CHINA'S MEGA-DAM ON THE BRAHMAPUTRA RIVER – GEOGRAPHY

NEWS: **China** officially commenced **construction** of a **massive hydropower project** on the **Brahmaputra River in Tibet**, near the Indian state of Arunachal Pradesh.

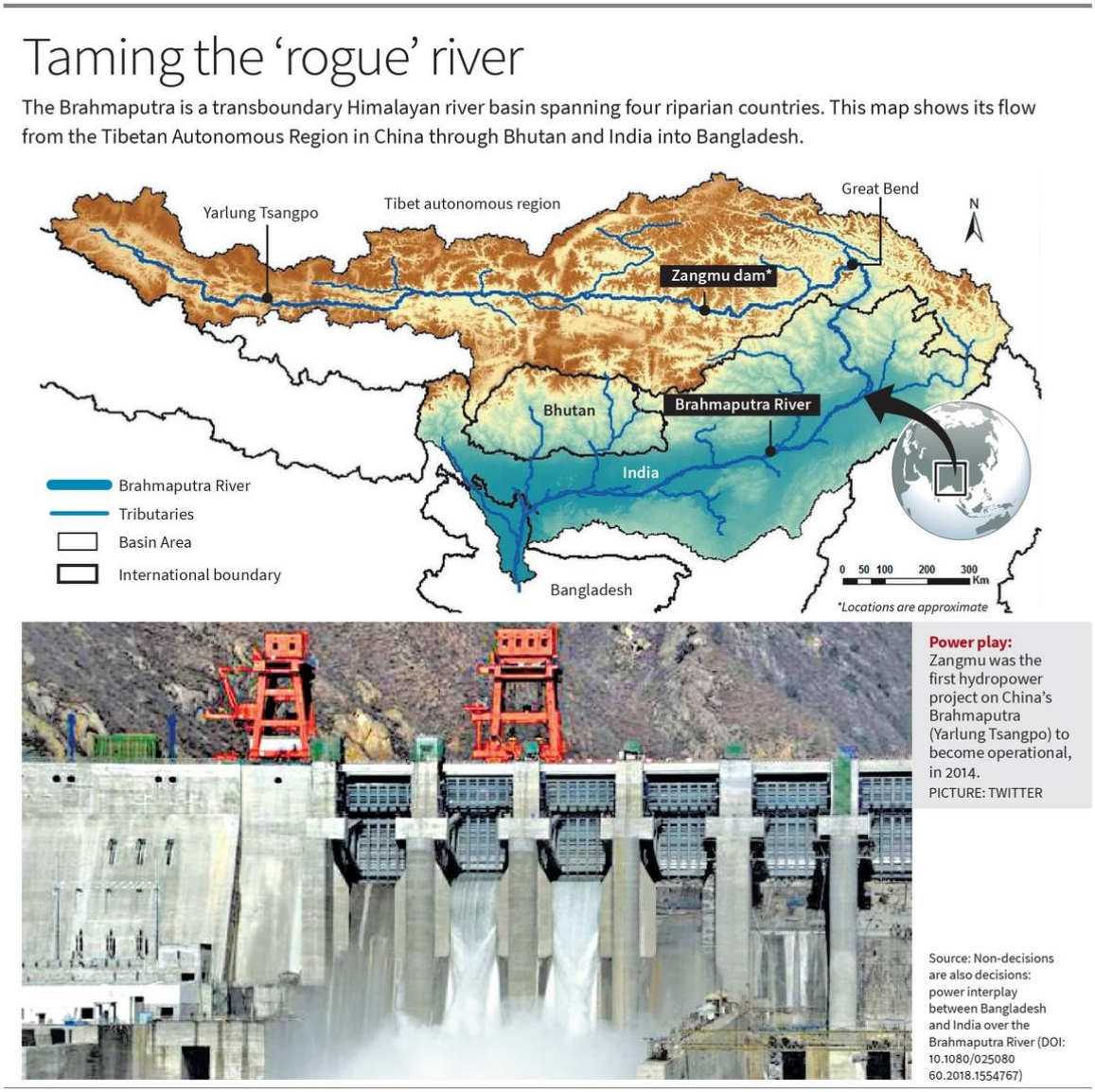
WHAT'S IN THE NEWS?

