

New research institute to help Singapore tackle rising sea levels

It will build expertise in coastal protection, flood management amid climate change

Cheryl Tan

A new research institute dedicated to building local expertise in coastal protection and flood management was launched on Thursday to help Singapore cope with rising sea levels arising from climate change.

Mean sea levels are expected to rise by 1m by 2100, and could jump by 4m or 5m when sinking land, storm surges (abnormally high tide due to a storm) and daily tidal activity are taken into consideration. Around 30 per cent of Singapore's land area is less than 5m above mean sea level.

The new Coastal Protection and Flood Resilience Institute (CFI) Singapore was launched by national water agency PUB and the National University of Singapore (NUS). It will bring together expertise from various local universities, research institutes and industry players to create innovative coastal protection solutions.

Speaking at a dialogue at the launch at NUS, Minister for Sustainability and the Environment Grace Fu noted that there are a lot of uncertainties in measuring the impact of climate change on Singapore.

"So, we have to look at this in a very dynamic way... if we do this too early, (and end up) protecting us too much, you waste a lot of resources. But if you made it too late, too little, you are not going to be in time," said Ms Fu.

"Similarly, if you build the coastal protection solution too low,

then you will find that, several generations later, you will need to enhance it," she added.

PUB chief executive Goh Si Hou said the CFI is the heart of PUB's \$125 million Coastal Protection and Flood Management Research Programme, and it will serve as the focal point to anchor and grow a collaborative research ecosystem in coastal protection.

This comes amid ongoing islandwide site-specific studies to determine the most suitable coastal protection measures for each of the eight different segments of coastlines.

CFI Singapore has begun its work with nine research projects in four areas – coastal science research; monitoring, prediction and digitalisation of the coastal environment; innovative engineering solutions; and integrated nature-based solutions.

For example, one project will test the efficacy of hybrid nature-

based solutions for coastal protection, such as perched beaches with seagrass meadows, and mangroves with rock revetments. Another project will focus on using modular solutions to enhance existing coastal protection infrastructure.

Each project will involve an expert as the principal investigator, and will be supported by several collaborators drawn from local and foreign universities, as well as industry players.

The centre will also look into the suitable conditions for mangroves, seagrasses and corals to grow – especially in a hybrid configuration – and their survivability under various climate change scenarios.

Ms Hazel Khoo, director of PUB's coastal protection department, said: "We are a low-lying island with a high population density and limited land. With many competing land uses, our coastal areas are precious to us.

"Our goal is to ensure our coastlines are not only well-protected, but can bring multi-functional value for Singapore."

The different coastal protection solutions will be implemented at each of the coastlines progressively, starting with the City-East Coast, which already has some natural coastal features.

Other areas include the Changi aviation hub, the recreational space at East Coast Park and the Greater Southern Waterfront, said Ms Khoo.

Focus group discussions will be held in October where members of the public can share their feedback on some shortlisted coastal protection solutions.

These could potentially include hybrid solutions integrating seawalls and revetments with natural ecosystems like mangroves, barges, and even land reclamation bolstered with sea bunds to double as a coastal protection measure.

Ms Khoo said that PUB will be sharing with the public the trade-offs of these solutions, and their potential impact on the environment.

Explaining how the CFI and the larger Coastal Protection and Flood Management Research Programme will work in tandem with the nationwide site-specific studies, Ms Khoo said that some of the solutions developed by the CFI could first be tested in the laboratory, or as part of a small-scale pilot before being implemented along the coastlines.

A living lab will also be included under the research programme, which will accelerate the adoption of coastal solutions by providing test-bedding sites.

Studies for the City-East Coast began in 2021, and are expected to be completed by 2025.

Suitable coastal adaptation measures for the area could then be implemented around 2030, she added.

The centre and its partner institutes – which include the Nanyang Technological University (NTU), the Singapore University of Technology and Design, the Singapore Institute of Technology, and the Agency for Science, Technology and Research – also aim to attract talent, create new research jobs and train PhD students.

For instance, NTU will be offering an undergraduate specialisation in coastal protection, and NUS will be offering a graduate certification programme in coastal protection and flood management.



Minister for Sustainability and the Environment Grace Fu viewing exhibits at the launch of the Coastal Protection and Flood Resilience Institute Singapore on Thursday.
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