+65

A Journal by the Founders' Memorial on Singapore's Post-Independence History and Society

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Sustainability

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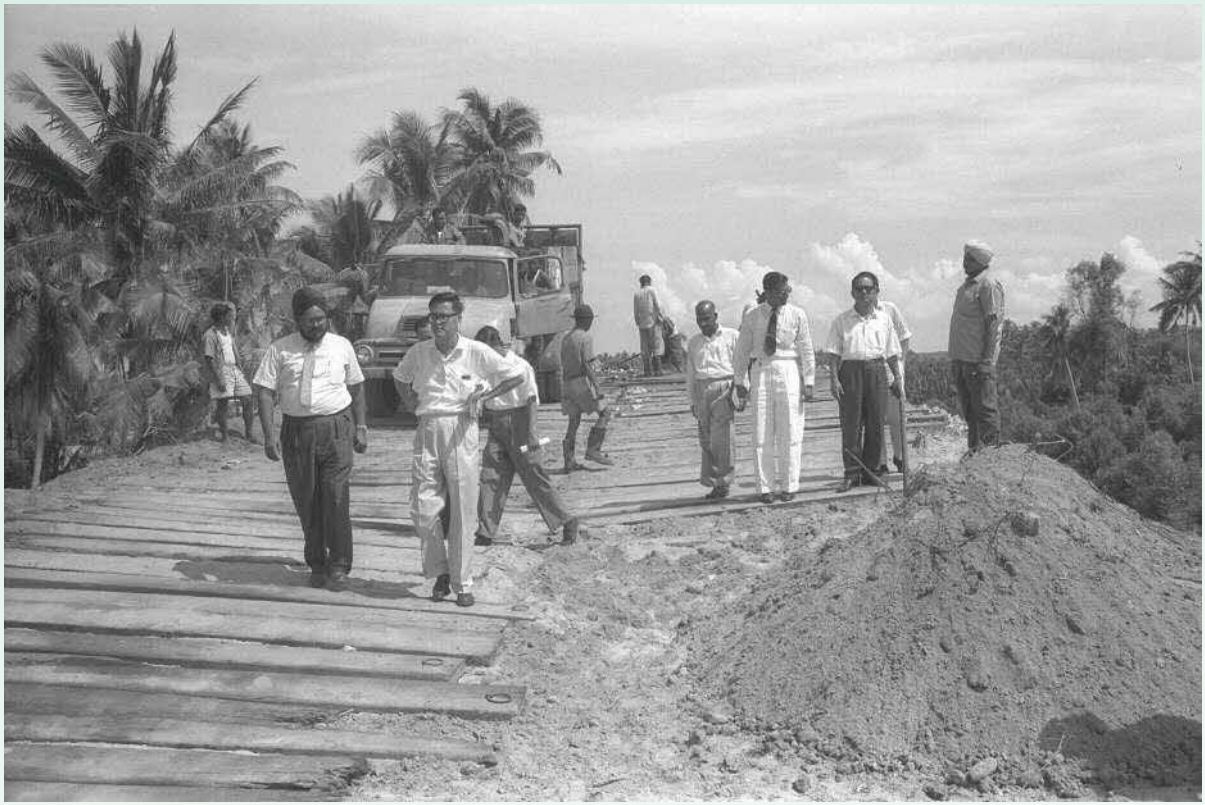
Foreword

"Singapore is now full of flies. There are many wild dogs and cows running about in the streets, and some of them have been occupying bus shelters as well. The situation looks very grave."

Such was the severity of the environmental and public health crisis facing Singapore in 1964, as expressed by then-Prime Minister Lee Kuan Yew in a speech to civil servants at the Victoria Theatre in November of that year.[1] In those turbulent years preceding independence, the dirt, grime, and squalor of our city presented a challenge which our first generation of post-colonial leaders confronted determinedly with broomsticks in hand. However, even as island-wide clean-ups proceeded apace, the terms "environment" and "sustainability" were rarely invoked, with the latter term in particular gaining traction only decades later.

Participants sweeping the road outside Jalan Besar Stadium, as part of a street cleaning campaign launched by Parliamentary Secretary for the Ministry of Social Affairs Chan Chee Seng, 1967. Ministry of Information and the Arts Collection, courtesy of the National Archives of Singapore.

[1] "Lee's pep talk", *The Straits Times*, 14 Nov 1964, 5; "Premier Lee hits Govt men for sag in standards", *The Straits Times*, 15 Nov 1964, 13; Ong Lian Teng, "Budget, Public Health Division", Budget, Legislative Assembly No. 3, Session 1, Vol. 23, Sitting No. 7, 16 Nov 1964.



Minister for Health Yong Nyuk Lin being briefed by health officials while inspecting a refuse disposal site during a visit to the Katong and Serangoon Health Offices, 1964. Ministry of Information and the Arts Collection, courtesy of the National Archives of Singapore.

Nevertheless, given how the term "sustainability" has captured current public imagination and become a present-day environmental buzzword, we have decided to use it as a theme and entry point for this second issue of *+65*. Indeed, looking back, it is remarkable that Singapore's founding leaders had taken on the challenge of forging a "middle way" between development and environmental protection well before "sustainability" came into vogue. This was not without its dilemmas. At times, promising but polluting foreign investments had to be turned away. Communities had to be resettled in the name of urban renewal as authors Choo Ruizhi and Adeline Chia remind us in their articles on the phasing out of pig farms and the cleaning-up of the Singapore River respectively. On a whole, for a land and natural

"We have built, we have progressed. But no other hallmark of success will be more distinctive than that of achieving our position as the cleanest and greenest city in Southeast Asia... Only a people proud of their community performance, feeling for the well-being of their fellow citizens, can keep up high personal and public standards of hygiene."

Prime Minister Lee Kuan Yew at the inauguration of the "Keep Singapore Clean" campaign on 1 Oct 1968[2]

[2] Lee Kuan Yew, Speech at the Inauguration of the "Keep Singapore Clean" Campaign, Singapore, 1 Oct 1968, National Archives of Singapore, Doc No. lky19681001.

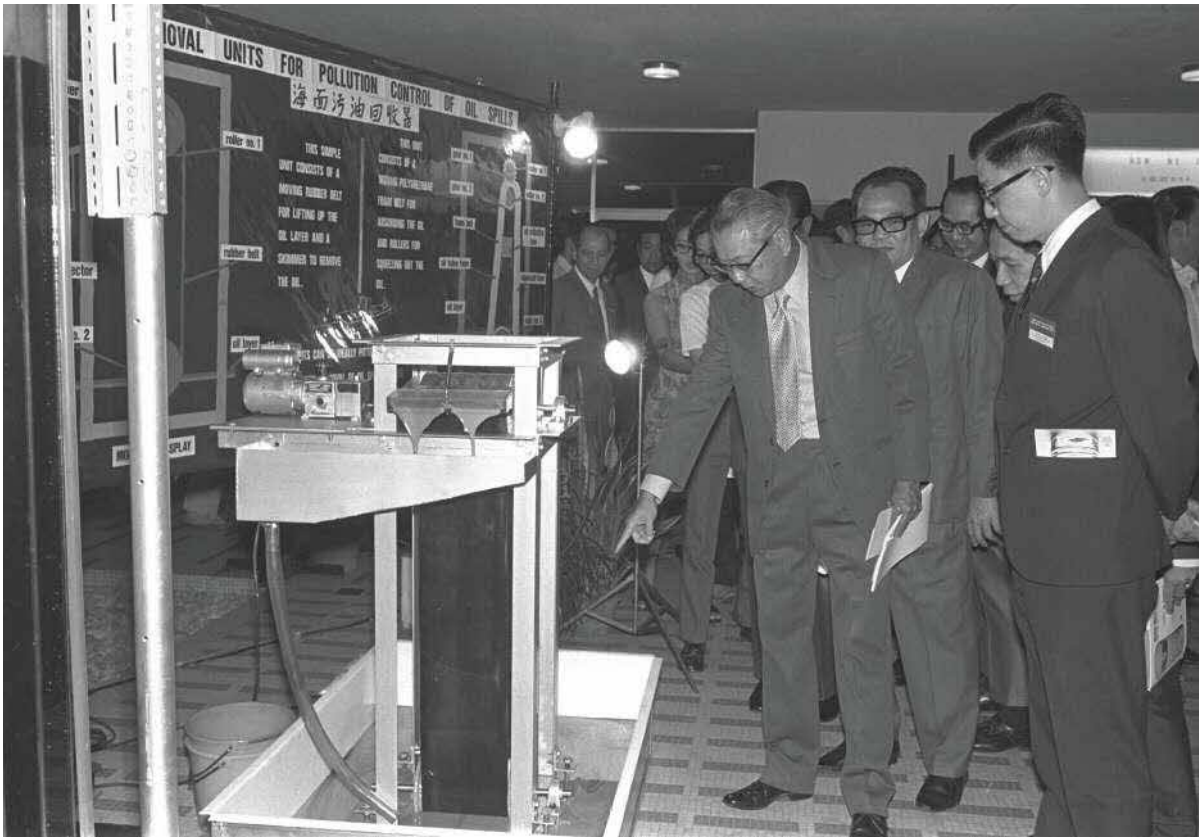
Minister for the Environment Dr Ahmad Mattar planting a sapling during a tree planting day event at Block 9 Jalan Rumah Tinggi, 1985. Ministry of Information and the Arts Collection, courtesy of the National Archives of Singapore.

resource-starved nation struggling to stand on its feet in the 1960s, such an approach to the environment required not only foresight and boldness of vision. It also required moral courage to make unpopular but necessary decisions after having considered each case on its own merits.

One can thus argue that perhaps Singapore's founding leaders had long been practising what are today considered the key tenets of sustainability, well before the term came into vogue. As a buzzword which gained popularity in the last decades of the 20th century in response to our planet's many ecological crises, "sustainability" emphasizes living with the earth's carrying capacity in mind, with a focus on growing and thriving without depleting and desecrating humankind's only home. Yet, in many respects, this notion of a delicate balance has long been embedded in Singapore's approach to the environment, given especially the limited resources afforded to us in our quest to create a liveable and pollution-free city state. As Professor Tommy Koh points out in this issue's main feature interview, by their frugality, thrift, and resourcefulness, our founding leaders had long exemplified what it means to live and act sustainably, both for themselves and for the nation.

The articles in this issue thus attempt to explore this remarkable phenomenon of a generation of leaders who, by actions and deeds, had long practised what is fashionable to environmental advocates today. Adopting a broadly chronological approach bookended by two feature interviews, it traces the many dilemmas and difficult decisions confronting our early leaders as they sought to both develop Singapore and clean it up. Collectively, the articles capture the diverse spheres—ranging from establishing a new Anti-Pollution Unit to reimagining waste management—in which change had to occur prior to Singapore becoming the City in Nature for which it is known today. As the pieces will demonstrate, change is not always unproblematic, nor is it always seen as desirable, particularly where the environment is concerned. In many respects, there is still much room to grow and improve, drawing on both the achievements of, and difficult lessons learnt by, our pioneers.

Insofar as this journal focusses on Singapore's post-independence history, it is the editorial committee's hope that the pieces shine a light not only on the path that has been trodden, but on the path that is to come as well. To this end, the concluding pages of this issue feature a set of contemporary and youth perspectives which collectively explore how the pioneering spirit of our founders may provide inspiration for the environmental challenges we face today. In fact, the choice of "sustainability" as this issue's theme was a direct product of our many conversations with youth readers, who felt that the



Minister for the Environment Lim Kim San viewing a pollution control unit designed for oil spills as part of the "Keep our Water Clean" exhibition at the Singapore Conference Hall, 1973. Ministry of Information and the Arts Collection, courtesy of the National Archives of Singapore.

topic should be meaningfully discussed and explored. Fittingly and somewhat incidentally, 2022 also marks half a century since the Ministry of Environment (the predecessor to today's Ministry of Sustainability and the Environment) was first established in 1972. As Singapore's first Minister for the Environment Lim Kim San once remarked, "all the economic successes that we may achieve would not be worth it if Singapore is polluted and unfit to live in."[3]

We hope you enjoy this read, and more importantly, are inspired to embark on a sustainability journey of your own.

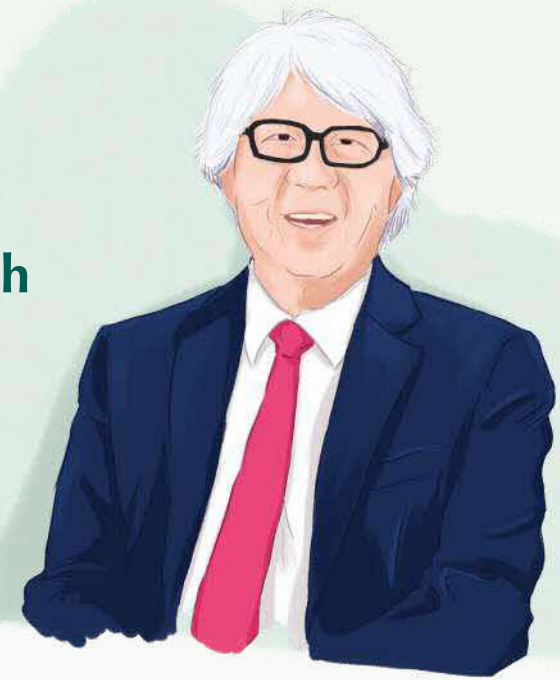
+65 Editorial Committee

+65 is presented by the Founders' Memorial, an institution of the National Heritage Board. The Founders' Memorial aims to commemorate how independent Singapore came to be, encourage reflection on its founding values, and inspire Singaporeans to commit themselves to contribute towards the nation's future. Opening in 2027, the Founders' Memorial will be an integrated gallery and gardens experience at Bay East Garden. The Memorial is currently at its design and content development stage, and the public can look forward to opportunities to contribute towards the Memorial's stories, experiences, and programmes in the coming years. More information on the Founders' Memorial is available at www.foundersmemorial.gov.sg. If you would like to be involved in future issues of +65, please contact us at Founders_Memorial@nhb.gov.sg.

[3] Lim Kim San, Speech at the Official Opening of the National Seminar on "Protection of the Marine Environment and Related Ecosystems", PUB Auditorium, Singapore, 26 Mar 1980, National Archives of Singapore, Doc No. 19800326_0001.

Finding the Middle Way between Development and Environmental Sustainability: An Interview with Professor Tommy Koh

by **Adeline Chia,** with **Brian Patrick Tan** and **Joshua Goh**



Singapore's ambassador-at-large and an eminent public figure, Professor Tommy Koh is a champion of environmental sustainability at home and abroad. Among his many contributions to the international sector is his work for the 1992 Earth Summit in Rio de Janeiro, for which he chaired both the Preparatory Committee and the Main Committee. The largest gathering of world leaders as of 1992, with 116 heads of state and government attending, the landmark conference helped to draft several important documents. One of these was the Rio Declaration, which laid down 27 broad, non-binding principles for environmentally sound development. In 2006, for his work championing international cooperation on the environment, Prof Koh was named one of seven "Champions of the Earth" by the UN Environment Programme.

Locally, Prof Koh is Co-Chairman of the National University of Singapore (NUS) Faculty of Law's Asia-Pacific Centre for Environmental Law, and Chairman of the NUS School of Design and Environment's Master of Science in Environmental Management Advisory Committee. Since 1990, he has been the Patron of Nature Society (Singapore). He is also Co-Chairman of the Asian Development Bank's Advisory Committee on Water and Sanitation, and founding Chairman of the Asia-Pacific Water Forum.

Over the years, Prof Koh has been a keen observer of the changes in environmental policies that have taken place in Singapore. In this interview, he shares his views with *+65* on Singapore's sustainability journey and some personal anecdotes and observations from his diplomatic experiences.

The Singapore delegation at the Earth Summit in Rio de Janeiro with Prof Koh (front row, centre) and then-Minister for Environment Dr Ahmad Mattar (front row, second from left), 1992. Courtesy of Tommy Koh.

Prof Koh (third from left) receiving the inaugural President's Award for the Environment from President S. R. Nathan, with other recipients including Dr Geh Min (second from left), 2006. Courtesy of Tommy Koh.

How has Singapore played a leadership role in environmental issues in the region?

Post-independence, unlike most developing countries, we did not follow the dominant view that we should grow first then clean up the environment later. We wanted to industrialise without polluting our environment. I remember in the 1980s, at a conference in Taipei, the Taiwanese premier Hau Pei-tsun confessed publicly that one of his regrets was that he followed the orthodoxy of, "Let's grow first and clean up the environment later." As a result, environmentally Taiwan was not in a good place then.

Has Singapore's own approach towards environmental sustainability changed throughout the years?

Due to our limited size, Singapore was a laboratory of the tension between the logic of the environment and the logic of development. Because of the enlightened view of our founding leaders, we were able to balance these two competing interests. In the early years, the economic logic dominated. In the beginning, desperate for foreign investment, Lee Kuan Yew asked himself, "How can I differentiate Singapore from other cities in Asia?" He decided to make Singapore clean and green. He believed that this would impress foreign investors. Later, he set up the Anti-Pollution Unit in the Prime Minister's Office.

Prof Koh (extreme right) chairing a UNCED meeting with UN Secretary-General Javier Perez de Cuellar (centre) and UNCED Secretary-General Maurice Strong (extreme left), 1991. Courtesy of Tommy Koh.

Prof Koh (first row, third from left) chairing UNCED Preparatory Committee IV in New York, with UN Secretary-General Boutros Boutros-Ghali on his right, 1992. Courtesy of Tommy Koh.

If the Unit opposed any investment proposal, it would be rejected. His ambition was to make Singapore a liveable city.

But things evolved. When the economy took off, the leaders were no longer so focused on just one agenda, which was to bring in investment and create jobs. They realised that they had to pay more attention to the environment. The economic logic evolved and became an environmental logic. So we've gone from a Garden City, to a City in a Garden, and more recently, to a City in Nature. This is a progression that has taken place over the last 50-plus years.

What do you count as your most significant activities at the international level in the environmental field?

Helping the 1992 Earth Summit to succeed was a major achievement. It had a double focus: it was the United Nations Conference on Environment and Development (UNCED). It addressed, once and for all, the tension between environment and development and sought a middle way.

The negotiations in Rio during the two weeks were tough. I set up eight negotiating groups and I appointed good people from different countries to chair them. I was determined to succeed. It was down to the wire on the last day, so we worked through the night and concluded at 6 AM the next morning. We solved one item after another, removed one set of disputed language after another and managed to achieve consensus.

