



# Integrated River Basin Management

**For Prelims:** [Indus Waters Treaty](#), [Ganga](#), [Brahmaputra](#), [Yamuna](#)

**For Mains:** Effective river planning, Necessity of multilateral treaties for effective management of Rivers, Indus Waters Treaty

[Source: IE](#)

## Why in News?

A recent report authored by the Kathmandu-based International Centre for Integrated Mountain Development (ICIMOD) and the Australian Water Partnership has emphasized the **need for multilateral treaties for effective integrated river basin management of the Indus, Ganga, and Brahmaputra rivers**.

## What are the Key Highlights of the Report?

- **Integrated River Basin Management:**
  - The report emphasizes the importance of **integrated river basin management**, which involves a basin-wide approach to river planning, backed by quality data sharing on water availability, biodiversity, and pollution among all stakeholders.
- **Need for Multilateral Treaties:**
  - Despite **existing bilateral treaties and agreements on water data sharing**, there is a **notable absence of multilateral agreements** for river management in the region, posing a challenge to effective governance.
    - It emphasizes the necessity for establishing multilateral treaties to manage the Indus, Ganga, and Brahmaputra rivers effectively.
- **Dependence on Critical Rivers:**
  - Millions of people in India, Tibet (China), Pakistan, Afghanistan, Nepal, and Bhutan rely on the Indus, Ganga, and Brahmaputra rivers for **food and water security**, making comprehensive management strategies imperative.
    - All three basins are part of the larger **Indus-Ganga-Brahmaputra (IGB) Plain**, a vast alluvial plain that spans across parts of India, Pakistan, Bangladesh, and Nepal.
  - **Ganga River Basin:**
    - 600 million Indians, 29 million Nepalese, and millions in Bangladesh live in this basin area.
    - No agreement involving Nepal, India, and Bangladesh.
  - **Indus River Basin:**
    - Lifeline for 268 million people living in its basin.
  - **Brahmaputra River Basin:**
    - Approximately 114 million people depend on it for water, electricity, food, agriculture, and fishing.
- **Recommendations:**
  - Recognising and **leveraging the knowledge of local communities** for effective crisis

management.

- Empowering local communities with **resources and technology** to enhance their resilience.
- Addressing **data gaps related to water availability, biodiversity, and pollution** in the river basins for better management and early warning systems.
- Adopting a holistic '**whole basin**' **research** approach that facilitates data-sharing, strategic planning, understanding climate change impacts, and ensuring reliable water supply.
- Promoting '**hydro-solidarity**' and **climate diplomacy** among researchers from different countries to build trust and foster dialogue on transboundary water issues.
  - '**Hydro-solidarity**' is about promoting cooperation and solidarity among nations in **managing shared water resources**. It involves recognising the **interdependence of countries regarding water resources** and the need for collective action to address water-related challenges.
    - This includes implementing fair water-sharing agreements, promoting collaborative governance, investing in water infrastructure, and addressing the water-energy-food nexus.
  - Climate diplomacy plays a crucial role in **addressing [water stress](#)** caused by **[climate change](#)**, and integrating water diplomacy with climate diplomacy can help tackle the interconnected challenges of water scarcity and climate change.

## What are the Key Facts About the Ganga, Indus and Brahmaputra River Basin?

### ▪ Ganga River Basin:

#### ◦ Source and Headwaters:

- The Ganga originates as **Bhagirathi from Gangotri Glacier, Uttarakhand** at an elevation of 3,892 m.
- Many small streams comprise the headwaters of Ganga. The important among these are **Alaknanda, Dhauliganga, Pindar, Mandakini and Bhilangana**.
  - At Devprayag, where **Alaknanda joins Bhagirathi**, the river acquires the name **Ganga**. It traverses 2525 km before flowing into the Bay of Bengal.

