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INDIAN RIVER SYSTEM



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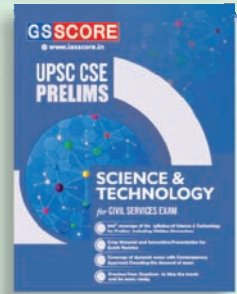
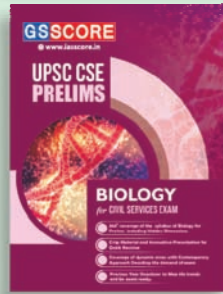
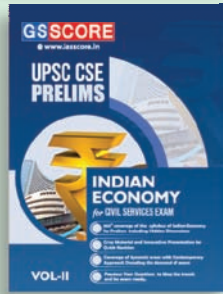
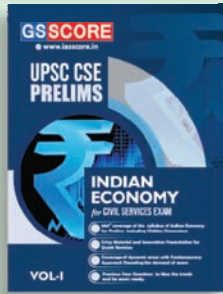
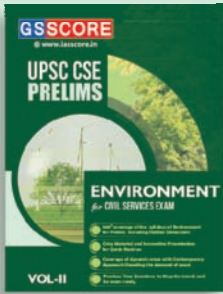
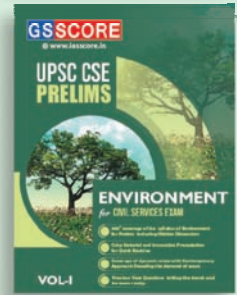
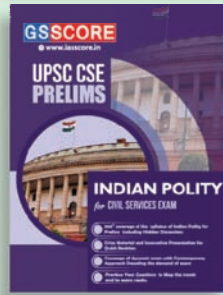
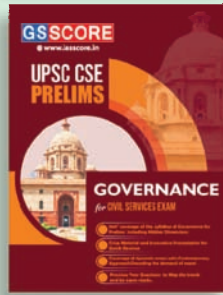
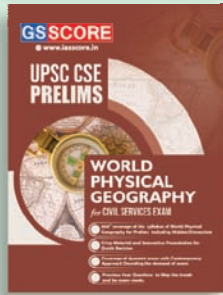
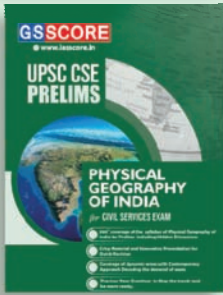
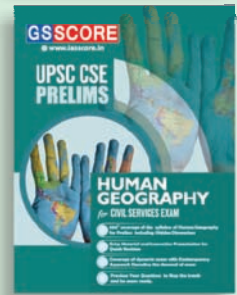