You mentioned the tension between economic growth and environmental protection. As Patron of Nature Society (Singapore), what has been your experience negotiating such conversations between civil society and government?

Prof Koh (third from right) with Dr Geh Min (fourth from right, in back row) and other members of Nature Society (Singapore)'s Butterfly & Insect Group at the launch of the Butterfly Trail at Orchard, 2010. Courtesy of Gan Cheong Weei, Nature Society (Singapore).

Top: The Singapore delegation to UNCED Preparatory Committee I in Nairobi on a safari in Masai Mara, Kenya, 1991. Courtesy of Tommy Koh.

Bottom: Prof Koh (extreme right) chairing a UNCED meeting with UNCED Secretary-General Maurice Strong (centre) and Deputy Secretary-General Nitin Desai (extreme left), 1991. Courtesy of Tommy Koh.

It's the same dynamic at the international level played out at home. The relationship between civil society and government went through some rocky years. It was very tense, sometimes even hostile. Things changed because of three people: Tan Yong Soon, Permanent Secretary at the Ministry of Environment and Water Resources (2004–2009), Dr Tan Wee Kiat, Chief Executive at NParks (1990–2006), and Dr Geh Min, President of Nature Society (Singapore) (2000–2008).

It was fortuitous that they were in leadership positions in these three institutions at [around] the same time, and I saw this as an opportunity to change the paradigm. I hosted a lunch because I believe in makan diplomacy. I said, "We are working for the same cause, there is no reason for us to quarrel. We should listen to each other, try to work together, and where we disagree, to disagree but in a polite and respectful manner." Since then, the relationship has been quite collegial. We sometimes still disagree, but we are never angry or hostile.

At the 2019 National Day Rally, Prime Minister Lee Hsien Loong addressed climate change and said that "everything must bend at the knee" to confront the issue. What are some of your observations about how Singapore's climate strategy has evolved over the years?

I'll tell you a story about Rio and my experience when I came home. I went to the Ministry of Finance and told them that there was an opportunity for Singapore to be a thought leader in solar energy. I believed there would be a stronger movement to reduce our dependence on fossil fuel and to go for clean and renewable energy instead. They told me, "No, don't recommend this stuff." At that time, they were right. In the 1990s, the economics did not favour solar. It was too expensive and oil and gas were cheaper.

Climate change wasn't an issue in the 1960s, 1970s, and 1980s. At the 1992 Earth Summit, we adopted the UN Framework Convention on Climate Change. All subsequent meetings and negotiations were held within the framework of this convention. Over time, we all realised that global warming and climate change are realities. We also realised that both are caused by humankind's activities. Because climate change causes the sea level to rise, this poses an existential threat to the survival and security of Singapore. I agree with PM Lee's statement.

Are there any areas which you feel we could still catch up on?

I'm super excited by the new Singapore Green Plan 2030. It is spearheaded by five ministries. This is historic. It means that we are serious and that there is unanimity in government that climate change is an existential threat, but it also offers us new opportunities in green finance, green technology, green business and so on.

This time we must not be late. We must be a first mover.

There is a natural rhythm in life. When you start out, you are daring as you have nothing to lose. As you become successful, you become less courageous because the stakes are higher. But you need to replenish and refresh yourself constantly so that you don't become so conservative that you miss the opportunities.

What sustainable practices from the past do you think should be brought back?

The pioneering generation of leaders were thrifty to a fault. They didn't waste. Now we are a typical American consumer society. The pioneering generation also recycled a lot. Now the young are a throw away society.

I'll give an idea of how our founding fathers actually behaved. In 1968, Lee Kuan Yew decided that he needed to know America better, because he was educated in the United Kingdom. He decided to spend a sabbatical in Harvard University and became a fellow at Eliot House. Before he went to Boston, he came to New York and asked my advice on what to wear. I said, "You shouldn't wear a suit everyday. You could either wear a blazer or a tweed jacket, it would be less formal." He asked me to take him to a department store to buy a tweed jacket.

We went to Saks Fifth Avenue and chose a tweed jacket. It cost US$50. He said it was too expensive. I said, "Well, these are New York prices."

He wore this during his Harvard stay and during his Yale sabbatical. Years later, at a dinner, I asked him, "Do you remember the jacket you bought at Saks in New York?" He said, "Yes, I passed it on to my children." This is the kind of thrift we lost, unfortunately. We have become a consumerist and throw-away society.

Do you have any favourite green spaces in Singapore?

My wife and I love the Botanic Gardens. We walk there several mornings a week. But we go at an unearthly hour, before six. My wife wakes me at five every morning.

Personally, I love the Bukit Timah Nature Reserve and Sungei Buloh Wetland Reserve.

What is your message to the youth of today on sustainability?

First, we should honour our heritage. From the beginning of independent Singapore, our leaders wanted to have both development and environmental protection. This is a precious heritage that we must preserve.

Second, we must never lose the pioneering spirit of our founding fathers. They were willing to take risks and venture into places other countries have not gone to.

Third, the future is very bright for Singapore. We can really take advantage of the many opportunities that the green economy offers the world.

Prof Koh (centre) planting a tree at the Singapore Botanic Garden's Learning Forest, with Director Nigel Taylor (back row, concealed), Deputy Director Lawrence Leong (extreme right), and Evelyn Lum (extreme left), wife of Nature Society (Singapore) President Shawn Lum, 2016. Courtesy of Tommy Koh.

Adeline Chia is an independent writer-editor in Singapore, covering art, culture and politics. She is also Reviews Editor of *ArtReview Asia*.

Brian Patrick Tan is Senior Assistant Director (Curatorial and Engagement) at the Founders' Memorial.

Joshua Goh is Assistant Manager (Curatorial and Engagement) at the Founders' Memorial.

Living with Nature: Lessons from the Orang Seletar

by **Ilya Katrinnada**

The late morning currents are in my favour as I steer my paddleboard towards Sungei Simpang, a river on Singapore's northern coast. I had started out from the sandy beaches of Sembawang Park, and Sungei Simpang offers a drastically different scenery. Its banks are lined by mangrove swamps with a biologically diverse ecosystem. A heron, a kingfisher, two wild dogs, several jellyfish, and countless crabs are some of the animals I encounter. Born and raised in post-independence Singapore's concrete jungle, I am unaccustomed to the sights, sounds and smells that make up this lush and verdant intertidal zone. It is at this point that I muse: how I wish that I possess the wisdom of the Orang Seletar, who once inhabited these waters.

For centuries, the Orang Seletar have called the Tebrau Strait—the thin maritime boundary that separates mainland Singapore and Peninsular Malaysia—their home.[1] As seafaring nomads, they once roamed the rivers and wetlands of both Singapore's northern shore and present-day Malaysia's southern coastline. Indeed, they are one of several indigenous Orang Laut (meaning 'sea people' in Malay) communities which trace their roots to Singapore's pre-colonial lands and waters, with each possessing a distinct culture and territorial occupancy. These communities include the Orang Gelam, who lived along the Singapore River, and the Orang Biduanda Kallang at the Kallang River. When Stamford Raffles landed in Singapore in 1819, he noted that the Orang Laut made up the bulk of the island's 1,000 inhabitants. This included 200 Orang Seletar.[2]

Sungei Simpang with wooden house in background, 1981. Lee Kip Lin Collection, courtesy of the National Library Board, Singapore.

[1] The Tebrau Strait is more commonly known as the Johor Strait. In the Orang Seletar language, *tebrau* refers to a big fish.
[2] Constance Mary Turnbull, *A History of Modern Singapore, 1819–2005* (Singapore, NUS Press, 2009), 25.

Like many indigenous communities around the world, the Orang Seletar possess a symbiotic relationship with the natural environment. For generations, they lived in mangrove forests and riverine zones, allowing them to acquire a robust system of knowledge about wild animals and plants, which provided them with crucial resources for their daily needs. They foraged for food such as tubers and wild yams, used handmade spears to catch fish, and hunted for wild pigs with the help of dogs.[3] In the mangrove estuaries, they sourced for wood from tall timber-producing trees such as *meranti* and *seraya* to build their *pau kajang*, or houseboats. Designed with thatched roofs made of *mengkuang* (pandan) leaves, these boats were mobile homes in which Orang Seletar slept, cooked, played, and travelled.[4] They were also experts in medicinal plants.

Between 2018 and 2019, I interviewed several members of the Orang Seletar community currently living in Johor Bahru as part of an oral history project. Letih, a community elder, told me that they still apply ground *nyirih* (a species of mangrove in the mahogany family) to the umbilical cord of newborns as a natural antiseptic, allowing the stump to fall off within three days.[5] Interestingly, despite

Eugen von Ransonnet, *Straits of Johor and Singapore*, 1869. Collection of the National Museum of Singapore, National Heritage Board.

Aerial view of Seletar Island with Sungei Khatib Bongsu in background, 1947. Aerial photographs by the British Royal Air Force between 1940 to 1970s, from a collection held by the National Archives of Singapore. Crown copyright.

Pandanus, 1803-1818. William Farquhar Collection of Natural History Drawings. Gift of Mr G. K. Goh. Collection of the National Museum of Singapore, National Heritage Board.

[3] Clifford Sather, *The Orang Laut* (Penang: Malaysian Academy of Social Sciences in cooperation with Universiti Sains Malaysia and Royal Netherlands Government, 1999), 9–10.

[4] Amir Ahmad and Hamid Mohd Isa, *"The Influence of Environmental Adaptation on Orang Seletar Cultures", 7th International Seminar on Ecology, Human Habitat, and Environmental Change in the Malay World* (2014): 176.

[5] Letih, interview by Ilya Katrinnada, 9 Jul 2018.

Top: A group of Orang Seletar aboard their *pau kajang* at Seletar Island, 1950s. The man in the middle, Pak Ketuak Buruk, was the group's headman, whom they called Pak Ketuak. Dr Ivan Polunin Collection, courtesy of the National Archives of Singapore.

Middle: Mah (centre), the wife of Pak Ketuak Buruk, with her children on a *pau kajang* at Seletar Island, 1950s. The boy seated on her right is now the headman of one of the Orang Seletar villages in Johor Bahru. Dr Ivan Polunin Collection, courtesy of the National Archives of Singapore.

Bottom: An Orang Seletar from a village in Johor holding onto a fish he had just caught using a spear, 2019. Courtesy of Jefree Bin Salim.

having been practised by generations of Orang Seletar, this method is not viewed favourably by hospitals today. Letih said, "Nurse[s] [will] get angry. When we see the nurse coming, we will wash off the *nyirih*. We will clean it up. When the nurse walks away, we will apply it again [on the stump]."[6] This anecdote gives us food for thought about how indigenous knowledge is perceived in present-day medical settings.

While the Orang Seletar continue to depend on the environment for their survival, they remain conscious about not exploiting it. From my interactions with them, I have observed that their reverential attitude towards nature stems partly from the belief that spirits inhabit the natural world. To appease these unseen beings, they take precautions against extracting more resources than needed, opting to live within nature's bounds. For instance, even today, they will let go of animals caught if they do not intend to eat them. During another interview, Jefree, who is an Orang Seletar fisherman, tour guide, and photographer, said, "A fisherman will not kill a dolphin using his spear if he does not want to eat it. He will let it go. Following the Orang Seletar tradition, he will let go of the dolphin so that it will bless him [with bountiful catches]."[7] Their way of living is thus a truly sustainable one, in which nature, rather than human beings, dictates everyday rhythms of growth and decline. Nature, here, is not a force to be wrestled with, but a precarious equilibrium of which man is but one part.[8]

Alongside many other communities whose lives were transformed by modern conceptions of statehood, the Orang Seletar found their nomadic lifestyle drastically altered in the 20th century. A major turning point was the separation of Singapore from Malaysia in 1965. With the establishment of borders between the two nations, the Orang Seletar were eventually no longer able to travel freely on their *pau kajang* across the Tebrau Strait. Interestingly, Orang Seletar who became Malaysian citizens were still given permission

[6] Letih, interview by Ilya Katrinnada.
[7] Jefree Bin Salim, interview by Ilya Katrinnada, 7 Sep 2018.
[8] For more insights on indigenous perspectives of the natural environment, see Robin Wall Kimmerer, *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teachings of Plants (Minneapolis: Milkweed Editions, 2015);* Harriet Kuhnlein, Bill Erasmus and Dina Spigelski, *Indigenous Peoples' Food Systems: The Many Dimensions of Culture, Diversity and Environment for Nutrition and Health* (Michigan: Food and Agriculture Organisation and Centre for Indige nous People's Nutrition and Environment, 2009); Thomas F. Thornton and Shonil A. Bhagwat, *The Routledge Handbook of Indigenous Environmental Knowledge* (New York: Routledge, 2020).

Several Orang Seletar hunting for wild boar in the mangroves of Sungei Melayu in Johor Bahru, 2019. Courtesy of Jefree Bin Salim.

The writer and her friend on a paddleboard expedition to the mangroves of Sungei Simpang, 2020. Courtesy of Outdoor & Adventure Learning Pte Ltd (OAALSG).

to cross the Strait until 1987.[9] However, all access ceased after the arrest of an Orang Seletar who was caught allegedly smuggling illegal goods.[10] Many Orang Seletar who still inhabit coastal villages in Johor now make a living by fishing and rearing mussels, though their catches have been dwindling in recent years due to environmental degradation. Their fibre boats provide them easy access to what is left of Johor's mangrove swamps, which remain untouched by land reclamation and urban development for now.

In Singapore, the Orang Seletar lived in various coastal settlements at the mouth of the Kranji and Kadut rivers and on Seletar Island during our early post-independence years. When these areas were slated for development, some moved up north to Johor. Others eventually assimilated into the local Malay community, leaving behind their seafaring and boat-dwelling lifestyle.[11] What remains are various toponyms which contain their namesake, such as Seletar Reservoir, Seletar Aerospace Park and Seletar River.

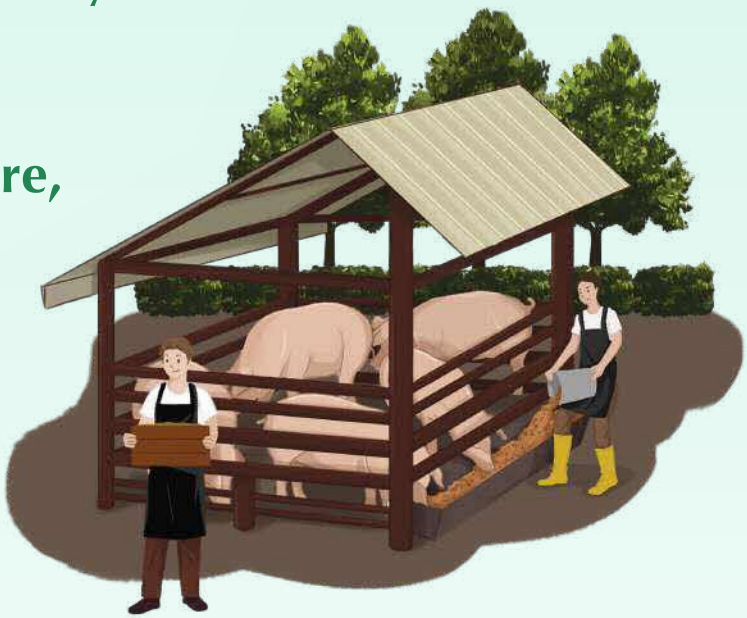
As I paddled away from the swamps of Sungei Simpang back to Sembawang Park, I caught sight of Seletar Island. This was one of the places where the Orang Seletar used to gather, docking their *pau kajang* side by side along the shores. I looked around me and saw other outdoor enthusiasts. Paddleboards, kayaks, and speedboats have replaced the sights of *pau kajang* that used to ply these waters. It is encouraging to observe urban dwellers still find ourselves wanting to be in nature. We may not be as intimately connected with the natural world as the Orang Seletar, but perhaps being regularly in touch with the waters that surround our island-nation could be a good start.

Ilya Katrinnada is an educator and writer with a keen interest in the intersections of creativity, community, and education. Between 2018 and 2019, she was part of a 3-woman independent research team which collected oral history interviews from the Orang Seletar community in Johor Bahru. These interviews were used in a verbatim play, *Tanah•Air 水•土: A Play In Two Parts*, which was presented by Drama Box in 2019 as part of the Singapore Bicentennial. She has also written about the history of the Orang Seletar in the Apr–Jun 2022 issue of *BiblioAsia*, a publication of the National Library of Singapore.

[9] Mariam Ali, "Singapore's Orang Seletar, Orang Kallang, and Orang Selat: The Last Settlements", in *Tribal Communities in the Malay World: Historical, Cultural and Social Perspectives* edited by Geoffrey Benjamin and Cynthia Chou (Singapore: ISEAS, 2002), 280.
[10] Personal communication with Jefree bin Salim, 24 Jul 2021.
[11] Ali, "Singapore's Orang Seletar", 278–80, 290.

Of Swine and Sustainability: Change, Choices, and Challenges of Pig Farming in Singapore, 1965–1984

by **Choo Ruizhi** of the
S. Rajaratnam School of International Studies (RSIS)



Chua Mia Tee, *Amah Shopping in Chinatown (Pork Stall)*, 1977. Oil on canvas, 78.5 x 79.4 cm. Gift of Times Publishing Limited. Collection of National Gallery Singapore.

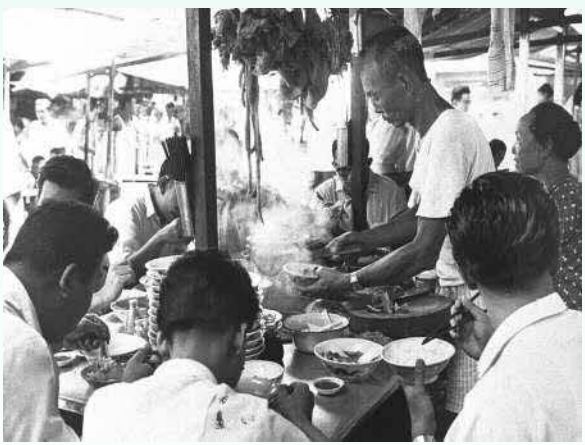
In *bak chor mee, babi pongteh*, and Korean barbecues. In restaurants, hawker centres, and *kopitiams*. In 2020 alone, Singapore consumed 123,625 tonnes of pork, making it the most popular red meat in the country.[1] Yet none of this pork was raised locally, because there have been no pig farms in Singapore since 1989.[2] The pork Singaporeans eat today comes either chilled, frozen, or fresh from over 20 different countries.[3]

Today, the only pigs left in Singapore are wild boars which roam the forested fringes of the island. Occasionally, these animals drift closer to human habitats, surfacing on social media and newspaper articles.

