explore all these physiographic features of the sub-continent, understanding and praising their explicit beauty.

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DRAINAGE SYSTEM

The flow of water through channels is called drainage. The network of such channels is known as drainage system. On the basis of origin, Indian drainage system is divided into – Himalayan rivers and Peninsular rivers.

I. HIMALAYAN RIVERS

- The major Himalayan rivers are the Ganga, the Indus and the Brahmaputra.
- These rivers are very long compared to the rivers of South India.

A. INDUS RIVER SYSTEM

- It is also known as Sindhu river.
- Total length is 2880 km.
- Source – Kailash Range, Tibet near Mansarovar Lake.
- Destination – Arabian Sea.
- Panchnad – Jhelum (Vitasta), Chenab (Chandrabhaga), Ravi (Iravati), Beas (Bipasha) and Sutlej (Satadru).

B. GANGA RIVER SYSTEM

- Source – Gangotri glacier near Gomukh, Uttrakhand in the Kumaon Himalaya.
- It is named as Bhagirathi here. At Devprayag, Alakananda joins Bhagirathi and becomes Ganga.

- In Allahabad it is joined by the Yamuna, the largest tributary of Ganga, rising from Yamunotri glacier.
- Left bank tributaries – Ramganga, Gandak, Kosi, Gharghara, Gomati.
- Right bank tributaries – Son.
- Kosi, a tributary, is flood prone. So it is known as "Sorrow of Bihar".
- Ganga flows through Uttrakhand, UP, MP, Chattisgarh, Bihar, Jharkhand and WB.
- It bifurcates into Bhagirathi and Hooghly in WB and Padma-Meghna in Bangladesh.
- Ganga-Brahmaputra delta is the largest delta in the world.
- Total length of Ganga – 2530 km.
- Ganga Basin area is 9,51,600 sq. km.
- The plain area from Haridwar to Ganga's mouth is fertile with alluvial soil.

