

Exactly Foundation – Residency #18 – *Singapore Surfacing* by Zak Zainal. November 2024, Singapore

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(essay in digital form: <http://www.exactlyfoundation.com/portfolio/residency-18-zak-zainal-november-2024/>)

Word from the ‘Wart’¹

17th May 2025

Getting one’s head around “the climate crisis” is not easy. Which aspect of the crisis are we talking about?

Most of us can say something about climate crisis: hot days/hottest year since YearXX, rainstorms and flooding, out-of-control forest fires, carbon emissions targets, carbon footprint of things we use, shockingly fast melting glaciers, bleached corals, mangrove loss, struggling alternative farming vertical and at sea. It’s endless.

(Good summary here *2024 wrapped: The biggest environment stories of the year, and what’s next*²)

Then there are the Singapore targets mostly by 2030: max +1.5 degree Celsius temperature, net zero carbon emissions, 30% locally produced food, 70% recycling target (now hovering in the 50s%), fleshing out the Long Island Plan at southeast Singapore. Then there are high octane efforts beyond us: COPxx (United Nations Conference of the Parties) now at 30, the infatigable Greta Thunberg, investment opportunity “worth US\$9 trillion (S\$11.7 trillion) by 2050 on flood protection and cooling systems to decarbonize or cut emissions”³. Mountains of content online.

Then there is new vocabulary, to name a few: biophilia, climate (in)justice, eco anxiety, carbon sinks, greenwashing, aquaculture, fish condominium, food sovereignty.

And ... yet ... I learned after hours of watching Netflix’s eight episodes of *Life on Our Planet* narrated by Morgan Freeman that there have been five mass extinctions in earth’s four-billion-year history. Mostly due to changes beyond our doing (since humans didn’t exist back then) such as shifts in magnetic fields, axis tilts, asteroid hit, earthquakes. The earth surface chilled or heated up beyond recognition and just about all life gets wiped out. Then somehow something has survived and from that, new life began again.

So disaster is going to happen anyway, right? Should we just go pure Taoist, respect the laws of nature and be done with it?

This project by Zak Zainal so appropriately titled *Singapore Surfacing* is Exactly’s effort to understand just one aspect of this climate crisis, relevant to Singapore: **rising sea levels**. And show how he as one resident in Singapore feels about it. Why bother with pumping out water, barricading ourselves, recycling more, growing food, fermenting food, shipping less, flying less

Let’s look at some recent basic information on Singapore’s project on rising sea levels:

The most visually stunning content I’ve found is this: *Climate Code Red. Saving Singapore’s Shores*. Straits Times January 2022. Compiled: IPCC AR6 Working Group I report, National Environment Agency, PUB, NParks, Singapore Land Authority, NTU’s Earth Observatory of Singapore. <https://www.straitstimes.com/multimedia/graphics/2022/01/singapore-protect-sea-levels-rise/index.html?shell>
(For more extensive reading, please refer to the brief bibliography below).

Basically here’s our Singapore rising sea levels problem and approach, compiled with a little help from ChatGPT:

- Approximately 30% of Singapore lies less than 5 meters above the mean sea level, making it particularly susceptible to flooding and coastal erosion.
- In the worst wet weather, we could be **below** sea level: by 2100, Singapore’s mean sea level is projected to rise by up to 1.15 meters. When combined with extreme weather events such as high tides and storm surges, sea levels could temporarily spike by an additional 4 to 5 meters.
- Government estimates the need to invest over S\$100 billion in coastal protection of Singapore in these next 100 years:
 - Land Reclamation Standards: taller build, raise minimum reclamation level from 3 to 4 meters
 - Polder alternative - drain out water to expose land, rather than fill sea with sand:
HDB is spearheading Singapore’s inaugural polder project at the north western Pulau Tekong, which aims to add 810 hectares of new land by constructing a 10-kilometer-long dike, standing about 6 meters above sea level, to enclose the area. Once enclosed, the seawater will be drained, creating land below sea level that is protected by the dike.
 - Coastal Protection Strategy: dikes or sea walls and stone embankments to cover about 70%-80% of the coastline, including the imposing Marina Barrage to pump out and keep out sea water.

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¹ ‘Wart is short for Stalwart, which Exactly Foundation’s first resident Kevin Lee suggested that for future residences, I should pen a statement as “Exactly Foundation Stalwart”. Thought “Stalwart” carried too much adult responsibility; ‘Wart will do.

