chapter

06

WAYS FORWARD

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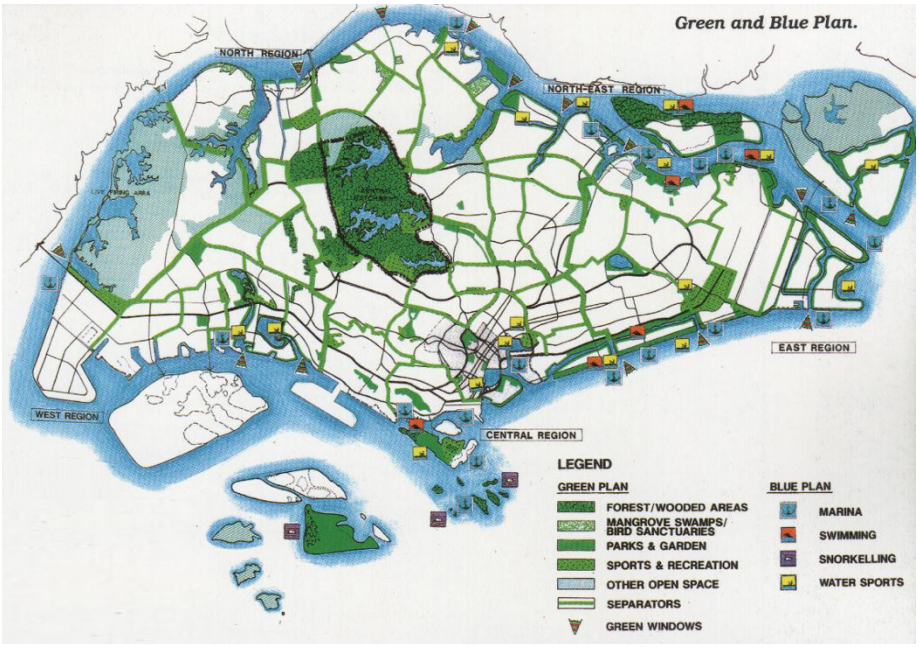
Beside Singapore's recent glamorous rise in notable architecture and urban design, centres of activity, event curation and other urban enterprises, the rise of the 'green-blue' planning and implementation since the early 1990s is perhaps its most truly distinctive and notable achievement in comparative terms with elsewhere in the world. By all accounts and certainly those discussed here, it has been and is truly remarkable, making Singapore a world leader. Much of this and further success can be attributed to the particular nurturing of Singaporean habits of mind, or what can be referred to as *'Kiasu'* ("afraid of losing" and "afraid of being static and needing to move on") with large doses of pragmatism, incremental effectiveness, doggedness and collective independence of opinion. Lurking behind is also a strong belief in the perfectibility of cities and that well-laid plans can be successfully carried out along with the technology needed to support them. While often leading to clean-cut and relatively narrow norms and ways of life, overall betterment has ensued for many if not most. Leadership, political will, visionary insight, clarity and directness in co-ordination among public and private agencies has come to the fore, with little wasted energy and outcomes. In the future, both internal and external challenges will undoubtedly emerge. Further buy-in by the public to Singapore as a truly 'city in nature' will require attention and public conversation. The result, however, also seems likely to be one of a kind, or if the rest of the world is shrewder in its choices, the first among many of its kind.

More squarely within the frame of reference concerning 'blue-green' planning and performance, Singapore appears almost certain to achieve many of its objectives. To be sure by 2061 if not earlier, some semblance of domestic water sustainability will have been accomplished, though not in the virtual realm beyond the island. Consequently, Singapore will rightfully take its place as a leader in the world of the water sector. Its domestic water sector initiatives will have continued to penetrate world markets and to set new standards of accomplishment elsewhere. The closed-loop, used water scheme of Singapore will be copied and the island state's expertise drawn upon and widely acknowledged. The 'green' component will also not go unnoticed, particularly as Singaporeans make their way into a more biophilic state with nature and begin to pioneer and make attractive the liberating effects of dense living and working within intense combinations of tropical flora and fauna. The necessary higher degree of acquaintance of Singaporeans with nature in order to secure their safe future in water will pay off and become more than an alibi for 'blue' with 'green' and a distinctive notable feature of the island state's urban landscape.[1] The integration required will put everyone more or less on the same page, so to speak, helping to further forge the degrees of inter-agency agreement and collaboration that have already been noteworthy and distinctive, but also in other offices as well. However the moral high-ground that Singapore seems likely to achieve among nations in pursuit of economic and environmental sustainability seems more likely to be achieved than not, pushing the young Republic further into the forefront.