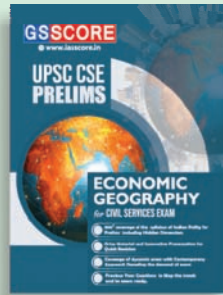
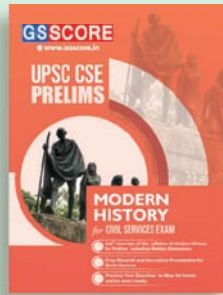
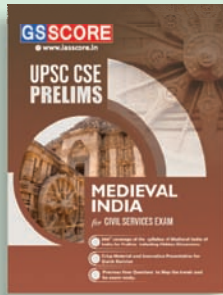
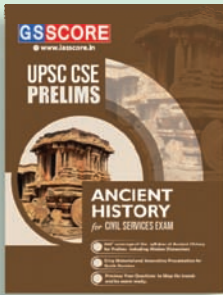
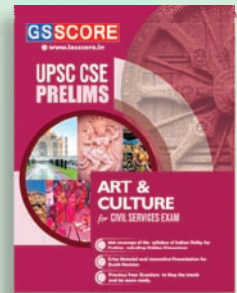
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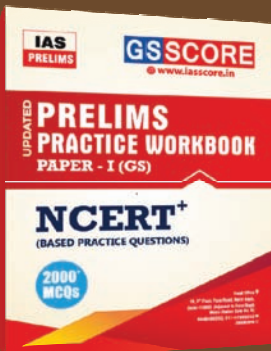
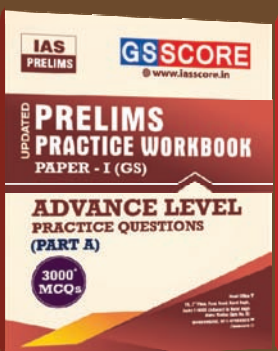
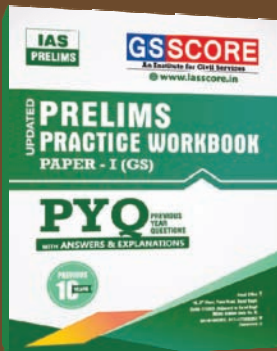
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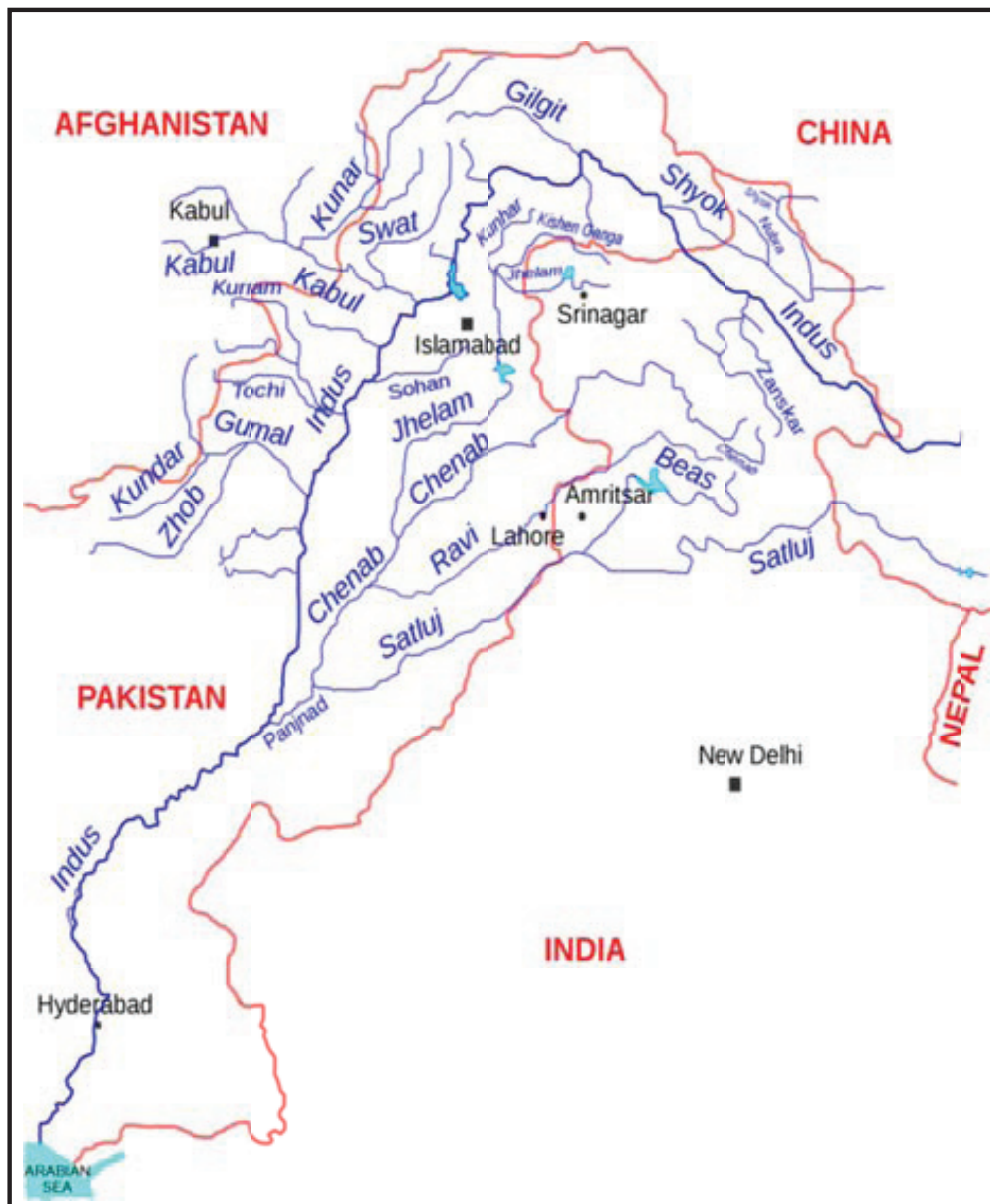
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INDIAN RIVER SYSTEM

