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South Asia

# Lessons from the Nepal earthquake: Prepare and survive

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**"A major earthquake has struck western Nepal, two weeks after a devastating quake killed more than 7,000 people.**

**The latest earthquake hit near the town of Namche Bazar, near Mount Everest.**

**The US Geological Survey said it had a magnitude of 7.4. An earthquake on April 26, centred in east Nepal, had a magnitude of 7.8.**

**The latest tremor was felt as far away as the capital of India, Delhi, as well as Dhaka, the capital of Bangladesh." [BBC News 12 May 2015.] This news makes the article below even more timely.**

It is humanly impossible not to be moved by the magnitude and quality of the humanitarian disaster that has visited Nepal and the adjoining regions of India and Bangladesh as a result of the April 25 earthquake of magnitude 7.9. The death toll has already crossed 5,000. The entire world, and India in particular, must do all it can to help the earthquake's victims with rescue and relief.

The disaster is a grim reminder of how vulnerable large parts of South Asia are to natural calamities like earthquakes, tsunamis, cyclones, flash floods and landslides. It also shows how unprepared the region's societies are to cope with these, and how governments routinely fail to mitigate their effects on the plea that some of these events cannot be predicted.

The plea is specious. Nobody can forecast an earthquake to the year, but scientists know enough about region-specific seismic hazards to be able to say that an earthquake of high or medium magnitude is likely to take place in the course of a few decades. This furnishes an adequate basis to formulate policies and put in place measures of disaster preparedness, mitigation and management.

It's precisely because governments fail to recognise risks and take preparedness measures that natural disasters become social catastrophes. Earthquakes are natural only in their causation. Their effects are socially determined and transmitted through arrangements created by societies and governments. Consider the following.

\* The United States and Western Europe are prone to earthquakes. Yet, quakes killing more than 10,000 people haven't occurred there for a century. Such earthquakes have only occurred in Third World countries—the exception being developed, but highly vulnerable, Japan.

\* In 2010, a magnitude-7 earthquake killed 300,000 people in Haiti, the highest recorded earthquake toll in history. That same year, a magnitude-8.8 earthquake occurred in Chile, which released 500 times greater energy, but killed 525 people. Thanks to better preparedness, only 0.1 percent of those "strongly shaken" died in Chile, compared to 11 percent in Haiti.

\* Natural disasters kill 63 people in Japan on average. But in Peru the average toll is 2,900—46 times higher. When Hurricane Elena hit the US in 1985, only five people died. But when a cyclone slammed Bangladesh in 1991, half a million perished.

\* Around the same time as the Latur (India) earthquake of 1993, California was hit by a quake that was 50 times more powerful. Three persons died in California; 8,000 people perished in Latur.

## Lessons from the Nepal earthquake: Prepare and survive

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\* Hurricanes and cyclones frequently hit the US East Coast. But the toll they claim is usually hundreds of times less than that taken by similar storms in Bangladesh, India or the Philippines.

Such First World-Third World differences have nothing to do with the intrinsic nature of the calamity itself, but with social arrangements, including disaster preparedness. This is the first lesson about disasters. As has been wisely said, earthquakes don't kill; falling buildings do.

A second lesson is that natural disasters are not class-neutral in their impact. Rather, they pick on the poor and the weak, who are far more vulnerable than the privileged, being forced to live in congested, overcrowded and unsafe conditions or in remote, poorly-connected areas. More than a third of people who live in Nepal's hills are more than four hours away from a tarred road; the headquarters of 15 of Nepal's 75 districts have no road connections at all.

Typically, the rescue and relief infrastructure in developing countries is hopelessly inadequate—for instance, in Nepal, hardly any earthmovers and cranes were available to clear roadblocks and rescue people. Emergency relief provision—especially of necessities such as shelter, food, water and medicines—is appallingly bad.

A third lesson is that governance has great bearing on how a society copes with natural disasters. If there's transparency in official decision-making, the toll tends to be low. This is the case where governments are responsive to people, and where early warnings are sounded, and accurate and adequate information is disseminated about availability of rescue and relief services; and provisions, including medicines, are properly stocked.

This doesn't happen in most Third World societies. Many are extremely hierarchical; their rulers feel no obligation to disseminate information to underprivileged citizens. This situation is changing somewhat thanks to greater investment in cyclone-warning and communications, but not nearly enough. Human life continues to be wantonly lost. The poor suffer the most.