87. THE GREEN BLUE PLAN ARISING FROM THE 1991 CONCEPT PLAN

a .

SUCCESSFUL INGREDIENTS

The ingredients for Singapore's success in these regards are several and interconnected. First, Singapore's governance is characterized by strong political will, visionary leadership, clear policy directions, whole-of-government collaboration, public-private partnerships, notable institutional capacities and what some have termed an ideology of pragmatism.[2] The extraordinary vision of Lee Kuan Yew from the early days of the Republic have already been commented upon and were pivotal to Singapore's rise and success along with the political will and clear insight that was also required, The success of single political party rule was constantly earned and not docilely granted, as witnessed in the most recent general elections in favor of the People's Action Party (PAP).[3] At a time when there was a certain amount of uncertainty about futures, votes were resoundingly cast for those who had made a difference and seemed to be well-known as distinct from unknown quantities in the mind's eye of the electorate. Such is to be expected rather than to be seen as unusual or somehow extraordinary by way of an outcome.

88. FROM A 'GARDEN CITY' TO A 'CITY IN NATURE'

Interagency collaboration was also necessary in order to capitalize on vision and leadership. Further, this occurred among several significant programmatic aspects of Singapore's 'green-blue' planning and implementation and for a number of reasons. In the broad scheme of things this flowed from the persistence, discipline and clarity of the Concept Plans and Masterplans, beginning in 1971. It was also strongly manifested in programs promulgated from lead agencies, like the PUB in the ABC Waters Programme, of NParks Streetscape Greenery Masterplans in conjunction with the URA. A sense of mutual respect, shared urgency of vision and technical capability underpinned these ventures. Throughout there was a high reliance on scientific and technical knowledge combined with real pragmatic reckoning with need. Arguments were thus reduced more to substance than to form, making collaborations easier. One sector's interests portended leadership, perhaps, but not a totalizing or dominant role.[4] This also enabled appreciably the whole-of-government approach to broad issues of interest and concern. A capacity for specific purpose agencies to morph, widen or focus their interests also played a role in the continuation of strong collaboration, especially as trends in both the water and green space sectors began to shift. For example, when the earlier version of the National Parks Board was merged with the Parks and Recreation Department in 1996, and became NParks today is a case in point and when the PUB foregrounded the ABC Waters Programme so strongly and forthrightly.

Public awareness and campaigns to keep the public interested and engaged also contributed to Singapore's success. The public at large were constantly made aware of environmental concerns and responsibilities from the early 'clean and green' movements to later ABC Waters Program. These were also metered out in bite-sized pieces, as it were, and for different constituencies on the way to reaching everyone. Again a clear case in point is when the ABC Waters Program's engagement began with children and then moved on to the adult populations of the parents. The campaigns were also attractive by way of presentation and purpose. The tone of urgency by not being either too lax or too strident was also important. Further, the tracking of specific campaigns in keeping with the temporal roll-out of broader programs also helped to engage the public through its relevancy, adding to the comfortable bite-sized messages being communicated.

Then too, something referred to as *kiasu* as a habit of mind of Singaporeans in general could be seen to lurk behind all these other ingredients, keeping the whole community, or most of it, synchronous or on the same page as it were. *Kiasu* is roughly translated as "afraid to lose", based on the Hokkein *kia* meaning 'afraid' and *su* meaning 'lose'.[5] As such it can imply possession of a grasping and selfish attitude. But moving further into the etymology of Singlish it can also mean an 'over-cautiousness' and 'fear of failing', as well as more positive senses of being *kiasu* in order to achieve something and to get ahead. As a general state of being kiasuism is perhaps closest to the American term 'paranoia' or an attitude driven by fear.[6] It can also convey the idea of risking as little as possible, which brings it close to a kind of pragmatism. Commonly used in Singapore often with an intended negative connotation, in some contexts it conveys a certain stalwart resolve to move ahead. One such context was during the early uncertain days of the Republic and a time of scarce resources. Without over-construing collective consciousness in this direction, *kiasu* combined with strong doses of pragmatism are evident in the almost dogged, incremental and technological pursuit of the ends of water security and the strong almost biophilic move towards tropical nature. Pragmatism is, after all, an outlook and approach that assesses the truth of theories and beliefs about situations primarily in terms of practical application. As one noted official commented, there was nothing fluky

