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# Glacial lake outburst Floods

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**Why is in news?** Glacial lake outburst flood kills 14 in Sikkim, 102 people missing: What is GLOF, and why does it happen?

ICIMOD or the **International Centre for Integrated Mountain Development** defines a GLOF as 'the sudden release of water from a lake fed by glacier melt that has formed at the side, in front, within, beneath, or on the surface of a glacier'.

## How does GLOF happen?

Retreating glaciers, like several in the Himalayas, usually result in the formation of lakes at their tips, called proglacial lakes.

It is often bound only by sediments and boulders.

If the boundaries of these lakes are breached, it can lead to large amounts of water rushing down to nearby streams and rivers.

It gathers momentum on the way by picking up sediments, rocks, and other material, and resulting in flooding downstream.

## Causes:

When **glaciers start to melt**, they can create glacial lakes. The water in these lakes can put pressure on the natural dam that holds the water in, causing it to fail.

**Earthquakes** can cause sudden changes in the shape and stability of a glacial lake and its dam, leading to a GLOF.

**Volcanic eruptions** under the ice can also cause GLOF. These volcanic eruptions might displace the boundary or increase the pressure on glacial lake or both.

**Rising temperatures and increased rainfall** can lead to more melt water and therefore more glacial lakes, as well as increase the risk of GLOFs.

**Human activities**, such as construction or mining, can cause changes in the area around a glacial lake that can lead to a GLOF.

## Impact:

GLOF has the potential to catastrophically threaten people's lives, livelihoods and regional infrastructure.

## Key measures to tackle GLOF:

The **National Disaster Management Authority (NDMA)** to tackle Glacial Bursts: Some of the key measures recommended by the NDMA include:

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**Risk assessment:** Conducting regular assessments of the risk posed by GLOFs in order to identify vulnerable areas and communities, and to prioritize areas for intervention.

**Early warning systems:** Establishing early warning systems that can detect potential GLOFs and provide timely alerts to communities and authorities.

**Disaster management plans:** Developing and implementing disaster management plans that outline the measures to be taken in the event of a GLOF, including evacuation plans, rescue and relief operations, and post-disaster rehabilitation.

**Capacity building:** Building the capacity of local communities, authorities, and emergency responders to respond to GLOFs and other natural disasters, through training and awareness programs.

**Risk reduction measures:** Implementing risk reduction measures, such as glacial lake stabilization to mitigate the risk posed by GLOFs.

### **Way forward:**

**A long-term solution will be feasible** if all the countries start working towards reducing global warming.

India needs to **form clear policy guidelines** to restrict further human activities like building roads, constructing hotels on banks, etc.

India needs to **undertake a cumulative assessment and strategic planning**. Geological Survey of India can use satellite images and technology like GIS (geographic information systems) and provide a clear analysis of the HKH region.

**Capacity building of the local community** will ensure disaster mitigation in the near future.

The government has to be proactive and **set up an early warning system** in the Himalayas.

### **Conclusion:**

India is one of the most vulnerable countries to climate change and global warming. Even though international cooperation is required to restrict the global temperature to 1.5°C, India can move ahead and implement the suggestions. With this India can be a role model to the other countries in mitigating the disasters.