A fourth lesson is that many Third World societies are severely under-regulated for safety. Most have no laws on zoning of residential and commercial activities and environmentally sound building codes. Or, regulations are routinely violated. This is of course true of Kathmandu, which has evolved into "a densely built-up urban sprawl". Most buildings there don't comply with the 1994 National Building Code, which was meant to improve earthquake resistance.

However, this applies to other South Asian countries too. An estimated 80 percent of buildings in big Indian cities aren't earthquake-resistant, although it doesn't cost a fortune to build or retrofit them to be so. Most municipalities don't even insist on completion certificates for new constructions, based on approval by structural engineers and other experts.

These lapses are serious, indeed unforgivable, considering that much of South Asia lies in a seismically active area, including large "very severe intensity" and "severe intensity" zones. This is the result in no small part of plate tectonics, a geological phenomenon in which giant land masses crashed into each other more than 25 million years ago.

Since then, the Indian plate has been thrusting into Tibet and the Indian and Eurasian plates have been moving closer to each other by 20 millimetres a year along the 2,400 km Himalayan belt, generating enormous stresses that can only be periodically released through earthquakes.

Great earthquakes (of magnitude greater than 8) have occurred along the Himalayas every 80 years, e.g. 1803,

## Lessons from the Nepal earthquake: Prepare and survive

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1833, 1897, 1905 (Kangra), 1934 (Nepal-Bihar), and 1950 (Assam-Tibet), producing utter devastation. The magnitude-7.6 Muzaffarabad (Pakistan) quake of 2005, while less severe, was part of the same phenomenon of stress release.

In addition to the Himalayan faults, which include parts of India, Pakistan, Nepal, Tibet, etc, the region also includes major faults in Indo-Gangetic and Brahmaputra plains, the Rann of Kutch, peninsular India and Andaman and Nicobar Islands. India alone has 66 listed faults. The regions most at risk include Uttarakhand, Himachal, Jammu and Kashmir, North Bihar and Kutch.

As a peer-reviewed paper in *Science* (2001) argued, "about 50 million people are at risk from great Himalayan earthquakes, many of them in towns and villages in the Ganges plain". The capitals of Bangladesh, Bhutan, India, Nepal, and Pakistan and many other cities with more than a million people are "vulnerable". Areas where stresses weren't released recently are especially vulnerable.

These governments should have their utmost in earthquake planning, including making construction seismicity-resistant, and launching disaster management, information and public education programmes, while strengthening seismic monitoring. But they seem to have learnt little from the recent experience with Uttarkashi (1991), Chamoli (1998), Bhuj (2001) and Muzaffarabad.

As if all this were not bad enough, the governments of India, China and Nepal have rushed headlong into hydroelectricity projects in the most vulnerable parts of the Himalayas. Worst of all, India went ahead with the Tehri dam on the Bhagirathi (a tributary of the Ganga) in Uttarakhand, bang in the centre of the 600-km Central Himalayan Seismic Gap, where no major earthquake has occurred for at least 500 years, and where a Big One is due anytime.

Among those who publicly warned against the Tehri dam was Vinod Gaur, a distinguished geophysicist and a co-author (with Roger Bilham and Peter Molnar of the University of Colorado) of the *Science* paper mentioned above. The government completed the dam but under-designed it for the likely peak ground acceleration for a maximum credible earthquake.

In case the dam is ruptured by an earthquake, the consequences for the millions of people who live downstream of the Ganga will be catastrophic.

Equally irresponsibly, the government ignored an article by Gaur and Bilham in the journal *Current Science*, which argued that the Jaitapur nuclear power project in Maharashtra was declared seismically safe without refuting the possibility of potential seismic vulnerabilities. But India's West Coast is well-recognised as probably "laced with ancient faultlines buried under sediments and waiting to spring back like a piano accordion..."

Yet the absence of seismicity in Jaitapur in the past century was wrongly interpreted to infer that no seismicity would occur in the future—although the nearby Koyna and Latur regions experienced major earthquakes (magnitude 6+). The paper should have been scientifically debated, but Indian nuclear power lobbyists ridiculed it and prevented Bilham from entering India in 2012!

Such "shoot-the-messenger" attitudes towards dissenting scientists speak of an authoritarian mindset—and worse, contempt for public safety in the face of disasters.

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South Asia Citizens Web ["Lessons From The Nepal Earthquake: Prepare and survive"](#).