



INDIA-EU WATER
PARTNERSHIP

Flood Management in Northeast India

Brahmaputra & Barak River Basin



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Parma, Italy

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Implemented

giz Deutsche Gesellschaft
für Internationale
Zusammenarbeit

Brahmaputra & NE Rivers

(Context & Importance)



Climate Change

Climate crisis in North East India:



About Brahmaputra River

- Flows through **China** → **India (Arunachal Pradesh, Assam State)** → **Bangladesh**
- Known for its **massive floods** and **erosion** due to high sediment load
- Forms the **world's largest river island** – Majuli (in Assam)
- **Basin area (in India):** 1,94,000 sq km
- Population Dependency: **40 million people**
- **River Length: 916 Km**
- Average **Annual Discharge: 19,820** cubic meter per second
- Average **Sediment Load: 735** Metric Tonne

Implemented by:

Key causes of Flooding (in Northeast India)

Impact



Monsoonal Rainfall & Glacier Melt

High peak flows

2022 satellite data (ISRO): annual glacier retreat of ~5–10m in Brahmaputra sub-basin



Sedimentation

Reduces capacity, increases spillover

Brahmaputra is **second most sediment-rich river** globally (avg. sediment load ~735 million tons/year)



Tectonic Instability

Affects river morphology and flow

Basin lies in **seismically active zone** - affects river **morphology** and flow regime



Anthropogenic Factors

Forest cover loss, floodplain encroachment

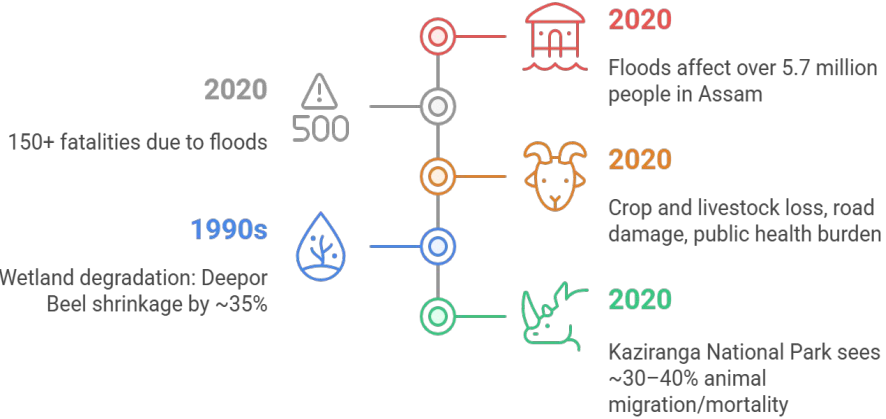
~**18% forest cover loss** in Upper Assam from 2001–2022 – Global Forest Watch

Impact of Flooding



NE State (Damages during yrs 2018-22)*	Humans Lost (No.)	Livestock Lost (No.)	Houses damaged (No.)	Crops Area Affected (in lakh Ha)
Arunachal Pradesh	81	910	3528	0.307
Assam	498	54,546	5,02,145	7.481
Manipur	78	142	10820	0.06
Meghalaya	100	5253	59664	0.031
Mizoram	25	0	1873	0
Nagaland	52	4505	8983	0.223
Sikkim	39	1510	6440	0.042
Tripura	44	4219	101122	0.334
TOTAL	917	71,085	6,94,575	8.478

*Source PIB, Govt of India dated 25.07.2022



River Widening

Expanded up to 15 km in some areas due to severe bank erosion



Land Loss

Assam has lost 4270 sq. km of land to erosion since 1950 – **7.4%** of its total area



Human Displacement

Over 3,000 families in Barpeta district displaced by ongoing erosion



Majuli Island Shrinkage

Shrunk from 1,000 sq km to 500 sq km



Potential Island Disappearance

Majuli Island may disappear by 2040, if erosion continues

Affecting more than **0.15 million people** of MAJULI ISLAND

Support to Ganga Rejuvenation

The Project “**Support to Ganga Rejuvenation (SGR)**” including “**India-EU Water Initiative (IEWI)**” is implemented by GIZ on behalf of German Federal Ministry of Economic Cooperation and Development (BMZ) and the European Union.