The drainage systems of India are mainly controlled by the broad relief features of the subcontinent. Accordingly, the Indian rivers are divided into two major groups:

- The Himalayan Rivers; and
- The Peninsular Rivers.

Himalayan Drainage System



Important Facts

- **The Jhelum**, an important tributary of the Indus, rises from a spring at **Verinag** situated at the foot of the **Pir Panjal** in the south-eastern part of the valley of Kashmir. It flows through **Srinagar** and the **Wular Lake** before entering Pakistan through a deep narrow gorge.
- **The Chenab** is the **largest tributary** of the Indus. It is formed by two streams, the **Chandra and the Bhaga**, which join at **Tandi near Keylong** in Himachal Pradesh. Hence, it is also known as **Chandrabhaga**.
- **The Ravi** is another important tributary of the Indus. It rises west of the **Rohtang pass** in the **Kullu hills** of Himachal Pradesh and flows through the **Chamba valley** of the state.
- **The Beas** is another important tributary of the Indus, originating from the **Beas Kund near the Rohtang Pass**
- **The Satluj** originates in the **Rakas Lake near Mansarovar** in Tibet where it is known as **Langchen Khambab**. It flows almost parallel to the Indus before entering India, and comes out of a **gorge at Rupar**.

IN NEWS

Sutlej-Yamuna Link

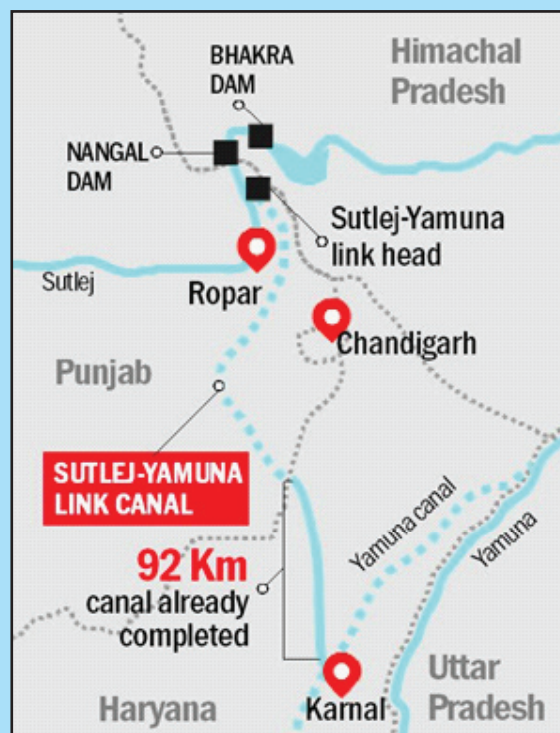
- The **Sutlej-Yamuna Link (SYL)** is a proposed 211-kilometre canal.
- It would connect the Sutlej River in Punjab with the Yamuna River in Haryana, providing Haryana with a share of the water from the Ravi and Beas rivers that flow through Punjab.
- The SYL canal project was proposed following the **Indus Water Treaty in 1960** between India and Pakistan, which granted India 'free and unrestricted use' of the **Ravi, Beas, and Sutlej rivers**.
- The **Sutlej-Yamuna Link canal** was planned in 1966 when Haryana was separated from Punjab.
- In 1976, the Government of India approved the construction of the canal.
- **The Controversy Around SYL is over the issue of water rights and allocation of water from the Sutlej and Yamuna rivers.**

Devika Rejuvenation Project in J & K

- The project was compared with the 'Namami Ganga' Project.
- The project was launched in 2019 in Jammu & Kashmir.
- The project gets funded under the National River Conservation Plan (NRCP).