² by Chin Hui Shan and Shabana Begum. *2024 wrapped: The biggest environment stories of the year, and what’s next*. Straits Times, 23 December 2024. https://www.straitstimes.com/singapore/2024-wrapped-the-biggest-environment-stories-of-the-year-and-whats-next?utm_source=emarsys&utm_medium=email&utm_campaign=ST_Newsletter_AM

³ Audrey Tan. *Climate adaptation solutions could offer \$11.7 trillion investment opportunity by 2050: GIC*. Straits Times, 2 May 2025. https://www.straitstimes.com/singapore/environment/climate-adaptation-solutions-could-offer-11-7-trillion-investment-opportunity-by-2050-gic?utm_source=emarsys&utm_medium=email&utm_campaign=ST_Newsletter_PM&utm_term=Climate+adaptation+solutions+could+offer+%2411.7+trillion+investment+opportunity+by+2050%3A+GIC&utm_content=02%2F05%2F2025

- R&D: In March 2024, a S\$125 million Coastal Protection and Flood Management Research Programme was launched. Including Coastal Protection and Flood Resilience Institute at NUS to develop solutions such as modular and nature-based floating structures to resist water and also to support infrastructure, housing, buildings.
- Flesh out the 'Long Island' Plan at Singapore's southeast coastline to protect low-lying shorelines and provide new waterfront living space.
'Long Island' offers an integrated solution ... (which) entails reclaiming about 800 hectares of land off the East Coast, potentially in the form of 'islands', to protect the low-lying area from sea level rise and strengthen Singapore's flood resilience, enhance our water resilience with a new reservoir, and create additional land to meet future development needs. The creation of 'Long Island' will also present new recreational opportunities by adding around 20 kilometres of new waterfront parks, part of a larger and continuous 120-kilometre-long stretch of accessible waterfront space along Singapore's southern coast. URA update: 'Long Island' <https://www.ura.gov.sg/corporate/planning/Master-Plan/Draft-Master-Plan-2025/Long-Island>.
- Arrest significant decline in biodiversity especially in coastal mangrove forests. In the 1820s, mangroves covered about 13% of the island's land area. Today, they occupy less than 0.5%, approximately 734.9 hectares (7.35 km²), mostly around Sungei Buloh Wetland Reserve and Pulau Tekong.
- Singapore still has plastic trashy beaches, with the biggest problem being plastic washup from elsewhere and plastic fishing nets/apparatus that fatally trap sea creatures. Curbs to limit single plastic use in Singapore are lukewarm: 5-10 cent charge for plastic bags; if needed, use recyclable disposable crockery; limit use of plastic straws. No ban yet on selling plastic bottled drinks or styrofoam takeaway food packaging. But we generate enough to empty an island to burn trash.
- Much reporting is seen about raising fish in seas near us and on land and also vegetable growing on vertical and private plots, investing in pig farms in Indonesia and China.
 - Fish condominium -- urbanized fish farming. We're not a farming community. Takes 6-7 months to harvest⁴
 - Grow food on water. *Project Castaway* Season 3 in CNA's *Growing Wild* series by Christopher Leow. *Season 1 introduced growing edibles and brought nature into personal spaces. Season 2 imagines how we cannot just grow food better, but should also safeguard the environment. Season 3 Project Castaway ... where for an entire year, Chris coaxes a whole new farming frontier - the ocean as a floating farm - to find self-sufficiency in food, energy and water.*⁵

At the helicopter level, Singapore's plan is to explore and execute using sophisticated technology: diked up, pump out water. Essentially barricade ourselves. There's also something we haven't talked about: climate refugees (Singapore doesn't have a track record of being hospitable despite most of us descending from sea-faring Asian immigrants). Additionally, as experienced during Covid, where are we going to get our food, with some 90% imported today?

A big question mark at the end of the last episode #8 of *Life on Our Planet*: firstly, this next extinction is undeniably from how humans live; secondly, we'll morph, we just don't know to what? Whatever happens happens, nature carries on.

*Humans are now causing the Earth's sixth mass extinction event. We are taking up almost all habitable land to feed ourselves, releasing carbon dioxide into the atmosphere and causing global warming, warming and acidifying the oceans and causing extreme weather events, all of which are being done at meteoric speed. However, humans are also the first species in the 4-billion-year-old story of life to understand what is happening to the world and understand what is needed to put it right. How we act now will determine the next chapter in the story of life. Freeman notes that no matter what future awaits the Earth, "life has always found a way ..."*⁶

Select Bibliography

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⁴ AsiaOne. *A fish farm in the heartlands. Future Food*. January 2025. <https://www.youtube.com/watch?v=I4c-z55Gnqw>

⁵ <https://www.channelnewsasia.com/watch/growing-wild/our-floating-future-5025296>

⁶ https://life-on-our-planet.fandom.com/wiki/Chapter_8:_Age_of_Ice_and_Fire