COMMENT

Apply science to mitigate disasters

LOSS PREVENTION: Lives can be saved and properties kept safe through early warnings and advanced engineering

Towns in the east coast of Peninsular Malaysia and Sarawak were affected by floods last year. ***Flood losses can be reduced*** *with the proper* ***application of science and technology.***

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THE monsoon season of last year caused widespread floods in both Peninsular Malaysia, and Sabah and Sarawak, displacing some 200,000 people. Flooding is almost an annual affair in some parts of the country but the unusually high precipitation in December, combined with the La Nina phenomenon and subsequent floods, have caused the loss of lives, assets and income.

Such losses can be substantially reduced through appropriate application of science and technology as illustrated in the case of the Netherlands, which undertook mitigation measures over a period of three decades — some US$3 billion (RM10.5 billion) have been invested in infrastructure projects to support development that help reduce flood risks as well as address likely impacts of climate change.

The country also employs disaster-risk innovations, for example, through controlled flooding of specific areas for temporary storage of floodwaters.

Hazards are largely natural and take many forms, and can be triggered or influenced by a combination of factors, such as climate change and uncontrolled human activity. Earthquake — a geological hazard not influenced by climate change — prediction is still not possible but options do exist to make forecasts and give warnings of several other impending hazards.

For example, warnings of extreme temperatures, storms and storm surges, floods — these and others, such as forest fires which form the hydrometeorological hazards influenced by climate change — can save lives and prevent significant property losses.

Coping with hazards is a challenge. The understanding of the causes and parameters of natural phenomena and in the techniques for resisting their forces were first presented in the mid-1980s by Dr Frank Press, a geophysicist and adviser to four United States presidents.

Over the years, scientific knowledge and evidence-based techniques have provided better understanding of the mechanism of natural hazards and the transformation of these hazards into disasters. This knowledge forms an important component for risk reduction.

One of the outstanding risk reduction achievements is the development of an accurate early-warning system (EWS) for impeding hazards. Based on years of scientific research and data gathering systems, sophisticated computer models replicating the sciences behind the planet's weather and water cycle can provide detailed forecasts allowing organisations and communities to prepare and protect themselves.

But is a warning system sufficient to initiate action?

As witnessed in the recent floods, there are people, before deciding a course of action, who decided to seek advice from family members or neighbours, or weigh up other factors, such as security of their property and livestock.

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Research has improved the tackling of disasters

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Lives have been saved as a result of EWS but property losses can be prevented with advances in technologies, such as in design and construction engineering.

For example, the 1995 hurricane damage in the shared Caribbean island of Saint Martin/Sint Maarten. There were substantially less damage on the French side (Saint Martin) because of better technology and monitoring compared with the Dutch side (Sint Maarten).

Framing of disaster risk as an "event" has changed and is now recognised as a "risk process", and the advantage of this framing is that for each hazard and its subsequent impact, there are ways to defend against them through scientific knowledge, such as adaptation to climate change or techniques, such as the use of remote sensing to provide visual maps of landslide risks.

However, there may be barriers to their adoption in situations requiring large-scale dislocation of communities or high input of public funds.

Secondly, re-framing of risk as an outcome of varying human-induced factors — putting people and assets at risk as in the case of Cameron Highlands, where rapid land-clearing for agriculture with housing on unstable land prone to landslides — will need research and thinking on risk governance.

The re-framing is pushing new areas for research in terms of risk perception, resilience and nature of vulnerability.

It is here that contributions of the social sciences, which can be sector-specific, such as health, poverty, development and insurance, will be important in supporting advocacy and investment in disaster reduction. Innovative social science research have contributed, for example, to improved understanding of local processes of vulnerability and societal responses to global environmental change.

Science will have to build bridges between disciplines to provide new insights but there must be sustained efforts to achieve the new results. In addition, science and technology inputs will need to further look into:

INCREASE in science capability;

DEVELOPMENT and mainstreaming risk reduction strategy; and,

EVIDENCE for advocacy purposes.

Disaster risk reduction is multidisciplinary in nature and collaboration will be required at national as well as international levels to search for opportunities for combined action far beyond the cost involved to achieve political understanding and commitment.