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EDITORIAL ANALYSIS

Nepal, Rishiganga and Dharali Are Signals of a Himalayan Crisis

DOWN TO EARTH

27 August 2026 · ENVIRONMENT · GEOGRAPHY · GS1 · GS3

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Down to Earth 27 August 2026 GS1 GS3

INTERVIEW ANGLE

"India's flood warning systems watch the rain. What should they be watching in a Himalaya where the largest floods increasingly begin with no rain at all?"

Source: Original editorial ↗ Down to Earth

Every fact web-verified against primary sources

THE LIFT LINE

Our warning systems watch the sky. These floods begin in the rock.

WHY THIS EDITORIAL MATTERS FOR YOUR EXAM

Disaster management is examined regularly, and answers default to the institutional architecture. This editorial supplies the physical mechanism, which is what distinguishes a geography answer from an administration answer.

GS Paper 1: Important geophysical phenomena; Himalayan geomorphology.

GS Paper 3: Disaster and disaster management; environment and climate change.

CONCEPT	MEANING	WHY IT IS TESTABLE
Rock-ice avalanche	Collapse of a mixed rock and ice mass from a high slope	The trigger with no rainfall precursor
Permafrost thaw	Warming of perennially frozen ground that binds rock in place	The mechanism linking climate change to slope failure
Cascading multi-hazard event	One hazard triggering a chain of others	The category the editorial says planning ignores

BACKGROUND AND CONTEXT

The Mechanism, Step by Step

1. **Permafrost thaws** at high altitude, weakening the ice that cements rock masses.
2. A **rock-ice mass detaches** and falls into a steep, confined valley.
3. The impact either generates a **flood wave directly**, by displacing water and mobilising sediment, or forms a **temporary landslide dam**.
4. If a dam forms, its **breach** releases a far larger and more destructive wave than the original event.
5. The wave travels down a **narrow gorge**, losing little energy, and strikes whatever is sited in the valley floor.

None of these steps requires rainfall.

The Related Hazard Vocabulary

TERM	MEANING
GLOF	Glacial Lake Outburst Flood, from the breach of a moraine-dammed glacial lake
LLOF	Landslide Lake Outburst Flood, from the breach of a landslide-formed dam
Rock-ice avalanche	Direct collapse of mixed rock and ice

The three are frequently conflated in reporting, and the distinction matters because each has a different precursor and therefore a different detection method.

The Institutional Landscape

BODY	ROLE
ICIMOD	International Centre for Integrated Mountain Development, headquartered in **Kathmandu**; the regional Hindu Kush Himalaya knowledge body
NDMA	National Disaster Management Authority, under the **Disaster Management Act, 2005**, chaired by the Prime Minister
NDRF	National Disaster Response Force
CWC	Central Water Commission, flood forecasting
IMD	Rainfall and weather forecasting
GSI and WIHG	Geological Survey of India and Wadia Institute of Himalayan Geology

THE ANALYSIS

1. This is a detection failure, not a forecasting failure. The distinction is important and frequently blurred. A forecasting failure means the system watched the right variable and predicted wrongly. A detection failure means it watched the wrong variable entirely. Rainfall-keyed systems facing a rock-ice initiation are in the second situation, and no improvement in rainfall forecasting accuracy addresses it.

2. Climate change enters through the rock, not only through the rain. Most climate-disaster discussion concerns precipitation intensity. Here the pathway is **permafrost thaw and glacial retreat destabilising slopes**, which raises initiation frequency independently of the monsoon. This matters because it means Himalayan risk is rising even in seasons of normal rainfall.

3. The historical record has stopped being a design guide. Infrastructure design standards, return periods and hydraulic assumptions are all derived from observed history. If the frequency of a hazard class is changing because its physical driver is changing, the historical distribution understates present risk. **A structure designed to a hundred-year flood derived from twentieth-century data may be facing something else entirely.**

4. The valley concentrates both the hazard and the exposure. A narrow gorge preserves the energy of a flood wave. It is also, for exactly the same topographic reasons, where run-of-river hydropower is sited and where the single arterial road runs. The terrain that makes these valleys economically attractive is the terrain that makes them dangerous, and this is a siting problem rather than an engineering one.

