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The Rasuwa Disaster Was Not a GLOF: What the Science Actually Says, and What the Toll Actually Is

30 August 2026 ·

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The Rasuwa Disaster Was Not a GLOF: What the Science Actually Says, and What the Toll Actually Is

30 August 2026 · 12 min read ·

✓ Every fact web-verified against primary sources

*Search and rescue in Nepal's **Rasuwa, Nuwakot, Dhading and Chitwan** districts entered a **fifth day on August 30, 2026**, following the flood of **August 26** down the **Bhotekoshi and Trishuli**. Prime Minister **Balendra Shah**, in office since March 2026, put the deployment at over **15,000 security personnel**. The **International Federation of Red Cross and Red Crescent Societies** estimates about **93,000 people** may be affected and has launched a **25 million Swiss franc emergency appeal**. India has sent a **tunnel rescue team**; the United States announced **\$3.6 million** in humanitarian aid.*

Scroll to “The Numbers” to see why, and treat that section as a lesson in reading disaster coverage rather than as an evasion.

FIRST, THE CORRECTION THAT MATTERS MOST

Much coverage has called it a GLOF. Technical assessments do not. The distinction is exact and directly examinable.

	GLOF	LDOF
Full form	Glacial Lake Outburst Flood	Landslide-Dam Outburst Flood
What forms the dam	Glacial material: ice, moraine or bedrock impounding a glacial lake	Landslide or avalanche debris blocking a river channel
This event	No	Yes

What actually happened. An ice and bedrock slab roughly **600 metres wide** detached from the **north face of Langtang Lirung** at **5,200 to 5,400 metres** and fell about **1,200 metres**. The debris **dammed the Lhende Khola** about 20 km upstream of the Miteri Bridge, forming a temporary lake. **That dam then**

failed. River level rose about **nine metres in roughly thirty minutes.**

The seismic record settles the sequence. The United States Geological Survey reclassified the **event** from an initial magnitude 4.4 earthquake to a **magnitude 5.2 landslide**, stating that the seismic signal **was generated by the collapse itself and not by a tectonic trigger**. A second event of Ms 4.2 followed about three hours later.

*A previously unrecorded **supraglacial lake in Tibet at 5,150 metres**, about 36 km upstream of Rasuwagadhi, burst after growing to **638,000 square metres by July 7**, with **no rainfall recorded from July 4 to 7**. It destroyed the Miteri Bridge and closed the corridor for about six months. **Two floods, same river, different mechanisms, one year apart.** Do not merge them.*

WHERE THE SLOPE FAILED

The failure was on Nepali territory, on Langtang Lirung's north face inside **Langtang National Park**, very close to the boundary. Nepal's **Department of Hydrology and Meteorology**, through hydrologist **Binod Parajuli** of its Flood Forecasting Division, described a combination of **ice avalanche, permafrost movement and rockslide**, and stated that the avalanche originated on Nepali territory and then crossed the border, **causing extensive damage on both sides.**

Volume estimates diverge by more than an order of magnitude and should not be reconciled. An ICIMOD **cryosphere** specialist gave **100 to 200 million cubic metres**. A 2026 reconstruction in the *Journal of Rock Mechanics and Geotechnical Engineering* gives about **5.5 million cubic metres** of progressive rock collapse followed by roughly **8.3 million cubic metres** of mixed rock and ice. Debris velocity is put at about **50 metres per second.**

THE MECHANISM, HONESTLY DESCRIBED

The technical term used for this class of event is a **rock-ice avalanche**. Some accounts use **sturzstrom**, from Albert Heim's German coinage of 1932 and formalised by Hsü in 1975: a stream of very rapidly moving debris from a disintegrating rock mass, typically over one million cubic metres, often exceeding 100 km per hour.

*Why these masses travel so far is **genuinely unresolved in the literature**. Competing explanations include **air-layer lubrication** (Shreve, 1968), **acoustic fluidization** (Collins and Melosh, 2003), **dynamic fragmentation** (Davies and McSaveney), **basal frictional melting**, and **meltwater lubrication** where rock mixes with ice. Meltwater lubrication is **one leading hypothesis, not the accepted mechanism.***

Firn, which appears in descriptions of these mixtures, is **compacted granular snow that has survived at least one melt season**, intermediate between snow and glacier ice, with density around **0.4 to 0.8 g/cm³**.

THE GEOGRAPHY TRAP

Nepal has **two rivers named Bhote Koshi**.