[1] Singapore Food Agency, "2020 Food Stats for SFA Website", https://www.sfa.gov.sg/docs/default-source/tools-and-resources/yearly-statistics/per-capita-consumption.pdf (accessed 2 Nov 2021).
[2] Ngiam Tong Tau, interview by Claire Yeo, Oral History Centre, National Archives of Singapore, Accession Number 003117, Reel 7, 4 Apr 2007.
[3] Singapore Food Agency, "Singapore Food Statistics 2021", https://www.sfa.gov.sg/docs/default-source/publication/sg-food-statistics/singapore-food-statistics-2021.pdf (accessed 29 Sep 2022).

Yet until as recently as the mid-1980s, over a million pigs were raised annually in farms across Singapore, producing almost all the pork Singaporeans consumed.[4] Evolving government policies, however, eventually determined that such self-sufficiency was not sustainable. The local pork industry, though tremendously efficient, came at the expense of other aspects of the country's development, and was thus gradually phased out.

Over the decades, Singapore's policymakers have had to balance the varying, sometimes conflicting demands of multiple stakeholders, so as to ensure that different aspects of Singapore's socioeconomic growth could be managed. The local pork industry was one such area in which disparate concerns about economic viability and environmental impact intertwined, resulting in policy changes that markedly transformed how Singaporeans obtained and consumed this protein. This short essay thus surveys how changing sustainability considerations since the 1960s affected pig farming in Singapore, leading ultimately to the imported pork Singaporeans consume today.



A street side hawker selling pork innards soup, 1965. Ministry of Culture Collection, courtesy of the National Archives of Singapore.

The 1960s: Food Self-sufficiency

As compared to the present, Singapore in 1965 resembled a different country. Sprawling expanses of farmland supported large rural communities, and pig farms dotted the banks of the Kranji and Kallang rivers.

To help meet Singapore's growing food needs, the then-Primary Production Department (PPD) set out to improve the efficiency of existing farms with better education and equipment.[5] Lectures and study trips were organised, while high-quality pig breeds and feedstock were provided to farmers.[6] In 1965, Singapore's first farm school was established in Sembawang.[7]

Taken together, these efforts saved the country "millions of dollars in foreign exchange" by minimising the need to purchase imported pork.[8] But changes were on the horizon. Competing national priorities meant that even efficient, small-scale farming could not be sustained in the long run.

The 1970s: Competing Priorities

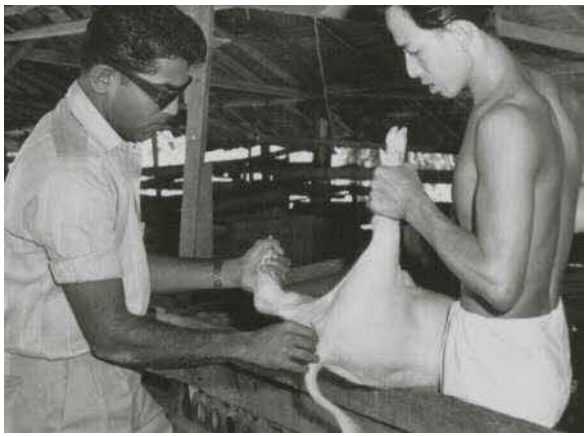
By the early 1970s, dramatic changes were occurring in Singapore's society, economy, and environment. In particular, Singapore's meteoric economic growth had begun generating tensions and trade-offs. Balanced against other national priorities, pig farming in Singapore had to be reorganised. Farmland shrank to make room for new factories, housing estates, and military training grounds.

Meanwhile, to improve Singapore's water security, large waterways like the Kranji River were dammed to create reservoirs. Large farms in water catchment areas such as Lim Chu Kang, Jurong, and Seletar were relocated to newly-created farming estates in

[4] Salma Khalik, "We are eating less fresh pork", *The Straits Times* [henceforth, *ST*], 14 Mar 1984, 17; Anonymous, "Farms will still rear 1.2m pigs a year", *ST*, 27 Feb 1981, 11.
[5] Elyssa Ludher and Thinesh Kumar s/o Paramasilvam, *Food and the City: Overcoming Challenges for Food Security* (Singapore: Centre for Liveable Cities, 2018), 13.
[6] Anonymous, "Classes for farmers on rearing livestock", *ST*, 15 Oct 1960, 4; Anonymous, "A 'pig and poultry' drive", *Singapore Free Press* [henceforth, *SFP*], 4 Nov 1960, 1.
[7] Anonymous, "Govt help for pig rearers", *ST*, 28 Jan 1964, 18; Anonymous, "Berkshire boars for farmers", *ST*, 26 Jul 1965, 6; Anonymous, "Young breeding boars offered to farmers", *ST*, 20 Mar 1967, 22.
[8] Anonymous, "From farmers and fisherman", *ST*, 30 Jul 1967, 12.

"We had about 6000 pigs before moving over here from Ang Mo Kio. But with various facilities provided to us, we have an additional 4000 pigs now, after only about half a year of resettlement."

Tan Hong Chuay, owner of 3.25–hectare farm with about 10,000 pigs, in a 1977 interview with *New Nation*[9]



Pig farms, 1960s. Ministry of Information and the Arts Collection, courtesy of the National Archives of Singapore.

Tampines, Punggol, and Jalan Kayu to prevent pig waste from contaminating new freshwater sources. Small-scale pig farmers were encouraged to raise less pollutive livestock, or to give up farming entirely.[10] The era of intensive farming had arrived.

Punggol Pork

One of the government's most ambitious experiments in intensive farming during this period was its development of the Punggol pig-farming district. Over 1,000 hectares of land was allocated to this venture. Electric cables and water pipes were laid, new roads were built, and government flats constructed to house resettled farmers.[11] The Punggol Pig Centre, a laboratory specialising in pig diseases and pig farm management, was also established in Jalan Serangoon Kechil.[12]

By 1977, the newly resettled pig farms in Punggol had considerably exceeded production targets despite the decrease in available farmland. The PPD declared Singapore "self-sufficient in pigs".[13] Intensifying pig farming with modern technologies had allowed for more efficient, sustainable use of resources. By September 1980, Singaporean farms were producing over 1.25 million pigs annually.[14] Despite these improved efficiencies, however, changes were soon afoot again. The 1980s would bring new choices and challenges.

"Does it make sense to spend some $80 million on waste treatment plants to achieve poor environmental standards? If pig farms have eventually to go, why prolong the agony?"

Dr Goh Keng Swee, in response to a question filed in Parliament in 1984[15]

[9] Anonymous, "'Big shift' for pig farmers cost the govt $9 million", New Nation, 17 Sep 1977, 2.
[10] Anonymous, "Pig breeders in two areas told to quit", *ST*, 21 Aug 1974, 9.
[11] Anonymous, "Big pig-farming project at Ponggol off to promising start", *ST*, 14 Mar 1976, 6.
[12] Ngiam, interview, Reel 3.
[13] Anonymous, "Intensive farming: Singapore is now self-sufficient in pigs and poultry", *ST*, 3 Oct 1977, 6.
[14] Anonymous, "Less land, but enough pigs, eggs", *New Nation*, 23 Sep 1980, 3.
[15] Goh Keng Swee, "Punggol Pig Farmers (Dispossession)", Oral Answers to Questions, Parliament No. 5, Session 1, Vol. 43, Sitting No. 6, 12 Mar 1984.

A pig farm at Punggol, 1970s. Collection of the National Museum of Singapore, National Heritage Board.

Minister without Portfolio Lim Chee Onn visiting a pig farm at Buangkok South Farmway, 1983. Ministry of Information and the Arts Collection, courtesy of the National Archives of Singapore.

The 1980s: The End of Singaporean Pork

Despite the local pork industry's high production output, policymakers by the early 1980s determined that pig farming was unsustainable when balanced against other aspects of national development.

In March 1984, Dr Goh Keng Swee, First Deputy Prime Minister, announced that all local pig farms would be progressively phased out. All of Singapore's pork would henceforth be imported.[16]

After "a major review of pig policy", the state had concluded that the extreme toxicity of pig waste, expensive waste treatment plants, and the resource-

[16] Ministry of the Environment, "The Phasing Out of Pig Farms", *Singapore Government Press Releases*, Information Division, Ministry of Culture, 43/APR, 07-0/85/04/23, 23 Apr 1985.

"When they mentioned that they wanted to phase out the pig farming, everybody was furious ... it really hit the farmers who are about 40, 50 years old ... when they are at this stage, you know, to tell them to go out and do other business, it's not easy.

My farm? We had to accept it, unwillingly, unfortunately. But that was the government policy, so we had to stop."

Hay Soo Kheng, a pig farmer, in a 1991 interview with the National Archives of Singapore[17]

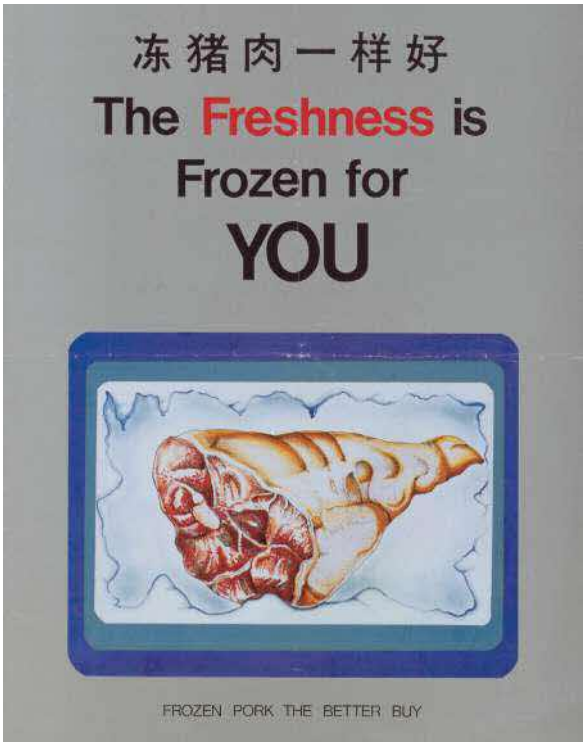
intensive nature of pig farming in general made it economically and environmentally unsustainable in the long run. It would be efficient, the government argued, to "supply the whole of our pork requirements through imports, probably at a lower cost".[18]

The decision had been made at the highest levels of government, who brooked no protest to this difficult decision.[19] Despite widespread disappointment from farmers and even some PPD officers, the reaction to this decision amongst most Singaporeans appeared to have been relatively muted.

The ambivalent response might have been a product of broader shifts in Singapore's economy. Many small farmers had already been transiting out of the pork industry for years, farming other crops, or exploring other livelihoods due to diminishing state support for pig farming.

Rows of empty concrete pig enclosures at Lim Chu Kang Road, 1987. Housing and Development Board Collection, courtesy of the National Archives of Singapore.

[17] Hay Soo Kheng, interview by Jesley Chua Chee Huan, Oral History Centre, National Archives of Singapore, Accession Number 001289, Reel 5, 19 Jul 1991.
[18] Goh Keng Swee, "Punggol Pig Farmers (Dispossession)", Oral Answers to Questions, Parliament No. 5, Session 1, Vol. 43, Sitting No. 6, 12 Mar 1984.
[19] Ngiam, interview, Reel 3.



Poster from the "Eat Frozen Pork Campaign", 1985. Primary Production Department Collection, courtesy of the National Archives of Singapore.

Member of Parliament for Jalan Besar, Dr Lee Boon Yang, at the "Eat Frozen Pork Campaign" exhibition, 1985. Ministry of Information and the Arts Collection, courtesy of the National Archives of Singapore.

For instance, stuck with excess pigs in his farms, Mr Lim Hock Chee turned to selling chilled pork from a rented booth in a Savewell Supermarket outlet at Ang Mo Kio in 1984, and was later able to take over the management of the entire store. The decision marked the beginning of the Sheng Siong supermarkets, which has today grown to an island wide chain of 61 outlets.[20]

After phasing out pig farms, the Government was not idle either. In addition to the monumental task of closing down local farms, PPD officials fanned out throughout the region, seeking suppliers in Indonesia, Malaysia, and Australia. New infrastructures were built to transport and market fresh, chilled, and frozen pork locally. Publicity campaigns encouraged Singaporeans to consume more imported pork.

"Now I'm 55. I have been farming since I was 18. What other work can I do ... The happiest thing in my life is that I have raised eight children and I don't owe anybody any money ...

That's not bad, isn't it, considering I never learnt to read and write?"

Poh Ah Leck, owner of a small family-run pig farm, in a 1985 interview with *The Straits Times*[21]

[20] Francis Chan, "Sheng Siong kidnapping: From pig farmer to supermarket tycoon", *ST*, 10 Jan 2014; Mak Mun San, 'Mind your 'p's and Queues", ST, 11 Feb 2008; Francis Chan, "From pig farmer to supermarket chain owner", *ST*, 10 Jun 2009

[21] Ngiam Tong Hai and Alan John, "Picking up the pieces after Dr Goh's bombshell", *ST*, 21 Apr 1985, 2. Reel 3.

A pig farm owner in his office at Lim Chu Kang Road, 1985. Housing and Development Board Collection, courtesy of the National Archives of Singapore.

"Mr Lim Chye Joo, 82, said Primary Production Department (PPD) workers came to his farm on Tuesday and put away two of his male pigs with a lethal injection [...] Mr Lim has 18 females and 12 piglets left. He said PPD men will return on Monday to kill the rest.

'It is not economical to sell them off because transportation costs for such a small lot exceed any profits to be made,' he said.

'The female pigs are already old. There is no point trying to sell the piglets off because farms in Punggol, Tampines, Changi and Sembawang are being closed at the same time and the market will be flooded,' he added."

An excerpt from "No market for these swine", *The New Paper*, 26 Nov 1988[22]

The era of Singaporean pork was over. Henceforth, Singaporeans (with initial reluctance) would begin consuming pork, grown in overseas farms, in increasing quantities.

Singapore, Swine, and Sustainability

The story of Singaporean pork illustrates how stark choices had to be made in Singapore's early nation-building years, as leaders and citizens alike strove to balance economic imperatives with growing concerns about environmental sustainability. Entwined with these grand narratives of national progress are hence also smaller stories of sacrifice, uncertainty, and loss.

Yet policymakers and pig farmers alike met these challenges with tireless determination and bold ingenuity, reinventing themselves to meet evolving contexts. History cannot predict the future, but perhaps this brief story of swine and sustainability shows us how we can likewise rise to meet the road ahead: with grit, daring, and imagination.

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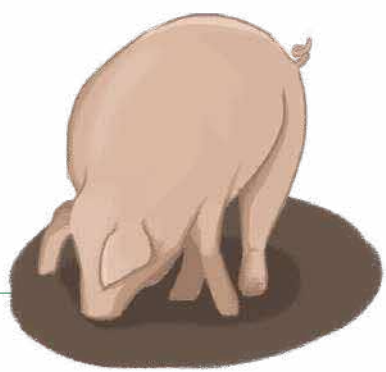


[22] Nicklaus D'cruz, "No market for these swine", *New Paper*, 26 Nov 1988, 3.

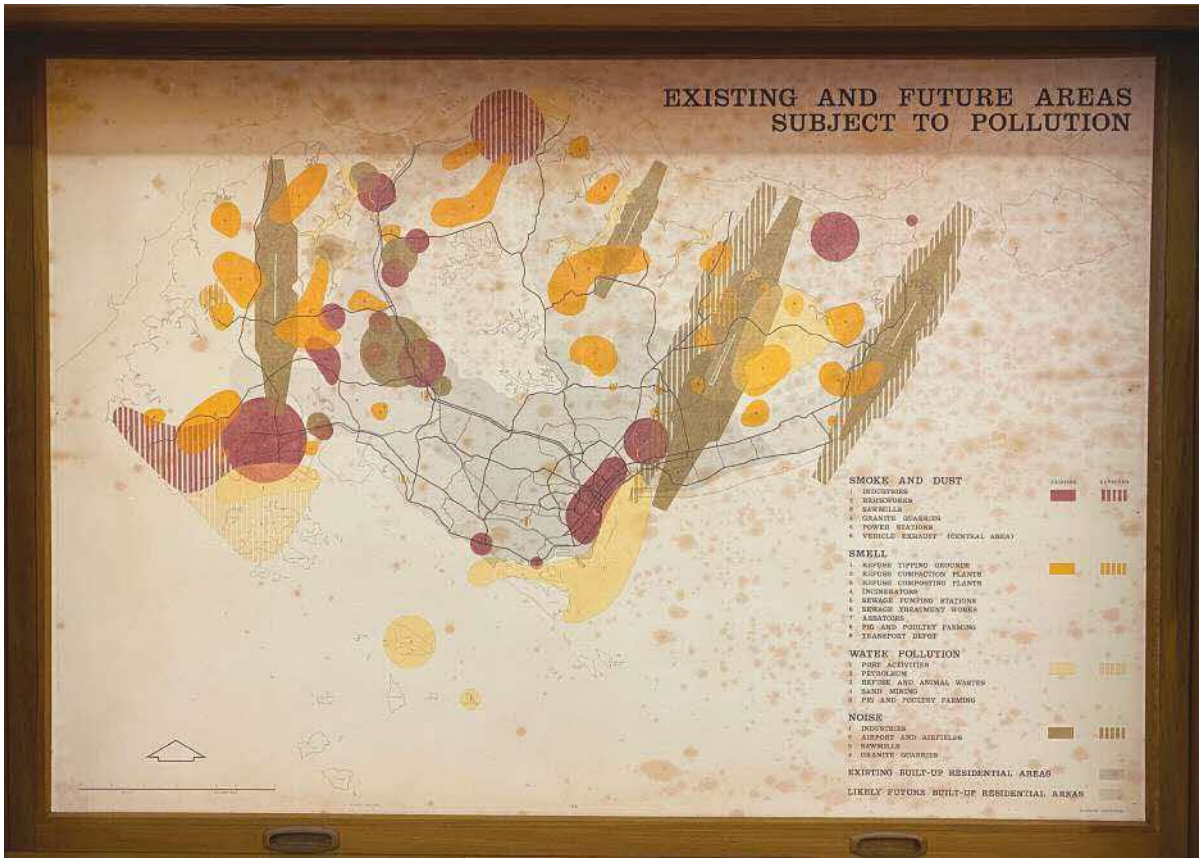
Pioneers of Pollution Control: The Early Years of Singapore's Anti-Pollution Unit, 1970s

by **Karen Ho Wen Ee**

My evening runs through Jurong take me through a network of factories. There is an oil refinery a few kilometres away, with Jurong Island located just beyond. Yet the sky here is no less blue than in any other neighbourhood, with no fewer birds or trees. This clean air, however, belies Singapore's heavy reliance on industrialisation which has powered our economy since the 1960s. In fact, it is a testament to careful planning right from the early stages of Singapore's post-independence development.

