

Scientists cite destructive dangers of climate change, land use in mountain ranges

September 1 2021



Imja Lake, Nepal, is considered one of the most hazardous lakes in Nepal. The moraine dam at lower left was engineered in 2016 to reduce the lake level slightly and to stabilize the outlet river so as to slightly reduce the glacial lake outburst flood (GLOF) hazard. A hazard early warning system is arranged downstream. Credit: Jeffrey S. Kargel, 2016.

In a new paper in the *Georgetown Journal of International Affairs*, seven researchers hailing from five countries have called for greater attention to the destructive potential and recent history of disasters seen in the world's mountain ranges, including places like the Himalaya and Andes.

The scientists, headed by lead author and Planetary Science Institute Senior Scientist Jeffrey S. Kargel, in "Climate Change, Land Use Change, and Mountain Disasters," a two-part article, review how [climate change](#) and burgeoning development of the world's [mountain regions](#) are driving a variety of natural hazards that can inflict harm on people and damage to [critical infrastructure](#).

Climate change is driving an increased tempo of the global hydrological cycle as well as thawing of the icy cryosphere. These consequences of global warming may be contributing to an increase of some types of hazards and disasters. "Climate change and other human-caused alterations of the Earth system during this modern era are forcing shifts of the processes and geographic distribution of mountain hazards," Kargel said. "This is happening even as the exposed human populations and infrastructure of many mountain regions are increasing. Some of these natural processes, such as landslides and glacier lake outburst floods, end up producing disasters."

"Mountain disasters commonly result from infrastructure getting in the way of hazard events like floods. In that very real sense, the disasters afflicting the Himalaya and other mountain regions are not natural disasters. Many are consequences of inadequate environmental decision-making," said Kavita Upadhyay, an Indian water policy specialist and an independent journalist covering environmental issues in the Himalayan region, who is a co-author on the paper.

"Knowledge of mountain hazards aids public safety and economic efficiency. For example, it is not helpful to build expensive

infrastructure if natural hazards then come around and destroy it," Kargel said. "Better investments may involve infrastructure that is placed in less hazardous places or where the [engineering design](#) can ward off the hazard activity expected or possible at the site."

However, some degree of risk taking is pervasive across our modern global economy. "In places where a calculated risk is accepted, at least we can undertake adequate early warning of some types of hazards. Early warning systems can allow people to escape to safety in some circumstances. However, currently not many places are covered by hazard early warning systems," Kargel said.

Hydropower generation is of particular importance these days as the world seeks ways to get off carbon-based fuels, causing a dilemma: "A global rush for hydropower has unfortunately resulted in many disastrous outcomes, most recently in the Indian state of Uttarakhand just last February," Kargel said.

The research team concludes that in some regions that are exceptionally hazard prone, nature conservation can be a better alternative to development. Doing so saves on premature destruction of investments and protects both people and Earth's natural heritage.

More information: Part One: [gja.georgetown.edu/2021/08/23 ... -mountain-disasters/](https://gja.georgetown.edu/2021/08/23...-mountain-disasters/)

Part Two: [gja.georgetown.edu/2021/09/01 ... -mountain-disasters/](https://gja.georgetown.edu/2021/09/01...-mountain-disasters/)

Provided by Planetary Science Institute

Citation: Scientists cite destructive dangers of climate change, land use in mountain ranges

(2021, September 1) retrieved 27 April 2024 from <https://phys.org/news/2021-09-scientists-cite-destructive-dangers-climate.html>

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