

## TEESTA DAM : GEOGRAPHY

**NEWS:** *The Teesta dam and the long shadow of climate change*

### WHAT'S IN THE NEWS?

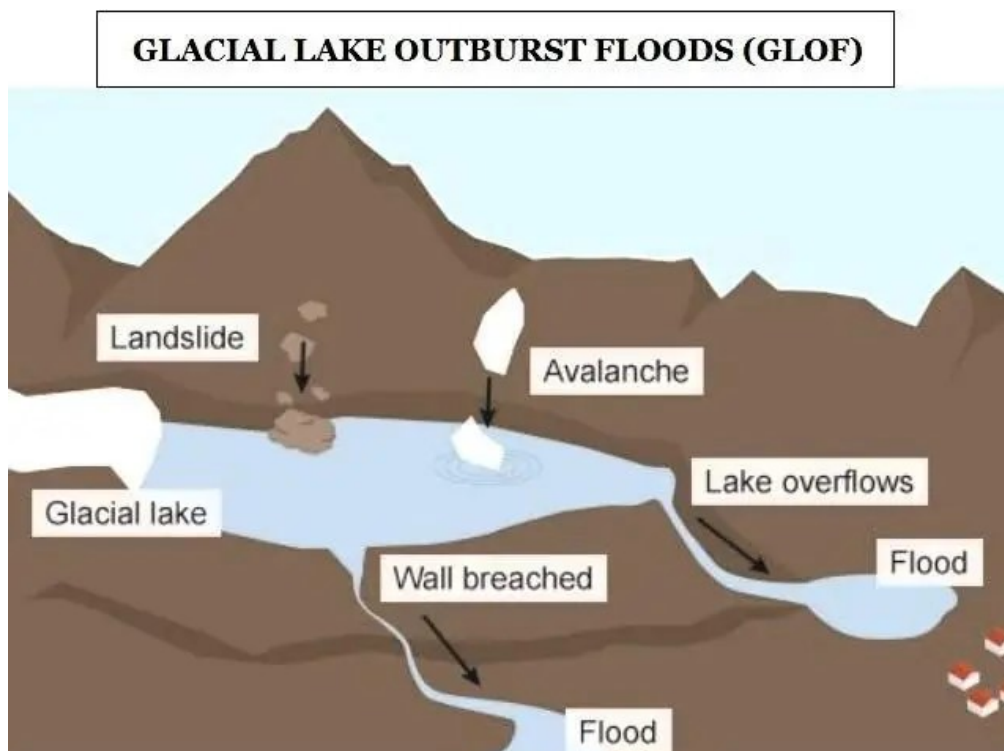
The approval to rebuild the Teesta-III Chungthang hydroelectric dam represents a critical development in India's infrastructure and environmental management strategy. This project addresses the catastrophic failure of the original dam, rethinking its design to withstand the severe and unpredictable impacts of climate change.

### Historical Context and Impact of the Disaster

- **Original Dam Destruction:** In October 2023, the 1,200 MW Teesta-III dam was destroyed by a Glacial Lake Outburst Flood (GLOF) from South Lhonak Lake. This event washed away the existing 60-metre-tall concrete dam and resulted in the loss of 40 lives.
- **Geological Instability:** The destruction was triggered by a moraine slope failure at South Lhonak Lake, which set off destabilizing landslides and sent significant rock debris into the lake, creating powerful ripples that overwhelmed the dam structure.

### Rebuilding Strategy and Design Innovations

- **Proposal for New Dam:** The Union Ministry of Environment, Forest and Climate Change has greenlit the construction of a new 118.64-metre-tall concrete gravity dam.
- **Gravity Dam Benefits:** Unlike the original rockfill dam, a gravity dam relies on its own weight to resist the hydrostatic pressure from the lake, which theoretically enhances its stability and durability against natural forces like floods and earthquakes.



## Concerns and Environmental Considerations

- **Pending Approvals:** While the MoEF&CC has approved the rebuilding plan, the design and structural specifics still await approval from other key bodies like the Central Water Commission, the Geological Survey of India, and the Central Soil and Materials Research Station.
- **Community and Environmental Concerns:** Local communities and environmental advocacy groups have raised significant apprehensions regarding the potential risks of another GLOF event and the general impact on the local ecosystem and communities.