RIVER	BASIN	ENTERS INDIA AS	REGULATED AT
Bhote Koshi of Rasuwa , this disaster, the upper Trishuli	Gandaki / Narayani	Gandak	Gandak Barrage, Valmikinagar, West Champaran, Bihar
Bhote Koshi of Sindhupalchok	Sun Koshi , hence Koshi	Koshi	Koshi Barrage at Bhimnagar, which is inside Nepal , operated by India

The Trishuli forms at Rasuwagadhi from the **confluence** of the **Kyirong Tsangpo** and the **Lhende Khola**, which rises in **Gyirong County, Tibet**. Debris was carried some **80 km**, with bodies recovered as far as **Chitwan, Gorkha, Tanahun and both Nawalparasis**. That district list is itself the proof of basin: it traces the **Trishuli-Narayani corridor**, not the Koshi.

A point of precision on the barrages. The **Koshi Barrage at Bhimnagar is in Nepal's Sunsari district**, not in India. India **operates and maintains** it under the **India-Nepal Koshi Agreement of April 25, 1954**, revised in 1966, through the Bihar Water Resources Department. Placing the flood in the wrong basin points Indian flood preparedness at the wrong districts and the wrong barrage.

THE NUMBERS, GIVEN UNRECONCILED

*On **August 30, 2026**, a single news page carried **675, 682** and “more than 650” as the death toll, and **2,400, 2,500** and **3,000** as the number missing, all describing the same Saturday, because each line came from a different agency at a different hour. **No single figure is defensible.** Anyone quoting one without a source and a timestamp is guessing.*

AS OF	DEAD	MISSING	ATTRIBUTED TO
Aug 26, 17:00 NST	72	403	Nepal Ministry of Foreign Affairs
Aug 27, 20:00 NST	359	596 foreign nationals	Nepal MoFA
Aug 27	165 bodies recovered	823	NDRRMA
Aug 28, 15:30 NST	538	511 foreign nationals	Nepal MoFA
Aug 28 evening	579	1,924 to 2,000	Kathmandu Post
Aug 29	675	nearly 2,400	PTI
Aug 29	682	nearly 3,000	AFP
Aug 29, 18:00	16 dead, 546 missing in Tibet		CCTV

Three things this table teaches, and each is a transferable skill.

One: the same number can mean two different things. “579” was used both for the **death toll** on the evening of August 28 and, two days earlier, for the **Nepal Tourism Board’s count of people out of contact**. “466” was used both for the **injured** and for **foreign tourists out of contact**.

Two: check what a count actually counts. Nepal’s MoFA figures for missing after August 27 are **foreign nationals only**, not the total. Much of the apparent contradiction between MoFA and NDRRMA dissolves once you notice that.

Three: the foreign-missing figure has fallen, not risen. It went from **511 on August 28 to about 320 by August 30**, because **261 previously uncontactable foreign tourists were found**. Coverage implying that number is still climbing is simply out of date. India’s **Ministry of External Affairs** reported over **275 Indians missing and 108 rescued**.

The official trail also stops. Nepal’s Foreign Ministry issued updates on **August 26, 27 and 28 and none afterwards**, so every figure dated 29 or 30 August comes from NDRRMA or Nepal Police relayed through wire agencies.

WHY SO MANY FOREIGN NATIONALS

Rasuwegadhi is Nepal’s principal overland trade link with China, opposite **Gyirong Port**, the largest land trade port in the Tibet Autonomous Region, now buried under debris. It is also **one of two main routes for the Kailash Mansarovar Yatra**, the other being Hilsa-Purang in western Nepal. **11,381**

pilgrims used Rasuwagadhi last year, and China reopened it to Indian pilgrims in June 2025. **Late August is peak season.** Most Indian casualties were Kailash-bound pilgrims.

Infrastructure destroyed. Nepal's Department of Roads reports **32 bridges completely washed away** and about **40 km of road** between Rasuwagadhi and Malekhu; the Ministry of Physical Infrastructure and Transport counts **41 bridges damaged or destroyed** across four districts. **Rasuwa is cut off from the national road network**, and the government holds only seven bailey bridges in stock. Six hydropower schemes were hit, taking a reported **431 to 475 MW** off the grid.

A live secondary hazard. Fresh glacial lakes have formed at the avalanche source, posing a further outburst threat on the China border.

CAN THIS BE BLAMED ON CLIMATE CHANGE? ATTRIBUTION HAS LIMITS.

Nepal's Foreign Minister and the UN climate chief jointly warned of the warming threat to the Himalayas. Scientists have **stopped short of directly attributing this event** to climate change, while noting that rising temperatures are warming the Himalayas and accelerating glacier melt. That restraint is scientifically correct, and worth understanding.

Detection and attribution are two different operations. **Detection** demonstrates that something has changed in a defined statistical sense, **without giving a reason.** **Attribution** evaluates the contribution of specific causal factors. That is the IPCC's framing.