A clue to these early plans lies in the former office of Singapore's founding Prime Minister, Lee Kuan Yew. Near his desk, a cabinet houses a series of large, detailed maps. One map, titled "Existing and Future Areas Subject to Pollution", dates to the early 1970s and indicates existing and expected sites of pollution in Singapore such as Jurong and Sembawang. The fact that this map was drawn up and hung in Mr Lee's office indicates that the issue mattered greatly to him, even during the initial stages of Singapore's industrialisation. What prompted this focus on pollution, and what was done about it? This article explores how Singapore approached and tackled this environmental challenge during our early nation-building years through the establishment of the Anti-Pollution Unit.

Jurong Hill and Jurong Industrial Estate, 1970. Collection of the National Museum of Singapore, National Heritage Board.



Map titled "Existing and Future Areas Subject to Pollution" located in the former office of founding Prime Minister Lee Kuan Yew, 1970s. Courtesy of Prime Minister's Office.

Anti-Pollution Unit: The Beginning

In the 1960s, Singapore embarked on a rigorous industrialisation programme to boost economic development. As public housing became located closer to industrial areas, residents complained about pollution such as smoke, dust, and fumes that came from the factories. At that time, the responsibility of enforcement was divided among two departments, the Public Health Engineering Branch and Environmental Health Department. However, existing guidelines to address air pollution were vague and regulation were ineffective.[1]

In February 1970, the government invited World Health Organisation consultant Graham Cleary to Singapore to assess the situation and recommend an action plan. His recommendations included establishing a specialised Air Pollution Unit, developing legislation for air pollution control and factoring air pollution considerations into urban planning.[2]

Although air pollution levels in Singapore were generally within global standards and lower than other industrialised cities, there would be problems

[1] Anti-Pollution Unit, Air Pollution in Singapore (Singapore: Government Printing Office, 1971), 2; Graham Cleary, *Air Pollution Control: Preliminary Assessment of Air Pollution in Singapore* (Singapore: Government Printing Office, 1971), 10.
[2] Cleary, *Air Pollution Control*, 9, 10, 12, 13.

The Economic Development Board's flatted factory at Tanglin Halt Industrial Estate being constructed, with public housing in close proximity, 1965. Ministry of Information and the Arts Collection, courtesy of the National Archives of Singapore.

"I was looking out of my office window at Pearl's Hill one day and I thought the rains were coming. But on taking a closer look, I realised that the murkiness was smog ... I asked myself: if Singapore did not take this thing in hand now, what would happen in the future?"

Lim Kim San, Singapore's first Minister for the Environment, as quoted in *Forging a Greener Tomorrow* [6]

down the road if prevailing growth rates were maintained.[3] Lee Ek Tieng, the first Head of the newly-established Anti-Pollution Unit (APU), recalled then-Prime Minister Lee being "very concerned" about the pollutive impact of industrialisation after having read Cleary's report. Within two months of Cleary setting foot in Singapore, APU was established under the Prime Minister's Office (PMO) before formally gaining Parliament's stamp of approval the year after.[4]

With other reforms to tackle land and water pollution such as the Environmental Public Health Act, the Prevention of Pollution of the Sea Act, and even the "Keep Singapore Clean" campaign, APU focused on curbing air pollution, ultimately aiming to play a preventive rather than retroactive role. Tan Guong Ching, who started his public service career in APU as an engineer, later commented: "If we had not placed our control measures right from the very beginning, Singapore would have been a totally different place—a very polluted place."[5]

Finding Their Way

As tackling industrial pollution was just in its early stages worldwide, little research data was available, especially for tropical climates like Singapore's. The Unit thus had to conduct its own experiments to measure the impact of air pollution here and find its own solutions. For instance, it needed to find out whether temperature inversions—a phenomenon where cold air is trapped under warmer air, keeping pollutive particles trapped as well—occurred at night in Singapore, as in temperate climates. To measure this, the team attached temperature sensors along the chimney of the Senoko Power Station in Sembawang, day and night. They found that temperature inversions did indeed occur in Singapore, and revised the guidelines for chimney heights to ensure that any pollutive emissions would not remain trapped.[7] While APU's methods were initially manual and rudimentary, Joseph Hui, who joined APU as an engineer in 1977 and eventually became Deputy CEO of the National Environment Agency, remarked that being closer to the ground gave the team "a sense of satisfaction for being able to protect the environment".[8]

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[3] Anti-Pollution Unit, *Annual Report 1970–1972* (Singapore: Government Printing Office, 1973), 7, 11, 12.
[4] Lee Ek Tieng, interview by Lim Siam Kim, Oral History Centre, National Archives of Singapore, Accession No. 002832, Reel 2, 21 Apr 2004; Anti-Pollution Unit, *Annual Report 1970-1972*, 2.
[5] Tan Guong Ching, interview by Wee Beng Geok, Oral History Centre, National Archives of Singapore, Accession No. 003133, Reel 1, 21 Mar 2007.
[6] Jessica Cheam, *Forging a Greener Tomorrow: Singapore's Environmental Journey from Slum to Eco-City* (Singapore: Straits Times Press Pte Ltd, 2012), 19.
[7] Tan Guong Ching, interview by Founders' Memorial, 10 Oct 2019.
[8] Cheam, *Forging a Greener Tomorrow*, 172.

Top: Liu Kang, *Working at the Brick Factory*, 1954. Oil on canvas, 97.8 x 128.6 cm. Gift of the artist's family. Collection of National Gallery Singapore.

Bottom: Visitors at the "Keep Singapore Pollution Free" campaign exhibition held at the Singapore Conference Hall, 1971. Ministry of Information and the Arts Collection, courtesy of the National Archives of Singapore.

The team also relied strongly on the global community to build up its expertise. As the first head of APU, Lee Ek Tieng completed a seven-month attachment in New Zealand and Australia in 1970 before returning to assume his position full-time. Subsequently, Singapore continued to engage these two nations closely, and as the three countries engaged in mutual dialogue, solutions such as new pollution control technology were jointly developed.[9]

Standing Their Ground

Having consulted advisors and gathered data, APU prepared to implement new anti-polluting regulations. Although these measures were unpopular with many investors and firms, the authority accorded to APU as an agency under PMO's ambit enabled it to stand its ground.

Before proper legislation was introduced, APU had sought assistance from other departments such as the Ministry of Labour and Registry of Vehicles to manage emissions; however, enforcement often seemed like a "cat-and-mouse game" due to polluters' evasive tactics and shortage of regulatory staff.[10] The Clean Air Act and Clean Air (Standards) Regulations, passed in 1971 and 1972 respectively, subsequently gave the Unit greater power. APU would screen all factories with potentially pollutive impact before allowing them to operate, and industries whose pollutive risk was too great were turned down. For example, an attractive offer by an Australian firm to set up an iron and steel plant was rejected. Existing factories also had to comply with new regulations by installing pollution control equipment such as venturi scrubbers, or by changing practices such as inefficient combustion techniques and pollutive waste management methods.[11]

To keep residential neighbourhoods pollution-free, APU also developed a zoning system that sorted industries according to their pollutive impact—a new strategy that was subsequently implemented by other countries.[12] Industries were categorised by indices that evaluated the amount of noise generated, the pollution potentially produced and the type of equipment involved. "Light Industries" that did not create air, water, or noise pollution could be situated near homes, while "Special Industries"—which ranged from the manufacture of ceramic tiles to petroleum refineries—faced pollution control measures and were situated in dedicated zones.[13] Some existing factories were forced to

[9] Anti-Pollution Unit, *Annual Report 1970–1972,* 37–38; Cheam, *Forging a Greener Tomorrow*, 172.
[10] Lee, interview, Reel 2; Centre for Liveable Cities, "Cleaning a Nation: Cultivating a Healthy Living Environment", *Urban Systems Studies* (Singapore: Centre for Liveable Cities, 2016), 27.
[11] Lee, interview, Reel 2; Centre for Liveable Cities, "Cleaning a Nation: Cultivating a Healthy Living Environment".
[12] Tan, interview, Reel 1.
[13] Anti-Pollution Unit, *Classification of Industries for Planning and Siting Purposes* (Singapore: Anti-Pollution Unit, 1974), 1, 11; Founders' Memorial email correspondence with Tan Guong Ching, 2022.

relocate, but the advantage was that those with outdated equipment moved into newer premises with better pollution control facilities.[14]

On how companies reacted to APU's guidelines, Tan Guong Ching recalled in an interview with the Founders' Memorial: "Of course they didn't like it. It meant cost to them."[15] Indeed, the new measures were an impediment to foreign investment and some industries moved out of Singapore altogether. Still, then-Minister for the Environment Lim Kim San understood that the costs of pollution could be even greater than the economic benefit from these investments.[16]

The fact that APU reported directly to the Prime Minister also gave it the authority needed for enforcement. In an interview with the National Archives of Singapore, Lee Ek Tieng recounted an incident where a large petrochemical company, upon needing to install a ground flare system for pollution control, "complained to everybody, every minister… they even appealed to Goh Keng Swee." Lee added, "Goh Keng Swee was very clever, left it to the Prime Minister. That was it. And they never got away. They finally had to put a ground flare."[17]

"Actually environmental pollution was quite a new topic ... we were among the pioneers of pollution control. So we had a lot of, shall I say, experimentation ... we thought through the problems and solutions ourselves."

Tan Guong Ching, in a 2007 interview with the National Archives of Singapore[18]

Top: Minister for Health Chua Sian Chin speaking at the opening of "Keep Singapore Pollution Free" campaign held at the Singapore Conference Hall, 1971. Ministry of Information and the Arts Collection, courtesy of the National Archives of Singapore.

Bottom: Minister for National Development S. Dhanabalan at Senoko Power Station, 1992. Ministry of Information and the Arts Collection, courtesy of the National Archives of Singapore.

[14] Tan Yong Soon, Lee Tung Jean and Karen Tan, *Clean, Green and Blue: Singapore's Journey Towards Environmental and Water Sustainability* (Singapore: ISEAS Publishing, 2009), 28.
[15] Tan, interview by Founders' Memorial.
[16] Cheam, *Forging a Greener Tomorrow, 31.*
[17] Lee, interview, Reel 2.
[18] Tan, interview, Reel 1.

Minister for Finance Hon Sui Sen checking out Philips' SO_2 air pollution monitor, which was presented by Philips Singapore during the opening of Philips Machine Factory and Telecommunications Factory in Jurong, 1973. Ministry of Information and the Arts Collection, courtesy of the National Archives of Singapore.

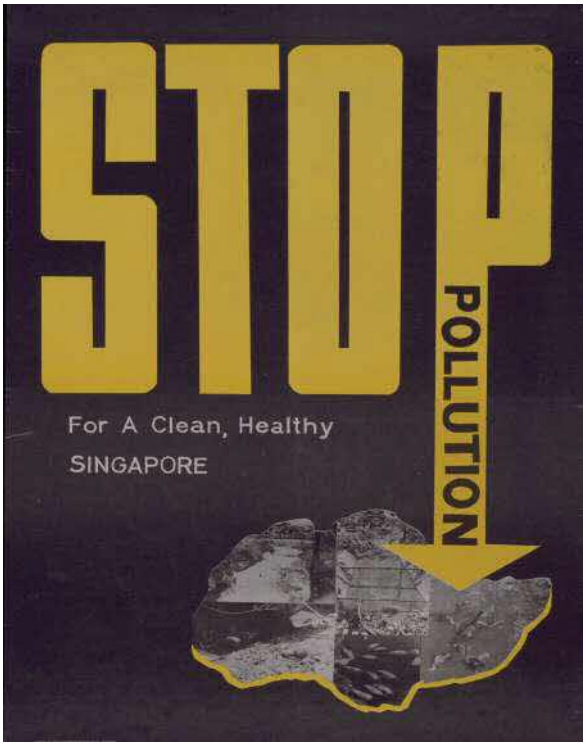
"We are here interested in prevention before the situation gets out of hand ... It is therefore not pre-mature to control air pollution now as some people think it is in Singapore. Industrialists and other polluters must think and accept that air pollution control is part of their responsibility."

Anti-Pollution Unit, in a 1971 publication titled *Air Pollution in Singapore*[19]

Opening of Pan-Malaysia Industries Ltd's plywood factory at Jurong Industrial Estate, 1964. Ministry of Information and the Arts Collection, courtesy of the National Archives of Singapore.

[19] Anti-Pollution Unit, *Air Pollution in Singapore*, 4.

Then-Head of APU Lee Ek Tieng at a laboratory during his attachment in New Zealand, 1970. Courtesy of Archives New Zealand.



Poster titled "Stop Pollution: For a Clean, Healthy Singapore", 1977. Ministry of the Environment Collection, courtesy of the National Archives of Singapore.

Conclusion

APU's establishment in 1970 marked the beginning of greater environmental awareness and action in Singapore. In 1972, Singapore became one of the first countries in the world to form a ministry dedicated to the environment, under which APU was eventually subsumed in 1983.[20]

In Singapore's early post-independence years, environmental protection was more about understanding the impact of pollutive activity and keeping these effects at bay. Recent conversations have moved towards the protection of wildlife and nature from human activity and the sustainable use of resources. While Singapore today looks to greening and reducing overall environmental impact, APU's spirit of experimentation and collaboration remains ever-relevant. The Unit's persistence in implementing anti-pollution measures paid off in the clean environment we enjoy today; similarly, one can expect the present generation's commitment to furthering environmental consciousness to have a palpable impact on our future.

Karen Ho Wen Ee is a Yale-NUS History graduate with an interest in the stories that make up Singapore. She currently works at a media monitoring firm and embarks on writing projects in her spare time. This article was written when she was Assistant Manager (Curatorial and Engagement) at the Founders' Memorial.

[20] Cheam, *Forging a Greener Tomorrow,* 19.

The Singapore River: From Working River to Iconic Lifestyle Precinct

by **Adeline Chia**

A bird's-eye view of the Singapore River at Clarke Quay with Read Bridge in the photo centre, 1980. Ronni Pinsler Collection, courtesy of the National Archives of Singapore.

Strolling along the Singapore River, with a view of its placid waters contrasting against the lively waterside establishments, one is hard-pressed to imagine the waterway's filthy past. Indeed, the clean-up of the Singapore River has long been held up as an example of the Republic's transformation and its commitment to sustainable development. Now, the riverine scenery is a dynamic combination of old and new, with historic features being adaptively re-used in a thriving leisure and entertainment scene.

The Singapore River clean-up is inseparable from the greater plan to modernise Singapore in its post-independence years, unfolding in tandem with state planning initiatives such as the development of public housing. The clean-up's origins can be traced back to 1969, when then-Prime Minister Lee Kuan Yew tasked the Public Works Department and Public Utilities Board to come up with a plan to clean up Singapore's major waterways.[1] Following this, there were some initial studies and proposals by individual government agencies, but the ball really got rolling in 1977, after a speech Mr Lee gave at the opening ceremony of Upper Peirce Reservoir, where he gave the Ministry of Environment a 10-year target to clean up the Singapore River and Kallang Basin.[2]

[1] Stephen Dobbs, *The Singapore River: A Social History, 1819–2002* (Singapore: Singapore University Press, 2003), 103–104.
[2] Joan Hon, *Tidal Fortunes: A Story of Change: The Singapore River and Kallang Basin* (Singapore: Landmark Books, 1990), 41.

Urban Redevelopment Authority projects along the banks of the Singapore River at River Valley and Hill Street junction, 1986. Ronni Pinsler Collection, courtesy of the National Archives of Singapore.

"The day we achieve that [clean river], whoever has been in charge for the last ten years or for the next ten years, if I am still around, I will give each one of them—both the Minister, the Permanent Secretary and the head of department—a real solid gold medal, one troy ounce (31.1 grams)."

Prime Minister Lee Kuan Yew at the opening of Upper Peirce Reservoir, 27 February 1977, announcing the Government's plan to clean up the Singapore River[3]

River works at Magazine Road, with Tan Si Chong Su temple, a National Monument, in the background, 1980. Ronni Pinsler Collection, courtesy of the National Archives of Singapore.

[3] Salma Khalik, "10 get their gold medals as PM keeps his promise", *The Straits Times*, 3 Sep 1987, 12.

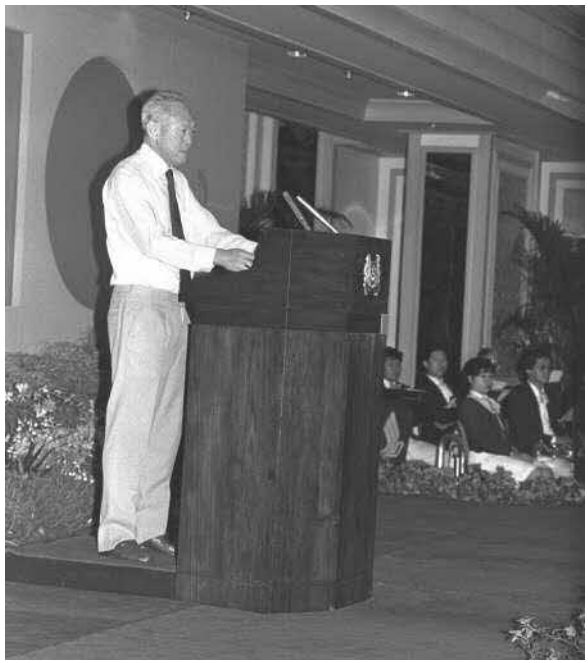
The pace of the clean-up then picked up. In and around the river, sources of pollution—contributing to garbage, sewage, and industrial waste—were removed. Over 10 years, more than 46,000 squatters in the Singapore River and Kallang Basin were relocated to public housing, and nearly 5,000 hawkers were asked to move to hawker centres.[4]

The clean-up was officially declared complete on 2 September 1987. As part of the Clean Rivers Commemoration, a five-day carnival held at Marina Bay, Mr Lee presented gold medals to 10 people for their contributions.[5]

Today, the Singapore River flows through several rejuvenated precincts including the Civic District and the Central Business District. The river ends in Singapore's largest reservoir, the Marina Reservoir, with a massive dam across the Marina channel that was completed in 2008.

