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Singapore must prepare for risk of increased haze in 2023 and 2024

We must be ready to protect the most vulnerable – the young, the old and those working outdoors.

Janice Lee, Steve Yim and Benjamin Horton



The very young and elderly are susceptible to respiratory illness when exposed to high levels of particulate matter. ST PHOTO: KELVIN CHNG

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The recent return of El Nino is again prompting discussions about how we should prepare for haze in Singapore.

A repeat of the 2015 South-east Asian transboundary haze is possible this year and probably in 2024. Much of Indonesia, Singapore, Malaysia, Vietnam and Thailand suffered a protracted period of poor visibility and air quality then, after peat and vegetation fires raging in Indonesia were intensified by a bout of hot and dry weather brought about by El Nino.

This haze blanketed the region, resulting in widespread loss of lives, health problems and economic woes across South-east Asia. The dust, smoke and moisture from these fires caused difficulties in seeing and breathing. Over 100,000 deaths could have been prevented.

The episode was said to have cost Singapore \$1.83 billion, given the adverse health impact, losses in business, tourism and productivity, and the costs of mitigation and adaptation, according to research by Nanyang Technological University.

Similar to that period from 2015 to 2016, this year marks the beginning of another El Nino. We are seeing above-average sea surface temperatures recorded in the Pacific Ocean, a weakening of winds from east to west along the Equator, resulting in less rainfall to South-east Asia. We can expect the annual dry season to be longer and drier, compared with previous years.

Same story across the world?

All across the world, the same story is playing out. Climate change creates conditions conducive to the spread of fires that also make them harder to extinguish. Rates of evaporation increase as temperatures rise, causing moisture to be drawn out from plants on the land. This drying can create tinderbox conditions. Any fire sparked can spread very quickly.

Extreme weather in 2023 has already led to massive wildfires in the Northern Hemisphere, resulting in devastating effects on people and ecosystems in Greece, Hawaii and Canada. Experts are already calling the Maui episode one of the worst natural disasters in Hawaii's history and have warned that the Greece wildfire has reached an unprecedented scale in the European Union.

In North America, New Yorkers awoke on June 7 to the smell of smoke in the air, a symptom of the wildfires raging in Canada. While New York prepared to distribute masks, air quality climbed to hazardous levels in places farther south including Minnesota and Indiana, due to north-easterly winds.

Transboundary haze, a phenomenon associated with South-east Asia, is increasingly an occurrence in other regions of the world. Unlike the haze occurrences elsewhere, however, the haze in South-east Asia is linked to the burning of not just vegetation, but also peatlands.

Peatlands are wetlands formed from the incomplete decomposition of vegetation under waterlogged conditions. These are widespread across South-east Asia, especially in Indonesia and Malaysia, and are rich in organic material.

Deforestation of peatlands, coupled with the building of canals, for infrastructure development and industrial and smallholder agricultural production of crops deplete the land of moisture. This creates highly flammable ecosystems that are particularly susceptible to prolonged burning.

At the height of the 2015 crisis, Indonesian fires were reportedly releasing more than 15 million tonnes of carbon a day into the atmosphere – more than the daily carbon emissions of the entire United States economy.

Even with Indonesia's efforts to restore peatlands and boost firefighting capabilities during the dry season, severe drought conditions can undermine such measures. They lower water tables in peatlands and make access to water sources difficult for firefighters.

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The best protections



There is public recognition that a rapid increase in high concentration of particulate matter can be harmful to human health. PHOTO: ST FILE

Singaporeans have adapted to the haze over the years by staying indoors, using air purifiers and air-conditioners, and using masks to protect themselves. There is public recognition that a rapid increase in high concentration of particulate matter can be harmful to human health.

However, not everyone has access to such adaptation measures. Some population segments are more vulnerable. The very young and elderly are susceptible to respiratory illness when exposed to high levels of particulate matter. People with respiratory conditions such as asthma might experience breathing difficulties. Access to air purifiers and air-conditioners may not be available to low-income residents.

People working in outdoor occupations such as those in the construction industry, military personnel and sports teachers will also have longer exposure to the haze.

The best protection is for everyone to monitor the air quality at haze.gov.sg and reduce time spent outdoors for non-essential work if the haze reaches hazardous levels. Workplace safety and health regulations can be tailored for each sector, with best practices recommended by the industry and relevant government agencies working in partnership.

The second-best protection, if essential work must continue outdoors, is to wear a mask. But while the Covid-19 pandemic has normalised mask-wearing, the use of a surgical mask is insufficient to protect ourselves from the worst effects of the haze. N95 or FFP2 masks, on the other hand, are designed to filter particulate matter more effectively from the haze.

Will Singapore have enough masks to tide us over if the air conditions take a turn for the worse? The Ministry of Health, fortunately, revealed in July that it is prepared to release a stockpile of N95 masks to pharmacies in a shortage. The inter-agency haze task force in Singapore also plans to work with the People's Association to distribute masks to low-income and vulnerable residents in the event of a severe haze episode.

The enduring solutions

Mitigation of fires over peatlands is undeniably the only long-term solution to stemming the health effects from the haze.

Punitive measures can help. Singapore's Transboundary Haze Pollution Act, with strong penalties for polluting companies based in Singapore, is one such instrument that can be used to push companies to be more diligent in monitoring and putting out fires in and around their land concessions.

Making businesses report on how their operations contribute to carbon emissions can guide investors to move away from pollutive industries contributing to deforestation and the haze. Although sustainability reporting is mandatory for Singapore Exchange-listed companies, more can be done to standardise reporting frameworks, with reference taken from global standards.

Pre-emptive moves to invest in the restoration of peatlands and reduce incentives for activities that contribute to the degradation of peatlands are better ways in which Singapore, as a global financial hub, can contribute to mitigate the haze.

Money sends a strong signal. This is where Singapore's development of a carbon market in the region connecting established carbon markets in the West and emerging markets in the region, and facilitating the flow of capital and carbon credits towards the restoration of peatlands and preservation of forests and peatlands, can be a game changer.

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Last, deepening research on the haze in South-east Asia is crucial for continued progress in understanding its root causes and socio-ecological effects. Raising awareness through science communication among Singaporeans will allow us to see how our consumer habits and investment decisions impact our environment and the region.

Research can also birth practical applications. Multi-disciplinary research at the Earth Observatory of Singapore, in mapping fires and monitoring air quality across regions in Singapore, can lead to useful research products that support national and regional policy decision-making on South-east Asia's haze.

- Assistant Professor Janice Lee and Associate Professor Steve Yim are principal investigators at the Earth Observatory of Singapore at Nanyang Technological University. Professor Benjamin Horton is director at the same centre.



In Your Opinion

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