

Life with and within the tides: A look into Singapore's climate plans for the future



High tide at East Coast Park Area B at 11.31am on Jan 12, causing seawater to overflow the banks of a drain. ST PHOTO: LIM YAOHUI

At dawn over the Singapore Strait, Mrs Teng, a first-generation Singaporean, stands on the urbanised remnants of her sea-side village. The once gentle waves along the far East Coast have given way to an ominous roar as the sea encroaches. Childhood memories of laughter on the now submerged beaches linger in her mind. This poignant tale underscores the pressing need for holistic measures to combat rising sea levels before we turn into a 21st century Atlantis.

Countries across the world are facing this impending crisis. According to a UN-IPCC study, low-lying island nations, such as the Maldives, Nauru and Tuvalu, have been identified as possibly uninhabitable by 2100 due to climate change [1]. This precipitates complex conundrums that range from the management of mass climate migrations to legal challenges for statehood that may arise under the 1933 Montevideo Convention on the Rights and Duties of a state [2] due to the absence of a defined territory.

Long Island Plan



An artist's impression of the view across the new reservoir from the Long Island, which comprises three land tracts. PHOTO: URBAN REDEVELOPMENT AUTHORITY

Rising sea levels pose an international challenge, and Singapore anticipates a rise of approximately 1.15 metres by 2100, according to Singapore's third National Climate Change Study [3]. This section explores a preemptive response of Singapore—the Long Island Plan, which has controversial impacts on marine ecosystems.

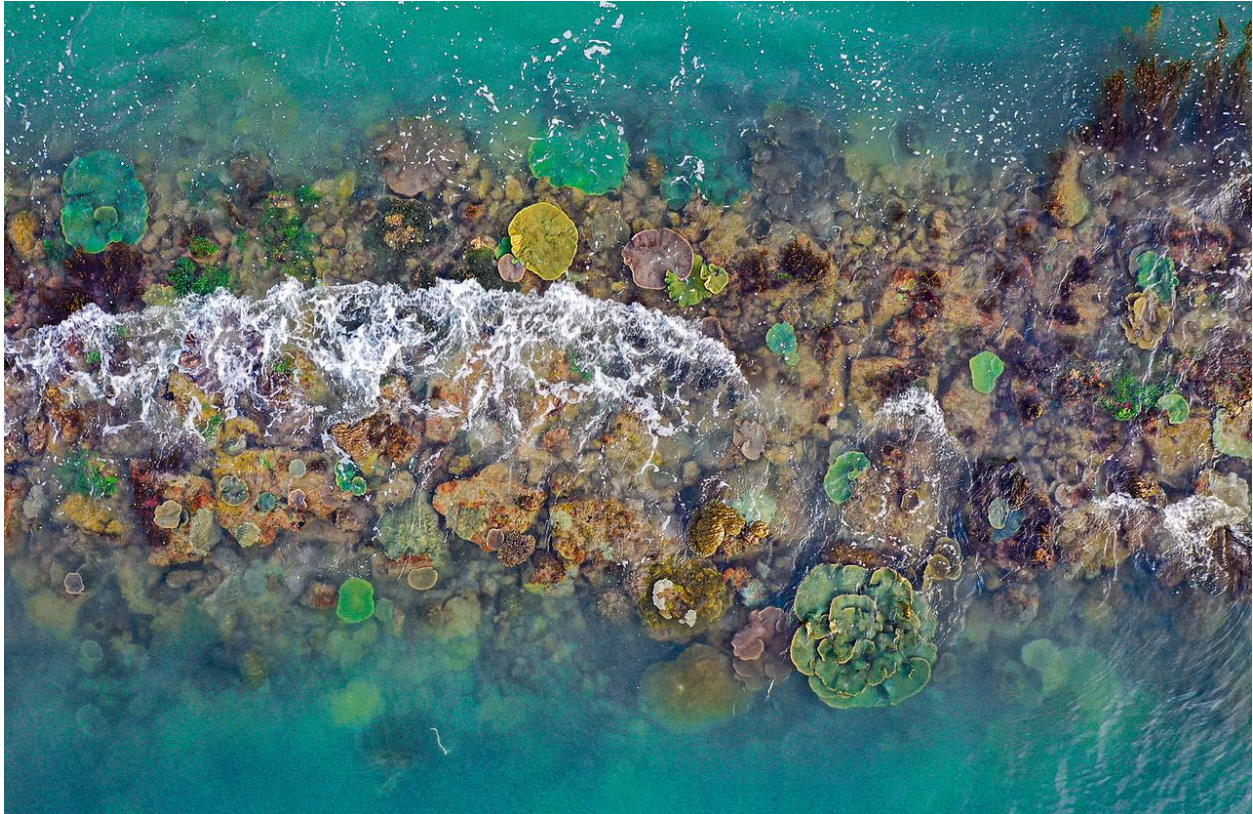
According to the URA, the Singapore Long Island Plan endeavours to reclaim roughly 800 hectares of elevated land [4] to “form a continuous line of defence along the coast for protection against rising sea levels”[5]. The initiative also comprises the construction of tidal gates and pumping stations [4] to complement our flood resilience. [1]

