

The Nepal floods: Making the case for congruence in policy and technology

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On August 26, 2026, a rock and ice collapse on the north face of Langtang Lirung dammed the Lhende Khola; when the dam failed, a debris flood swept down the Bhotekoshi and Trishuli rivers on both sides of the Nepal–China border (ICIMOD, 2026). As of October 1, 2026, 1,453 deaths have been confirmed across Nepal and Tibet, with more than 6,000 people still missing ([Awale, 2026](#)). Finance Minister Swarnim Wagle has put the initial cost of rebuilding at US\$4–5 billion ([Reuters, 2026](#)), nearly a tenth of an economy whose nominal gross domestic product for 2025 was US\$45.49 billion ([World Bank, 2026](#)).

While Nepal and China have sought to institutionalize information sharing on transboundary water management, prospects remain limited. Similarly, early warning systems for glacial lakes and other glacier hazards remain limited in coverage. As such, we argue that greater congruence is needed between the technology related to early warning systems vis-à-vis glacial lake outburst floods (GLOFs) and other glacier hazards, and policy related to transboundary information sharing to prevent future impact on human security from such hazards. Congruence in technology and transnational policy is necessary to mitigate impact on human security and economic well-being of states with vulnerable glacial lakes.

Limits of institutional cooperation and technology

The collapse on the north face of Langtang Lirung and the subsequent flood downstream unfolded within minutes: debris reached the Nepal–China border corridor about seven minutes after the collapse at 08:37 ([ICIMOD, 2026](#)). Coming barely a year after the July 2025 Purepu flood in the same river system, the August 2026 Rasuwa flood signals the prospect of repeated disasters of this kind. Nepal and China have sought to institutionalize mechanisms for transboundary collaboration when it comes to transboundary flood management; however, this cooperation remains limited. The 2019 Agreement on the Boundary Management System between Nepal and China established the commitment of not deliberately changing or causing to change the course of trans-boundary rivers flowing into Nepal from China. Institutionalization of cooperation in this area remains limited ([Koirala, 2020](#)).

Limits of institutionalization

Nepal and China have collaborated, albeit in a limited manner, over the years to share data and provide early warnings if necessary; one such example is that of Cirenmaco Glacier ([Wang, 2022](#)). In 2025, two glacial lake outbursts paved the way for conversations surrounding the need for greater transboundary collaboration when it comes to GLOFs. On July 7, 2025, a glacial lake

on the Nielangpu Glacier burst but did not cause much damage ([Zhang, 2026](#)). However, on July 8, 2025, another glacial lake burst on the Purepu Glacier, which led to GLOFs in the Lhende Khola and Bhotekoshi, killing 11 people in Nepal and leaving 18 missing, while a further 11 people were swept away in China ([Pokhrel, 2025](#)). Following the July 8, 2025 flood, China and Nepal agreed to share cross-border real-time information on floods and landslides and flag potential risks of glacial lake outburst floods ([Giri, 2026](#)). However, no formal agreement has been signed to implement such a mechanism. At a meeting in Kathmandu on May 27, 2026, Nepali officials asked for data on glacier movements, water levels and precipitation, but the Chinese delegation said it lacked the mandate to sign an agreement ([Sharma, 2026](#)).

The scale of death and damage in August 2026 makes evident that Nepal's early warning system, which relies on conventional networks of river gauges, was overwhelmed ([Sands, 2026](#)). The speed and scale of the flood were unprecedented: SMS alerts went out at around 09:15, some 25–30 minutes after debris had reached the border corridor, and warning systems built around rainfall and river levels cannot detect sudden mountain collapses ([ICIMOD, 2026](#)). This underscores the need for a more robust early warning system and stronger transnational information sharing and collaboration.

Current technology related to glacial lakes

The recent flood in Rasuwa has underscored the importance of early warning systems in reducing loss and damage wrought by such cataclysms. With this understanding, Nepal has adopted technical warning systems in some of the most disaster-prone lakes. The first system of its kind was installed in Tsho-Rolpa lake in Dolakha district, east-central Nepal, which consisted of water level sensors and 19 sirens located downstream ([Shrestha, 2014](#)).

The Imja Glacial Lake Flood Risk Reduction Project, carried out with support from UNDP, is considered the other flagship achievement of Nepal. Under this, the water level in Imja lake was reduced by 3.4 meters, while early warning systems were set up in six key settlements downstream. A notable advancement in this project was the addition of SMS alert systems and construction of evacuation centers compared to the only siren-based system of Tsho-Rolpa ([UNDP Nepal, 2026](#)). According to a 2020 ICIMOD and UNDP study, there are 2,070 glacial lakes in Nepal. Of the 47 potentially dangerous glacial lakes the study identified across the Koshi, Gandaki and Karnali basins, 21 are in Nepal, 25 in the Tibet Autonomous Region of China and one in India ([Bajracharya, 2020](#)).

The 2025 Purepu flood, and the concentration of potentially dangerous lakes in Tibet, expose Nepal's vulnerability to disasters originating upstream of its borders, while the 2026 disaster showed how hazards near the border can devastate both countries. This requires a coordinated installation of warning systems that not only record water movement but also track in real time the changes in glacial movement and resultant change in the surrounding landscape. Satellite radar recorded up to 40 cm of ground movement on Langtang Lirung in the 48 days before the collapse ([ICIMOD, 2026](#)), suggesting that such monitoring could provide earlier warning.

The need for congruence in policy and technology: Implications for human and economic security

The extensive negative impact on human and economic security caused by the August 2026 flood has necessitated the need for a functional transnational information gathering and sharing between Nepal and China. This requires institutionalization in which the governments of Nepal and China, together with intergovernmental bodies such as the International Centre for Integrated Mountain Development (ICIMOD), whose member states include both countries, lead integrated disaster preparedness and response measures. Such efforts should empower real-time information sharing mechanisms and response protocols for catastrophes that transcend boundaries of both states. In addition, such policy congruence should entail detailed technical assessment of glacial lakes, along with monitoring of the changes in overall Himalayan landscape and behaviors.

Policy congruence needs to be coupled with technological collaboration for early identification of potential disasters involving glaciers and glacial lakes. This involves installation of equipment that measures changes in water levels, tracks glacial movements and monitors slope stability, which requires policy coordination between upper riparian states like China and lower riparian states like Nepal.

To mitigate the impact on human and economic security as witnessed in Nepal, greater congruence in technology and policy between upper and lower riparian states is necessary. Transparency in data and technical support between states is essential to prevent loss of life and property. Institutionalization and technical cooperation help capacitate states to deal with environmental insecurities emanating from climate change, which impact human and economic security as well.

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