Transformative as the clean-up may be, there are those who have noted the human costs of this process of urban renewal. Historian Stephen Dobbs has chronicled the hardships of lighter operators who were evicted from the river to upgraded facilities at Pasir Panjang over the course of the clean-up.[6] Other cultural commentators have lamented the loss of the Singapore River's place identity. Singaporean poet Lee Tzu Pheng wrote in her much-anthologised poem, *Singapore River*: "The operation was massive;/ designed to give new life to the old lady./ We cleaned out/ her arteries, removed/ detritus and silt,/ created a by-pass/ for the old blood./ Now you can hardly tell/ her history".[7]

These losses, arguably, are outweighed by gains in other quarters, such as massive improvements in sanitation and safety. There are also other positive ecological outcomes. Overall, the city-state's cleaner waterways have become attractive habitats for wildlife, attracting species previously rare in Singapore, such as otters.



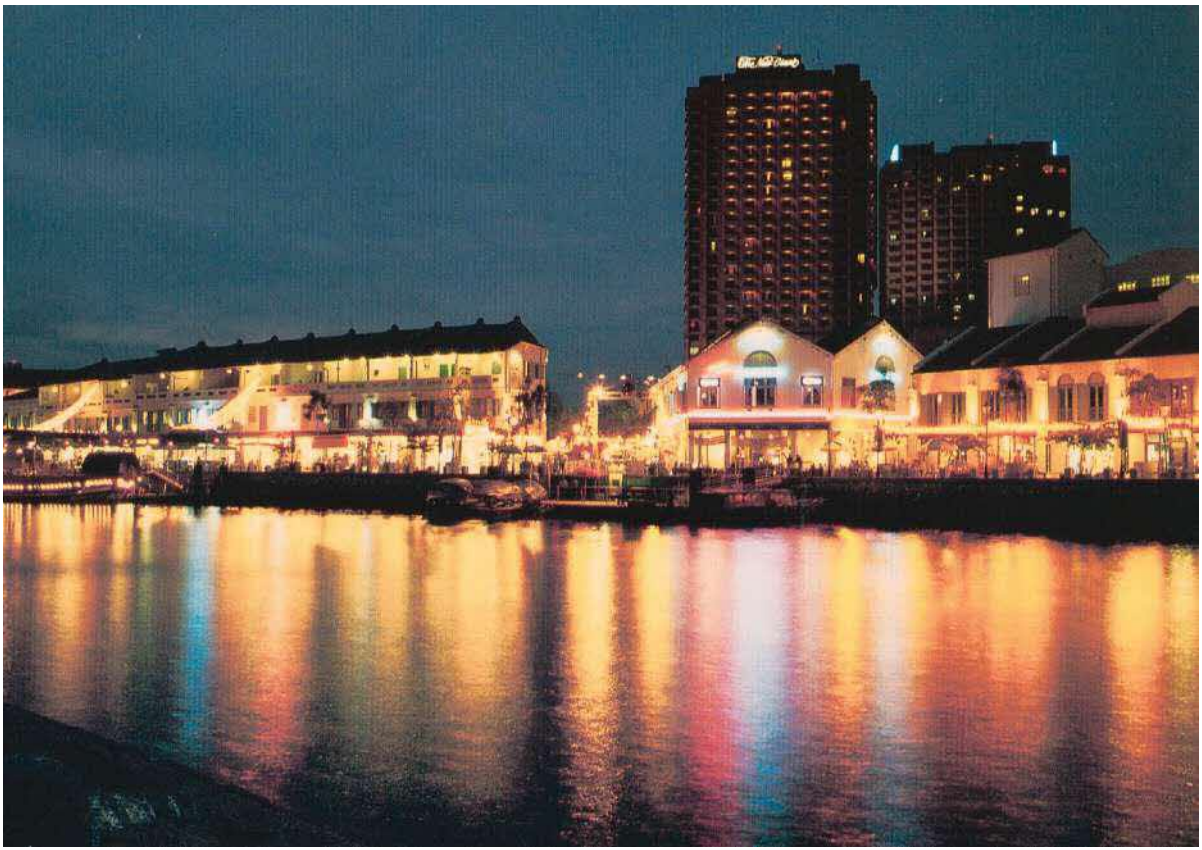
Top: PM Lee Kuan Yew speaking at the Clean Rivers Commemoration opening ceremony at Marina Mandarin, 1987. Ministry of Information and the Arts Collection, courtesy of the National Archives of Singapore.

Bottom: PM Lee Kuan Yew, Mrs Lee, and Environment Minister Dr Ahmad Mattar inspecting Marina Bay and Kallang Basin, 1987. Ministry of Information and the Arts Collection, courtesy of the National Archives of Singapore.

[4] Tan Yong Soon, Lee Tung Jean and Karen Tan, "Cleaning the Land and Rivers", in *50 Years of Environment: Singapore's Journey towards Environmental Sustainability, edited by Tan Yong Soon*, (Singapore: World Scientific, 2015), 15–44.
[5] Lee Kuan Yew, "Speech by Prime Minister Lee Kuan Yew at the Opening Ceremony of Clean Rivers Commemoration '87 held at the Marina Mandarin Hotel on 2 Sep" (speech, Singapore, 2 Sep 1987), National Archives of Singapore, lky19870902.
[6] Stephen Dobbs, "Urban Redevelopment and the Forced Eviction of Lighters from the Singapore River", *Singapore Journal of Tropical Geography*, Vol. 2, Issue 3 (2002), 288–310.
[7] The poem was first published in Lee's anthology *The Brink of an Amen* (Singapore, Times Books International, 1991), 56.

Ultimately, what the Singapore River story shows is that pursuing sustainable development often involves altering the social fabric of a place. Nevertheless, the river's past is never completely cut off, as shown in the conserved buildings lining its banks. Another way the river's history can be kept alive is in the memories of those who encountered it back then. In closing, this essay ends with the accounts of those who have experienced the river at different times. Indirectly, these rich stories chart the river's evolution and reflect the myriad facets of these waters.

Reclamation works at Marina Bay, 1977. © Urban Redevelopment Authority. All rights reserved.



Night view of Clarke Quay, mid–1980s. Collection of the National Museum of Singapore, National Heritage Board.

1960s

James Foo Siang Kee, 82, retiree

From 1962 to 1963, I was attached to the Marine Police department at Clifford Pier and worked as a police constable in a patrol boat. The river was very busy with tongkangs, sampans, lighters, and bumboats. We had to check that there were no laws broken on the boats. Sometimes, we encountered workers smoking opium in the lighters, and sometimes bumboats were caught with stolen goods of illegal alcohol and cigarettes.

We were not tasked to police people dirtying the river, which had a lot of rubbish, especially food waste from hawkers and customers. The water was then very polluted and smelly.

Lightermen relaxing along Boat Quay in front of Ellenborough Market, 1982. Ronni Pinsler Collection, courtesy of the National Archives of Singapore.

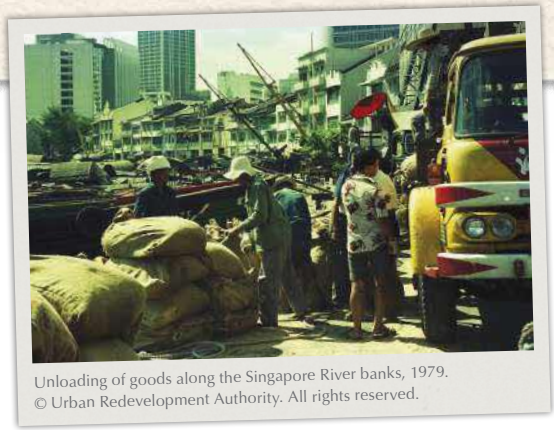
1970s

Alvin Oon, 54, self-employed

From the 1930s to the 1970s, my maternal great-grandfather ran an import-export business at the junction of Hill Street and North Boat Quay called Hua Seng. The company managed the loading and unloading of goods from the riverboats to the warehouses along the Singapore River. The river was a very busy place, with coolies carrying goods from boat to shore, balancing on thin planks with heavy sacks on their backs.

Tools used by coolies for picking up rice sacks from boats docked along the Singapore River banks, 1950s–1970s. Gift of Neo Kim Teah. Collection of the National Museum of Singapore, National Heritage Board.

The smell of the river was quite bad, like a sewer. The water was murky and dirty and often one could see animal carcasses floating by. On the opposite bank were shophouses that stored foodstuff on the ground floors and provided accommodation on the second or third floor. To protect the food items from rats, the shophouse owners kept pythons as pets on the ground floor.



Unloading of goods along the Singapore River banks, 1979.

Present-day

Mohamad Rizuan Pathie, 39, partner at Dentons Rodyk & Davidson LLP

Dentons Rodyk & Davidson is a law firm that has a deep affiliation with the Singapore River since its inception 160 years ago, with our offices always being near the river. Currently, we are situated at UOB Plaza 1, which offers spectacular views of the river.

To me, the river represents the lifeline of our nation's roots as a trading hub and symbolises the artery of our nation's commercial heartbeat. Today, it has many faces, which explains its appeal to different people. The vibrant dining and entertainment options in Clarke Quay and Boat Quay are a contrast to the more peaceful surroundings of the historical bank where the Victoria Concert Hall is.

I enjoy sitting on the stairs overlooking the Asian Civilisations Museum and seeing people stream past. There is something therapeutic about seeing the movement of people by the river, with the crowds ebbing and flowing at different times of the day, like the water.

Night scene at Boat Quay, 1990s. Singapore Tourism Board Collection, courtesy of the National Archives of Singapore.

Present-day

Ho See Wah, 26, Manager (Content & Communications), Singapore Tyler Print Institute (STPI) Creative Workshop & Gallery

After work, I like to spend some time at Alkaff Bridge (so energetically painted by Filipino artist Pacita Abad) and let my eyes wander along the surface of the river and savour the moments of stillness. The river is taking its time and so am I, amidst the busy crowds of joggers, dinner groups and commuters heading home.

It's always wonderful to see other creatures being in the river, including turtles and catfish. Recently, I've been reading books that posit a more expansive view of our entangled ecologies, reminding us of the mutual kinship we have with the world around us.

A dragon boat race along the Singapore River, 1988. Singapore Tourist Promotion Board Collection, courtesy of the National Archives of Singapore.

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A Landfill Reimagined: Lorong Halus and Singapore's Solid Waste Management Journey

by **Wong Lee Min**

Thick white smoke billowing beneath street lamps, acrid fumes of burning rubber and plastic wafting into homes—these unpleasant sights and smells were familiar nuisances to the long-time residents of Pasir Ris and Hougang in the early 1990s. For several years, they had complained about the haze and nauseating odour, which were the products of frequent fires that broke out at the nearby Lorong Halus Dumping Ground due to methane released from decaying matter. Despite the best efforts of the Ministry of Environment to minimise smouldering and maintain good hygiene standards, regular complaints about smoke, stench, and vermin arose throughout Lorong Halus' lifespan as a landfill from 1970 to 1999.[1] By the time it closed, the landfill had grown into a sprawling 234-hectare site with rubbish mounds piled ten storeys high.[2]

Lorong Halus was the last dumping ground on mainland Singapore. Today, it is a far cry from what it was before the turn of the millennium. An idyllic haven for birdwatchers, the site has been developed into Singapore's first large-scale man-made wetland, designed as a bio-remediation system to filter and treat leachate from the former landfill before it is released into the sewage network.[3] This essay traces Lorong Halus' transformation from a repository of waste to a purifier of contaminated water as a means to explore the bold policies and forward planning that shaped solid waste management in Singapore.

Bulldozer covering refuse with a layer of earth at the Lorong Halus Dumping Ground, late 1980s and early 1990s. Courtesy of the National Environment Agency.

[1] *The Straits Times* [henceforth *ST*], "4-year 'haze' from Hougang dump", 27 Oct 1994, 24; *ST*, "Haze over Pasir Ris in the night", 16 May 1995, 32; *ST*, "Ministry doing its best to minimise nuisance from sanitary landfill site", 23 May 1995, 30; *Singapore Parliamentary Debates*, Vol. 45, Sitting No. 6, Col. 364-365, 7 Mar 1985.

[2] National Heritage Board, "Lorong Halus Wetland", https://www.roots.gov.sg/places/places-landing/Places/landmarks/tampines-heritage-trail-green-spaces-trail/Lorong-Halus-Wetland (accessed 27 Nov 2021).

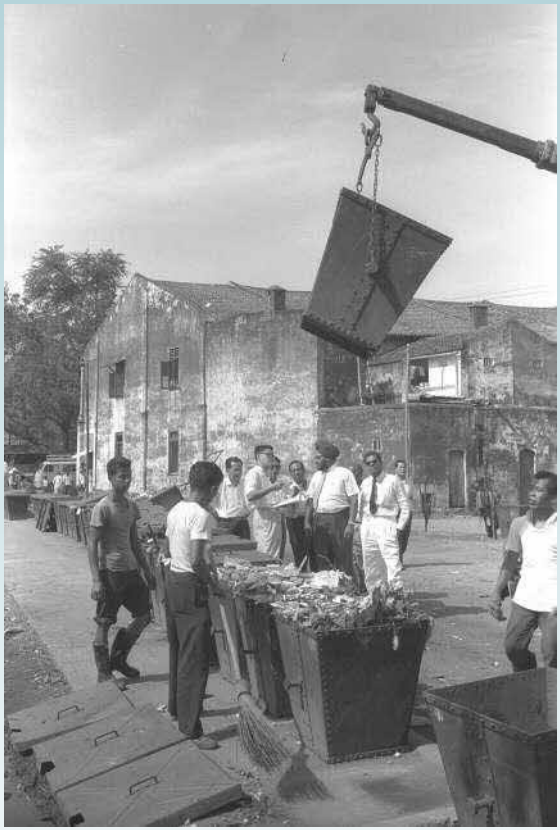
[3] Dan Koh, "Lorong Halus", *Singapore Infopedia*, National Library Board, 30 Nov 2016, https://eresources.nlb.gov.sg/infopedia/articles/SIP_2016-11-30_193336.html (accessed 27 Nov 2021).

Whither Our Trash? Incineration to the Rescue

Landfill operations at Lorong Halus commenced in 1970, a few years before the depletion of older dumping grounds in Tampines and Koh Sek Lim Road in 1975 and Choa Chu Kang in 1976. The sanitary landfill method was employed at Lorong Halus, where bulldozers with spiked wheels compacted rubbish buried in depressions. A layer of soil up to 15cm thick was then spread over the trash, before the bulldozers compressed the ground again, to minimise erosion, smouldering, stench, and vermin breeding.[4]

While the sanitary landfill method of disposing trash was a cheap solution, it rendered the land unstable and thus unsuitable for heavy housing or industrial developments. This was problematic given Singapore's shortage of land. Therefore, the Ministry of Health had as early as in 1969 called for landfill space to be used more judiciously by reducing the volume of solid waste disposed. Among the solutions considered, incineration and the compaction of rubbish into bales that could be used for land reclamation became the most favoured.[5] Incineration could reduce the volume of rubbish by 80 to 90 percent while generating heat that could be converted into electricity. However, it would have increased the cost of waste disposal exponentially, from $2.50 to $18 per tonne in the 1970s. The alternative—bale compaction—required less capital costs but incurred higher operational costs, and could only reduce the volume of trash by 75 percent.[6]

Due to the huge expense involved in either solution, the Ministry of Health took another three years for consultancy and consideration. In 1972, it recommended the construction of a Waste-to-Energy incinerator with the capacity of 1,200 tonnes per day, accompanied by one to two compaction plants with the capacity of 400 tonnes per day, at an estimated cost of $100 million.[7] Eventually, only the incinerator was constructed in 1979, making Singapore the second country in



Top: Minister of Health Yong Nyuk Lin observing workers clearing rubbish at a refuse collection centre, 1963. Ministry of Information and the Arts Collection, courtesy of the National Archives of Singapore.

Bottom: Rubbish truck tipping its load at Lorong Halus Dumping Ground, 1970s. Courtesy of the National Environment Agency.

[4] Singapore Environmental Consultancy and Solutions, "Lorong Halus Environmental Baseline Study", http://secs.sg/lorong-halus-ebs/ (accessed 30 Nov 2021); Ministry of the Environment, *Singapore—My Clean & Green Home* (Singapore: Ministry of the Environment, Singapore, 1997), 44-45; *The Business Times* [henceforth *BT*], "Putting Up With Your Rubbish", 25 Jan 1978, 6.

[5] *Singapore Parliamentary Debates*, Vol. 28, Sitting No. 11, Col. 856-857, 8 Apr 1969.

[6] *BT*, "Putting Up With Your Rubbish", 6.

[7] *Singapore Parliamentary Debates*, Vol. 31, Sitting No. 17, Col. 1241, 27 Mar 1972; *Singapore Parliamentary Debates*, Vol. 32, Sitting No. 14, Col. 759, 13 Mar 1973.

Refuse collection vehicles at weighbridge before proceeding to Lorong Halus Dumping Ground, late 1980s and early 1990s. Courtesy of the National Environment Agency.

Asia after Japan to adopt this technology. Funded by a US$25-million loan from the World Bank, the $130-million plant situated in Ulu Pandan produced more than enough electricity for its operations and sold the surplus energy (around 40 percent of the total power generated) to the Public Utilities Board (PUB).[8] For former Director-General of Environmental Public Health Daniel Wang, the government's decision to build the incinerator was a demonstration of its "really clear foresight", given that there were many other infrastructural projects of direct benefit to the population, such as schools, hospitals, and roads, which were competing for these funds.[9]

Workers at Ulu Pandan Incineration Plant, 1989. Ministry of Information and the Arts Collection, courtesy of the National Archives of Singapore.

[8] Ministry of Sustainability and the Environment, "Overcoming the environmental challenges of our past", https://www.towardszerowaste.gov.sg/zero-waste-masterplan/chapter1/our-past (accessed 30 Nov 2021); Lee Ek Tieng, interview by Lim Siam Kim, Oral History Centre, National Archives of Singapore, Accession No. 002832, Reel 3, 29 Apr 2004.

[9] Centre for Liveable Cities, *Cleaning a Nation: Cultivating a Healthy Living Environment* (Singapore: Centre for Liveable Cities, 2016), 19–20.