or overly chance laden in the Singaporean approach to environmental management, water security and many other issues. Strong leadership, interagency collaboration, public awareness, all with a dash of *kiasu* and practical reckoning with reality, is what made the difference in Singapore.

b.

PUBLIC PARTICIPATION

What might be termed state-aided participation on the part of the general public was and is visible in Singapore's planning processes. Moreover, in its disciplined practice it is different from other forms that often appear bottom-up, spontaneous and unruly. Specifically in the development towards a 'Garden City,' a 'City of Gardens and Water,' the Singapore government has actively attempted to instill in their residents a sense of environmental consciousness, communitarian values and social responsibility over greening activities.[7] This public engagement takes two forms: raising public awareness, as described earlier, and public participation and consultation through, for instance, focus groups or workshops.[8] Campaigns that aim to inform the Singaporean public and raise awareness generally have an additional goal of creating ownership over a specific project or government policy. In fact, campaigns will often precede the introduction of an environmental or public health law.[9] Examples of campaigns, as noted earlier, include Singapore's long-running 'Clean and Green' Week, the recently launched Park Connector Appreciation Day, and the Annual Tree Planting Day. The Community in Bloom Program, in which Singapore's NParks aims to promote a gardening culture among residents is another example that contributes to the overall greening strategy and has the added explicit objective of encouraging social cohesion, even if the extent to which the later has proven successful is contested.[10] Also as noted earlier a second major public outreach method is through the educational system. By educating schoolchildren, the wider public is informed.[11]