## Risk Mitigation and Management Measures

- **Enhanced Spillway Design:** The new design proposes a spillway capable of handling up to 19,946 cubic meters per second, a significant increase from the original capacity. This design aims to provide better management of possible extreme water flow scenarios.
- **Implementation of Early Warning Systems (EWS):** A robust early warning system for flood alerts is suggested to enhance preparedness and potentially save lives by providing advance notice of similar events.
- **Comprehensive Environmental Impact Assessment (EIA):** An EIA incorporating climate change projections, glacial behavior, and potential GLOF risks is critical for ensuring the dam's long-term viability and safety.

## Regional Hydrology and Ecological Significance

- **South Lhonak Lake Dynamics:** The lake has shown significant expansion due to glacial melt, indicative of broader environmental changes affecting the region. Monitoring and managing this lake's dynamics are crucial for the area's safety and ecological health.
- **Teesta River System:** The river is vital for the hydrology of Sikkim and West Bengal and has significant implications for agriculture and human settlement in Bangladesh. The management of its flow and the strategic placement of dams are pivotal for regional water security and bilateral relations concerning water sharing.

## Future Directions and Strategic Importance

- **Community Engagement:** Involving local communities in the monitoring and management strategies can help in better managing the ecological and social impacts, fostering a sense of ownership and responsibility among those directly affected.
- **Technological Integration:** Utilizing advanced technologies such as AI for predictive analytics, drone technology for real-time monitoring, and 3D mapping for structural analysis can significantly enhance the management and safety of the dam.
- **International Cooperation:** Given the transboundary nature of the Teesta river, cooperative frameworks with neighboring countries, particularly Bangladesh, are essential for managing the river's resources and addressing potential disputes.



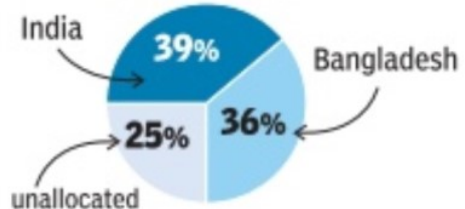
### What is the Teesta

- Teesta originates in Sikkim from the Khangse and Zemu glaciers
- Its major tributary – Rangeet – joins it at Darjeeling's Teesta Bazaar
- At Mekhligunj in north Bengal's Cooch Behar, it enters Bangladesh, joins Brahmaputra
- Teesta is Bangladesh's fourth largest transboundary river for irrigation and fishing
- Teesta floodplain covers 2,750sq.km in Bangladesh
- Of Teesta's catchment, 83% in India; 17% in Bangladesh
- Its catchment supports about 10m people – and 14% of crop
- Nearly 1 lakh hectares across 5 districts impacted by upstream drawals from the Teesta in India

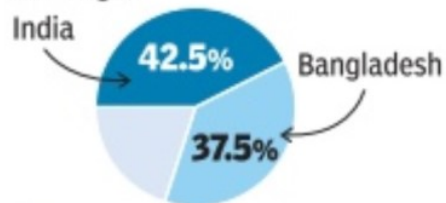
### What is the dispute

➤ Bangladesh wants **50% of Teesta's water** between Dec and May annually; **India claims a share of 55%**

Negotiations on since 1983, preliminary deal gave



In 2011, Delhi & Dhaka struck interim deal for 15 years – India would get



- But Banerjee opposed it; signing shelved to later that year
- Teesta water-sharing agreement waiting to be signed since 2011

Hydropower on Teesta is another point of conflict; At least **26 projects** on the river mostly in Sikkim, aimed at **producing some 50,000MW**

## Conclusion

The rebuilding of the Teesta-III dam presents an opportunity to not only restore a crucial piece of infrastructure but also to innovate in how such critical facilities are designed, monitored, and managed in the face of escalating climate risks. This project's success will depend heavily on a holistic approach that incorporates advanced engineering, environmental sensitivity, community involvement, and regional cooperation.

Source: <https://www.thehindu.com/opinion/lead/the-teesta-dam-and-the-long-shadow-of-climate-change/article69220357.ece>