Monsoon in North East India

Mains Syllabus: GS I - Important Geophysical phenomena such as earthquakes, Tsunami, Volcanic activity, cyclone etc.,(Monsoon)

Why in the News?

South West Monsoon has been wreaking havoc in North East India.

How does monsoon reach North East India?

- **South West Monsoon** - The Southwest Monsoon begins in early June, driven by intense heating of the Indian subcontinent, which creates a low-pressure area over northern and central India.
- Moisture-laden winds from the Indian Ocean are drawn towards this low-pressure zone.

In 2025, South West monsoon has made a early onset on May 24.

- **Two Branches** - These winds split into two branches as Arabian Sea Branch (moves up the western coast) and Bay of Bengal Branch (moves northeastwards over the Bay of Bengal).

- **Arrival in Northeast India** - The Bay of Bengal Branch picks up additional moisture as it travels over the Bay of Bengal and typically arrives in early June, often just days after it reaches Kerala.
- **Orographic Rainfall** - When it reaches the northeastern states (like Assam, Meghalaya, Arunachal Pradesh), the winds are forced to ascend by the Eastern Himalayas and the hills of the region.
- This orographic lifting causes the air to cool rapidly, leading to condensation and extremely heavy rainfall.

Why is North East India more vulnerable to monsoon?

- **High Rainfall** – The base level of monsoon rains in North East States is higher than many States in India.

  Mawsynram receives the highest rainfall in India and is the wettest place on Earth, with an average annual rainfall of 11,872 millimetres.

- **Intense Rainfall** - The northeast receives intense rainfall over short periods, especially during the southwest monsoon (June–September).
- This leads to sudden surges in river water levels, overwhelming natural and man-made drainage systems and causing widespread flooding.
- **Unique Geographical Features** - The region is characterized by hilly and mountainous terrain, with steep slopes , narrow valleys and extensive river systems, including the Brahmaputra, Barak, and their tributaries.
- The steep gradients and narrow valleys of the hills makes rainwater quickly accumulates in rivers, increasing flood risk.

- **Soil Characteristics -** Northeast India has alluvial soils that, while fertile, are prone to trapping seismic waves and becoming unstable when saturated, making landslides common during heavy monsoon rains.
- **Siltation and Riverbed Rise** - Rivers in North East region carrying large amounts of silt and debris from the hills due to their young and highly erosive nature and high deforestation uphills.
- This silt raises riverbeds, reducing their capacity and making them prone to overflowing during heavy rains.

The Brahmaputra River, one of the largest in the world by volume, flows through Assam with over 50 sediment-laden tributaries, which makes it highly prone to overflowing and changing course.

- **High Seismicity** - The region falls under seismic zone V, the highest risk category in India. Earthquakes can destabilize slopes and trigger landslides, especially during the monsoon when soils are saturated.
- **Changing Rainfall Patterns** - The Northeast region has been experiencing heavier, more erratic bursts of rainfall in recent years, followed by "flash floods" in areas where intense rain over a short span overwhelms the rivers and existing drainage systems.
- **Dense Population** - Many parts of the northeast, especially river valleys and foothills, are densely populated and Urban and rural settlements often expand into floodplains and unstable slopes, making them more vulnerable to monsoon disasters.

What lies ahead?

- Monsoon disasters in North East India are no longer just a seasonal inconvenience — they're a chronic disaster.
- There needs to be a systematic review involving all the affected States and the Centre to evaluate a sustainable long-term plan to reduce fatalities and the widespread destruction annually.
- Long-term solutions like dredging rivers, building resilient embankments, developing real-time flood forecasting systems, and strengthening inter-state and international water-sharing coordination are essential.

Reference

1. The Hindu | Monsoon Woes
2. TIMESNOW | Why Is Assam Drowning Every Monsoon?