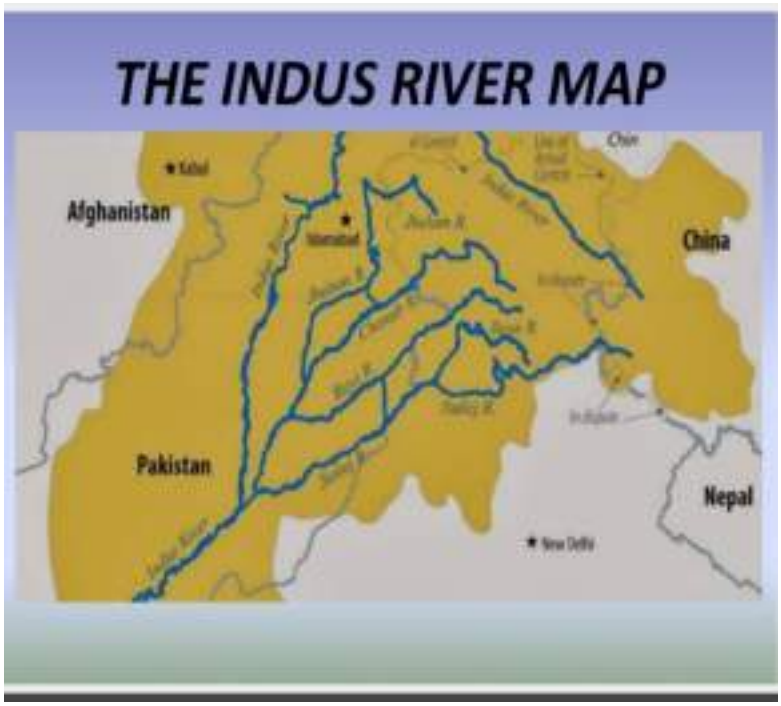
C. BRAHMAPUTRA

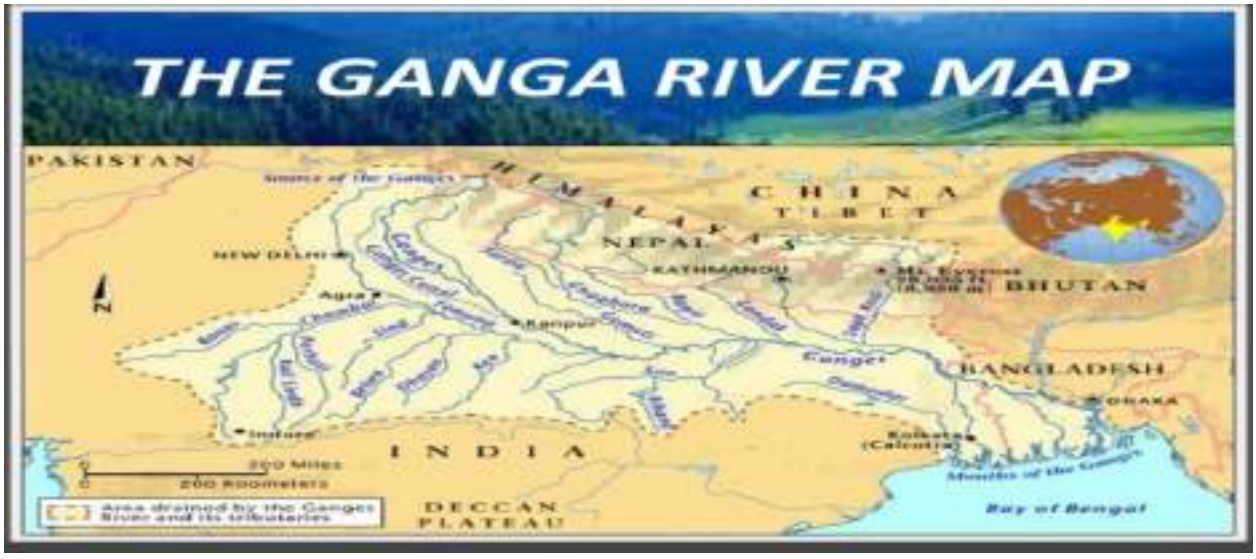
1. Source – Chemayung-Dung glacier near Mansarovar in Tibet.
2. In Tibet it is known as Tsangpo.
3. It turns SW near Namcha Barwa in Arunachal Pradesh and enters India as Dihang
4. Near Sadiya, Dihang enters into India where Dibang and Lohit join it to make Brahmaputra.
5. Finally it enters into Bangladesh as Jamuna and meets Padma to drain into Bay of Bengal.
6. Right bank tributaries – Subansiri, Kameng, Manas.
7. Left bank tributaries – Buri Dihang, Kameng.
8. Majuli is a large riverine island of Brahmaputra.
9. Total length of Brahmaputra is 2900 km.

II. PENINSULAR RIVER SYSTEM

- Peninsular rivers are both west and east flowing.

- Narmada and Tapi drain into Arabian Sea where Mahanadi, Godavari, Cauvery and Krishna drain into Bay of Bengal.
- East flowing rivers form delta where west flowing rivers don't form delta.
- Narmada and Tapi are rift valleys.





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CLIMATIC CLASSIFICATION OF INDIA

- Koeppen's Classification of Climatic Regions of India is an empirical classification based on mean annual and mean monthly temperature and precipitation data.
- Koeppen identified a close relationship between the distribution of vegetation and climate.
- He selected certain values of temperature and precipitation and related them to the distribution of vegetation and used these values for classifying the climates.
- Koeppen recognized five major climatic groups, four of them are based on temperature and one on precipitation.
- The capital letters:

- A, C, D and E delineate humid climates and
- B dry climates.

- The climatic groups are subdivided into types, designated by small letters, based on seasonality of precipitation and temperature characteristics.
- The seasons of dryness are indicated by the small letters : f, m, w and s, where

- f – no dry season,
- m – monsoon climate,
- w – winter dry season and
- s – summer dry season.