Objective of IEWI:

- To strengthen **technological, scientific and management capabilities of India** in sustainable modernisation & management of water resources, including through joint EU-India businesses, States, regions and/or cities initiatives in the water sector.

River Basin Management

Tapi River, Ramganga River, Barak River



Urban Flooding

Pilot Study - Trivandrum City, Kerala



Impacts of Climate Change

Resue of treated wastewater by Thermal Power Plants



Implemented by:

Brahmaputra Board

(Mandate and Jurisdiction)

Flood Control

Implementing strategies to mitigate flood risks in the Northeast region of India



Erosion Management

Managing and preventing soil erosion along riverbanks



Drainage Improvement

Enhancing drainage systems to prevent waterlogging and improved water flow



Brahmaputra and Barak River Basin

To develop **Master Plans for basin water resources**, & formulate short-term action plan

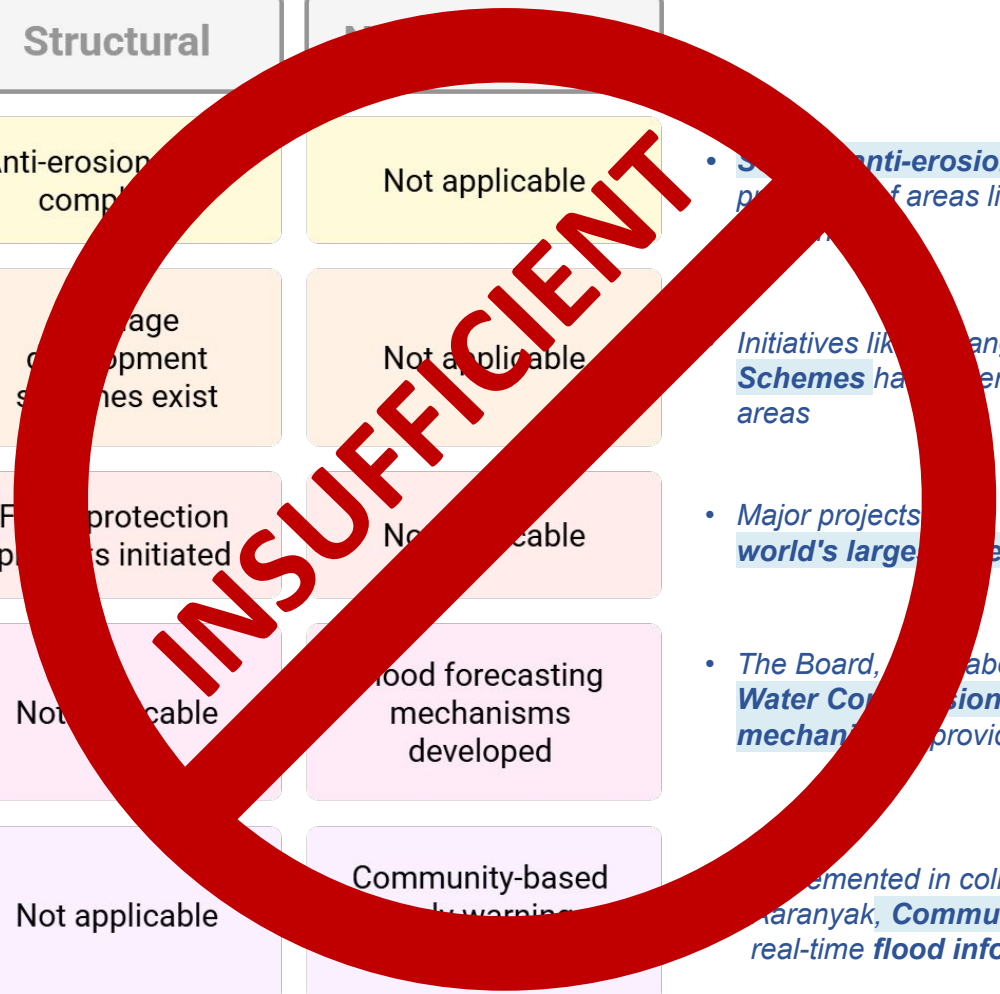


Implemented by:

Flood Mitigation Strategies

(Current measures undertaken by Brahmaputra Board in MASTER PLANS)

