



Uttarkashi Flash Floods 2025

Why in news: At least **four people** died after flash floods and mudslides swept through **Dharali village in Uttarkashi**, damaging several buildings, shops, and hotels.

- Flash floods in Uttarakhand's upper hilly areas are often triggered by **cloudbursts**, but in this case, **no cloudburst occurred** despite heavy rainfall in the past three days.
- The **topography** of Uttarkashi — steep slopes, narrow valleys, and high ridges — causes heavy rain to trigger landslides, sending debris into rivers, creating flash floods downstream.
- Uttarkashi is located at **800–6,900 m** elevation, contains the upper reaches of the **Ganga and Yamuna**, and has glaciers, snowbound regions, and sharp elevation drops up to **800 m** in valleys.
- Receives **1,289 mm annual rainfall**; highest recorded was in **1969**; July is **wettest month**.
- Continuous rainfall, fragile geology, limited vegetation, and **loose moraine** made the area vulnerable; **climate change** has increased rainfall intensity and glacier melt.

Not a Cloudburst

- **IMD definition:** ≥ 100 mm rain in 1 hour over $\sim 10 \times 10$ km area.
- Uttarkashi received only **32 mm** below cloudburst threshold. Haridwar received heavier rain (300 mm in 24 hrs).

Possible Cause

- Suspected **Glacial Lake Outburst Flood (GLOF)** due to possible breach of upstream lake in **Kheer Ganga river**.
- NDMA cites **glacier retreat creating new lakes** prone to breaches. **NRSC (2011–15)** recorded **352 lakes** in Indus basin, **283** in Ganga, **1,393** in Brahmaputra.

NDMA Guidelines to Reduce GLOF Risks

- **Identify and map dangerous lakes** using field and satellite data (SAR imagery).
- **Structural measures:** controlled breaching, outlet structures, siphoning, tunnelling.

Do you know?

Glacial Lake Outburst Flood (GLOF)

- **GLOFs** are disaster events caused by the **abrupt discharge of water** from **glacial lakes** located in front of, on top of, or beneath a melting glacier.
- As a **glacier withdraws**, it leaves behind a depression that fills with **meltwater**, forming a lake. The more the glacier **recedes**, the larger and more dangerous the **lake** becomes.
- Such lakes are often dammed by **unstable ice** or **sediment** composed of loose rock and debris.
- If the **boundary** around them breaks, huge amounts of water rush downstream causing **flooding** — referred to as a **GLOF event**.
- **GLOFs** can be triggered by **glacial calving**, avalanches, or landslides impacting the **lake boundary stability**.
- GLOFs unleash **large volumes of water, sediment, and debris** downstream with high **force** and **velocity**.
- Floodwaters can submerge **valleys**, destroy **roads, bridges, buildings**, and cause **loss of life and livelihoods**.
- GLOF events have risen in the **Himalayan region** due to **global warming** and rapid **infrastructure development** in vulnerable areas.
- Since **1980**, GLOFs have become more frequent in **southeastern Tibet** and the **China-Nepal border area**.
- *Nature* study (2023) found **3 million people in India** and **2 million in Pakistan** face GLOF risk. Despite smaller **lake sizes** in India and Pakistan compared to Tibet, high **population density** makes them more vulnerable.
- **Uttarakhand** has witnessed major GLOFs in **2013** (Kedarnath valley worst hit) and **2021** (Chamoli district flash floods).
- Uttarakhand has **13 glacial lakes** prone to GLOF, classified into **risk levels A, B, and C**. **Five highly sensitive lakes** in 'A' category include **Vasudhara Tal** (Chamoli) and four lakes in **Pithoragarh** district — Maban Lake, Pyungru Lake, and two unclassified lakes.



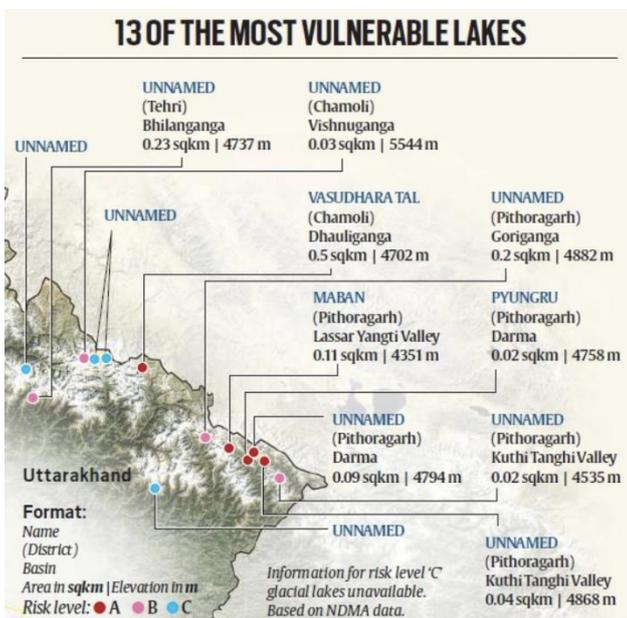
- **Other measures:** No construction in high-hazard zones; relocate existing habitations; protection measures in medium-hazard zones. Land use planning to avoid hazard-prone areas; develop regulations.

Early Warning Systems (EWS)

- Very few operational GLOF EWS globally; **none in India for glaciers**, but history of successful LLOF warnings (e.g., **Gohna 1894**). Need sensor-based monitoring, communication infrastructure, and alarm systems.

Rescue Operation Guidelines

- Involve NDRF, ITBP, Army, and **trained local teams** (80% rescues done by locals before official help).
- **Equip teams** for shelters, relief distribution, missing persons identification, and vulnerable group assistance.
- Use **sirens, mobile alerts, heavy earthmoving equipment**, boats, life jackets.
- Provide **emergency medical response** via QRMTs, field hospitals, heli-ambulances.
- Include **psychological counselling** and accurate information dissemination.



[Current Affairs Course is now Live](#). Course will start in October 2025 1st week.

Modules will include class notes, monthly compilation, quarter compilation and annual compilation. This will help in regular revision r/t in the fag-end of preparation.

I will provide my annual compilation, like last year, on Telegram in May 1st week.

[Last year I had promised 20 questions in Prelims from my notes & 28+ Questions could be answered from the same.](#)

30 questions is my aim for 2026 prelims. To meet that, I have analyzed why I missed 5-6 C.A. questions in 2025 and I have increased my coverage accordingly.