Confidence is not uniform across event types. It is **highest for heat extremes** and **lowest for short-duration, small-scale phenomena** such as thunderstorms, because most global climate models cannot resolve fast-changing processes. **IPCC AR6 Working Group I, Chapter 10** states that phenomena such as **land-sea breezes and mountain wind systems can only be realistically represented at resolutions of the order of 10 km or finer**, which current models generally do not support.

What attribution can do, done properly. As background, in a study published in May 2026, on **May 14, 2026**, **World Weather Attribution** found that climate change **approximately tripled the probability** of the South Asian heat event of **April 15 to 29, 2026**, and that the same event would have been **about 1°C cooler in a pre-industrial climate.** WWA was founded in **2014** by **Friederike Otto** and **Geert Jan van Oldenborgh** with Climate Central, and its co-authors on that study included the **India Meteorological Department.**

The method. Model simulations are run for a counterfactual pre-industrial world at about **278 to 280 ppm** of carbon dioxide, and again for present-day conditions. **Mauna Loa recorded 432.00 ppm in May 2026.**

*A single Himalayan rock-ice collapse **cannot presently be attributed to climate change with confidence**, because the observational record for such events is short and the processes are too fine-grained for current models. **That is not the same as saying climate change is irrelevant.** Warming is degrading permafrost that binds high-altitude rock, and that is a well-established physical mechanism. The correct position is that **the trend is attributable and the individual event is not yet**, and an aspirant who writes that precisely will outscore one who writes either extreme.*

UPSC RELEVANCE

GS Paper 1: Important Geophysical phenomena; salient features of world's physical geography. GLOF versus LDOF, Himalayan drainage, and the Gandaki and Koshi systems are directly examinable, and this event supplies a live case.

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GS Paper 3: Conservation, environmental pollution and degradation. Extreme event attribution, its methods and its stated limits.

★ FACTS CORNER — KNOWLEDGEEDIA

The August 26, 2026 Rasuwa flood was a landslide-dam outburst flood, an LDOF, not a glacial lake outburst flood.

A GLOF dam is glacial ice, moraine or bedrock; an LDOF dam is landslide or avalanche debris blocking a channel.

An ice and rock slab about 600 m wide fell some 1,200 m off Langtang Lirung's north face, from 5,200 to 5,400 m.

The USGS reclassified the event as a magnitude 5.2 landslide, the signal generated by the collapse, not a tectonic trigger.

The debris dammed the Lhende Khola; when the dam failed, river level rose about nine metres in thirty minutes.

The July 2025 Rasuwa flood was a true GLOF: a supraglacial lake at 5,150 m in Tibet burst without any rainfall.

The Rasuwa Bhote Koshi is the upper Trishuli, in the Gandaki basin; it enters India as the Gandak, not the Koshi.

Sindhupalchok's separate Bhote Koshi feeds the Sun Koshi and hence the Koshi. Same name, different basin.

The Trishuli forms at Rasuwagadhi from the Kyirong Tsangpo and the Lhende Khola, which rises in Gyirong County, Tibet.

Gandak Barrage is at Valmikinagar in West Champaran, Bihar; Koshi Barrage is at Bhimnagar inside Nepal.

India operates the Koshi Barrage under the India-Nepal Koshi Agreement of April 25, 1954, revised in 1966.

Firn is granular snow surviving at least one melt season, between snow and glacier ice, density about 0.4 to 0.8 g per cc.

Sturzstrom, coined by Heim in 1932 and formalised by Hsu in 1975, describes rock avalanches over a million cubic metres.

The long runout of such avalanches is unresolved; air-layer lubrication and acoustic fluidization are competing hypotheses.

The historical analogue is Chamoli, February 7, 2021: about 27 million cubic metres of rock and ice fell from Ronti Peak, killing more than 200.

Balendra Shah has been Nepal's 40th Prime Minister since 2026, sworn in on March 27 after the RSP won 182 of 275 seats.

Kamal Kishore of India heads UNDRR as UN Assistant Secretary-General and Special Representative for DRR, since March 2024.

World Weather Attribution was founded in 2014 by Friederike Otto and Geert Jan van Oldenborgh

with Climate Central.

WWA found climate change roughly tripled the odds of the April 2026 South Asia heat, about 1°C cooler without warming.

IPCC AR6 WGI Chapter 10: land-sea breezes and mountain wind systems need resolution of about 10 km or finer.

Attribution confidence is highest for heat extremes and lowest for short-duration convective events like thunderstorms.

Pre-industrial carbon dioxide was about 278 to 280 ppm; Mauna Loa recorded 432.00 ppm in May 2026.

Source: The Rasuwa Disaster Was Not a GLOF: What the Science Actually Says, and What the Toll Actually Is —
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