The construction of two more incinerators between the 1980s and 1990s, an expansion of the landfill site, and campaigns promoting reducing, reusing, and recycling waste prolonged the lifespan of Lorong Halus dumping ground from 1981 to 1999.[10] Today, Singapore's only landfill is situated offshore at Pulau Semakau due to the shortage of land on the mainland, and is projected to fill up in 2035.[11]

Transforming Wasteland into Wetland

In a 2001 review of Singapore's first Water Master Plan of 1972, PUB realised that advancements in water recycling and desalination technologies meant that Singapore's long-term goal to become self-sufficient in water was now within reach. One way to achieve this coveted goal was to increase Singapore's water catchment from 45 percent to 67 percent by damming the Singapore and Kallang rivers, as well as Sungei Punggol and Sungei Serangoon to form the Marina, Punggol, and Serangoon reservoirs respectively.[12] The proposed Serangoon reservoir was, however, situated next to the former Lorong Halus Dumping Ground. To ensure that polluted water from the disused landfill did not contaminate the reservoir, PUB decided to convert the site under the Active, Beautiful, Clean Waters (ABC Waters) Programme into a water treatment site hidden by lush greenery and picturesque ponds. This visionary transformation was materialised through a massive engineering feat that took three years to complete at the cost of $47.7 million. A 6.4-km long, 18-m deep and 0.8-m thick wall with pumps was constructed along the reservoir to block off leachate from the adjoining former dumping ground. Leachate is then directed through the wetland where pollutants and sediments are removed. Reeds such as cattail and papyrus sedge absorb nutrients from the leachate before it is released in its treated form to the sewers.[13]

Top: Minister for the Environment Ong Pang Boon viewing a scale model of Tuas Incineration Plant during its ground-breaking ceremony, 1983. Ministry of Information and the Arts Collection, courtesy of the National Archives of Singapore.

Middle: Reed beds which are part of Lorong Halus Wetland's bio-remediation system, 2017. Courtesy of the National Heritage Board.

Bottom: Lorong Halus Wetland, 2017. Courtesy of the National Heritage Board.

[10] *ST*, "Third incineration plant to handle expected increase in rubbish", 11 Dec 1988, 24; Koh, "Lorong Halus", https://eresources.nlb.gov.sg/infopedia/articles/SIP_2016-11-30_193336.html; ST, "Offshore dumping in five years", 18 Aug 1992, 24.

[11] National Environment Agency, "Semakau Landfill 20th Anniversary", *Envision Lite*, Jul 2020, https://www.nea.gov.sg/corporate-functions/resources/publications/books-journals-and-magazines/envision-lite/june-july-2020/semakau-landfill-20th-anniversary (accessed 10 Jan 2022).

[12] Tan Gee Paw, interview by Jason Lim, Oral History Centre, National Archives of Singapore, Accession No. 003170, Reel 5, 11 Dec 2007.

[13] *ST*, "Punggol's Rustic Charm", 5 Mar 2011, 19; Today, "From former landfill to wetland", 5 Mar 2011, 3; *ST*, "The Smell of Success", 23 Jun 2012, 8-9.

Little Grebe building nest at Lorong Halus, 2015. Courtesy of Francis Yap, Singapore Birds Project.

The iconic red bridge across Sungei Serangoon, 2017. Courtesy of the National Heritage Board.

The decision to turn Lorong Halus into a wetland suitable for birdwatching entailed turning down a competing use of the land as a motocross racetrack. In 2007, the Motorcycle Safety & Sports Club (MSSC) and Singapore Adventure Racing Team created a temporary 10-km motocross and mountain bike trail at Lorong Halus, and were keen to further develop parts of the site that were not earmarked for the wetland. Their proposal found support with members of the Cabinet, and would no doubt have been popular among motocross enthusiasts, given that Singapore's only approved motocross track in Loyang had closed in 1993 following complaints about the din it generated.[14] Despite the MSSC's assurance that "motocross and nature [can] co-exist", and that participating motorbikes would have to pass a noise test, Nature Society (Singapore) strongly opposed the suggestion, stating that the noise generated would impact the area's fauna. By then, Lorong Halus was home to 36 percent of bird species in Singapore and the only known local breeding ground of the Little Grebe, a nationally threatened bird. In fact, prior to becoming a landfill, Lorong Halus was already a resting point for migratory birds.[15] Eventually, a motocross adventure ground was constructed in Tuas instead, demonstrating that environmental concerns were recognised and considered in land planning.[16]

When Rubbish Gets Constructive

The story of Lorong Halus dumping ground reveals the daring and long-term decisions Singapore took in solid waste management, from developing incineration plants to re-imagining a landfill's function. What then may the future look like for our landfills?

Even as the amount of trash in Singapore continues to increase, the Ministry of Sustainability and the Environment has set a target to reduce the waste sent to Semakau Landfill each day by 30% per capita, by 2030.[17] A cutting-edge invention contributing to this goal is the development of NEWSand—treated incineration ash and slag that can replace sand for construction purposes—which has been trialled in concrete footpaths and 3D-printed benches.[18] From seeking to lengthen the lifespan of our landfills to envisioning life without any landfill, Singapore has come a long way to close its waste loop.

Wong Lee Min is Senior Manager (Curatorial and Engagement) at the Founders' Memorial. Her reading interests lie very broadly in the social and cultural aspects of Singapore and Southeast Asia, spanning from prehistoric times to the present.

[14] *The New Paper* [henceforth *TNP*], "Trail Blazers", 8 Apr 2007, 42; *TNP*, "Wheel takes a turn", 8 Apr 2007, 49.
[15] *Today*, "Not part of the plan", 25 Dec 2009, 3; *ST*, "Ruffled Feathers", 21 Oct 2007, 46.
[16] *TNP*, "Wheel takes a turn", 8 Apr 2007, 49.
[17] Ministry of Sustainability and the Environment, "Introduction", https://www.towardszerowaste.gov.sg/zero-waste-masterplan/ (accessed 29 Sep 2022).
[18] *ST*, "Processed waste known as NEWSand may be used as construction materials here", 25 Nov 2019, https://www.straitstimes.com/singapore/processed-waste-known-as-newsand-may-be-used-as-construction-materials-here (accessed 8 Dec 2021).

Aerial view of Lorong Halus Dumping Ground from the south, late 1980s and early 1990s. Courtesy of the National Environment Agency.

Aerial view of Lorong Halus Wetland, 2010. Courtesy of PUB, Singapore's National Water Agency.

Saving Chek Jawa: A Cross-Society Approach to Environmental Conservation

by **Associate Professor Dan Friess** of the **Department of Geography, National University of Singapore**

The recent launch of the Singapore Green Plan 2030, an ambitious set of actions and targets for mainstream sustainable development across the nation, has put our natural environment firmly at the centre of Singapore's decision making and urban planning.[1] Its announcement comes at a time of increased public interest and debate about the future of our environment in the face of development. National debates over the future of green spaces such as the Dover and Clementi Forest show that many members of the public are deeply invested in protecting our natural surroundings.

Intense interest in our environment is not new. In Singapore's context, this has been shaped by decades of work by nature advocates from civil society, working together with the public sector to navigate difficult trade-offs and dilemmas in land-use planning. The contours of this evolving dialogue between different environmental stakeholders in Singapore can be traced in the post-independence histories of our island's various green spaces.

Chek Jawa, on the eastern point of Pulau Ubin, is an illustrative case study. It was a kampong area and a little-known wetland of natural beauty which faced potential land reclamation. Its evolution to one of Singapore's most well-known environmental treasures is the result of a framework of collaboration and negotiation that underlies environmental conservation efforts in Singapore.

Minister for Education Ong Pang Boon opening a new jetty at Pulau Ubin, 1965. Ministry of Information and the Arts Collection, courtesy of the National Archives of Singapore.

[1] Ministry of Sustainability and the Environment, "Key Focus Areas", *Singapore Green Plan 2030*, 2 Mar 2022, www.greenplan.gov.sg/key-focus-areas/overview (accessed 3 Mar 2022).

Sea view of Pulau Ubin at low tide, 1992. Courtesy of the National Archives of Singapore.

A/P Dan Friess with participants of a scientific workshop at Sungei Durian, near Chek Jawa, 2018. Courtesy of Ria Tan, www.wildsingapore.com.

Saving Chek Jawa

The 100-hectare Chek Jawa is a rare spot along Singapore's coastline because of its biological diversity. From just one spot on the Chek Jawa boardwalk, one can see mangroves, seagrass meadows, mud flats, sand flats, coastal forest, and rainforest.

However, these rich habitats were once in danger of being destroyed. In 1992, three decades after independence, reclamation plans for Pulau Ubin's eastern coastline were drawn up with talks of future housing towns as well as a potential Mass Rapid Transit (MRT) link.[2] Later, these plans were earmarked in the Urban Redevelopment Authority's Master Plan 1998, and announcements were made in 2001 that the reclamation would proceed.[3] But on 20 December 2001, days before reclamation was due to begin, the Ministry of National Development formally announced the deferment of these plans.[4] No doubt this deferment came with substantial trade-offs, as it meant giving up an area of land "the equivalent of five Bishan parks".[5] So what transpired to cause a change in this planning decision?

Decisions changed in part because of academic and civil society efforts to highlight Chek Jawa's unique biodiversity. When news of the reclamation emerged, these groups used the opportunity to document the soon-to-be-lost biodiversity and to relocate flora and fauna to other locations.[6] The fate of Chek Jawa began to receive significant public and media attention, with over 1,000 people visiting the mudflats to see its biodiversity for what was thought to be the last time.[7] One of Singapore's most passionate nature advocates was Mr Subaraj Rajathurai, who was involved in the efforts to save Chek Jawa. In his 2018 oral history recollections with the National Archives of Singapore, Subaraj highlighted that the most important stakeholder was the general public, because of their passion and their support for Ubin's threatened coastline. He went as far as to say, "Chek Jawa [was] the first nature area to be saved by the public".[8]

The government, however, also played an important part in protecting Chek Jawa. Then-Minister for National

[2] Anna Teo and Chuang Peck Ming, "Reclamation on Tekong, Ubin may cost $1.39 billion", *Business Times*, 17 Jul 1992, 2.
[3] Ang Hwee Suan, "Chek Jawa reclamation decided after careful study", *The Straits Times*, 27 Jul 2001, 25.
[4] Ministry of National Development, "Deferment of Reclamation Works at Tanjung Chek Jawa", Press Release, 20 December 2001.
[5] Lydia Lim, "Reprieve for rustic Ubin", *The Straits Times*, 15 Jan 2002, 1.
[6] Chua Ee Kiam, *Chek Jawa: Discovering Singapore's Biodiversity* (Singapore: Simply Green, 2002), 99.
[7] Liang Hwee Ting, "Nature lovers flock to Chek Jawa", *The Straits Times*, 25 Dec 2001, 1.
[8] Subaraj Rajathurai, interview by Benjamin Ho, Oral History Centre, National Archives of Singapore, Accession No. 004236, Reel 9, 9 Apr 2018.

Development Mah Bow Tan himself visited the site in October 2001 and met representatives from academia, civil society and the public.[9] When the deferment of reclamation plans was announced, the National Parks Board (NParks) set up a committee comprising representatives of Nature Society (Singapore), the then-Raffles Museum of Biodiversity Research, and other experts, to work out how to best preserve Chek Jawa's ecosystem.[10] This was especially vital given the crowds of people excited to visit the wetland, potentially damaging the very site which the public was lobbying to protect.

Tangible and Intangible Value

Recognition of Chek Jawa's importance has grown over the years. In terms of biodiversity, it is home to numerous species. These include a unique combination of mangrove and seagrass plants, including the globally rare seagrass *Halophila beccarii*, which is critically endangered in Singapore. A number of animals also call Chek Jawa home, including crabs, otters, and mudskippers—a special type of amphibious fish that can survive both in and out of water.

But Chek Jawa is more than just a reservoir of biodiversity, as its coastal habitats help people too. They protect our shorelines, trap pollutants in their soils and suck up our greenhouse gas emissions. Cumulatively, the mangroves and seagrasses of Chek Jawa store the equivalent of 1,824 tons and 506 tons of carbon dioxide per hectare respectively.[11] It is no wonder then that Chek Jawa is famous internationally as a site of immense scientific value and interest.[12]

Chek Jawa is also culturally important. It is a key recreation spot, offering respite to inhabitants of densely urban Singapore. Recreation improves our health and wellbeing and brings concrete economic benefits to the livelihoods of Ubin residents. Chek Jawa also has important cultural value, particularly for former residents of Kampong Chek Jawa.

Top: A honeycomb whipray beached during low tide, 2003. Courtesy of Ria Tan, www.wildsingapore.com.

Bottom: A wild boar along the beach at Chek Jawa with visitors in the background, 2012. Courtesy of Ria Tan, www.wildsingapore.com.

[9] Lydia Lim, "Govt open to feedback on conservation issues", *The Straits Times*, 15 Jan 2002, 2.
[10] Chua Lee Hoong, "Anatomy of a U-turn", *The Straits Times*, 2 Jan 2002, 7.
[11] Valerie Phang, Chou Loke Ming and Daniel A. Friess, "Ecosystem carbon stocks across a tropical intertidal habitat mosaic of mangrove forest, seagrass meadow, mudflat and sandbar", *Earth Surface Processes and Landforms* 40, no. 10 (2015): 1387–1400.
[12] Daniel A. Friess, Erik S. Yando, Lynn-Wei Wong and Natasha Bhatia, "Indicators of scientific value: An under-recognised ecosystem service of coastal and marine habitats", *Ecological Indicators* 113, no. 106225 (2020): 1–10.

Top: Chek Jawa boardwalk at sunrise, with seagrass plants beneath the water's surface, 2015. Courtesy of Ria Tan, www.wildsingapore.com.

Middle: A/P Dan Friess speaking to then-Minister for National Development Lawrence Wong and then-Minister of State Desmond Lee at the Restore Ubin Mangroves booth during the Pesta Ubin festival, 2016. Courtesy of Ria Tan, www.wildsingapore.com.

Bottom: Volunteers releasing horseshoe and swimming crabs from an abandoned drift net, 2007. Courtesy of Ria Tan, www.wildsingapore.com.

Coming Together

While the benefits provided by Chek Jawa are well recognised, some challenges to securing its future still remain. The option for development still exists in the long run, as suggested by the Urban Redevelopment Authority's Master Plan 2019.[13] Oil spills and other sources of pollution have the potential to impact Chek Jawa and its biodiversity.[14] And as with many coastlines around the world, there are concerns about how our coastal ecosystems may respond to the impacts of climate change, such as sea-level rise.

In balance, though, the future of Chek Jawa appears to be bright, because the conditions that led to the original protection of Chek Jawa are even stronger today—which is a legacy of collaboration between diverse stakeholders.

For example, the Friends of Ubin Network comprises a passionate group of volunteers representing the nature and heritage communities, Ubin villagers and academics supported by the government; together, they help ensure the sustainable and sensitive use of the island.[15] Similarly, the Restore Ubin Mangroves initiative brings together nature enthusiasts, fish farmers and academics working with NParks to advocate for mangrove restoration opportunities.[16]

Ultimately, natural spaces such as Chek Jawa are more than just ecological jewels. They are places for various communities and stakeholders in Singapore to come together towards a common goal. They represent a record of how our interactions with and valuing of nature have changed over the decades, and are a guide to how we can continue to create a more sustainable Singapore into the future.

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[13] Urban Redevelopment Authority, "Master Plan 2019", *Master Plan*, 2022, www.ura.gov.sg/corporate/master-plan/introduction (accessed 3 Mar 2022).
[14] Toh Wen Li, "NParks volunteers help will oil spill cleanup efforts at Chek Jawa over the weekend", *The Straits Times*, 7 Jan 2017, 3.
[15] National Parks Board, "Friends of Ubin Network", *Pulau Ubin*, February 2021, www.nparks.gov.sg/pulau-ubin/friends-of-ubin (accessed 3 Mar 2022).
[16] Restore Ubin Mangroves, "Restore Ubin Mangroves Initiative", September 2021, https://rum-initiative.blogspot.com/ (accessed 3 Mar 2022).

Finding Common Cause: The Nature Society in Singapore's Early Post-Independence Years

While it is not uncommon to read news excerpts characterising the relationship between environmental groups and the government in adversarial terms, a look at Singapore's post-independence history reveals a far more textured picture in which green advocates often found common cause with state actors. In fact, one study by Goh Hong Yi of the Nature Society (Singapore)'s early days suggests that both state and civil society attitudes towards the environment have been consistently defined by a common motivation to place society before self.[1]

According to Goh, this disposition towards "collaboration and consultation" for the greater good has informed the Nature Society's outlook ever since its Singapore chapter was established as a branch of the Malayan Nature Society (MNS) in 1954.[2] For example, as early as 1976, it had pioneered two major projects—an ecological study of the Bukit Timah Nature Reserve and a bird study at the former Serangoon Sludge Treatment Works—both of which were well received by the then-Nature Reserves Board.[3] In response, the Board even invited the Society to design an educational pamphlet on the reserve's flora and fauna.[4]

Perhaps more interestingly, the Society also played an active role in bridging the gap between public sentiment and Government policy towards the wildlife trade during our early nation-building years.[5] During those decades, the Society would frequently receive letters of concern about the peddling of exotic meats such as civet cats, water monitors, and pythons in areas such as Bugis Street and Sago Lane. In turn, it acted with decisiveness and integrity, carrying out its own investigations and reporting errant dealers to the authorities.[6]

Lastly, the Society also monitored the practice of trapping wild birds for pets, which was a common practice amongst those seeking to exploit enforcement loopholes in the Wild Animals and Birds Act. Trapped birds spotted during outings were rescued, and reports were filed with the then-Primary Production Department (PPD).[7]

A reptile food shop owner in Chinatown skinning a monitor lizard, 1959.

[1] Goh Hong Yi, "The Nature Society, Endangered Species, and Conservation in Singapore", in *Nature Contained*, edited by Timothy P. Barnard (Singapore: NUS Press, 2014), 245–275.
[2] Goh, 251.
[3] Nancy Byramji, "Save These Birds From Extinction", *The Straits Times*, 16 Oct 1977, 12; Gloria Chandy, "Look at Nature up Bt Timah", *The Straits Times*, 26 Feb 1977, 9.
[4] Goh, 254.
[5] "Anyone for a cuppa—of fresh 'musang' blood and samsu?", *The Straits Times*, 10 Apr 1977, 24.
[6] Goh, 255; Ilsa Sharp, "Add dash of morality to exotic food", *The Straits Times*, 13 May 1981, 9.
[7] Goh, 255.

