Sikkim Flash Floods

Why in news?

A cloud burst over Lhonak Lake in North Sikkim resulted in a flash flood in the Teesta River in Lachen Valley killing around 14 people.

South Lhonak Lake
• **Location**- Located at 17100 feet above sea level in Sikkim • **Formation-** It is a glacial moraine dammed lake formed due to the melting of the Lhonak glacier. • It is one of the 14 potential lakes susceptible to Glacial Lake Outburst Flood (GLOF). • Scientists had warned in 2021 that the South Lhonak lake in Sikkim would burst.

What triggered Sikkim floods?

- **GLOF & excess rainfall** - The primary reason for sudden surge in water level appears to be a likely combination of excess rainfall and a Glacial Lake Outburst Flood (GLOF) at South Lhonak Lake.
- **Rough weather -** According to National Disaster Management Authority (NDMA), out of the 7500 glacial lakes in the Himalayan ranges, Sikkim has 10% of it.
- Further, this region is known for highly localised heavy rainfall events.
- **Melting of glaciers –** The lake is rapidly growing in size due to the melting of Lhonak glaciers.
- GLOFs occur when lakes formed by melting glaciers suddenly burst open.
- **Nepal earthquake -** Scientists are also exploring whether the recent earthquake that struck Nepal is responsible for the south Lhonak lake outburst.

A flash flood is a sudden flood of water that occurs within a short frame of time after a precipitation event, which is generally less than 6 hours.

What are Glacial Lake Outburst Flood (GLOF)?

- **Glacial lakes-** They are large bodies of water that sit in front of, on top of, or beneath a melting glacier.
    - **Example -** *Uttarakhand's Kedarnath* witnessed flash floods along with a GLOF in 2013 caused by the Chorabari Tal glacial lake.
- **GLOF** - Glacial lakes are mostly dammed by unstable ice or sediment composed of loose rock and debris.
- If the boundary around them breaks, huge amounts of water rush down the mountains, causing flood in the downstream areas.

- It is fast, and can be triggered by various causes, including *glacial melting, rising water levels, and earthquakes.*

How much damage has been caused in Sikkim?

- The lake outburst caused extensive damage to life and property, including the breakdown of road networks and communication.
- The lake outburst led to the breach of the ***Chungthang dam***, which is the largest hydropower project in the state.
    - Chungthang dam is also a part of the 1,200-megawatt (MW) Teesta Stage III Hydro Electric Project.
- Bridges such as the *Indreni bridge, Ritchu Bridge, Sangkhalang bridge*, etc. were washed away in the floods

What steps have been taken to prevent GLOFs?

- **The Sendai Framework (2015-2030)** – It is a global blueprint for disaster risk reduction and prevention.
- **Coalition for Disaster Resilient Infrastructure -** CDRI is an international climate initiative by India in 2019 to promote resilient climate-proof critical infrastructure in member countries.
- **National Disaster Management Authority (NDMA)** - NDMA, headed by the Prime Minister of India, is the apex body for Disaster Management in India.
- Central Water Commission (CWC)/ National Remote Sensing Agency (NRSA)/ State governments also check for landslides and blockages in rivers with the help of satellite imageries.
- **Aapda Mitra** – Launched in 2016, it is a *central sector scheme* implemented by NDMA to train community volunteers in disaster response in selected 30 most flood prone districts of 25 states including Sikkim.
- **Doppler radars** - The India Meteorological Department (IMD) has been using Doppler radars, a flash floods forecasting and warning systems.
- **Sikkim State Disaster Management Authority (SSDMA)** – It is the nodal institution for planning, co-ordination and monitoring for disaster prevention, mitigation, preparedness and management in the State.
- **Flood Management Programme** – Under the scheme, critical anti-erosion works have been undertaken in Ganga Basin, Brahmaputra and Barak Valley States.

What lies ahead?

- As per the *International Centre for Integrated Mountain Development (ICIMOD) report*, the most important mitigation measure for reducing GLOF risk is to reduce the volume of water in the lake in order to reduce the peak surge discharge.
- In order to reduce the volume of lake water, the ICIMOD report recommended:
    - Controlled breaching
    - Construction of an outlet control structure
    - Pumping or siphoning out the water from the lake

- Making a tunnel through the moraine barrier or under an ice dam

Teesta River

- It is a major transboundary river that flows through India and Bangladesh.
- It originates from the Pahunri (or Teesta Kangse) glacier and flows through Sikkim and West Bengal before flowing into Bangladesh.
- It is a tributary of the Jamuna River (Brahmaputra River).

References

1. Indian Express- Explained Glacial Lake Outburst Flood in Sikkim
2. Down To Earth- Threat of South Lhonak Lake
3. CNBC18 | Sikkim floods reason

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