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Indonesia's Twin Disasters: Will the Next Big One Reach Singapore?

By Yang Razali Kassim

Synopsis

The twin disasters that struck Indonesia in the last week of October 2010 are a timely alert that the region must be better prepared for the worst. Scientific predictions point to a bigger earthquake, and consequently a possible killer tsunami in the years to come.

Commentary

ON 25 OCTOBER 2010, Indonesia's President Susilo Bambang Yudhoyono rushed back from the ASEAN Summit in Hanoi. A major 7.7 magnitude earthquake had just struck off Sumatra's Mentawai Islands, triggering fears of another tsunami since the one in 2004 which savaged Aceh and killed some 230,000 people across 14 countries. As it turned out, this second tsunami was much less deadly, taking away almost 500 lives so far. But the Mentawai earthquake was quickly followed the next day by a volcanic eruption in Mount Merapi in central Java, which killed at least 38 people.

Although the combined death toll has not been massive, the back-to-back disasters in Sumatra and central Java have raised fears that both the Mentawai earthquake and the Merapi eruption could be linked. If so, this could be ominous for Indonesia. Volcanologists believe Indonesia may have been spared another major catastrophe – for now. But experts have warned that the big one is yet to come.

The Next Big One

Professor Pan Tso-Chien, director of the Institute of Catastrophe Risk Management, Nanyang Technological University, was at a World Bank forum in Seoul on the eve of the Mentawai earthquake where he predicted that Sumatra was ripe for another major shock. The forum, ironically entitled "It's Not Too Late: Preparing for Asia's Big Earthquake", noted that few Asian cities, except for Japan and New Zealand, have proper earthquake mitigation programmes.

Similar predictions have been made by NTU's Earth Observatory of Singapore, which has been monitoring the region's geological trends. Its director, Kerry Sieh, has been widely quoted that the 7.7 magnitude Mentawai earthquake was a foretaste of worse to come. In its website, the EOS assessed that the 25 October quake was a large aftershock of the magnitude 8.4 Sumatran earthquake three years earlier on 12 September 2007. Basing its assessment on the analysis of the US Geological Survey, the EOS expects a more severe earthquake off the western coast of Sumatra up to magnitude 8.8 within the next few decades.

The EOS, in collaboration with the Indonesian Institute of Science (LIPI), runs a network of GPS instruments to monitor tectonic movements along the west Sumatran coast and the Mentawai Islands. LIPI's earthquake geologist Danny Hilman Natawidjaja sees the Mentawai earthquake as either part of the *healing* process following the 2007 incident or part of a *wounding* process that would lead to a bigger rupture of a fault line known as the Sunda megathrust. According to EOS, scientists say such a rupture is inevitable because of strain that has been building up in the Sunda megathrust where two tectonic plates interact.

Based on the patterns of large earthquakes over the past seven centuries, the EOS adds that scientists believe the current sequence of earthquakes will eventually culminate in a much larger earthquake, even approaching the size of the killer earthquake of magnitude 9.1 which triggered the 2004 tsunami. "Exactly when that might happen isn't clear. As they said previously, it could be in 30 minutes or in 30 years," says the EOS. Natawidjaja has been warning of the need for infrastructure development to factor in the threat of earthquakes in the vicinity of Sumatra, including the Sunda Strait where Krakatoa is located. The proposed Java-Sumatra bridge across the Sunda Strait would be particularly vulnerable.

Impact on Singapore

Also potentially vulnerable would be high-rise buildings in Singapore and Kuala Lumpur, according to the EOS, citing a recent research. It has assessed that if a giant earthquake struck again off Sumatra, some high-rise buildings in these cities could be affected by ground-shaking. It says tall buildings constructed above soft soils may be at high risk because ground motion from distant earthquakes can be amplified.

The EOS did simulation studies to determine how ground motion from such a huge Sumatran quake would affect buildings in nine major cities in the region: Padang, Bengkulu, Palembang, Pekanbaru and Jakarta in Indonesia as well as Singapore and the Malaysian cities of Kuala Lumpur and Penang. These cities were considered because they lie within two fault lines of the Mentawai megathrust segment. The results were reported in the Bulletin of the Seismological Society of America.

Given their proximity, Padang, Bengkulu and other major cities in Sumatra would be most vulnerable to structural damage from a powerful Mentawai-area quake. The studies also investigated whether buildings in Singapore and Kuala Lumpur were adequately resilient. Ground-shaking can also affect high-rise buildings far away because low-frequency seismic waves travel great distances.

"Such waves are amplified in areas where the soil is soft," says the EOS in its website. "As such tall buildings in the two capital cities are 'relatively brittle', and it is crucial to investigate their performance under the kind of sustained ground shaking that would occur in a powerful Sumatran quake," the research concludes. The EOS says the findings can help cities plan mitigation strategies such as retrofitting buildings to make them more earthquake-resilient.

Responding to Future Disasters

Given the scientific evidence, the question is clearly not if, but when the next major catastrophes will occur. Killer earthquakes may trigger killer tsunamis. Both are occurring with greater frequency. Singapore and the ASEAN region clearly have to be prepared for the storm ahead. At the level of the individual ASEAN states, disaster preparedness seems to come in varying degrees – from those who are well-gearred to those who are worryingly still ill-prepared. Indonesia, which is part of the world's most volatile earthquake belt – the Ring of Fire – will suffer the most and therefore must step up its act.

At the regional and international levels, ASEAN has been actively preparing for the worst. At its just-concluded summit in Hanoi, ASEAN ramped up its collaboration with the United Nations in disaster management. Both will cooperate to develop disaster management strategies, following their successful joint response to Cyclone Nargis in Myanmar. An ASEAN-UN joint response will be crucial in future. In the end, however, individual ASEAN countries, especially Indonesia, must be responsible for the safety and well-being of their own citizens.

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