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Climate adaptation has a new model, made in Singapore

The challenges lie in catalysing private sector involvement and securing public buy-in.

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Who should carry the responsibility of climate adaptation – from raising shorelines in response to rising sea levels to dealing with storm surges as weather patterns become erratic?

Across the world, governments typically shoulder this overwhelming burden. More than 90 per cent of global climate adaptation financing currently comes from national governments and development banks, according to the World Economic Forum.

Singapore is trying something different. The Coastal Protection and Other Amendments Bill passed on March 6 introduces a governance model that assigns responsibility for coastal protection not only to the Government, but also to private landowners along the shoreline.

In doing so, Singapore is charting a middle path between the highly centralised flood defence systems seen in countries such as the Netherlands and the more decentralised approaches used elsewhere.

If it works, the model could offer a pragmatic way for coastal cities to plan long-term and develop a sustainable approach to address the mounting costs of climate adaptation. But its success will depend on how effectively Singapore manages questions of cost-sharing, coordination and public awareness.

The stakes are considerable. Mean sea levels around Singapore are projected to rise by up to 1.15m by the end of the century. During extreme events combining storm surges and high tides, water levels could temporarily rise by as much as 5m.

Singapore has been preparing for this challenge for several years. In 2020, the Public Utilities Board (PUB) was designated the national coastal protection agency. From 2021, site-specific studies were conducted along different stretches of the coastline to assess risks and identify suitable protection measures.

In 2023, the Government announced the Long Island project to protect the East Coast while creating additional land for housing and recreation. The same year also saw the launch of the Coastal Protection and Flood Resilience Institute Singapore to strengthen research capabilities under PUB's $125 million Coastal Protection and Flood Management Research Programme.

A SHARED RESPONSIBILITY

The new law now establishes a legal framework for implementing these efforts. What makes Singapore's approach notable is how it distributes responsibility.

The Netherlands, widely regarded as the global benchmark for flood defence, operates a highly centralised system under the Delta Act of 2012. The Dutch government finances the Delta Programme through the Delta Fund, which is expected to provide €27.4 billion (S$40.3 billion) until 2050.

Japan represents a more decentralised model. Under its Coastal Law, the national government sets policy direction while prefectural governments take the lead in implementing and managing coastal protection infrastructure, with national subsidies covering a substantial share of the costs.

Singapore's model sits somewhere between these two approaches.

Under the new legislation, both the Government and landowners – including private businesses – are responsible for implementing coastal protection measures on their sites. About 30 per cent of Singapore's coastline is owned or leased by private entities.

From a fiscal perspective, this reflects the reality that coastal protection will require substantial investment over many decades. Relying entirely on public funds may prove increasingly difficult as climate risks intensify and governments face competing priorities. Sharing responsibility with private landowners may therefore provide not only a more sustainable funding model over the long term, but also reflects the reality that climate change requires all of us to adapt and have skin in the game.

At the system level, the impacts are collective and often second-order in nature such as affecting insurance costs and rental prices. The co-sharing model makes sense as private landowners do gain from the reduced risk as a result of public expenditures for coastal protection while paying their share for the public good of resilience. In fact, the shared responsibility is arguably in the self-interest of the landowners as markets may accord valuation premiums to the protected properties.

COSTS, FAIRNESS AND PUBLIC BUY-IN

At the same time, the approach raises important questions about cost and fairness. Some landowners have expressed concerns about the financial burden of complying with the new requirements, particularly where lease tenures may complicate long-term investments. The Government has indicated that grants will be available to help defray certain costs, including flood-risk studies and infrastructure modifications, though details have yet to be announced.

Yet coastal protection should not be seen purely as a regulatory obligation. For businesses, investing in resilience can help reduce exposure to climate-related disruptions, safeguard assets and preserve property values.

Even so, implementation will not be straightforward. Effective coastal protection depends on maintaining a continuous line of defence along the shoreline. If neighbouring landowners adopt inconsistent measures, gaps could emerge that undermine the effectiveness of the entire system.

The public, at large, must also become more aware of the stakes involved. Sea-level rise often feels like a distant threat compared with more immediate impacts of climate change such as rising temperatures.

Singapore has also been fortunate not to experience catastrophic coastal disasters such as the 1953 North Sea flood, which killed more than 1,800 people in the Netherlands and ultimately led to the creation of the Dutch Delta Programme.

To address the implementation risks, the new law gives PUB enforcement powers to ensure compliance and maintain a continuous line of defence. Landowners who fail to meet requirements may face penalties.

Still, laws alone will not keep rising seas at bay. Ultimately, Singapore's coastal protection strategy will depend on effective coordination between government and private stakeholders, robust regulatory oversight and a broader understanding among the public of the risks that loom.

Coastal protection is not merely an engineering challenge. It is a long-term test of whether governments, businesses and communities can work together to confront one of the defining challenges of climate change.

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Mean sea levels around Singapore are projected to rise by up to 1.15m by the end of the century. During extreme events combining storm surges and high tides, water levels could temporarily rise by as much as 5m. ST PHOTO: LIM YAOHUI