5. The jurisdictional mismatch is the hardest part. In the Bhote Koshi case the initiation zone was in the Tibetan catchment, the destruction was in Nepal, and the basin continues as the Trishuli and Narayani before entering Bihar as the **Gandak**, which is why discharge at the Valmiki Nagar barrage peaked hours

later. **No single country can monitor the chain.** Effective early warning requires data sharing organised along the basin, which is why the India-China agreement of August 25 on expert-level meetings covering trans-border rivers and hydrological data sharing is more consequential than its procedural framing suggests.

6. The counter-argument is about proportion, and it is fair. Ordinary monsoon flooding still kills more people in the Himalaya, more often, than rock-ice events do. Diverting monitoring resources away from conventional gauging would trade a large routine protection for a small exceptional one. The reply is that **slope and glacier monitoring is largely satellite-based**, so it is additive rather than substitutive, and cheap relative to ground instrumentation.

DATA AND INSTITUTIONS VAULT

PRELIMS-GRADE FACTS:

GLOF: Glacial Lake Outburst Flood. LLOF: Landslide Lake Outburst Flood. A rock-ice avalanche is a direct collapse of mixed rock and ice.

Permafrost is perennially frozen ground; its thaw destabilises high-altitude rock masses.

ICIMOD is headquartered in Kathmandu and covers the Hindu Kush Himalaya.

NDMA was created under the Disaster Management Act, 2005 and is chaired by the Prime Minister.

The Central Water Commission handles flood forecasting; the IMD handles rainfall forecasting.

Two Nepali rivers are called Bhote Koshi. The one that flooded on 26 August 2026 is the upper Trishuli in Rasuwa, fed by the Lhende Khola from Gyirong county, Tibet; it drains to the Narayani and enters India as the Gandak. The other, the Matsang Tsangpo or Poiqu in Sindhupalchok, joins the Sun Koshi and thence the Koshi, the “Sorrow of Bihar”. Do not conflate them.

ICIMOD did not classify the 26 August event as a GLOF, attributing it to a suspected ice-rock avalanche into the Lhende Khola; the USGS attributed it to a glacial collapse.

Rishiganga: about 27 million cubic metres of rock and ice detached. Dharali: nearby Harsil recorded only about 8 mm of rain, and Nepal’s Department of Hydrology found no rainfall intensity matching the Rasuwa flood. This is the strongest single piece of evidence that rainfall was not the trigger.

The Rishiganga is a tributary of the Dhauliganga in Chamoli district, Uttarakhand.

A **GLOF** *and a* **rock-ice avalanche flood** *are not the same event. A GLOF involves the breach of a glacial lake; a rock-ice avalanche need involve no lake at all. Reporting routinely labels every Himalayan flash flood a GLOF, and answers that repeat this lose the mechanism the question is testing.*

THE DEBATE

FOR (monitor slopes and glaciers): These floods have no rainfall precursor, so rainfall-keyed warning never activates. Permafrost thaw raises initiation frequency independently of the monsoon. Historical return periods understate current risk. The initiation zone is often across a border from the impact zone.

AGAINST (do not weaken conventional monitoring): Rainfall remains the dominant trigger by frequency and by cumulative deaths. Scarce monitoring resources spent on rare high-altitude instability weaken the systems protecting far more people far more often. Denser gauging and faster dissemination save more lives per rupee.