From Crisis to Opportunity: The Active, Beautiful, Clean Waters Programme

by **PUB, Singapore's National Water Agency** in collaboration with the **Founders' Memorial**

Each time a torrential downpour occurs, the water level in the Kallang River at Bishan-Ang Mo Kio Park rises and the adjacent park space becomes a floodplain to channel stormwater downstream to Marina Reservoir. At times, this trademark characteristic of the waterway's rejuvenation under the Active, Beautiful, Clean Waters (ABC Waters) Programme attracts the attention of curious onlookers. Some take to social media to express concern at this sight. Yet others may be aware that this innovative stormwater management measure is in itself a direct outgrowth of Singapore's decades-long experience of combatting what had once been regular and severe floods. In fact, lying beneath the surface of the Kallang River is an inspiring story of crisis transformed into opportunity.

A flood in Singapore, 1963. Ministry of Information and the Arts Collection, courtesy of the National Archives of Singapore.

Minister for Communications and Works Francis Thomas initiates works for the construction of a dam at Ulu Bedok to alleviate floods at 9th mile Changi Road, 1955. Ministry of Information and the Arts Collection, courtesy of the National Archives of Singapore.

Solid Foundations: 1950s–1970s

In the 1950s, rapid development and urbanisation had increased flood risks on our low-lying island, putting Singapore's drainage networks under severe pressure. Indeed, up to the 1970s it was not uncommon to witness residents in both rural and urban Singapore occasionally wading through knee-deep waters as part of their commute to work or school. Mr Tan Gee Paw, former Chairman of PUB (2001–2017), recalled in a 2007 interview with the National Archives of Singapore that when the Kallang River breached its banks in the 1970s, "flood waters [rose] up all the way to the roof of attap huts", with the army eventually called in to rescue farmers who were perched precariously on their rooftops.[1] Clearly, governments of the day could not sit idle. As early as 1955—the year in which David Marshall's Labour Front won the most seats in the Legislative Assembly—the then-colonial government appointed for the first-time an "Anti-Floods Chief",

[1] Tan Gee Paw, interview by Jason Lim, Oral History Centre, National Archives of Singapore, Accession Number 003170, Reel 3, 20 Nov 2007.

F. Pelton, who took up the role of "Chief Drainage Engineer" in the Public Works Department.[2] Pelton was to head a special branch of the Public Works Department tasked with drawing up an overall flood relief plan for Singapore, and would spend the next few years working closely with the incoming Labour Front administration to address one of Singapore's most pressing environmental and public health issues.

Complicating the Public Work's Department task was the breakneck speed at which Singapore's landscape was changing in the mid-20th century. With plans for new buildings, roads, and houses aplenty, engineers had to ensure that complex drainage issues were addressed before the start of each new development, in addition to addressing existing insufficiencies. Faced with such a gargantuan undertaking, they started with basic plans for tide control gates, canals, and irrigation dams, which, though simple by today's standards, required tidy sums of money in the 1950s.[3] Besides Pelton, another key leader who made a mark in these early discussions was Francis Thomas, the Minister for Works and Communications in David Marshall's Labour Front government. Speaking in the Legislative Assembly on 12 October 1955, Thomas promised that $60 million would be allocated for flood control in the city area, but even then, such spending had to "be balanced against other public expenditure".[4] This, however, was not the only dilemma. Infrastructurally, Thomas and his staff also had to grapple with the question of how flood alleviation schemes in upstream areas like Tai Seng could be constructed without affecting downstream areas like Geylang.[5] Undeterred and with maps in his hand, Thomas personally led trips down to

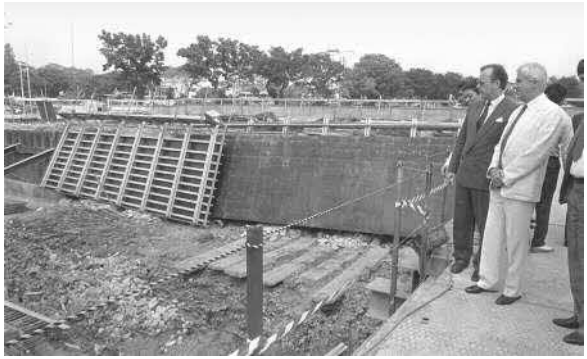
Parliamentary Secretary for the Ministry of Home Affairs Chan Chee Seng and HDB Chairman Lim Kim San visit areas affected by floods, 1963. Ministry of Information and the Arts Collection, courtesy of the National Archives of Singapore.

[2] "Engineer's new job: To beat the floods", *The Straits Times*, 2 Feb 1955, 8; "He will tackle Colony floods", *The Straits Times*, 6 Feb 1955, 5; "Anti-flood expert begins works", *Singapore Free Press*, 2 Mar 1955, 8.
[3] "Tide Control Gates to Beat Floods", *The Straits Times*, 25 Jul 1956, 9; "The Next Step–Tidal Gates for Geylang", *Singapore Free Press*, 23 Jan 1957, 3.
[4] "$60m. to fight floods", *Singapore Free Press*, 12 Oct 1955, 1.
[5] "Enlarging the canals could mean chaos", *Singapore Free Press*, 10 Jan 1957; "Expert criticises flood schemes", *The Straits Times*, 24 Oct 1957, 7.

flood-affected areas, where he listened and consulted affected communities. Successive government leaders involved in flood planning, from Lee Kuan Yew to Lim Kim San, would continue this practice, with archival images showing them umbrellas in hand, surveying flooded areas across Singapore. Just like the utilitarian canals constructed during this era, these small but basic steps mattered, for they were fundamental building blocks that paved the way for more complex schemes to be undertaken later.

A Bold Leap: 1980s–2010s

By the 1980s, with improvement works to Singapore's drainage system having proceeded apace for almost 30 years, the basic infrastructure to tackle the flooding menace was all but in place. The Public Works Department team responsible for drainage works had also undergone a metamorphosis of its own, having been established as a department in its own right under the newly-formed Ministry of the Environment in 1972.[6] More broadly, however, towards the last two decades of the millennium there was also a general shift in the way urban planning was conducted, with an increasing focus on the qualitative aspects of city living. Recognising that waterbodies and waterways could play more than just a functional role, in 1989 the Urban Redevelopment Authority (URA) developed a plan to boldly reverse what had been the status quo: concretising and canalising waterways. Now, under the ambit of the Waterbodies Design Panel, URA worked with the then-Drainage Department to naturalise and beautify Singapore's rivers, canals, and streams, with the first test-bed case being the beautiful mangrove-lined canal of Sungei Api Api in Pasir Ris town. As Wong Kai Yeng, former Director of Planning & Policy at PUB was to later elaborate, "the fundamental[s] [had not] changed" as the primary purpose of canals and drains was still flood prevention.[7] Yet, with boldness and vision, planners had already begun to reimagine how waterways could feed into the nationwide vision of a Garden City.



Top: A foreign dignitary being briefed on the Bukit Timah Flood Alleviation Scheme, 1987. Ministry of Information and the Arts Collection, courtesy of the National Archives of Singapore.

Bottom: Sungei Api Api at Pasir Ris, with HDB flats lining both banks, 2019. Courtesy of the National Heritage Board.

"Our ABC Waters Programme will turn concrete monsoon drains and canals into streams. The whole island has been sewered up, so only clean rainwater will flow into our drains and canals. In 10 years, Singapore will have many waterways and park connectors, creating more recreational areas and an aesthetic environment. Future generations must keep this city beautiful, distinctive."

Then-Minister Mentor Lee Kuan Yew at the Clean and Green Singapore Exhibition, 2009[8]

[6] Centre for Liveable Cities, *The Active, Beautiful, Clean Waters Programme: Water As An Environmental Asset* (Singapore: Centre for Liveable Cities, 2017), 14.
[7] Wong Kai Yeng, interview by Centre for Liveable Cities, Ministry of National Development (unpublished transcript), Accession Number CLC/027/2016/004, 11 Oct 2016.
[8] Lee Kuan Yew, note from Minister Mentor's office titled "Quote from Minister Mentor Lee Kuan Yew for Clean and Green Singapore Exhibition 2009", 10 Oct 2009.

It was against such a backdrop that PUB, Singapore's National Water Agency, later launched in 2006 the ABC Waters Programme as one key plank of Singapore's goal to be a City of Gardens and Water. Building on Singapore's decades-long experience in flood management, the ABC Waters Programme seeks to harness the potential of our waterways and waterbodies by integrating them with the urban environment and creating new community and recreational spaces for all to enjoy. According to Mr Khoo Teng Chye, former Chief Executive of PUB (2003–2011), a key driver of the success of ABC Waters was founding PM Lee Kuan Yew's foresight and thinking, and his championing of integrated blue-green spaces.[9] Today, ABC Waters projects include the iconic Kallang River at Bishan-Ang Mo Kio Park, the upgrading of Rochor Canal, and more recently, the naturalisation of a section of Sungei Tampines. When the ABC Waters Programme was first launched, it was a new approach towards managing water resources for PUB—one that maintained the basic hydrological and drainage functions of waterways but with an increased emphasis on engaging key stakeholders like the public.

Unchanging Fundamentals

Not unlike flood alleviation efforts undertaken in Singapore's early nation-building years, the ABC Waters Programme requires close coordination among agencies, and careful planning to strike a balance between utility, aesthetics, and land scarcity concerns. Before PUB launched the ABC Waters Programme in 2006, some expressed scepticism if it was possible to transform the concrete canals into beautiful rivers while meeting drainage needs. Others had concerns about hygiene and public safety if the public were given access to waterbodies for recreational use. To assure the public of the feasibility of the ABC Waters Programme, PUB embarked on demonstration projects at various locations and held multiple outreach programmes.

In these ways and more, the ABC Waters Programme represents the bold vision of our early leaders coming to fruition, even as successive generations of Singaporeans continue to build on their work. For example, while the technical feats behind naturalising canals and streams

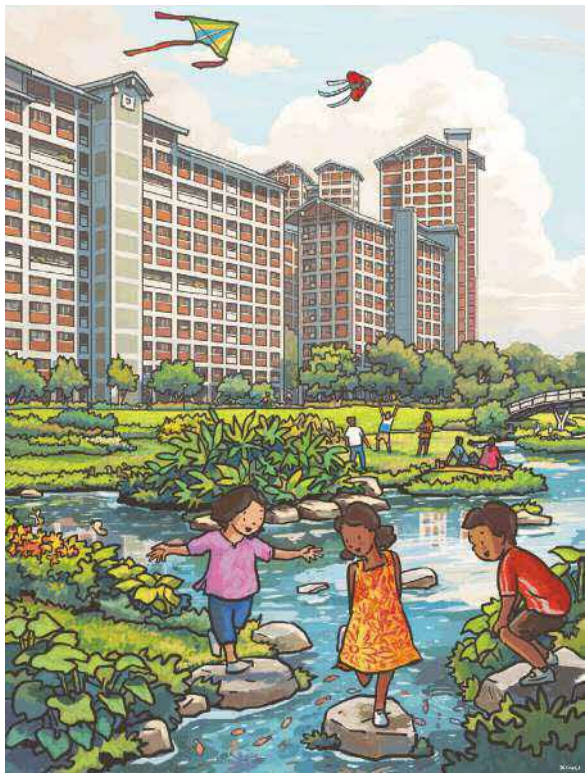
ABC Waters site at Sungei Tampines, with Tampines Eco Green on the right, 2022. Courtesy of PUB, Singapore's National Water Agency.

ABC Waters Design Features are part of a natural treatment system of plants and soil that slow down, detain, and cleanse stormwater runoff, 2018. Courtesy of PUB, Singapore's National Water Agency.

[9] Khoo Teng Chye, interview by Founders' Memorial, 7 Feb 2018.

may be modern and new, the ethos of innovation and foresight remains a constant thread. Admittedly, the problems faced by our founding leaders in the early days were of a different order and magnitude. Yet, it was precisely because our leaders across the years had the resolve and determination to not only deal with, but also look beyond the most pressing of issues, that today's generation can now build on the solid foundations established. Just like how leaders ranging from Francis Thomas to Lim Kim San rolled up their sleeves and worked hand-in-hand with communities across Singapore, so too has PUB continued to creatively imagine how waterways can bring people together. For example, when the Sungei Ulu Pandan and Geylang River ABC Waters projects were being designed, planners and engineers spoke to nearby residents and schools, as part of a wider process of consultation and engagement.[10] Seen in this way, our blue spaces continue to serve the critical function of drainage, but now also double up as environmental assets that enhance residential areas and complement green spaces while serving as educational tools to increase awareness of water-related issues to the public.

What then does the future hold? As Singapore looks ahead, the looming storm of climate change confronts us, with coastal cities around the world being threatened by rising sea levels and unpredictable weather systems. Yet, if history is anything to go by, Singapore has yet another chance to turn a crisis into opportunity, if only we continue to approach the coming decades with the same imagination and verve that impelled our early generation of nation-builders.



Top: Flood relief efforts, 1964. Ministry of Information and the Arts Collection, courtesy of the National Archives of Singapore.

Bottom: Lee Xin Li, illustration of ABC Waters site at Bishan-Ang Mo Kio Park commissioned by PUB. Courtesy of Lee Xin Li (@xinli29288), www.leexinli.com.

[10] Kenneth Er, Leong Chee Chiew, Khoo Teng Chye, and Joseph Hui, Environment (Singapore: Institute of Policy Studies and Straits Times Press, 2016), 111-112.

School Lunch from a Tingkat: Unpacking Sustainable Food Packaging in Singapore Then and Now

by **Chew Ding Hong, Kaung Zin Thant, Ng Lok Woon,** and **Ramathas Visvatharshni** of **Jurong Secondary School**

Since the outbreak of the Covid-19 pandemic, students across Singapore have had to consume their meals individually at classroom desks rather than communally at canteens. At Jurong Secondary School, we, a group of students from the Environment Club, noticed that this has led to a rise in the use of disposable food containers and utensils. While some of our friends have heeded the call to "Say Yes to Waste Less"—the National Environment Agency's campaign slogan to reduce waste—most still rely on single-use plastic cups and styrofoam boxes to transport their iced drinks and warm meals from canteen to classroom. This *dabao* (a colloquial term meaning to "takeaway") culture has in turn led to a significant increase of waste in our school's trash bins.

Nevertheless, we observed that some students started bringing lovingly prepared meals from home instead. One contraption, which was used by our classmate Sathya to pack her food, caught our eye. A three-tiered receptacle, it towered over the usual squat and square lunchbox. Intrigued, we began to delve deeper into its origins, which led us to explore the history of food packaging in Singapore. As we conversed with parents and friends, we found ourselves transported to a time where resourcefulness and ingenuity characterised how food was packed and transported. We wondered: could this be an inspiration for how we pack and consume takeaway food today?

A student eating from her modern-day tingkat, 2022. Courtesy of Jurong Secondary School.

The container used by Sathya, we soon learnt, is a tiffin carrier. It is also commonly known by the name *tingkat*, a Malay term that means "levels" and which refers to the carrier's vertically stacked bowls. Mrs Ng, Lok Woon's mother, shared with us that *tingkats* were once used as part of wider food delivery networks. Food would be placed securely in these carriers, which were delivered to customers at their homes or workplaces. After consuming their food, customers would wash them and place them outside their homes. At the next meal delivery, the cleaned *tingkats* would be collected and another one containing food would replace it. This left us amazed at how environmentally conscious Singaporeans were in the past, but Mrs Ng quipped, "It was not about environmentalism, it was about graciousness. People treated things better. If somebody gave you food in a container, you took care of the container well before you passed it back to them. Plus, plastics were just much more expensive at that time. Nobody was going to use something once and then just throw it away."

Are *tingkats* still used by Singaporeans today? When sent on errands by our parents to purchase food from food courts or hawker centres, they hardly made an appearance. We thus approached our classmate Sathya to find out why her family still used these carriers. She shared that her mother wakes up early on school days to cook and pack food in a *tingkat* for her, as she prefers her mother's home-cooked food. Although her *tingkat* drew some stares during the first few days of school, Sathya thinks it is a practical and sensible choice. In her own words, "[Because] my tiffin carrier is small, it holds the right amount of food I need, and since it is made of metal, it keeps the food warm when it is placed inside an

"It was not about environmentalism, it was about graciousness. People treated things better. If somebody gave you food in a container, you took care of the container well before you passed it back to them."

Mrs Ng, Lok Woon's Mother

Top: Tiffin carrier, 1960s. Collection of the National Museum of Singapore, National Heritage Board.

Bottom: Big Mac clam shell food container, 1975-1990. Collection of the National Museum of Singapore, National Heritage Board.

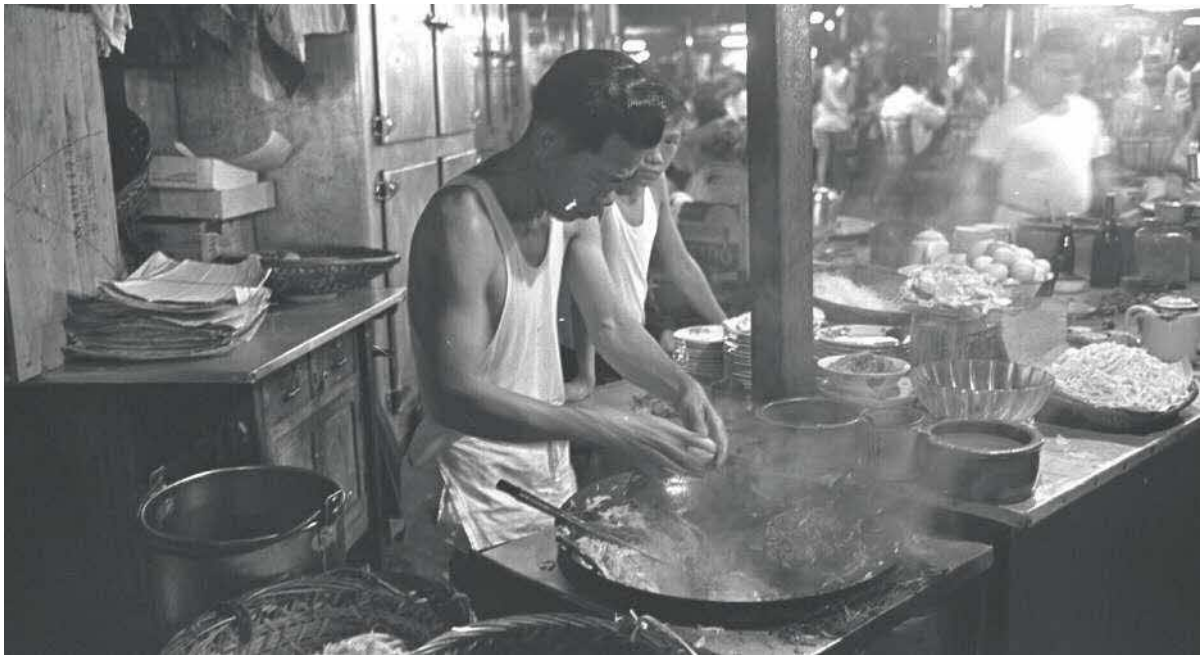
insulated bag. When I return home, my mom washes the tiffin carrier and dries it so that I can use it again the next day."