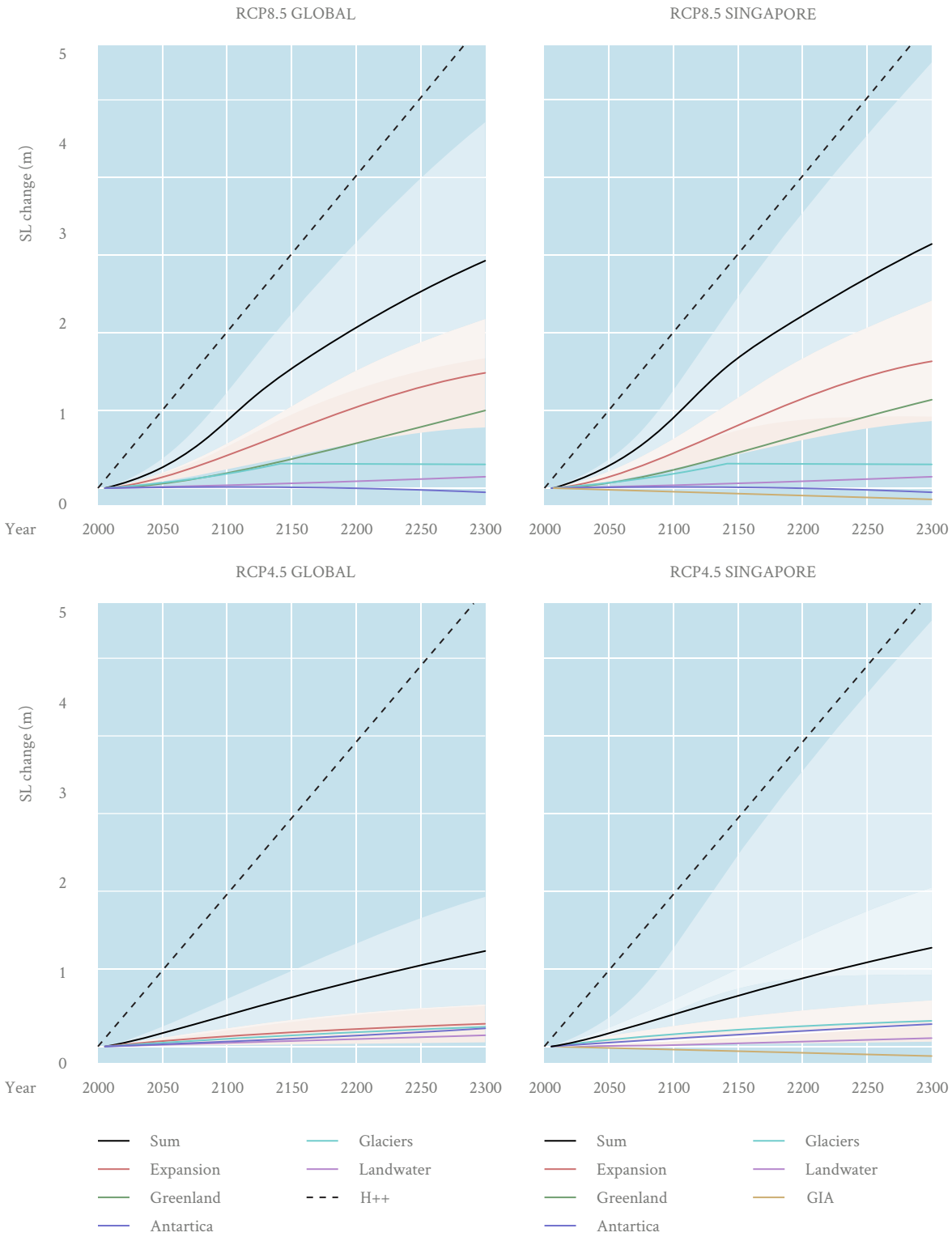
Public participation in green and blue projects in Singapore takes place through state-initiated focus groups or, for instance, design workshops at a project level. For example in the development of the Singapore Green Plan of 2012, setting out Singapore's approach to environmental sustainability for a ten year period, focus groups formed an integral part of the participatory process.[12] In addition there have been some examples of proactive interventions by Singapore's civil society. Although somewhat unconsolidated, Singapore's civil society influenced the determination of Sungei Buloh Freshwater Swamp as a bird sanctuary and natural reserve, as well as the reversal of plans to reclaim the Chek Jawa Wetlands on Pulau Ubin Island. As far as

on-going projects are concerned, the Rail Corridor coordinated by the Ministry of National Development and the Urban Redevelopment Authority, is seen as a unique opportunity to engage the public, with the Nature Society instigating strong public engagement resulting in the consolidation of a Consultation Group comprising nature, heritage and other interest groups. As described briefly earlier, public engagement in this project included ideas competitions, design workshops, and an online portal. Another key example is the ABC Waters Program, in which public engagement played a crucial role in ensuring community buy-in and ownership over the water and park assets after implementation.[13]

One contention in relation to public participation in Singapore centres on the lack of participation from the working and middle classes, or really, the majority of the Singaporean population. As described by one commentator, public influence on planning processes in Singapore is contingent on three factors. Citizens have to abide by conditions and boundaries set up by the state.[14] This is particularly relevant to issues of ethnicity and religion. Then also participation should take place from a constructive standpoint with a purpose of seeking consensus rather than contention and, finally, citizens should accept that their views may be scrutinized and challenged. As stated by some other authors, this may cause less informed or skilled citizens to be discouraged from actively participating in planning and consultation processes, leading to a skewed representation of the general population with a predominance of so-called 'super-citizens'. This is a term coined to describe those citizens that are well-informed, adhere to the requirements of engagement, and are likely to be professionally related to the field of concern, such as practitioners, investors and academics.

c. FUTURE CHALLENGES

In the context of Singapore's 'blue and green' activities, the challenges likely to be faced in the future seem to emanate primarily from beyond its borders, although certainly engaging internally with the capsule ecology the island estate has developed for itself. Among the trans-boundary conditions affecting Singapore there are at least three particular phenomena. They are: climate change and its various manifestations; externally posed threats to public health and environmental quality; and the risks posed by civilian nuclear proliferation within the region. Among these, the effects of climate change probably looms largest, although the other two cannot be so easily dismissed. Geographically, Singapore is surrounded and in close proximity to Malaysia, from which it broke away and Indonesia, close by on the east and southwest. Further afield are other Southeast Asian nations, broadly comprising the ASEAN group of member states.