#### ◦ Course and Major Tributaries

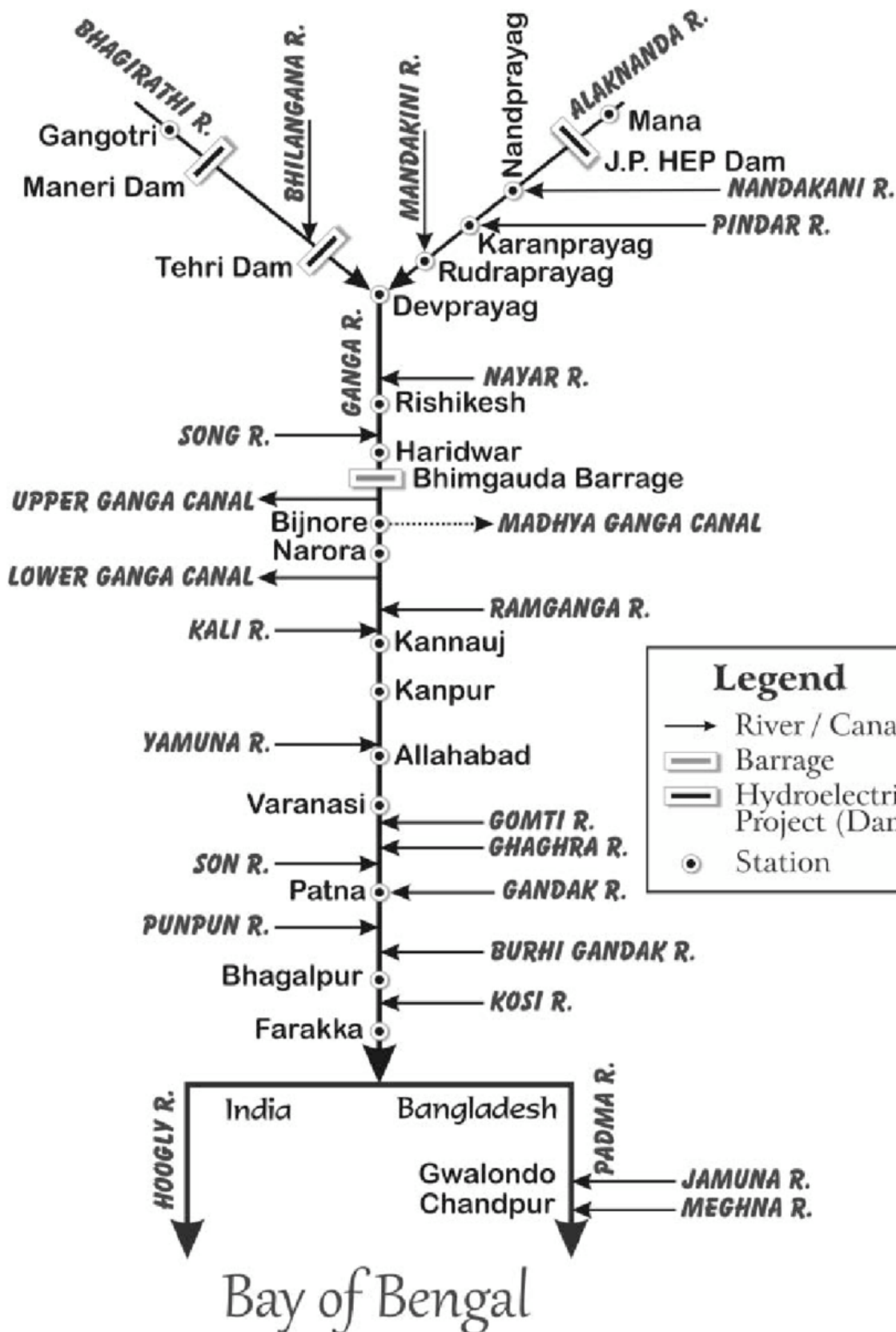
- Flows through the states of Uttarakhand, Uttar Pradesh, Bihar, Jharkhand, and West Bengal in India, before entering Bangladesh.
- Nearly 80% of the Ganges river basin is in India, the rest is in Nepal, Tibet (China) and Bangladesh.
- Major tributaries include the **[Yamuna](#), [Gomti](#), [Ghagra](#), [Gandak](#), and [Kosi rivers](#)**.
- Known for its fertile alluvial plains, which have supported agriculture and human settlements for centuries.

#### ◦ Delta and Outflow

- After a journey of around 2,510 kilometres, the Ganga River merges with the **Brahmaputra River in Bangladesh, forming the Padma River**.
  - The Padma River then joins the Meghna River and flows into the **Bay of Bengal** through the **Meghna Estuary**.

# Flow Chart of the Ganga River Basin

(Not To Scale)