	Structural	Non-Structural	
Erosion Control	Anti-erosion compl...	Not applicable	<ul style="list-style-type: none"> • Significant anti-erosion measures in Assam and Nagaland, including protection of areas like Nagrijuli, Rangia Town, etc from floods and erosion
Drainage Improvement	Drainage development schemes exist	Not applicable	<ul style="list-style-type: none"> • Initiatives like Drainage Development Schemes have been undertaken to improve drainage in flood-prone areas
Area Protection	Flood protection projects initiated	Not applicable	<ul style="list-style-type: none"> • Major projects have been initiated to protect areas like Majuli, the world's largest river island, from floods and erosion
Forecasting	Not applicable	Flood forecasting mechanisms developed	<ul style="list-style-type: none"> • The Board, in collaboration with Ministry of Jal Shakti and Central Water Commission, has developed robust flood forecasting mechanisms providing up to 72 hours of pre-warning
Early Warning Systems	Not applicable	Community-based early warning systems	<ul style="list-style-type: none"> • Implemented in collaboration with organizations like ICIMOD and ICARANYAK, Community-based early warning systems provides near real-time flood information to vulnerable communities

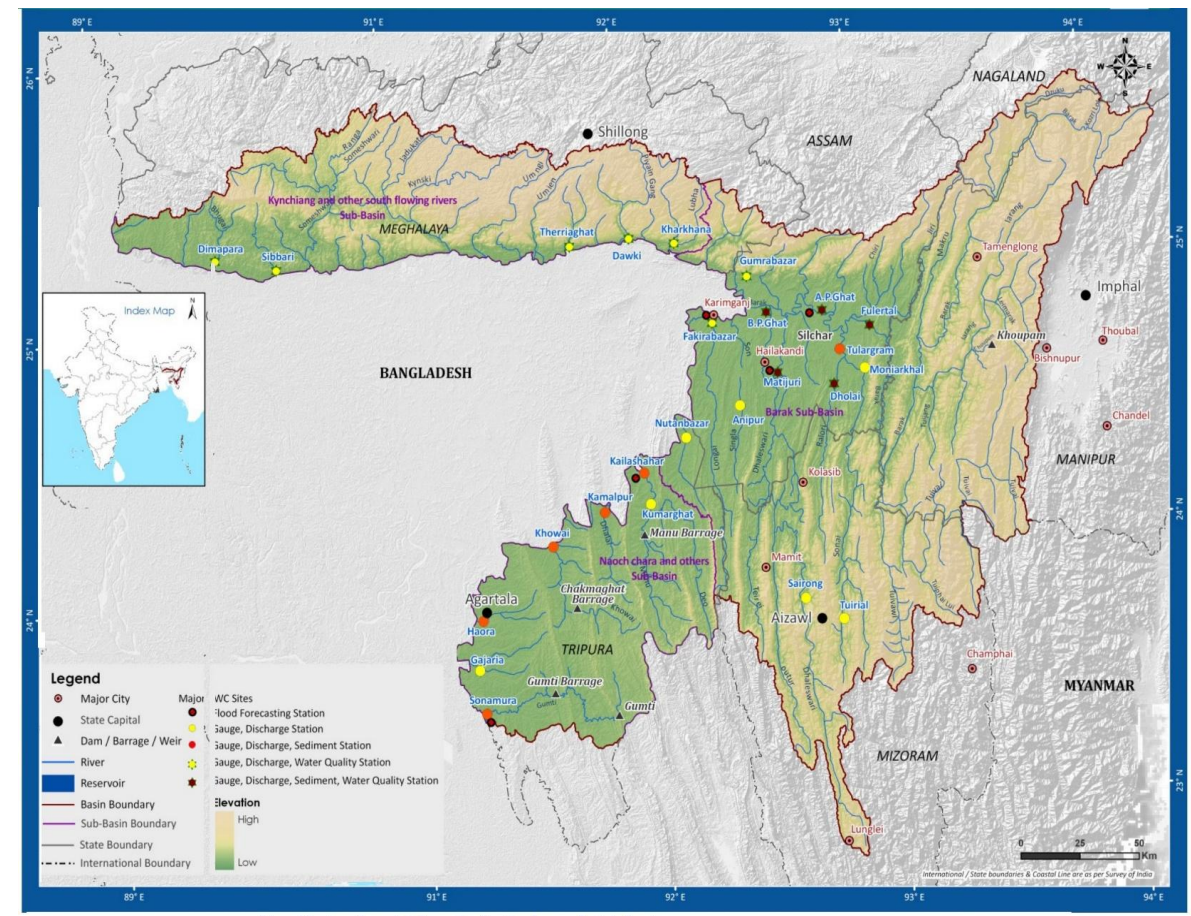
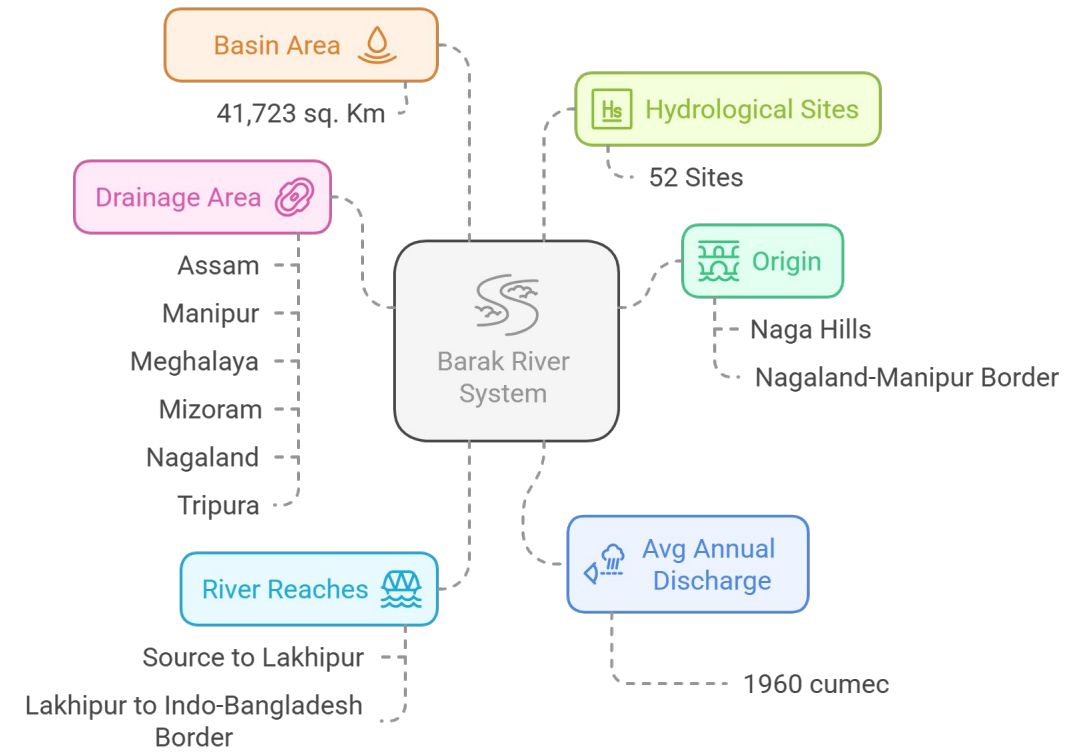


Barak River Basin

(Basin Characteristics)

Integrated **RBM Plan for Barak basin** based on EU Water Framework Directive

 Total Basin (Sq. Km)	41,723
 River Length (Km)	902
 Avg Annual Rainfall (mm)	2198



Integrated River Basin Management (RBM) Plan for Barak basin

Managing flood risk through RBM planning and adaptive strategies

India-EU Water Initiative

- To develop integrated RBM plan, with Flooding as KWMI
- Based on **EU Water Framework Directive**

Flood Risk Assessment

- Use of smart modelling tools to **simulate climate change scenarios**, for informed decision-making



THE WATER FRAMEWORK DIRECTIVE



Brahmaputra Board

- Addresses **flooding** and **bank erosion as major issues**
- Challenges related to integrated river management plan

Stakeholder Consultations

- Involves various state departments (Irrigation, Forest, Planning authorities etc)

Nature-Based Solutions

- Nature-based Solutions** (Green Infrastructure)
- Ecosystem-based adaptation measures** for **CLIMATE-ADAPTATION**



Implemented by:



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