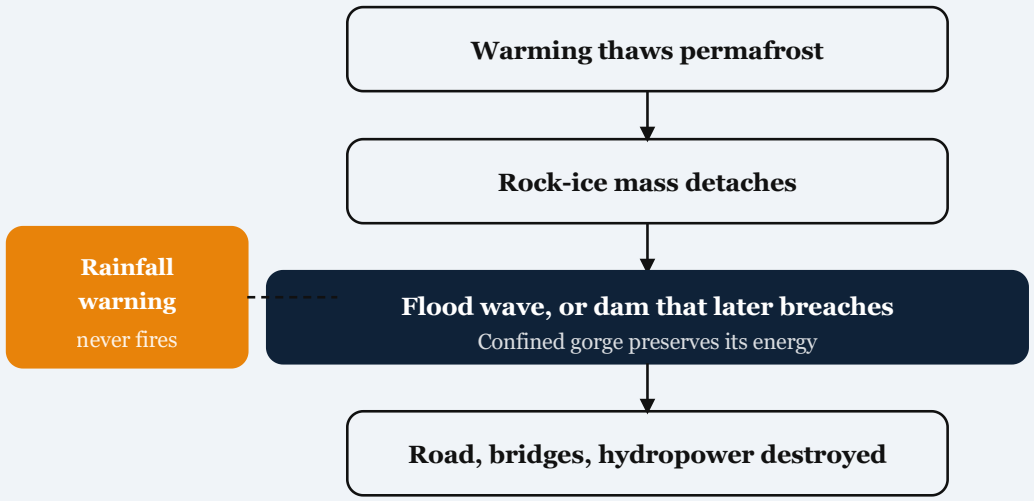
Balanced verdict: These are not competing claims on the same budget, because they use different instruments. Conventional gauging requires **ground infrastructure** and must continue to densify. Slope and glacier monitoring is largely **satellite-based and remote-sensed**, and is therefore comparatively inexpensive to add. The genuinely hard part is neither: it is **organising data sharing along the river basin rather than the national border**, which is a diplomatic problem, and the reason the Bhote Koshi warning chain did not exist is jurisdictional rather than technical.

HOW TO THINK ABOUT THIS

When a warning system fails, establish first whether it **predicted wrongly** or **was not watching**. These have entirely different remedies, and conflating them wastes the response.

A prediction failure is answered with better models, more data and finer resolution. A detection failure is answered by monitoring a different variable altogether, and no amount of improvement to the existing system helps. The diagnostic question is simply: was there a signal the system could have seen? If the answer is no, the system is not inaccurate, it is aimed elsewhere. This distinction generalises to epidemic surveillance, financial stress monitoring and security intelligence, where the most damaging failures are almost always of the second kind.

DIAGRAM-IN-WORDS



Not a wrong forecast. The system was watching the wrong variable.

The chain runs top to bottom without ever producing the signal the warning system on the left is built to detect. That dashed line is the whole problem.

TAKEAWAY BOX

Our warning systems watch the sky. These floods begin in the rock.

GLOF versus LLOF versus rock-ice avalanche; permafrost thaw as the climate pathway; ICIMOD headquartered in Kathmandu; NDMA under the Disaster Management Act, 2005, chaired by the Prime Minister; CWC for flood forecasting and IMD for rainfall; the two rivers both called Bhote Koshi, of which the one that flooded is the upper Trishuli in the Gandaki basin, not the Koshi; Harsil's 8 mm of rain during the Dharali event; the Rishiganga is a Dhauliganga tributary in Chamoli district.

Should a country be obliged to share real-time hydrological data with a downstream neighbour it has an unresolved boundary dispute with?

Connects to past UPSC Mains questions on Himalayan ecological fragility, on disaster preparedness, and on hydropower development in seismically active zones.

"Himalayan disaster warning in India suffers from a detection problem rather than a forecasting problem." Critically examine.

