

Annex A: Tranche 2 research projects awarded under CFI Singapore

Coastal Science Research

Project title	Summary
1. Model development and quantifications of coupled near-shore processes impacted by climate change	The project will quantify the interaction and impacts of major coastal process on sediment movement and shorelines through numerical models, which factor in climate change. This would provide critical planning parameters for the design of coastal protection structures.
2. Enhancements in the predictions of sediment transport around Singapore coastal waters	This project will monitor the sediment distribution in Singapore's coastal waters, using a cost-effective method. Data collected will be used to perform advanced simulation and to assess sediment movement during extreme events due to climate change and sea level rise.

Monitoring, Prediction and Digitalisation of Coastal Environment

Project title	Summary
1. Network of experimental catchments for understanding runoff formation and flood risk	A network of experimental catchments will be built to understand how water flows in tropical urbanised catchments. Data collected will help to build better models to predict flood, and design better flood-retention solution, so Singapore remains safe in changing climate.

Innovative Engineering Solutions

Project title	Summary
1. Smart and multifunctional floating structures for coastal protection and flood control	Project will develop anchored floating breakwaters that allow for the floating breakwaters to be incrementally raised based on the rising sea level. The breakwaters can be equipped with green harvesting technology, tapping on wave and tidal energy. The research may provide a flexible and adaptive alternative to protect the Southern Islands and Jurong Islands against climate change and sea level rise.
2. Eco-cement enhanced methods for beach erosion control and beach land restoration	Project provides an eco-friendly and sustainable alternative to existing soft engineering solutions, which currently require intensive engineering work. Eco-cement, made of industrial waste and carbon dioxide, and jute

through soil accumulation	fabric will be used to construct jute tubes that can be deployed at beaches to protect the shoreline from erosion, and restore beaches through soil accumulation.
---------------------------	---

Integrated Nature-based Solutions (3)

Project title	Summary
1. An Integrated Coastal Ecosystem Model (ICEM) to assess the environmental impacts of anthropogenic activities and climate change on hybrid solutions	Project will help to understand interactions between mangroves, seagrass, and grey infrastructure, to determine an optimal balance of green and grey components in hybrid solution, and provide a water quality guideline and Integrated Coastal Ecosystem Model for hybrid solutions.
2. Promoting hybrid solution resilience by optimising hydrodynamical and structural influences on coral larval attachment to reefs and sediment clustering amid seagrass	Interactions between water flow, corals, seagrass, and structures will be investigated to optimise coastal protection structures for coral attachment and increase the viability of seagrass. Engineering parameters obtained from investigations can be used to enhance the efficacy and survivability of future hybrid solutions.
3. Maximising the beneficial environmental effects of tropical hybrid shorelines - (MaxBETH)	The project will investigate the challenges and benefits of scaling up hybrid shoreline solutions, and characterise the ecological function required for hybrid shorelines.