Flash Floods in Uttarkashi District

Why in News?

Flash floods, triggered by heavy rainfall, have caused widespread devastation along the **Kheer Ganga river** in Uttarkashi district, Uttarakhand.

- The floods, which hit the town of **Dharali,** a **popular tourist spot** situated 8,600 feet above sea level, have resulted in significant loss of life, with many others feared missing.

Key Points

- **Reasons for Flash Floods:**
  - Experts suggest that a **glacier collapse** or a **glacial lake outburst (GLOF)** upstream, rather than a cloudburst, likely triggered the flash flood in **Dharali village**.
  - The **Indian Meteorological Department (IMD)** recorded minimal rainfall during the disaster, well below the typical levels that cause cloudburst-induced flooding, leading experts to suggest the possibility of a glacier burst or GLOF, supported by satellite images showing significant glaciers and glacial lakes above Dharali.
- **Disaster Risk:**
  - According to the **Wadia Institute of Himalayan Geology**, Uttarakhand is home to **1,266 glacial lakes**, ranging from small to large bodies of water, some of which pose **significant downstream threats**.
  - The **National Disaster Management Authority (NDMA)** has identified **13 glacial lakes** as **high-risk**, with **five classified as extremely dangerous**.
  - Such disasters occur when water accumulates at high elevations and is suddenly released—**heavy rainfall alone cannot trigger such catastrophic events**.

Flash Flood

- **Definition:** Flash floods are sudden increases in water levels **during or immediately after intense rainfall.** They are **highly localized** and short-lived events, typically occurring within 6 hours of rainfall.
- **Causes:**
  - Flash floods are primarily **caused by intense rainfall** that overwhelms the soil's absorption capacity and drainage systems.
  - Apart from heavy rain, flash floods can also result from **rapid snowmelt due to sudden temperature rise,** dam or levee breaches, ice or debris jams, and sudden glacial lake outbursts.
  - Additionally, **urbanisation with impervious surfaces** like roads and buildings increases runoff, reducing water absorption and intensifying flood risks.

Glacial Lake Outburst (GLOF)

- **About:** A GLOF is a type of catastrophic flood that occurs when the **dam containing a glacial lake fails**, releasing a large volume of water.
  - This type of flood is typically caused by the rapid melting of glaciers or the buildup of water

in the lake due to heavy precipitation or the inflow of meltwater.
    - In February 2021, **Chamoli district in Uttarakhand witnessed flash floods** which are suspected to have been caused by GLOFs.
- **Causes:**
    - These floods can be triggered by a number of factors, including changes in the volume of the glacier, changes in the water level of the lake, and earthquakes.
    - According to **the NDMA (National Disaster Management Authority)**, glacial retreat due to climate change occurring in most parts of the **Hindu Kush Himalayas** has given rise to the formation of numerous new glacial lakes, which are the major cause of GLOFs.