About Devika River

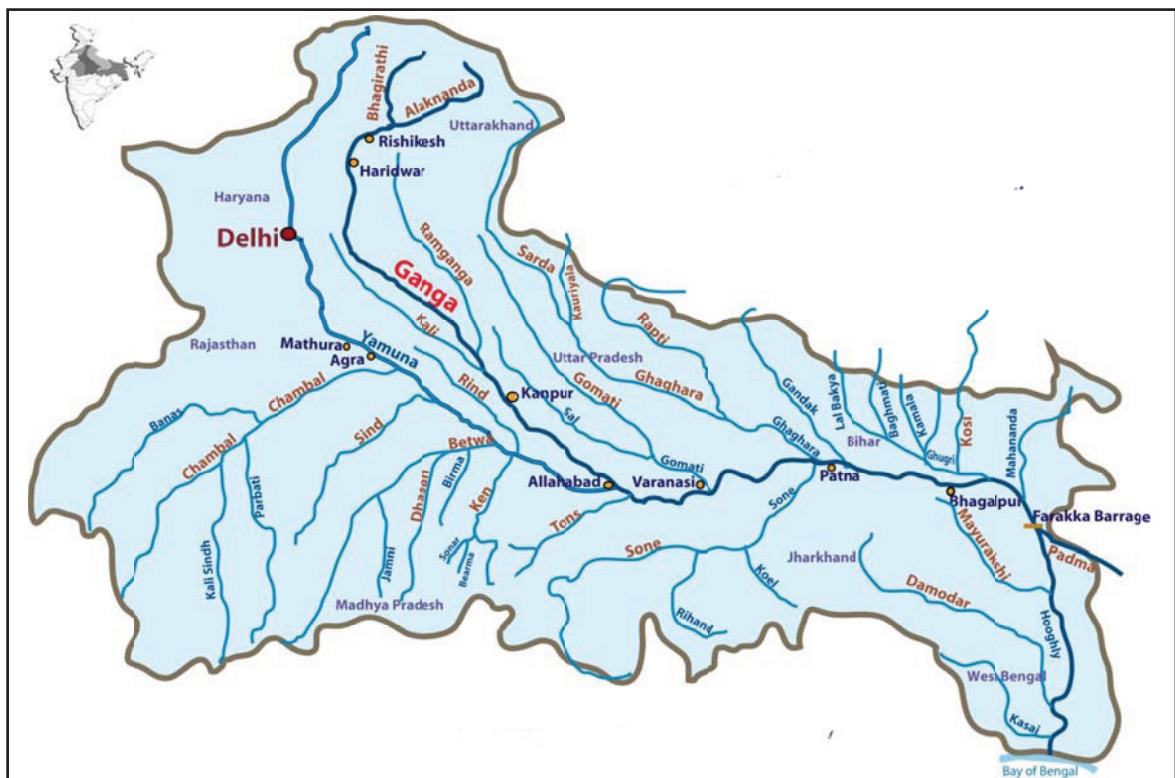
- The Devika river holds great religious significance.
- It is revered by Hindus as the **sister of the river Ganga**.
- Devika is also known as **Gupt Ganga**.
- The river also got mentioned in the NilmatPuran written in the 7th century by Nela Muni
- **Origin:** The river originates near **SuddhaMahadev Temple** in Udhampur, Jammu.
- At Venisung it merges with Tawi River.
- **Tawi** flows through Jammu and is a major left-bank tributary of the river Chenab.
- At this confluence, a fair is organised on the eve of Baisakhi every year.