10. The above mentioned major climatic types are further subdivided depending upon the seasonal distribution of rainfall or degree of dryness or cold.

a: hot summer, average temperature of the warmest month over 22°C

c: cool summer, average temperature of the warmest month under 22°C

f: no dry season

w: dry season in winter

s: dry season in summer

g: Ganges type of annual march of temperature; hottest month comes before the solstice and the summer rainy season.

h: average annual temperature under 18°C

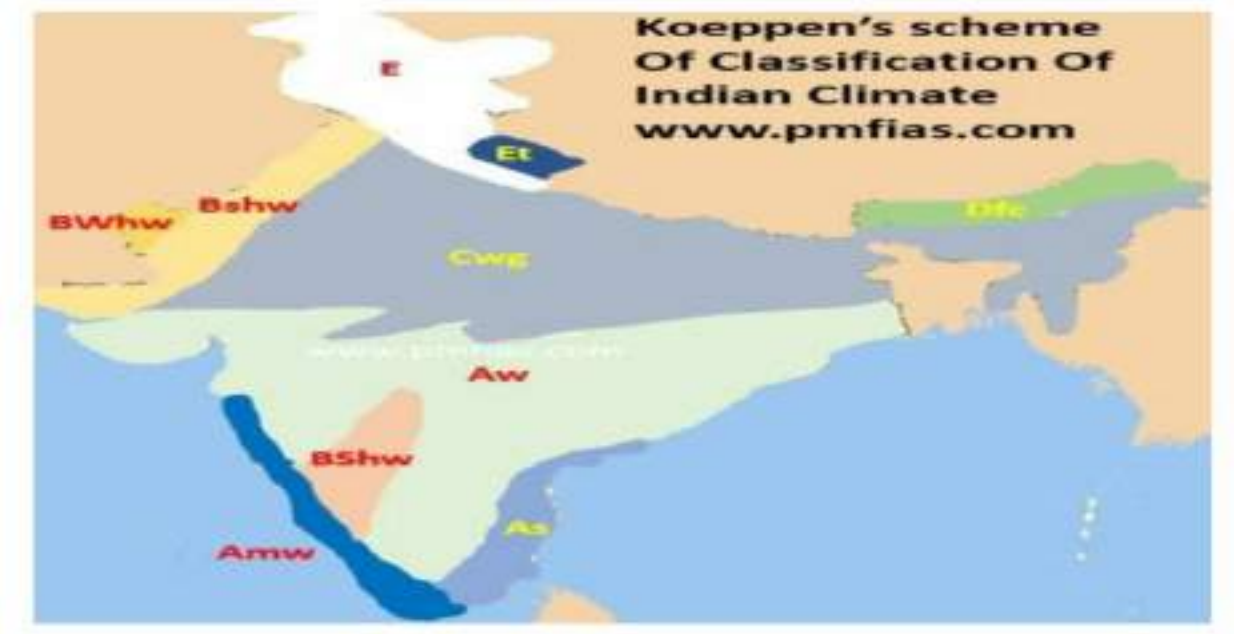
m (monsoon): short dry season.

- The capital letters S and W are employed to designate the two subdivisions of dry climate:
- semi-arid or Steppe (S) and
- arid or desert (W).
- Capital letters T and F are similarly used to designate the two subdivisions of polar climate
- tundra (T) and
- icecap (F).

Koeppen's Scheme – Climatic Regions of India

Climate type	*Region*	*Annual rainfall*
Amw (Monsoon type with short dry winter season)	Western coastal region, south of Mumbai	over 300 cm
As (Monsoon type with dry season in high sun period)	Coromandel coast = Coastal Tamil Nadu and adjoining areas of Andhra Pradesh	75 – 100 cm [wet winters, dry summers]
Aw (Tropical Savanah type)	Most parts of the peninsular plateau barring Coromandel and Malabar coastal strips	75 cm
BShw (Semi-arid Steppe type)	Some rain shadow areas of Western Ghats, large part of Rajasthan and contiguous areas of Haryana and Gujarat	12 to 25 cm

BWhw (Hot desert type)	Most of western Rajasthan	less than 12 cm
Cwg (Monsoon type with dry winters)	Most parts of the Ganga Plain, eastern Rajasthan, Assam and in Malwa Plateau	100 – 200 cm
Dfc (Cold, Humid winters type with shorter summer)	Sikkim, Arunachal Pradesh and parts of Assam	~200 cm
Et (Tundra Type)	Mountain areas of Uttarakhand The average temperature varies from 0 to 10°C	Rainfall varies from year to year.
E (Polar Type)	Higher areas of Jammu & Kashmir and Himachal Pradesh in which the temperature of the warmest month varies from 0° to 10°C	Precipitation occurs in the form of snow



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