

## **Question by Dr Lim Wee Kiak**

To ask the Minister for the Environment and Water Resources (a) what is the prospect of Singapore being hit by a major earth tremor; (b) whether any scientific study has been carried out to find out the chances of Singapore being hit by a major tremor; and (c) what is the likely impact of a major volcanic eruption in neighbouring countries on Singapore.

## **Reply by Dr Vivian Balakrishnan**

### *Earthquake risks*

1 The likelihood of a major earthquake occurring in Singapore is extremely low. Most earthquakes tend to occur at the active margins of tectonic plates, such as in Sumatra, Java, the Philippines, Japan, New Zealand and South America. Singapore is situated about 400km from the nearest plate margin. The crust underlying Singapore is considered stable by experts in geology, and the records from our seismic stations and global positioning instruments show no evidence of active faults within Singapore.

2 Despite this, Singapore can be affected by tremors from distant large earthquakes. Some high-rise buildings may sway as a result of such tremors. However, few events release enough seismic energy for tremors to be felt here, and even then much of the energy is lost by the time it reaches Singapore. Hence, such tremors are unlikely to be significant enough to cause structural damage to our buildings. Buildings in Singapore are designed to established building codes and are therefore sufficiently robust to resist the tremors arising from distant earthquakes. For example, tremors were felt in Singapore in 2004, 2005, 2007 and 2009; and there was no structural damage to our buildings.

### *Impact of a major volcanic eruption*

3 Singapore is a few hundred kilometres away from the nearest volcano, but if an eruption is sufficiently large and winds are unfavourable, it could result in fine windborne ash reaching Singapore. The possible downstream consequences are that air transport, air quality, water quality and cleanliness of open areas could be affected by suspended ash and ashfall.

4 Where air quality is concerned, the approach we take is to monitor and prepare for such episodes as we do for transboundary haze. NEA also provides relevant information for the public on its website. As for other possible impacts such as on aviation, there are plans in place to coordinate a quick response and mitigate the impact of such volcanic ash.

5 The severity and duration of a volcanic eruption would vary. The last documented case was the eruption of Mount Pinatubo in Luzon Island, Philippines in June 1991. Following the eruption on 14 Jun 1991, air quality in Singapore went into the moderate or unhealthy range for 3 days. (Based on the new PSI scale with 24-hour PM<sub>2.5</sub> included, the readings were 91, 112 and 91 for 17, 18 and 19 June respectively.) No other adverse effects were reported.

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