

# Are We Prepared for the Tsunami Threat?\*

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**D**isasters are not uncommon in the Southeast Asian region. Of significance was the Boxing Day 2004 tsunami that hit fourteen countries in Southeast Asia, parts of South Asia and as far away as Somalia. Cities and villages were destroyed, thousands killed and hundreds of thousands displaced. Other disasters such as the 2008 Cyclone Nargis which affected Myanmar, and the 2009 Typhoon Ketsana which affected the Philippines, Cambodia, Laos and Vietnam, caused deaths, injury and untold damage.

Then came the 2010 'triple disaster' in Indonesia -- the flooding in Papua, the tsunami in Mentawi islands and the Mount Merapi volcanic eruption. The 2011 earthquake that hit Myanmar, near the borders of China, Thailand and Laos, was significantly less powerful than the one that hit Japan on March 11, 2011.

The world also witnessed the 2011 flooding in Bangkok, and more recently Hurricane Sandy lashed the east coast of the United States with wind and rain. Southeast Asia is dealing with the damage from a powerful storm that has killed a number of people over the same period.

A recent workshop discussion indicated some interesting findings regarding disasters and climate change.

Generally, geological hazards such as earthquakes, tsunamis and volcanic eruptions are not influenced by climate change but by other geological hazards such as landslides and subsidence, because water tables and their sensitivity to rainfall are indirectly influenced by the changing climate. As for hydrometeorological hazards, including extreme temperatures, droughts, storms and storm surges, floods and



*Huge tsunami waves crashing down on a crowd of people*

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forest fires, these are influenced by climate change. However, research findings have also indicated a changing relationship between global warming and extreme weather events such as tropical cyclone/typhoon activity in Asia.

That extreme weather events such as storms occur in phases — a phase of increasing storms and a phase of decreasing storms — may be quite difficult to comprehend. What must be noted is that the nature of storms has changed. They are generally becoming more intense. What is therefore important is the need for more basic research so that we can understand the nature of the relationship between extreme weather events and climate change. There is also a need for better historical data to study the trend of extreme events and resulting disasters.

However, funding for the collection of such data is a problem, not only within developing countries, but also developed countries. Studying trends helps to indicate changes in some extreme weather events or hazards, vulnerability, exposure, human-induced changes and disaster risks. Countries within the region are in the process of understanding the nature and extent of hazards in relation to climate change, the impacts of these events on communities and the underlying causes of vulnerability. There are also efforts to help communities understand the information in order to minimize their vulnerability to disaster risks.

In terms of preparedness, Malaysia has in place the 'End-to-End Early Warning System' aimed at empowering individuals and communities threatened by hazards so that they

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can respond appropriately and in a timely manner to reduce the possibility of personal injury, loss of lives and livelihoods, and damage to property and the environment. The early warning system has all the necessary elements — risk knowledge, monitoring and warning service, dissemination and communications, and response capability — to raise awareness and to convince all concerned stakeholders that they should work to make cities and areas of concern resilient to disasters.

In a country that was once considered relatively safe and sheltered against major natural disasters, the Boxing Day Tsunami of 2004 demonstrated how such a phenomenon could impact the life and security of the people. It certainly changed the perception of policy-makers, the scientific community, aid workers, private donors as well as many others regarding the patterns of such catastrophes, and more specifically, about their implications, such as changes in societal vulnerability, and also imbalances in development.

It cannot be denied that numerous programmes and research activities have been instituted by the government much earlier to monitor activities pertaining to disaster prevention and to improve society's preparedness in facing disasters, but the 2004 tsunami raised questions regarding the nature of disaster and its 'globalization.'

The globalization of disaster is not entirely a new phenomenon according to one prominent researcher. However, due to the space constraint here, it suffices to say that the growth of information and communications technology and

greater ownership of receiving devices have all enabled descriptions and images of human suffering in disasters to be disseminated without delay. This has created a greater sense of participation. Coupled with rapid travel, it has enabled the international community to respond almost immediately, barring any political or sovereign 'sensitivities.'

In terms of the nature of disaster, why is there interest in tsunamis or about when they could strike Malaysia? Research and monitoring activities relating to earthquakes and/or tsunamis, especially since 2004, despite constraints in funding, is commendable, as is the sharing of findings through various discussion groups

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nationally and regionally. Drawing from a review of tsunami-related research literature, more often than not, only tsunamis of seismic origin have been investigated. Tsunamis generated by landslides or volcanoes have so far escaped the radar.



*A tsunami approaching the Penang coastline*

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Tsunamis generated by earthquake(s) in the Manila Trench (currently considered a major hazard in the South China Sea and parts of Sabah) have captured the interest of many. Sabah also faces potential tsunami threats from the Sulu Trench or from submarine landslides. Within the country, while focus is concentrated on tsunami generation and propagation in the South China Sea and the Sulu-Sulawesi Sea, attention is also given to the Straits of Malacca (potential tsunamis originating from the Andaman Sea/Indian Ocean). Tsunami simulation studies and the conducting of risk assessments are already underway.

Attention is also given to tsunami characteristics — arrival time, wave height, wave force, and inundation distances — in shallow and confined waters, as well as to impacts on coastal structures. But equally important, due to the uncertainty in predicting those earthquake characteristics that generate a tsunami, as already highlighted by several researchers, variations in magnitude and orientation must be taken into account in the evaluation of risk, and in developing risk maps/evacuation routes.

Aspects of disaster mitigation, emergency relief and safety provisions are already being tackled by the relevant Malaysian authorities but are they better understood? Will Malaysians cooperate and be more prepared? Tsunami science and its significance will have to be translated and understood by all, including relevant stakeholders involved in the planning and development processes, and by the vulnerable community, so as to recognize the threat and to respond accordingly. The role of the media is therefore invaluable.

To pursue economic and social well-being is important. Unfortunately, populations tend to concentrate in and around economic centres, and also areas dotting the coastlines (including hazard-prone areas). They generally populate these areas more quickly than protection measures for them can be devised or put in place. So when subsequently re-enforcement of structures is required, these may be costly.

Next, many Malaysians tend to be complacent; cooperation and response to tsunami drills is an issue. Therefore, at a time of real disaster, chaos may arise. During the March 2011 tsunami for example, in even a trained and experienced community such as the Japanese, the priority placed on saving loved ones and escaping by road had the effect of hampering the evacuation process leading to the loss of lives.

A worldwide relief system exists, but response to catastrophes requires strong local and national preparedness, and effort on the part of many players. Again, one of the challenges is to involve the general public in managing its own safety and security. While an increase in the knowledge of hazards is essential, equally important is better organization and a more concerted effort with respect to awareness, education, training, planning etc. Malaysia is an active partner in the Hyogo Protocol and the Asean Agreement on Disaster Management and Emergency Response (ADMER) but should not greater priority be given to risk reduction?