Indus River System

- Originates
 - ▶ The Indus originates in the Kailash range in Tibet near Lake Manasarovar.
 - ▶ It follows a north-westerly course through Tibet.
 - ▶ In Tibet, it is known as 'Singi Khamban; or Lion's mouth.
 - ▶ It enters Indian Territory in Jammu and Kashmir.
 - ▶ It forms a picturesque gorge in this part.
- Several tributaries
 - ▶ The Zaskar, the Shyok, the Nubra and the Hunza join it in the Kashmir region. The other important tributaries joining the right bank of the Indus are the Khurram, the Tochi, the Gomal, the Viboa and the Sangar.
- Regions
 - ▶ It flows through the regions of Ladakh, Baltistan and Gilgit and runs between the Ladakh Range and the Zaskar Range.
 - ▶ It has a large number of tributaries in both India and Pakistan and has a total length of about 2880 km from the source to the point near Karachi where it falls into the Arabian Sea.
 - ▶ The river flows southward and receives 'Panjnad' a little above Mithankot. The Panjnad is the name given to the five rivers of Punjab, namely the Satluj, the Beas, the Ravi, the Chenab and the Jhelum.
 - ▶ The principal rivers of the Indus River system are snow-fed.
 - ▶ The Indus and its tributaries receive all their waters in the hilly upper parts of their catchments.
 - ▶ The Indus flows in India only through the Leh district in Jammu and Kashmir.

The Ganga River System



- The Ganga is the most important river of India both from the point of view of its basin and cultural significance.
- Originates
 - ▶ It rises in the Gangotri glacier near Gaumukh (3,900 m) in the Uttarkashi district of Uttarakhand. Here, it is known as the Bhagirathi.

- ▶ At **Devprayag**, the **Bhagirathi** meets the **Alaknanda**; hereafter, it is known as **the Ganga**.
 - ▶ The **Alaknanda** has its source in the **Satopanth glacier** above **Badrinath**.
 - ▶ The **Alaknanda** consists of the **Dhaulti and the Vishnu Ganga** which meet at **Joshimath** or **Vishnu Prayag**.
 - ▶ The **Ganga** enters the plains at **Haridwar**.
 - ▶ From here, it flows first to the **south, then to the south-east and east before splitting into two distributaries, namely the Bhagirathi and the Hugli**.
- **Regions**
 - ▶ It is shared by **Uttarakhand (110 km) and Uttar Pradesh (1,450 km), Bihar (445 km) and West Bengal (520 km)**.

IN NEWS

KEN-BETWA LINK PROJECT AUTHORITY (KBLPA)

- Centre has constituted a **KBLPA and a national steering committee for interlinking the two rivers**.
- KBLPA has been constituted as a vertical of National Water Development Agency.
- It will comprise of secretaries from ministries of environment, power and tribal affairs.
- All central funds for the project will be routed through KBLPA.
- It will be chaired by Jal Shakti Ministry secretary.
- This project involves transfer of water from the **Ken river** to the **Betwa River**.

- **The Gandak** comprises two streams, namely **Kaligandak and Trishulganga**.
 - ▶ It rises in the **Nepal Himalayas** between the **Dhaulagiri and Mount Everest** and drains the central part of **Nepal**.
 - ▶ It enters the **Ganga plain in Champaran district of Bihar** and joins the **Ganga at Sonpur near Patna**.
- **The Ghaghara** originates in the **glaciers of Mapchachungo**.
 - ▶ After collecting the waters of its tributaries – **Tila, Seti and Beri**, it comes out of the mountain, cutting a **deep gorge at Shishapani**.
 - ▶ The **river Sarda** (Kali or Kali Ganga) joins it in the plain before it finally meets the **Ganga at Chhapra**.
- **The Kosi** is an antecedent river with its **source to the north of Mount Everest in Tibet**, where its **main stream Arun rises**. After crossing the **Central Himalayas in Nepal**, it is joined by **the Son Kosi from the West and the Tamur Kosi from the east**.
 - ▶ It forms **Sapt Kosi** after uniting with the river **Arun**.
- **The Ramganga** is comparatively a small river rising in the **Garhwal hills near Gairsain**.
- **The Damodar** occupies the **eastern margins** of the **Chotanagpur Plateau** where it flows through a rift valley and finally joins the **Hugli**. **The Barakar** is its main tributary. Once known as **the 'sorrow of Bengal'**, the **Damodar** has been now tamed by the **Damodar Valley Corporation, a multipurpose project**.
- The **Sarda or Saryu River** rises in the **Milam glacier** in the **Nepal Himalayas** where it is known as the **Goriganga**. Along the **Indo-Nepal border**, it is called **Kali or Chauk**, where it joins the **Ghaghara**.
- **The Mahananda** is another important tributary of the **Ganga** rising in the **Darjiling hills**. It joins the **Ganga as its last left bank tributary** in **West Bengal**. **The Son** is a large **south bank** tributary of the **Ganga**, originating in the **Amarkantak plateau**.

