



The Tsunami, Science and Disaster Management

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Those affected coasts have been unduly disturbed by rumours of imminent tsunamis and earthquakes. These false alarms are adding to the trauma of the victims and compounding relief. The rumours are fed by false prophets, a climate of uncertainty, and compounded by the new defensiveness of authorities. Thus I believe that it is worthwhile to lay out the essential scientific facts.

After the first reports of the submarine earthquake between Aceh, Indonesia and Sri Lanka on the 26th of December, 2004, I compiled the relevant scientific information. The information was disseminated to experts locally and internationally through the Internet. These websites were cited in newspaper, television and radio programs internationally. Since then we have developed the Internet Resource Centers to assist Sri Lankan recovery (websites <http://www.recoverlanka.net> and <http://www.geolanka.net>). These websites have been developed by scientists and professionals voluntarily to disseminate credible information rapidly and to provide a platform for public participation in recovery.

The essential facts related to the earthquake, the tsunami and the response to it are:

- The earthquake measured 9.0 on the Richter scale and occurred at 06.58 a.m at the epicenter. It led to a sequence of 15 other quakes of lesser intensity across the Bay of Bengal region bordering Andaman Islands and Aceh. The first earthquake ranks among the most intense that have been recorded.
- Earthquakes occur when any of the 13 tectonic plates that comprise the earth's crust collide. The present collision is due to compression between the Indian and Burmese plates which had been under compression.
- Earthquakes cannot be predicted to occur on a precise date. However, one may determine that certain regions are at higher risk. This risk in the region close to Indonesia was known to a few alert scientists.
- The initial earthquake occurred near the meeting point of the Australian, Indian and Burmese plates. Scientists have shown that this is a region of compression as the Australian plate is rotating counterclockwise into the Indian plate. This also means that a region of seismic activity has become active in the South Eastern Indian Ocean. Thus in future, we must pay great attention to earthquake risk.
- Once the earthquake was detected it was possible to give 2 hours of notice of tsunami risk for Sri Lanka and India. Such a system of warnings is in place across the Pacific Ocean but not in the Indian Ocean.
- Tsunamis are rarer in the Indian Ocean as the seismic activity is much less here than in the Pacific. Still, over the last century, there have been 7 records of tsunamis set off by earthquakes near Indonesia, Pakistan and in the Bay of Bengal, with little impact on Sri Lanka.
- Tsunamis are not entirely unknown in Sri Lanka. For example, the tsunami in 1883 generated by the eruption at Krakatoa led to a surge of half a meter in Pottuvil and Galle. Krakatoa is partially confined from the Indian Ocean by Sumatra. This may be why the impact of the quake led to modest impacts in Sri Lanka.
- Coastal residents in the Pacific littoral are educated to get to high ground following tremors, unusual waves and unusual events. In addition, building and infrastructure around the Pacific Ocean are constructed to withstand earthquakes.
- Once the pent-up energy in the compression zones of the plate boundaries has been released, it takes time to build up energy for another event of similar magnitude. Thus is unlikely in the short-term (meaning in the order of weeks and months or years).

- This failure to alert is an indictment on scientists who did not forewarn of earthquake and Tsunami risk in the Indian Ocean. It is also an indictment on successive governments, leaders and development-managers for the neglect of appropriate disaster risk management and science and technology.

Now, there should be no lapse in the development of an early warning system. International agencies are competing to put in place early warning systems. But one must guard against an undue focus on the scientific fix. While early warning has its place, we also know that early warning alone shall not be effective without disaster preparedness, prearranged systems of communication, contingency plans for evacuation, emergency management procedures, vigilant operators and cooperation at many levels.

Successive governments, officials, overseers from lending agencies have failed in safeguarding the vulnerable notwithstanding successive disasters. Even as we have failed in implementing the lessons that we learnt from past disasters, we must not only learn from this failure but also ensure that the lessons learnt translate into disaster preparedness and management. We must hold our institutions, administrators and leaders accountable. Those among us with expertise should speak out. The public should demand answers. Too much is at stake to afford the deceptions, the lack of professionalism, complacency and mismanagement to continue in disaster risk management.

After the events of September 11th 2001 took place in the United States, a commission with independence, adequate funding and staffing was created by citizen pressure led by the bereaved. This commission led a national conversation which identified many weak spots and some strength. Notwithstanding many flaws, due to political realities in the US, the commission issued a revealing and authoritative account of what went wrong and what could be the remedial measures. Such a commission is needed in Sri Lanka to authoritatively review the events of December 26th so that we may learn lessons from it to protect the vulnerable and manage disaster risk better in the future.

Tsunami wave propagation: Started at 6.58am
(Courtesy: National Institute of Advanced Industrial science and Technology, Japan)