However, this will come at a heavy cost to marine life and ecosystems in the targeted areas [6]. Over 60% of coral reefs around Singapore have been lost over the past few decades due to such reclamation projects. [6]

According to Mr Muhammad Nasry, executive director of Singapore Youth Voices for Biodiversity, “sand dumping makes the water cloudy, which limits light penetration and can significantly impact the survival of organisms that depend on photosynthesis.” [4] Thus, there is a fallout on oceanic life.

Dr Daisuke Taira, a research fellow at the NUS Centre for Nature-based Climate Solutions, has expressed concerns that “the new shorelines may not necessarily support the original community of marine life” in an interview.

Importance of biodiversity



Corals growing on an artificial embayment along East Coast Park. PHOTO: NATHANIEL SOON

As we explore the environmental impact of Singapore’s response on aquatic life, it begs the question of whether marine life plays a sufficiently critical role for it to be worth protecting.

Worldwide, marine life is an important provider for human needs. Aquatic life supplies half of the oxygen humans breathe while [7] fishes serve as a source of protein for us. [8]

With seafood being one of the most commonly consumed foods in Singapore, where each person consumes an average of 22 kg of seafood annually [8], the importance of marine biodiversity in Singapore is highlighted.

Moreover, the presence of marine biodiversity presents many opportunities for the healthcare sector. For example, ecteinascidin, extracted from an aquatic animal called tunicates, has been tested for cancer treatment. [9] Ecteinascidin-743, known as Trabectedin was approved by the

Food and Drug Administration and is being utilised as an antitumor chemotherapy medication for ovarian cancer treatments. [10]

Mr Sivasothi, senior lecturer in the NUS Department of biological sciences stated that “for Singapore, marine biodiversity gives a cultural identity and expands recreational options”.

He added that the importance of marine life is not in its economic value, but rather the intrinsic unique identity it provides to the area around.

The government has adeptly perceived this attraction people have to nature and accordingly integrated certain nature elements into living spaces.

Solutions

Some of these issues caused by the Long Island plan can be minimised by taking a “nature-first” approach as mentioned by Mr Stephen Beng, Chairman of the Friends of Marine Park initiative. [6] This approach encompasses the provision of required depths for mangroves and the enablement of natural accumulation of sediments along shorelines. [6]

On top of that, solutions such as coral relocation techniques and reef enhancement units can be used to restore marine habitats. [11]

Additionally, Singapore has looked to mangroves as a viable solution to the imminent issue of rising sea levels. In 2023, a 5,148 square metres planting area in the upcoming Bay East Garden was dedicated to planting mangroves. [12]

According to Dan Friess, founding member of IUCN Mangrove specialist group, mangroves are extremely effective at breaking waves. Mangroves also trap sediment, creating a wall that rises in height with the sea level. Thus they act as natural blockades that counter the increasing sea levels. [13]

Complementing mangroves with man-made barricades are being explored by Singapore as well.

Furthermore, mangroves provide a rich habitat for animals. [14]

As stated by Smithsonian Ocean, “mangroves are amongst the most productive and biologically complex ecosystems on Earth.” [15]

Home to a plethora of fish and crustaceans species, mangroves are crucial to the flourishing of aquatic ecosystems, serving as a nursing ground and source of nutrients for fishes vital to fisheries.

Notwithstanding the boons of mangroves, it is not the solution for every situation. As explained by Dr Taira, creating entirely new habitats for mangroves is not sensible, and instead emphasis should be placed on restoring or maintaining existing habitats. This is due to inefficiency and unlikelihood of survival of mangroves in new habitats. He points out that hybrid engineering,

integrating mangroves into seawalls is a possible approach albeit more research needs to be done to ensure the feasibility of such an approach.

Lastly, dialogues are also extremely important. In an interview, Mr Sivasothi mentioned that Singapore is small, so each space should have multiple uses. Through dialogue, governments have been able to connect with experts, citizens and various stakeholders to facilitate understanding and effective planning.

When combating the effects of climate change such as rising sea levels, countries should be wary of the possible ramifications on sea life and seek to develop solutions that allow ecosystems to thrive.

List of interviewees:

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