Brahmaputra River System



- The river Brahmaputra originates in **Himalayan Lake Manasarovar** in Tibet to the **outfall in the Bay of Bengal**.
- It flows **eastward in Tibet and south, south-west in India**.
- In the **upper reaches**, the river is **fed by the glaciers** and in the **lower reaches**, it is joined by a **number of tributaries** which originates at different elevation in the hills encircling the catchment, forming watershed.
- Among the tributaries **Subansiri, Manas, Jiabharali, Pagladiya, Puthimari and Sankosh**, etc. is snow fed.
- The Tibetan name of river is **"TSANGPO"** and Chinese name is **"YALUZANGBU"**.
- Its name also changes from **"TSANGPO" to Siang and Dehang** in Arunachal Pradesh.
- Before touching plains it is joined by two major Himalayan tributaries viz. **Lohit and Debang**.
- The combined flow of these rivers is known as the Brahmaputra and passes through the plains of Assam and Bangladesh before falling into the Bay of Bengal.
- **From Passighat to Dhubri** where it travels in plains of Assam is well known as **Brahmaputra valley**.
- The **important tributaries of River Brahmaputra** are:
 - ▶ **Left bank tributaries:** Dhansiri, Kapili, Barak.
 - ▶ **Right bank tributaries:** Subansiri, Jia Bhoraali, Manas, Sankosh, Tista & Raidak
 - ▶ **Dhansiri:** Rises from Naga Hills.
 - ▶ **Sankosh:** It's the main river of Bhutan, meets Brahmaputra at Dhubri, Assam.
 - ▶ **Manas:** Rises from Tibet and joins Brahmaputra on its right bank.
 - ▶ **Subansiri:** It is flows in between the Mikir hills & Abor hills and later joins Brahmaputra on its right bank.
 - ▶ **Tista:** Rises from Kanchan-junga, fed by the tributaries like Rangit & Rangpo, it joins the Brahmaputra river in Bangladesh.
 - ▶ **Barak:** Rises in Nagaland. It enters Bangladesh as River Surma which falls into River Padma at Chandpur.

Drainage System of Peninsular India

Origin of Peninsular Drainage

- Subsidence of western flank of peninsula during early tertiary period. It has disturbed the symmetry of peninsular block's river watershed.
- Upheaval of the Himalayas when the northern flank of peninsular block was subjected to subsidence and consequent trough faulting. The Narmada and Tapi flow in trough faults and fill the original cracks with detritus materials. Hence there is lack of alluvial and deltaic deposits in these rivers.
- Slight tilting of peninsular block from North-West to South-East has caused entire drainage system to flow towards Bay of Bengal.
- Types of Peninsular River System (On the basis of direction of flow)
 - ▶ **West flowing rivers**
 - ▶ **East flowing rivers**

