CHINA'S TSANGPO HYDROPOWER PROJECT

SYLLABUS:

GS 2 > International relations > India and Neighbours > India -China

REFERENCE NEWS:

- Recently, China has formally commenced construction of a **massive hydropower dam** (**world's largest hydropower project)** on the **Brahmaputra river** (known as Yarlung Zangbo in Tibet), near the India-China border in Arunachal Pradesh.

MORE ON NEWS:

- The dam is located at the **"Great Bend" of the river**, just before it enters India at Gelling in Arunachal Pradesh, where it is called the **Siang.**
- The dam will have a projected generation capacity of **60,000 MW**, making it nearly **three times larger than the Three Gorges Dam**, currently the biggest in the world. The total cost of the project is estimated at $167.8 billion.
- The project is part of China's efforts to meet its **carbon neutrality goals and stimulate economic development in Tibet.**
- The project has raised concerns in **downstream countries like India and Bangladesh** about potential ecological impacts and alterations to water flow.
- **Arunachal Pradesh Chief Minister** Pema Khandu has raised alarm over the dam, **calling it a potential existential threat**.
- The dam's **location in a seismically active zone** also raises concerns about structural safety and downstream disasters.
- India has expressed its concerns to China, urging that the interests of downstream states of the Brahmaputra are not harmed by upstream activities.
- The dam's construction is expected to **significantly alter downstream water flow patterns and impact local biodiversity.**

Yarlung Tsangpo/Brahmaputra River

- Originates in Tibet and flows through the **Great Bend** in Medog County before entering Arunachal Pradesh, India, where it is called the **Siang River**.
- In Assam, it joins tributaries like the **Dibang and Lohit** to become the **Brahmaputra River**.
- The river flows through Bangladesh as the **Jamuna** before draining into the **Bay of Bengal**.

WHY THE YARLUNG TSANGPO HYDROPOWER PROJECT?

- **China's Clean Energy Ambition:** The Tsangpo project is integral to China's drive to transition from conventional energy sources to renewable energy, as part of its goal to achieve **net carbon neutrality by 2060**. The steep descent of the Yarlung Tsangpo from the Tibetan plateau ensures a **remarkable flow rate**, making it an ideal location for generating hydropower.
- **Energy Capacity and Scale:** On completion, the project will have a capacity of **60,000 MW**, producing three times the electricity of the **Three Gorges Dam**. The electricity generated is expected to total **300 billion kilowatt-hours annually**, significantly contributing to China's energy mix and reducing reliance on fossil fuels.
- **Economic and Development Goals:** Beijing views the project as a means to boost **economic development in Tibet**, a region it has long sought to integrate economically and politically. The project underscores China's intention to consolidate control over Tibetan resources while addressing its burgeoning energy demands.
- **Strategic and Geopolitical Implications:** As noted by several experts and media reports, the dam will give China **greater control over the transboundary flow** of the Brahmaputra River, which originates as the Yarlung Tsangpo in Tibet. While Beijing has claimed that such projects are environmentally and socially beneficial, critics argue they grant China significant leverage over **downstream nations like India and Bangladesh**, raising concerns over **regional stability and water sharing**.

CONCERNS ASSOCIATED WITH THE TSANGPO HYDROPOWER PROJECT:

- **Geopolitical Concerns: The "Water Bomb" Threat:**
  - The **"water bomb" threat** refers to fears that China's control over the transboundary rivers, including the Yarlung Tsangpo (Brahmaputra in India), could be weaponized to manipulate water flow.
  - By building dams and diverting water upstream, China could potentially cause **flooding** or **water scarcity** in India during periods of hostility.
  - As reported by *The Economic Times*, the ability to regulate the river's flow gives China a strategic advantage, raising concerns about **India's water security** and regional stability.
- **Seismic Vulnerability:**
  - The Tsangpo project is located in the **Eastern Himalayan seismic zone**, which is part of **Seismic Zone V** in India's seismic zoning map — the **most active and highest risk category**, increasing the risk of earthquakes and landslides, which could lead to **catastrophic dam failures**.
  - The **fragile ecology** of the region further **amplifies the risks**, making both construction and long-term operation highly unsafe.
- **Disruption of River Ecology:**
  - Large infrastructure projects in fragile ecosystems disrupt **biodiversity**, alter **river flow patterns**, and reduce **silt deposition**, which is vital for downstream agriculture.
  - **Three Gorges Dam**, a similar project, caused **seismic disturbances**, displaced millions, and led to environmental degradation.
  - In the case of the Tsangpo project, **ecologists fear severe loss of biodiversity in Arunachal Pradesh and Assam**, reduction in floodplain rejuvenation, and disruption of fish migration routes.
- **Impact on India's Water Resources**
  - The **Brahmaputra River** is essential for agriculture, drinking water, and biodiversity in India's northeastern states.
  - Any disruption to its natural flow can have **devastating consequences**, including: **water shortages,** reduced agricultural productivity due to diminished **silt deposition** and negative effects on local **biodiversity**.
- **Agricultural Dependence:**
  - Communities in **Assam and Arunachal Pradesh** rely on the **seasonal flood pulse** and nutrient-rich silt for agriculture.
  - Flow alteration due to dam regulation could lead to **lower crop yields, food insecurity**, and **increased rural-urban migration**.
  - For instance, the **Upper Siang basin**, which the dam could affect, supports tribal agricultural systems that are highly sensitive to seasonal and sediment changes.
- **Flood Risks:**
  - India's concerns extend to **sudden water surges** caused either intentionally or due to **dam failure, landslides, or poor reservoir management**.
  - For instance, Arunachal CM warned that a **sudden water release could destroy entire habitations along the Siang**.

- Additionally, the **fragile mountains** make the region prone to flash floods. This increases disaster vulnerability for **millions downstream**, especially in Assam's low-lying areas.

- **Data Sharing Challenges:**
  - While MoUs exist, disruptions during geopolitical tensions (e.g., **Doklam standoff 2017** and **Ladakh conflict 2020**) highlight the lack of consistent **data-sharing mechanisms**.
  - Limited transparency from China regarding dam operations adds to India's concerns.
- **Precedents of Negative Impacts**
  - China's dam-building on the Mekong has caused **water scarcity** and **environmental degradation** downstream, impacting nations like Laos, Cambodia, and Vietnam.
  - Similar consequences could occur in the Brahmaputra Basin.
- **Lack of Consultation with Downstream Countries:**
  - China began construction **without prior consultation with downstream nations**, **despite repeated calls from India** for transparency and cooperative mechanisms.
  - India has consistently expressed that, **as a lower riparian state** with established user rights, it must be consulted on mega projects with **transboundary implications**.
  - The **Chinese government maintains** that the **project is an internal matter under its sovereignty**, but India emphasizes the need for regional cooperation on water governance to prevent future conflicts.

COORDINATION MECHANISM BETWEEN INDIA AND CHINA ON TRANSBOUNDARY RIVERS

1. Memorandums of Understanding (MoUs)

- **Umbrella MoU (2013):**
  - Signed to establish cooperation on transboundary rivers.
  - It has no expiry date but currently sees **no active engagement**, as stated on the **Ministry of Jal Shakti's website**.
- **Brahmaputra MoU:**
  - Focuses on sharing hydrological data of the Brahmaputra River during monsoon months.
  - This MoU is renewable every five years but **lapsed in 2023**, with renewal discussions ongoing.
- **Sutlej MoU:**
  - Introduced after the **Parechu Lake incident** in 2004, which caused flooding in India.
  - Lacks provisions for year-round data sharing, and the agreement is **pending renewal**.

2. Expert Level Mechanism (ELM)

- Established in **2006** to facilitate **annual meetings** between India and China on water-related issues.
- The process has faced interruptions during times of geopolitical tensions, such as:
  - The **Doklam crisis (2017)**.
  - The **Ladakh standoff (2020)**.

3. United Nations Convention on Watercourses (1997)

- Neither India nor China is a signatory to this convention, but both adhere to its principles, including:
  - **Equitable and reasonable utilisation of waters**.
  - Avoiding actions that significantly harm other riparian states.
- This framework provides a potential guideline for managing transboundary rivers effectively.

Challenges in Cooperation

- Data-sharing mechanisms, though largely functional, have seen disruptions during bilateral tensions.
- China has not agreed to **round-the-year hydrological data sharing**, limiting transparency.
- There is a lack of progress in implementing broader, binding agreements that require mutual commitment.