About the Project

- **Largest Infrastructure of Its Kind:** The project is being promoted as the world's biggest hydro-infrastructure initiative, surpassing even China's Three Gorges Dam in ambition.
- **Hydropower Cascade Stations:** It consists of five cascade-style hydropower stations along the Yarlung Tsangpo river.
- **Estimated Investment:** The project involves an investment of approximately **1.2 trillion yuan** (roughly **USD 167.8 billion**), making it one of the most expensive hydropower ventures globally.
- **Power Output Capacity:** Expected to generate **300 billion kilowatt-hours annually**, enough to meet the electricity needs of **300 million people**.
- **Strategic Location:** Situated in the **Yarlung Tsangpo Grand Canyon** — just before the river enters Arunachal Pradesh — near the ecologically fragile and geologically active India-China border.

About the Yarlung Tsangpo / Brahmaputra River

- **Origin:** The river originates from the **Chemayungdung Glacier** in Tibet, where it is called **Yarlung Tsangpo** or **Zangbo**.
- **Indian Journey:**
    - Enters **Arunachal Pradesh** as the **Siang** river.
    - In **Assam**, it is joined by tributaries such as the **Dibang** and **Lohit**, and becomes the **Brahmaputra**.
- **Transboundary Flow:** Flows into **Bangladesh** and empties into the **Bay of Bengal**.
- **River Basin Area:** Spans approximately **5,80,000 sq km**:
    - China: 50.5%
    - India: 33.3%
    - Bangladesh: 8.1%
    - Bhutan: 7.8%



Impacts of the Project

1. Geopolitical Concerns

- **Lower Riparian Vulnerability:** India and Bangladesh depend heavily on the Brahmaputra for agriculture, fisheries, drinking water, and floodplain ecosystems.
- **Water Flow Disruption Risk:** Unilateral upstream dam construction may alter or reduce water flow during dry seasons, adversely affecting agriculture and riverine livelihoods downstream.
- **Silt Blockage:** The dam could prevent **nutrient-rich sediments** from reaching India and Bangladesh, impacting soil fertility and aquatic ecology.
- **Strategic Leverage in Conflicts:** The dam could allow China to manipulate water flows during diplomatic or military hostilities, posing a national security threat to India and Bangladesh.

2. Ecological and Seismic Risks

- **Ecosystem Disruption:** Threat to sensitive Himalayan biodiversity, aquatic life, and wetland systems downstream.

- **Seismic Zone:** Located in an active seismic region; the **1950 Assam–Tibet earthquake** is a historical reminder of the area's geological volatility.
- **Structural Risks:** A massive dam in this zone could fail during earthquakes, causing catastrophic flooding and loss of life downstream.

3. Disaster Vulnerability

- **GLOF Threats:** The region is vulnerable to **Glacial Lake Outburst Floods (GLOFs)**, such as those witnessed in **Sikkim in 2023**.
- **Climate Change Amplification:** Accelerated glacial melting and erratic monsoon patterns may increase the frequency and intensity of river-based disasters.

India-China Cooperation Mechanisms

Existing Framework

- **Umbrella MoU (2013):** A broad-based agreement between India and China on cooperation in transboundary rivers; this MoU has **no expiry date**.
- **River-Specific MoUs:** Separate MoUs for the Brahmaputra and Sutlej rivers. The **Brahmaputra MoU lapsed in 2023** and has not yet been renewed.
- **Expert Level Mechanism (ELM):** Established in **2006**, this body facilitates **hydrological data sharing**, especially during monsoon/flood periods.

Limitations

- **No Binding Treaty:** There is **no legally binding agreement or treaty** between the riparian countries to govern water-sharing or dam construction.
- **Lack of Regional Participation in Global Norms:** China, India, Bhutan, and Bangladesh are **not signatories** to the **1997 UN Convention on the Law of the Non-navigational Uses of International Watercourses**, which promotes equitable and reasonable utilization of international rivers.

Way Ahead

1. Strengthening Diplomatic Channels

- Promote transparent and sustained dialogue between China, India, Bangladesh, and Bhutan to foster trust and develop a **mutual water-sharing framework**.

2. Institutionalising River Governance

- Create a **permanent transboundary river management authority** to:
    - Monitor dam operations.
    - Share real-time hydrological data.
    - Coordinate flood forecasting and disaster mitigation.

3. Enhancing Disaster Preparedness

- Develop joint early warning systems, emergency protocols, and **shared disaster response resources** across the region.

4. India's Strategic Response

- Accelerate India's **hydropower and infrastructure development** in Arunachal Pradesh to:
    - Utilize its own share of Brahmaputra waters.
    - Strengthen presence in border regions.
    - Serve as a **counterweight to Chinese infrastructure moves** in Tibet.

Source: https://timesofindia.indiatimes.com/world/china/flow-control-china-starts-mega-dam-project-on-brahmaputra-in-tibet-how-will-it-impact-india/articleshow/122782282.cms