West Flowing Rivers

Narmada

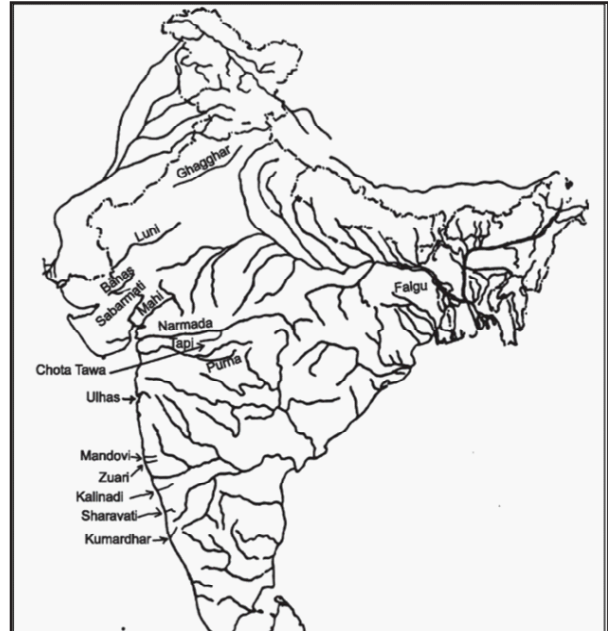
- **Origin** – Amarkantak plateau (1,057m) (Shahdol district, Madhya Pradesh)
- **Total Length**– 1,310 km (largest west flowing river) Only 112 km navigable from mouth.
- Flows 1,078 km in Madhya Pradesh. Forms 32 km long boundary between M.P and Maharashtra.
- Forms 40 km long boundary between Maharashtra & Gujarat Flows 160 km in Gujarat
- Makes an estuary before entering into Gulf of Khambhat.
- There are several islands in estuary formed by Narmada. Aliabet is an important estuary island.
- **States** – M.P., Maharashtra, Gujarat
- **Landmarks** – Dhuandhar falls also called cloud of mist (30m) located in Jabalpur district, Madhya Pradesh. This fall is located in a Gorge of marble.
- Other falls- Mandhar falls (12m) Dardi fall (12m) Sahasradhara falls (8m)

Tapi (or Tapti)

- **Origin** – Betul plateau (M.P) in Satpura Range

- **Total length** – 730 km (32 km from sea)
- **State** – M.P, Maharashtra & Gujarat
- **Meets**- Arabian Sea at Gulf of Khambhat

Sabarmati



- Sabarmati River is formed by confluence of **Sabar and Hathmati streams**
- **Origin** – Mewar hills (Aravali range) (Rajasthan)
- **Length** – 320 km
- **Mouth** – Gulf of Khambhat
- **States** – Rajasthan & Gujarat
- **Tributaries** – The Sedhi, The Harnav, the Vartak, the Wakul, The Meshwa

Mahi

- **Origin** – Vindhyas (500 m)
- **Meeting point** – Gulf of Khambhat
- **States** – Madhya Pradesh, Maharashtra & Gujarat
- **Length** – 533 km
- **Tributaries** – Som, Anas and Panam

Luni

- Also known as '**Sagarmati**'
- It flows through '**Thar Desert**'
- It has an **Inland Drainage** as it disappears into Marshy land of Rann of Kutch

- **Origin** – Aravalli (west of Ajmer, Rajasthan)
- **Length** – 482 km
- **Meeting point** – Lost into Marshy land of Rann of Kutch (Inland drainage)

Mahadayi River

- Mahadayi or Mhadei, the **west-flowing river**, originates in **Bhimgad Wildlife Sanctuary (Western Ghats)**, Belagavi district of **Karnataka**.



- It is essentially a **rain-fed river and known as Mandovi** in Goa.
- It is joined by a number of streams to form the Mandovi which is one of two major rivers (the other one is Zuari river) that flows through Goa.
- The river travels 35 km in Karnataka; 82 km in Goa before joining the Arabian Sea.
- **Goa and Karnataka** have had long disputes over **water sharing issues of the Mhadei river**.

Kalasa-Banduri project

- Centre has given approval for implementation of Kalasa-Banduri canal construction project.
- The project proposes to divert water from two tributaries of the Mahadayi river (also known as Mandovi): Kalasa and Banduri to the Malaprabha river.
- Entire project aims to construct several dams on the river Mandovi.
- Aimed at facilitating drinking water for towns in drought-hit northern Karnataka.