WAY FORWARD

- **Renew MoUs:**
  - Expedite the **renewal of the Brahmaputra MoU** (lapsed in 2023) to ensure timely and consistent data sharing during monsoon months.
  - Introduce provisions for **round-the-year hydrological data sharing**, especially in light of sudden water surges or dam-related incidents. Renew and strengthen the **Sutlej MoU**, ensuring it covers **emergency protocols and year-round data transmission**.
- **Reinvigorate the Expert Level Mechanism (ELM)**
  - Resume and ensure **regular annual meetings** of ELM to reduce trust deficits and enhance coordination. Institutionalize mechanisms to **insulate water-related cooperation from broader geopolitical tensions**, such as the Doklam (2017) and Ladakh (2020) incidents that previously disrupted dialogue.
- **Enhancing Regional Cooperation**
  - Collaborate with **downstream riparian countries like Bangladesh and Bhutan** to build a **regional water-sharing framework**.
  - Develop **joint early warning systems** and **shared hydrological monitoring platforms**. Build consensus with neighbours to present a **unified regional position to China** on transboundary river governance.
- **Advocating Transparency and Data Sharing**
  - India should **continue demanding transparency** from China regarding dam design, reservoir operation schedules, and real-time flow data.
  - India should establish **independent hydrological monitoring stations** in Arunachal Pradesh and Assam to reduce dependence on Chinese data.
- **Diplomatic Engagement**
  - The **"water bomb" threat**, flagged by Arunachal CM Pema Khandu, should be presented in regional security dialogues as a **non-traditional security concern**.Integrate water security into broader India–China **confidence-building measures** and **border cooperation frameworks**.
- **Developing Domestic Infrastructure**

- Expedite the construction of India's **Upper Siang Hydropower Project**, which not only has strategic power potential but can also act as a **flow buffer** against sudden Chinese releases.
- Promote sustainable dam construction practices and enhance **floodplain zoning, embankments, and inland channel networks** to better manage high-flow conditions. Operationalize **inter-basin water transfer links** between the Brahmaputra and the Ganga as proposed by the **National Water Development Authority**.

- **Leveraging International Frameworks**
  - Though India and China are not signatories to the **1997 UN Convention on the Law of the Non-Navigational Uses of International Watercourses**, India should **champion its core principles**: equitable utilisation and no significant harm. Advocate for **regional water cooperation regimes** and table concerns at global forums such as the **UN**, **Shanghai Cooperation Organisation**, or **BIMSTEC**, emphasising **ecological fragility and geopolitical risk**.
- **Strengthening Disaster Management**
  - Develop **state-level and national disaster protocols** for **flash floods, dam failure, and seismic-triggered water surges**.
  - Establish **real-time monitoring and early-warning systems** along the Siang and Brahmaputra valleys.
- **Environmental Impact Mitigation**
  - Commission **environmental impact assessments** (EIA) specific to **transboundary projects** like Tsangpo, with focus on biodiversity loss, river ecology, and sediment disruption.
  - Push for **regional environmental safeguards**, such as **seasonal flow thresholds**, fish passage solutions, and controlled sediment release norms.
  - Strengthen **local community consultation frameworks** in Arunachal and Assam to ensure sustainable development with ecological awareness.

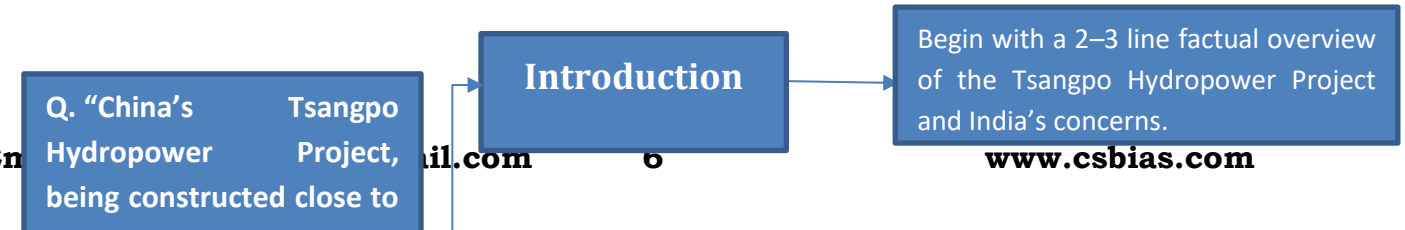
CONCLUSION:

- India China's Tsangpo hydropower project poses significant **ecological, geopolitical, and hydrological challenges for India**. A balanced strategy combining diplomatic engagement, regional cooperation, infrastructure readiness, and data transparency **is essential to safeguard India's water and national security interests.**

PRACTICE QUESTION:

Q. "China's Tsangpo Hydropower Project, being constructed close to the India-China border, has raised serious ecological and strategic concerns for India". Discuss the reasons for India's apprehensions. Suggest a multi-pronged strategy to address these concerns. (10 marks, 150 words)

APPROACH:



MODEL ANSWER:

Discuss the key concerns for India.

Suggest multi-pronged strategy to address the concerns. Also, include a box/section – "Existing India–China Mechanisms on Rivers"

Conclusion

Conclude with a balanced perspective and emphasize the need to leverage existing platforms like MoUs and the ELM

MODEL ANSWER:

China has commenced construction of a $167.8 billion hydropower dam on the Yarlung Tsangpo (Brahmaputra) river at the **"Great Bend"** near Arunachal Pradesh. With a projected capacity of 60,000 MW, it will be the **world's largest hydropower project**. While aimed at clean energy and Tibetan development, the project raises significant concerns for India due to its **downstream location and geopolitical implications.**

Why India is concerned:

1. **Geopolitical Leverage:** China's upstream control enables potential weaponisation of water. Sudden releases or withheld flows could be used as coercive tools—referred to as a "**water bomb**" by Arunachal CM.
2. **Seismic Risk:** Located in **Seismic Zone V**, the project lies in an earthquake-prone region, increasing risks of dam failure and downstream disasters.
3. **Ecological Disruption:** The project threatens biodiversity, **reduces silt deposition** crucial for agriculture, and **disrupts fish migration and floodplain rejuvenation** in Arunachal and Assam.
4. **Water Security Threat:** The Brahmaputra is vital for agriculture, livelihoods, and biodiversity. Flow alterations could lead to **shortages, lower productivity, and rural migration.**
5. **Lack of Transparency:** China shares **limited hydrological data**. The 2023 lapse of the Brahmaputra MoU and disruptions in the Expert Level Mechanism (ELM) highlight fragile cooperation.
6. **Unilateralism:** The dam was constructed **without consulting downstream nations**, undermining **India's riparian rights.**

Multi-pronged strategy to address the concerns:

1. **Renew Bilateral Mechanisms:** Reactivate **Brahmaputra and Sutlej MoUs** and reinvigorate the ELM for regular dialogue.

2. **Strengthen Infrastructure:** Expedite India's Upper Siang Project and improve flood control in the northeast.
3. **Enhance Regional Cooperation:** Coordinate with Bangladesh and Bhutan for joint monitoring and early warning systems.
4. **Push for Transparency:** Demand real-time data sharing; set up independent hydrological stations in Arunachal and Assam.
5. **Diplomatic Engagement:** Raise the issue in multilateral forums like the UN and BIMSTEC, invoking UN Watercourse principles of equitable use and no harm.
6. **Environmental Safeguards:** Mandate environmental impact assessments (EIAs) and involve local communities in river governance.

Existing Mechanisms Between India and China on Transboundary Rivers

- **Umbrella MoU (2013):** General framework for river cooperation; currently inactive.
- **Brahmaputra MoU:** For monsoon data sharing; lapsed in 2023, renewal pending.
- **Expert Level Mechanism (ELM):** Annual dialogue platform (since 2006); disrupted during tensions.
- **UN Watercourses Convention (1997):** Neither is a signatory, but both follow core principles like equitable use and no significant harm.

These mechanisms are underutilized, especially during crises. Their **revival and active use** is key to building trust and resolving river-related issues.

India must respond with a balanced strategy combining **diplomatic assertiveness, scientific preparedness, regional partnerships, and ecological resilience**. While challenges are serious, existing platforms like MoUs, ELM, and adherence to international principles offer a foundation for constructive engagement.