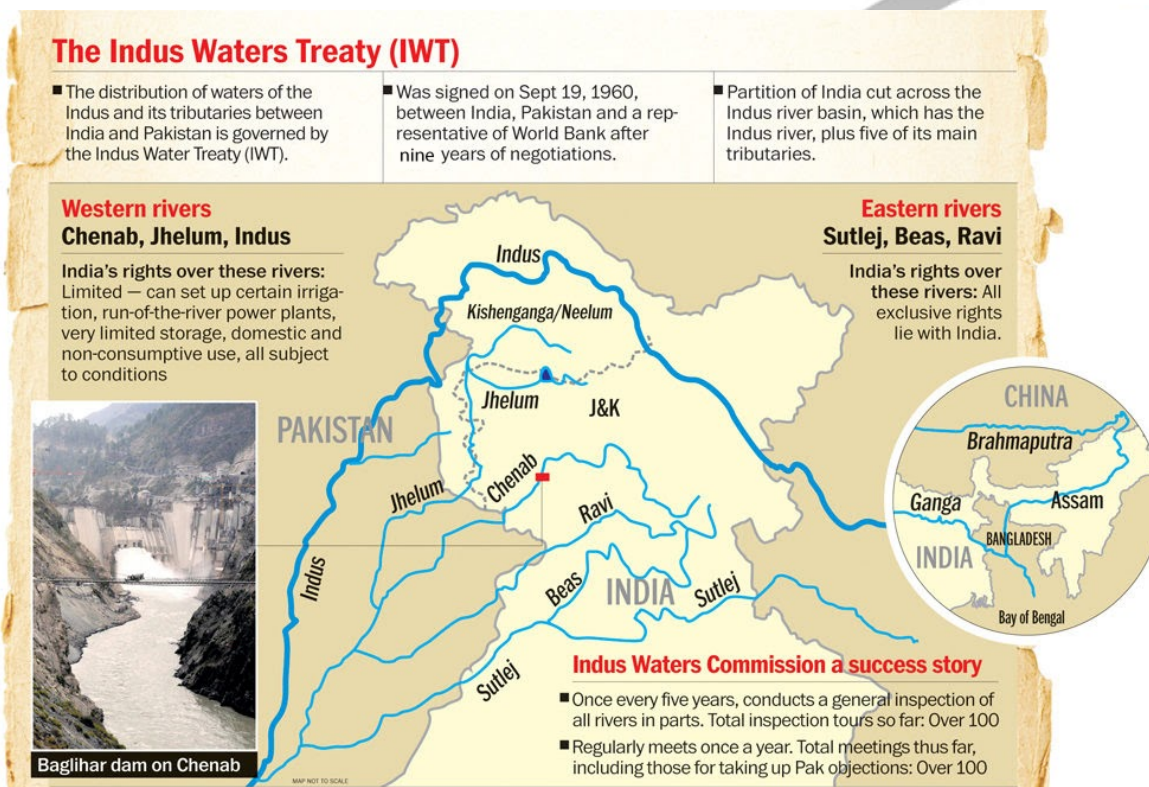


## ▪ Indus River Basin:

### ◦ Source:

- The Indus (Tibetan-Sengge Chu, 'Lion River'), a major river in South Asia, originates in **Tibet near Mansarovar Lake in the Trans-Himalaya.**

- The river flows through **Tibet, India and Pakistan** and about 200 million people live in the area of its drainage basin.
- The [Indus Waters Treaty](#) is a **treaty between India and Pakistan** that was signed in 1960, to define the rights and responsibilities of each country regarding the use of the **Indus River system's waters**. The treaty was brokered by the [World Bank](#).
- **Course and Major Tributaries:**
  - It enters **India through Ladakh** and flows through Jammu and Kashmir before reaching **Pakistan's Gilgit-Baltistan region**.
  - The major left-bank tributaries of the Indus River are the Zaskar, Suru, Soan, Jhelum, Chenab, Ravi, Beas, Satluj, and Panjnad rivers. The major right-bank tributaries are Shyok, Gilgit, Hunza, Swat, Kunnar, Kurram, Gomal, and Kabul rivers.
  - The Indus River and its tributaries are vital for agriculture and water supply in the region, particularly in Pakistan, where it serves as the lifeline for the country's economy.
- **Delta and Outflow:**
  - The Indus River empties into the **Arabian Sea** near the city of Karachi in southern Pakistan.
    - Forms a vast delta known as the **Indus Delta**.
  - The delta is home to numerous creeks, marshes, and mangrove forests.



### ■ Brahmaputra River Basin:

- **Source:**
  - It originates under the name of **Siang or Dihang**, from the **Chemayungdung glacier of the Kailash range** near the Mansarovar Lake, the Brahmaputra ranks fifth in the world in terms of average discharge.
  - The basin covers an area of around 580,000 square kilometers spanning parts of Tibet (China), India, Bhutan, and Bangladesh.
  - The Brahmaputra River and its tributaries are important for agriculture, [hydropower generation](#), and transportation in the region.
- **Course and Major Tributaries:**
  - Known as the **Yarlung Tsangpo in Tibet**, flows eastward through the Himalayas and enters the Indian state of Arunachal Pradesh.
  - Continues its journey through the states of Assam and West Bengal in India, before



entering Bangladesh.

- Major tributaries include the Subansiri, Kameng, Manas, and Dhansiri rivers in India, and the [Teesta River](#) in Bangladesh.
- **Delta and Outflow:**
  - The Brahmaputra River joins the Ganga River in Bangladesh, forming the **Padma River**.
    - The **Padma River then merges with the Meghna River** and flows into the Bay of Bengal through the **Meghna Estuary**.



## UPSC Civil Services Examination, Previous Year Question (PYQ)

### Prelims:

**Q1. With reference to the Indus river system, of the following four rivers, three of them pour into one of them which joins the Indus directly. Among the following, which one is such a river that joins the Indus direct? (2021)**

- (a) Chenab
- (b) Jhelum
- (c) Ravi

(d) Sutlej

**Ans: (d)**

**Q2. Consider the following pairs (2019)**

	Glacier	River
1	Bandarpunch	Yamuna
2	Bara Shigri	Chenab
3	Milam	Mandakini
4	Siachen	Nubra
5	Zemu	Manas

Which of the pairs given above are correctly matched?

(a) 1, 2 and 4

(b) 1, 3 and 4

(c) 2 and 5

(d) 3 and 5

**Ans: (a)**

**Mains:**

**Q1.** Present an account of the Indus Water Treaty and examine its ecological, economic and political implications in the context of changing bilateral relations. **(2016)**

**Q2.** Discuss the Namami Gange and National Mission for Clean Ganga (NMCG) programmes and causes of mixed results from the previous schemes. What quantum leaps can help preserve the river Ganga better than incremental inputs? **(2015)**

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