One of our groupmates, Zin Thant, uses tiffin carriers as well, but his story is somewhat different. "My family cooks a lot at home and often we have too much food and we can't finish it", he shared. "So we use the tiffin carriers to pack food that we know we can't finish and we deliver the food to our neighbours. In return, they cook their own food and place them in the same tiffin carriers before returning them to us. These small acts of kindness bring a lot of warmth and happiness to us and make us a more tight-knit community." But why tiffin carriers, we asked? Zin Thant shared that taste was also on his mind. "Tiffin carriers allow us to pack different dishes separately without them intermixing. This keeps the flavours just how we want it to taste. The rice also stays nice and fluffy, and not soggy and soaked in the gravy."

Besides tiffin carriers, there were other materials used to pack food in Singapore in the past, used by sellers from roadside stalls, hawkers and *teh sarabat* joints (stores selling hot milk tea usually pulled by Indian Muslim vendors). Our teacher's father, Mr Samuel,

Aluminium tiffin carrier, 1970s. Gift of Avadai Ganga Bai. Collection of the National Museum of Singapore, National Heritage Board.

A customer taking away food from a Malay food stall using a plastic carrier, 1990s. Singapore Tourism Board Collection, courtesy of the National Archives of Singapore.



A char kway teow stall at People's Park, with *opeh* leaf wrappers in background, 1965. Ministry of Information and the Arts Collection, courtesy of the National Archives of Singapore.

A condensed milk tin reused as a *kopi* carrier, 2022. Courtesy of the National Heritage Board.

revealed to us that because plastic was not used widely before the 1980s, hawkers would use different types of leaves to pack food. "I remember going to the forest behind my house to cut down leaves from the *simpoh* air shrub (*Dillenia suffruticosa*)", he recalled. "The leaves were abundant and they were a little waxy so the sauce didn't spill out when the food was wrapped. Many shops also used banana leaves or dried *opeh* leaves, which comes from the betel nut plant (*Areca catechu*). But people mainly just brought their own containers if they needed the food to be packed. I think back then, Singaporeans just didn't like throwing things away." Our teacher also recalled how used condensed milk tins were once popular containers for *kopi* (a Malay term for coffee) but have since been displaced by styrofoam cups.

So why is it that Singaporeans seem to be less environmentally conscious? The answer seems to boil down to convenience. Firstly, compared to loosely wrapped leaves, lightweight single-use plastics prevent spillage of sauces and liquids. As for reusable carriers such as *tingkats*, they need to be cleaned after use, and some users may find them bulky, or they may be prone to misplace them. Finally, the waste generated from disposable food packaging goes out of mind as it "disappears" once we throw it into the rubbish chute.

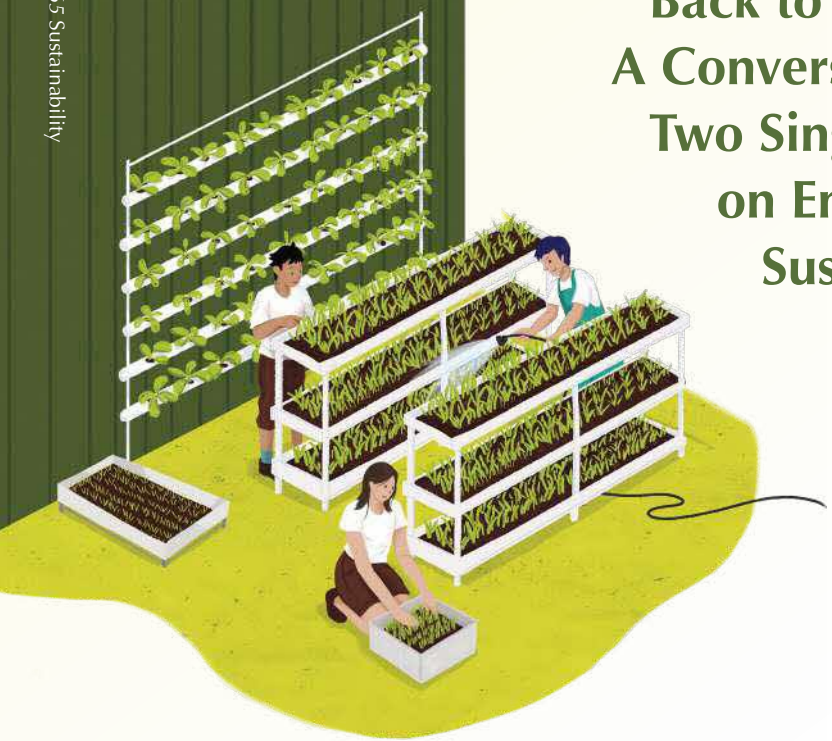
We believe that the humble *tingkat* and *opeh* leaf can inspire us to a more sustainable future by going back to basics. Both remind us that reusable crockery and cutlery need not come in the form of the latest stylishly designed lunchbox or the fanciest metal straw. Rather, by fully utilising already available containers and

resourcefully adapting products from nature, all of us can partake in creating a low-waste, environmentally friendly future. In any case, doesn't the suspense of unwrapping a pack of banana leaf-wrapped nasi lemak, or the anticipation prior to opening a *tingkat* container, add to the delight of consuming a deliciously prepared meal?

Chew Ding Hong, Kaung Zin Thant, Ng Lok Woon, and Ramathas Visvatharshni are students from Jurong Secondary School's Environment Club. The club actively promotes sustainability as a way of life, both within the school, and in the Taman Jurong community and beyond. This article was crafted with inputs from teachers Don Marcus Kannangara and Daniel Lee.

A woman preparing rice dumplings using bamboo leaves, 1982. Ronni Pinsler Collection, courtesy of the National Archives of Singapore.

Chua Mia Tee, *Eating on Banana Leaves*, 1979. Oil on canvas, 69 x 81.5 cm. Gift of Times Publishing Limited. Collection of National Gallery Singapore.



Back to the Future: A Conversation with Two Singaporean Youths on Environmental Sustainability

featuring
Nichell Teo of
Jurong Secondary School
and
Ting Wai Kit of the
National University of Singapore

by **Joshua Goh**

From mitigating climate change to protecting biodiversity, youths across the world are at the forefront of addressing our planet's environmental crises. This is no less true in Singapore, where beach clean-ups and campaigns against single-use plastics are but two ground-up initiatives commonly associated with environmentally conscious youths.

Yet how does the average Singaporean youth think about environmental sustainability, particularly in a city where "cleaning and greening" has become an all too familiar refrain? Do youths take inspiration from the foresight of our founders who dared to imagine a metropolis free of pollution, or are they charting their own distinct paths?

Recycling bins at East Coast Park, 1991. Ministry of Information and the Arts Collection, courtesy of the National Archives of Singapore.

+65 speaks to Nichell Teo, a Secondary 4 student at Jurong Secondary School, and Ting Wai Kit, a Year 3 Geography and University Scholars Programme undergraduate, and member of the National University of Singapore's Students' Association for Visions of the Earth (NUS SAVE) interest group, to find out more.

As digital natives, both of you have witnessed how environmental issues have emerged as an increasingly "hot" topic on social media in recent years.

The Singapore Green Plan 2030, COP26, and debates over the future of green spaces such as the Clementi and Dover Forests are but some issues that have made the headlines recently.

Amidst these discussions, one catchphrase that is often invoked involves the term "sustainability". Do both of you have any reflections on what being sustainable means when it comes to the environment?

Wai Kit: Well, the Singapore Green Plan 2030 is a good example of a national level initiative which integrates sustainable development with Singapore's environmental vision of being a City in Nature by 2030. Nevertheless, on a personal level, leading a sustainable lifestyle has to do with individuals reducing their impact (or footprint) on the environment. Our actions, though seemingly unnoticed, do have a substantial combined impact. As Anne Marie Bonneau (@zerowastechef) puts it, "We don't need a handful of people doing zero waste perfectly. We need millions of people doing it imperfectly."

Nichell: I agree with Wai Kit! Meeting our national sustainability goals is a collective effort by all citizens and residents of Singapore. Building a better future through sustainable practices comes from us, and given the environmental challenges we face, it is increasingly important for us all to adopt such a mindset.

Top: Wai Kit taking part in a tree planting initiative, 2021. Courtesy of NUS SAVE.

Bottom: Nichell in conversation with her grandmother, 2021. Courtesy of Jurong Secondary School.

Speaking of inculcating sustainable practices in everyday life, we understand that Nichell recently had a conversation with her grandmother about this topic. Could you share with us how the conversation went? There is a view that environmental sustainability is a pet topic only for "woke" youth. Any thoughts on this?

Nichell: Well, I was surprised that my grandmother responded to the conversation with ease! In fact, she elaborated by commenting that her idea of sustainability is to "save and conserve our resources for further use until they are no longer useful".

Looking back, I can see that this was shaped by the circumstances of her childhood. Her parents were raising a total of 7 kids and they were not financially well-off then. Hand-me-downs were thus common in her family, and they would sometimes weave quilts from worn-out clothes to make ends meet. Naturally, being frugal and prudent were qualities which she has carried with her to this day.

Even though she did not have a textbook definition of sustainability, it was clear to me that she understood the principles behind this concept. We have to remember that problems such as global warming were not exactly pressing issues in Singapore's early post-independence days, as compared to now. Of course, with citizens, businesses, and organisations all subscribing to this buzzword today, the sustainability message is now encoded even in everyday objects such as recycling bins, which are a common sight wherever we go.

That's true. While our Pioneer and Merdeka Generations may not have utilised the vocabulary of sustainability, their actions certainly demonstrated that they were driven by a mindset not different from the 3 'R's we know today—reduce, reuse, recycle.

In fact, in this issue's feature piece (pp. 8–13), Professor Tommy Koh comments on how thrift and frugality are two virtues which have unfortunately gone 'out of fashion'. In addressing our present environmental crisis, how else may we benefit from the wisdom of our pioneers?

A poster created by NUS SAVE calling on students to utilise reusable water bottles, 2020. Courtesy of NUS SAVE.

Nichell: I would say that we should not neglect the role of the community. To quote again from my grandmother's story, she grew up rearing chickens and ducks, but she did not own a piggery. This did not stop her from collecting leftover food and placing them at her neighbours' doorsteps, as families raising pigs could then process the food scraps into feed.

Wai Kit: If I may carry on from Nichell's point and provide a contemporary example of community action, at NUS SAVE, we have mobilized the student body to take action by reducing plastic waste in canteens, recycling textile waste, and allowing students to appreciate the natural world through nature walks and beach clean-ups. In fact, many green groups across Singapore are organising events, curating programs, and running campaigns that are empathetic and engaging, and which act as a gentle nudge for citizens to undertake this green transition.

Both of you are right! In thinking of environmental sustainability, we should really be looking to build on past efforts, while having our eye on the future. Speaking of the past, it seems that much of the conversation globally has thus far been framed

Students from Jurong Secondary School tending to their hydroponics farm, 2020. Courtesy of Jurong Secondary School.

Lee Sow Lim, *A 'kampong' scene*, 1950s–1960s. Collection of the National Museum of Singapore, National Heritage Board.

in binary terms—for example, *either* environmental protection *or* development. But Singapore has shown that environmental sustainability can co-exist with and complement other pressing priorities. Are there any projects you are aware of which could help illustrate this point?

Nichell: My example has to do with how being green can overlap with helping uplift the needy in our society. Personally, I'm quite intrigued by the idea of a community fridge which is today found in many neighbourhoods, and how it both allows needy families to meet their food requirements while preventing wastage. I've seen vegetables, fruits, fish, and other meats being shared by charitable organisations and neighbourhood groups through this initiative.

Another example would be how urban farming efforts can build economic resilience, in light of the food security challenges we have been facing and our national "30 by 30" goal. Looking around Singapore, rooftop gardens are an

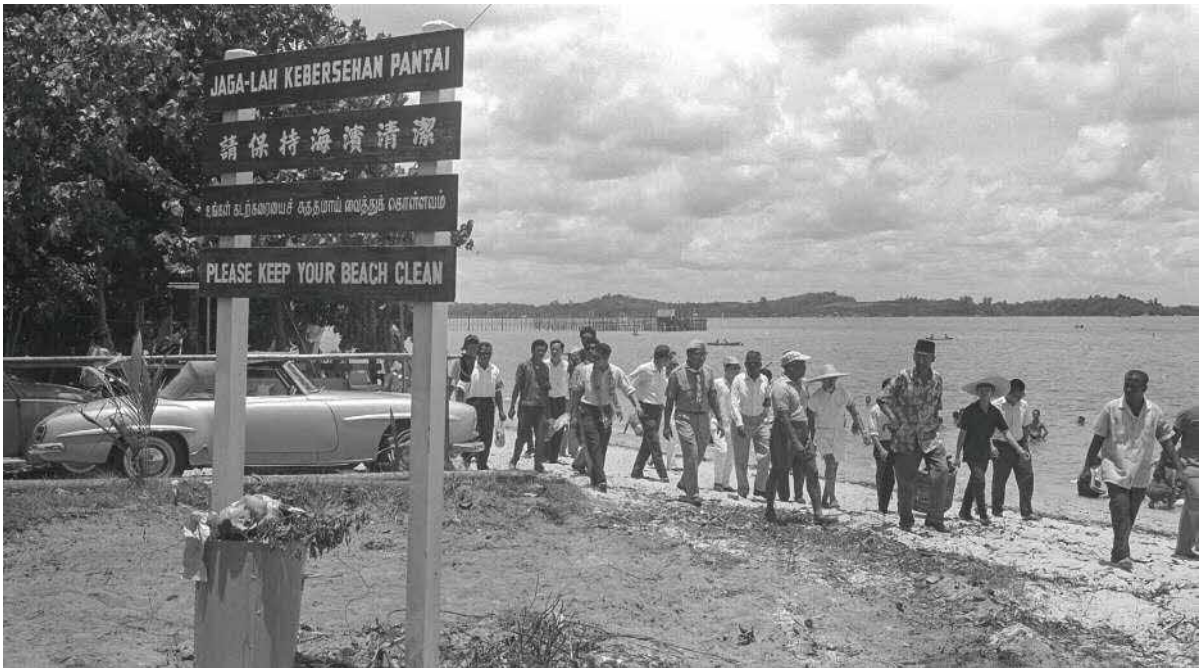
Community fridge in Yishun, 2022. Courtesy of the National Heritage Board.

increasingly ubiquitous sight to behold. They are sustainable, non-intrusive, and address our lack of available land for gardening and farming.

Interestingly, I've had the chance to learn more about composting food waste as part of my Applied Learning Programme here in Jurong Secondary School. We have workshops on how we can manage food waste on a personal level at home. Food scraps can be categorised and put aside to create compost that we use for a small garden plot or even potted plants. At school, we use the compost made in class for class garden plots. We then compare that process to a hydroponics set-up right next to it. This helps us to experience different ways of farming in land scarce Singapore.

Wai Kit: I would like to raise the topic of Dover Forest, as I'm part of the Friends of Clementi-Ulu Pandan Nature Corridor group which was set up to engage stakeholders on the delicate issue of balancing environmental protection with our national priority of public housing.

Rows of crops growing at Funan Mall's rooftop urban farm, 2022. Courtesy of Jeremy Thaddeus How.



Participants at the "Keep Your Beach Clean" campaign launch at Changi Beach, 15¾ milestone Nicoll Drive, 1966. Ministry of Information and the Arts Collection, courtesy of the National Archives of Singapore.

Students from NUS SAVE taking part in PUB's Singapore World Water Day beach clean-up at Pasir Ris Beach in conjunction with the Inter-University Environmental Coalition, 2022. Courtesy of NUS SAVE.

As a city-state with scarce land, our government has the challenge of addressing a wide range of needs. In the case of Dover Forest, the government adopted a science-based approach for ecological connectivity. When rare wildlife species were seen in the forest's western sector, plans were drawn up to conserve it in the form of a nature park. Dover Forest East, on the other hand, will be developed sensitively for public housing, with green elements weaved in to improve air quality, attract wildlife, and reduce the urban heat island effect.

To me, it's gratifying to see residents, nature groups, and youth leaders coming together to dialogue through such a platform. I personally look forward to even more inclusive approaches that involve the community, environmental professionals, and the government to discuss upcoming development plans for the benefit of future generations.

A green bazaar at NUS' University Town, at which participants can purchase donated books, clothes, stuffed toys, and bags, 2022. Courtesy of NUS SAVE.

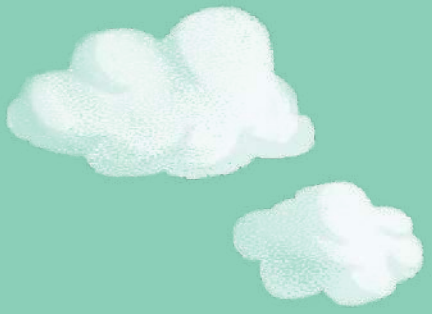
Sounds like there is much to look forward to! Both of you have clearly thought about how we can move beyond approaching environmental sustainability from the perspective of trade-offs alone. On a final note, any advice or reflections, whether for the young or young at heart?

Nichell: I would like to end off on an optimistic note by reflecting on how we have already made much progress in our goal towards being a more sustainable society, without compromising the economic health and well-being of our nation. Without a doubt, we can definitely do much better than what we are currently doing now. Nevertheless, we must remember that this is not only the government's responsibility. We the people of Singapore must ourselves play a part.

Wai Kit: From my perspective, many individuals care deeply about our environment and wish to conserve it. However, they may be unsure of where and how to start, or are too shy to speak up, thinking that their voice and opinions are not as "educated" or "informed" as others. By taking the first step to be involved in a green community, you'll find that the people there are friendly and open to share opportunities. A starting point could even be engaging in dialogues with professionals from the environmental sector! Being surrounded by a community of like-minded individuals makes it less lonely and easier to commit to sustainability, as we might be seen as "idealistic" or "unconventional" when doing good for the environment.

Thanks very much Nichell and Wai Kit, and all the best on your sustainability journey!

Joshua Goh is Assistant Manager (Curatorial and Engagement) at the Founders' Memorial.



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