Source: Nepal, Rishiganga and Dharali Are Signals of a Himalayan Crisis — Ujiyari.com | Free UPSC & State PCS Editorial Analysis

KEY ARGUMENTS AT A GLANCE

Writing in Down To Earth, Jay Singh Rawat argues that the Nepal, Rishiganga and Dharali disasters share a new and under-recognised mechanism, namely catastrophic floods triggered by collapsing rock-ice masses rather than by rainfall alone, which conventional flood science and infrastructure planning are not built to anticipate, and that as warming destabilises slopes and glaciers retreat, cascading multi-hazard events will intensify and require integrated cross-border monitoring rather than the single-hazard, single-country approach currently in use.

✓ SUPPORTING

- A flood initiated by a rock-ice avalanche has no rainfall precursor, so a warning system that keys off precipitation thresholds does not activate at all, which means the failure is not one of forecast accuracy but of monitoring the wrong variable.
- Warming destabilises high-altitude slopes by thawing the permafrost that binds rock masses together, so the frequency of such initiations rises for reasons independent of the monsoon and outside the range of the historical record on which design standards rest.
- The initiation zone is frequently in a different country from the impact zone, as in the Bhote Koshi case where the trigger lay in the Tibetan catchment, the destruction in Nepal, and the consequences reached Bihar through the Gandak, so effective monitoring cannot be organised within a single national jurisdiction.

⚠ COUNTER

The counter-view is that rainfall remains the dominant trigger of Himalayan flooding by frequency and cumulative damage, and that diverting scarce monitoring resources toward rare high-altitude slope instability risks weakening the rainfall-based systems that protect far more people far more often. On this reading, the priority is denser conventional gauging and faster dissemination, since most lives lost in Himalayan floods are still lost to ordinary monsoon events.

→ WAY FORWARD

The two monitoring objectives are complementary and differently priced: continue densifying rainfall and river gauging, which protects the most people, while adding satellite-based slope and glacier monitoring, which is comparatively cheap because it is remote-sensed rather than

> instrumented on the ground, and negotiate data-sharing arrangements that follow the river basin rather than the border.

✍ MAINS ANSWER FRAMEWORK

QUESTION

Himalayan disasters are increasingly cascading multi-hazard events rather than single-hazard ones. Examine what this shift means for forecasting, infrastructure siting and transboundary cooperation. (250 words)

INTRODUCTION

Himalayan flood disasters are conventionally understood as monsoon events, and India's warning architecture is built on that understanding. Writing in Down To Earth, Jay Singh Rawat argues that a series of recent catastrophes share a different mechanism, one for which that architecture has no detector.

BODY

The mechanism is the collapse of a rock-ice mass high in a catchment. A large volume of rock and ice detaches, falls into a confined steep valley, and either directly generates a flood wave or blocks the channel to form a temporary dam whose subsequent failure releases one.

The distinguishing feature for warning purposes is that the sequence can begin without rainfall, so a system monitoring precipitation thresholds registers nothing until the wave arrives. The Rishiganga disaster in Uttarakhand and the events at Dharali and in Nepal's Bhote Koshi catchment are read as instances of this class.

The underlying driver is warming, which destabilises high-altitude slopes by thawing permafrost, the frozen ground that binds rock masses in place, while glacial retreat leaves oversteepened slopes and newly formed moraine-dammed lakes. Both processes raise the frequency of initiation for reasons unconnected to any particular monsoon, and both push conditions outside the historical range on which infrastructure design standards were calibrated.

The consequences compound because these valleys are narrow: a flood wave in a confined gorge loses little energy, and the same terrain that makes a valley suitable for run-of-river hydropower and for a single arterial road makes it a channel that concentrates the wave onto exactly those assets. The Bhote Koshi event illustrates the jurisdictional problem as well, since the initiation zone lay in the Tibetan catchment, the destruction occurred in Nepal, and the downstream basin reaches Bihar.

CONCLUSION

A balanced answer should accept the counter-argument that rainfall still causes the majority of Himalayan flood deaths and that conventional gauging must not be weakened. The resolution is that slope and glacier monitoring is largely satellite-based and therefore comparatively cheap, so it can be added rather than substituted, and that data sharing should be organised along the river basin rather than the border.

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