East Flowing Rivers

Subarnrekha

- **Origin** – Ranchi plateau
- **Length** – 474 km



- **Tributaries** –Baitarni & Brahmani
- It flows in States of **Jharkhand and Odisha**

Mahanadi

- **Origin** – Dandakaranya (near Sihawa, Raipur, Chhattisgarh)
- **Length** – 857 km States –
- It flows in **Chhattisgarh and Odisha**.
- It forms delta of about 9,500 km sq.

In News

- The National Green Tribunal (NGT) has directed the Odisha government to revive a dead river 'Sukapaika River' in next six months by earmarking a dedicated fund for the purpose.
- Sukapaika River is a dead river, originates from **Mahanadi River**.
- It traverses a length of 27.50KM and then falls at Bankala in the same Mahanadi River.
- It covers three blocks such as Cuttack Sadar, Raghunathpur and Nichintakoili of Cuttack.
- The mouth of the river was closed during the year 1950 for development of Taladanda Canal System and for flood protection in the delta of Sukapaika.

Rushikulya River

- **Origin** – Nayagarh hills (Odisha)
- **Length** – 165 km
- **States** – Its flows in Odisha
- It flows near Chilka lake (largest brackish water lake of Asia)

- Mouth of Rushikulya River is known for mass hatching of olive ridley turtles. This is smallest and most abundant of all sea turtles found in the world.
- Olive Ridley turtles are only found in tropical waters of Pacific, Atlantic and Indian Ocean.

Godavari River

- **Origin** – Trimbak plateau (Nashik, Maharashtra)
- **Length** – 1,465 km States – Maharashtra, Andhra Pradesh, Telangana
- It is **second largest river** of India and largest river system of Peninsular India
- It is also called **Gautami or Virdhha Ganga**

Krishna River

- **Origin** – Western Ghats just north of Mahabaleshwar (Maharashtra)
- **Length** – 1400 km
- **State** – Maharashtra, Telangana, Karnataka, Andhra Pradesh

Penneru River

- **Origin** – Nandidurg Peak (Karnataka)
- **Length** – 597 km

- **State** – Karnataka and Andhra Pradesh
- **Tributaries**-Kundur, Charavati, Papagni, Punchu

Kaveri River

- **Origin** – Taal Kaveri (Bramhagiri Range, Western Ghats, near Bengaluru, Karnataka)
- **Length** – 800 km
- **States** – Karnataka, Tamil Nadu
- It receives rainfall from both **South-West monsoon** as well as **retreating north-east monsoon** due to which it causes flood in its lower course during winter.
- One of the most well utilized rivers having 90-95% capacity utilized.
- Forms delta before merging into Bay of Bengal.
- **Sivasamudram waterfalls** (101 m high) are situated on it.

Vaigai River

- **Origin** – Varusanadu hills (near Annamalai hills & Palni hills)
- **Length** – 258 km
- **State** – Tamil Nadu
- It is a **dry channel** which reappears and disappears frequently.
- **Madurai** is located on Vaigai river

Difference between Himalayan and Peninsular Rivers

Characteristics	Himalayan	Peninsular
Origin	Himalayas	Peninsular highlands
Regime and Flow	Perennial and lesser fluctuations	Seasonal and Higher regime fluctuations
Stages of life	Mostly in their Youth stage	Most of the rivers are in the mature to the old stage
Geographic features	Erosional features like V-shaped valley, meanders are formed. Depositional features like Deltas are formed	Erosional features are U shaped Valley. Meanders are generally absent. Depositional features are Deltas of Godavari, Krishna and Estuaries of Narmada, Tapi
Geomorphic characteristics	Bedrocks of Himalayan rivers are soft, sedimentary and easily erodible.	Bedrocks of peninsular rivers are Hard, resistant and not susceptible to erosion
Drainage Basin characteristics	Large basins, Antecedent river systems	Relatively smaller basins and subsequent, Superimposed drainage system
Impact of climate change	Himalayan river system would be affected by climate change. Initially the flow would be higher due to increased melting of snow and ice. However, later it would reduce when the glaciers recede.	Peninsular river system may have greater variations in water availability. Impact of climate change on Monsoons and precipitation levels would affect these river systems.

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