

In Nepal's Next Big Quake, Hydropower Dams Threaten Catastrophe

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by Michael Buckley

A spate of hydroelectric dam building in Nepal means that future earthquakes could send inland tsunamis flooding down the steep mountain valleys, writes Michael Buckley. Disaster was averted in last month's quake - a badly damaged dam was not yet filled. But despite the risks and the damage to river ecology, tourism and rural livelihoods, there's no sign of any policy shift.

If an earthquake topples such a dam, that would unleash a massive torrent of water and rubble, taking out scores of villages downstream. It would be a Fukushima moment - earthquake followed by tsunami.

After the 25th April earthquake in Nepal, China sent in large teams to rescue quake victims. But it was also intent on rescuing its own people.

A delicate operation got under way to reach 280 Chinese construction workers trapped at a dam construction site around 40 miles from the earthquake epicentre.

Two workers were killed by the quake, and others were injured. The 110-MW Rasuwagadhi Dam was being built on the upper Trishuli River in a very remote corner of Nepal near the Tibetan border.

China imports its own construction workers to build these megadams, though locals are used for manual labour tasks. This is one of three megadams currently being built in Nepal by Chinese state-run Three Gorges Corporation, with a dozen more on the horizon for a dam cascade on the Trishuli River.

Three Gorges Corporation has mastered the technology for building behemoth dams, and the projects in Nepal are growing larger: West Seti Dam is slated to generate 750 MW of power.

And underlining the risks it will create, the dam's reservoir is to stretch back 16 miles (25km), holding back 1,200,000 acre-feet (1.5 cubic kilometres) of water. Just imagine the devastation that would cause if an earthquake let it all go at once!

Three Gorges Corporation has projects around the world, particularly in third-world nations - many of them highly controversial because of environmental concerns. The company itself has been implicated in scandals in China involving corruption and shady practices.

At Rasuwagadhi Dam site, huge rockslides and falling debris hampered rescue attempts: Chinese engineers and construction workers were eventually helicoptered out across the border into Tibet, with assistance from the People's Liberation Army. A handful of Chinese engineers remained to supervise the damaged site.

Nepalese workers were left to fend for themselves, and trek out.

How long before Nepal's 'Fukushima Moment'?

Here's a statistic: the gigantic Three Gorges Dam in China was built to withstand the forces of a 7-magnitude earthquake, and is able to withstand an 8-magnitude earthquake for a short time, according to the company. That is where the engineering problems lie: the quake in Nepal was 7.9 magnitude.

Rasuwagadhi Dam was described as severely damaged by the quake. And that brings up a nightmare scenario. What if that dam were up and running, with a huge reservoir sitting behind it?

If an earthquake topples such a dam, that would unleash a massive torrent of water and rubble, taking out scores of villages downstream. It would be a Fukushima moment - earthquake followed by tsunami.

Only in this case, an inland tsunami would be unleashed on a river. The megadam becomes a lethal hydro-bomb, piling horror upon horror.

Increasingly, as more dams are built on Himalayan rivers, this nightmare scenario is given more chance of playing out. With the highest mountains in the world on its northern borders, Nepal is particularly rich in hydropower potential.

All over the Himalayas, a dam-building frenzy

Few of Nepal's rivers have been tapped for large dams. But that is rapidly changing. Dozens of dams are in the works there, under construction particularly by China and India.

Across the Himalayas, in Tibet, Pakistan, India, Bhutan and Nepal, hundreds of large dams are on the drawing board, in an unprecedented wave of dam-building.

Very little impact assessment is done for these dams. And there is a high risk that they will be located in a seismic zone. In 2012, researchers at Canadian NGO Probe International examined locations for dams on a number of Himalayan rivers including the Yarlung Tsangpo, Salween, Mekong and Yangtze.

Their report, '[Earthquake Hazards and Large Dams in Western China](#)', found that 48.2% of them would be sites in zones of high seismic activity, while 50.4% would be in zones of moderate seismic activity. That would leave only 1.4% found in zones of low seismic activity.

The report concluded that China is embarking on a major experiment with potentially disastrous consequences by building over 100 megadams in regions of known high seismicity.

That's one good reason why mega-dams should not be built on Himalayan rivers. Another reason is that dam-building has been connected to actually triggering an earthquake, in a phenomenon known as 'reservoir-induced seismicity'.

For example the building of Zipingpu Dam in Sichuan Province in China has been implicated in the disastrous quake of 2008 that killed over 85,000 people and left millions homeless: the dam was just 4 miles from the epicentre of the 7.9-magnitude quake.

The quake cracked Zipingpu Dam and caused damage to 60 other smaller dams in the region. Dam personnel and military rushed to empty water from scores of dam reservoirs, causing considerable flooding downstream.

Ecological destruction, loss of land, fish and livelihoods

But the fundamental reason that megadams should not be built in Nepal is that they destroy ecosystems. Rivers are lifelines for the communities along their banks, supplying water for irrigation: megadams impact entire ecosystems by blocking nutrient-rich silt, essential for agriculture, and by blocking fish migration.

In Nepal, it's clear that the government has woefully inadequate resources to deal with an emergency situation on the scale of the recent earthquake, let alone a disaster involving a megadam. Yet when it comes to signing lucrative contracts for megadams with nations like China and India, the Nepalese government is quick to act.

Two months ago, I was rafting on the upper Bhote Kosi river, north of Kathmandu. Paddling down the river we passed a small group of buildings, with signs displayed in Chinese. It was part of a Chinese operation for building a 100 MW dam further upstream near the Tibetan border.

The Chinese construction crew all came out to wave at us as we drifted by. Our captain did not wave back: he said they might as well be waving the river goodbye.

The owner of the rafting company told me that once the dam starts operation, that would be the end of rafting on the upper Bhote Kosi, and villagers along the river would suffer dire consequences.

All his efforts failed - until nature stepped in

He tried everything to stop construction of the dam - taking the dambuilders to court, involving Nepalese celebrities in a campaign, petitioning Nepalese leaders and politicians, and garnering community support to try and block the dam and save the ecosystem on which their livelihoods depend for growing crops.

All to no avail. The dam is going ahead.

Once the dam is completed, the villagers will probably have to relocate. It's a sad but familiar refrain: power, greed and corruption in Nepal trump the need to preserve the environment. In Nepal, the cost of rampant megadam building could be catastrophic.

In this case, Mother Nature appears to have stepped in: the dam on the upper Bhote Kosi lies in an area that was devastated by the recent earthquake, most likely setting the dam-builders back a few years on their schedule.

Michael Buckley is an adventure travel writer, environmental investigator, author of [‘Meltdown in Tibet: China’s Reckless Destruction of Ecosystems from the Highlands of Tibet to the Deltas of Asia’](#), and filmmaker for three short documentaries about environmental issues in Tibet.

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