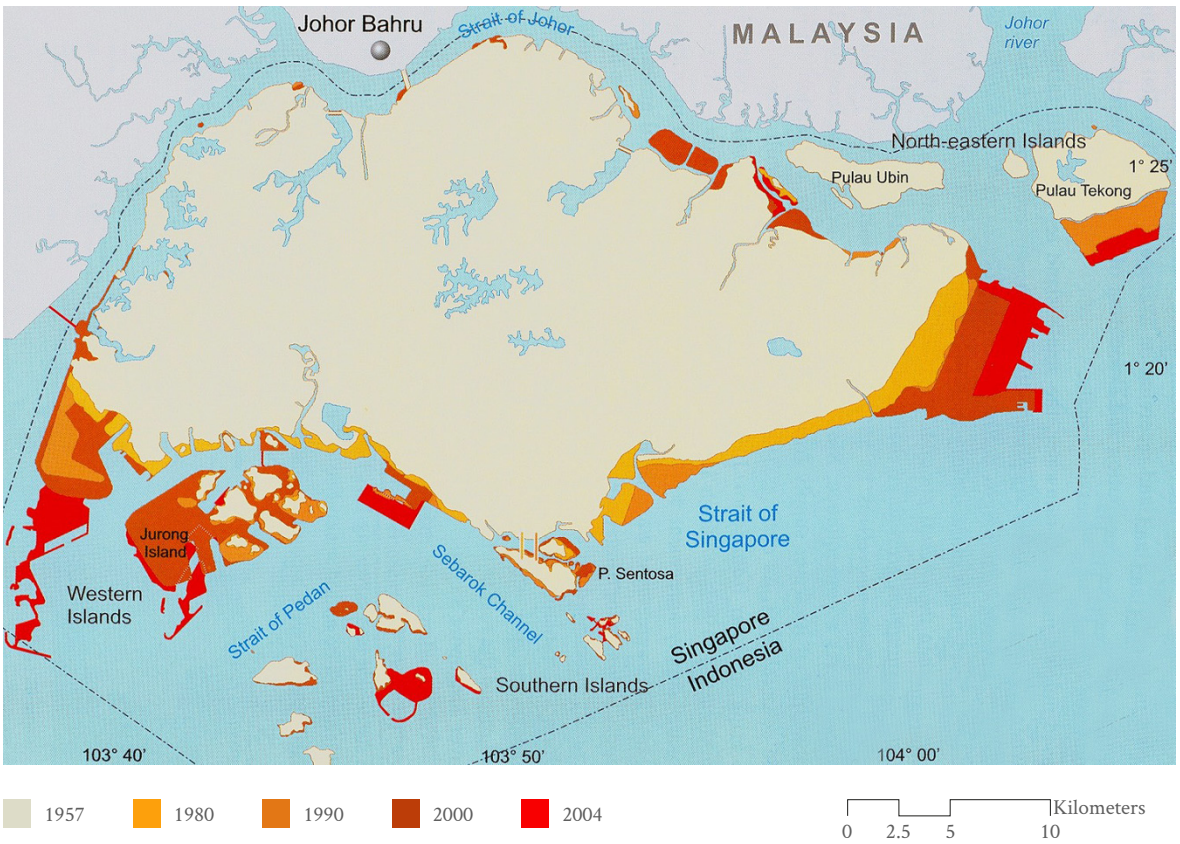
89. GLOBAL AND SINGAPORE CLIMATE CHANGE SCENARIOS (RCP8.5 AND RCP4.5)

An overwhelming amount of scientific evidence points to climate change as an anthropogenic event, from the past and likely future atmospheric greenhouse gas emissions. Efforts to describe and predict the consequences of these emissions fall, most notably, under the Intergovernmental Panel on Climate Change (IPCC) founded under the auspices of the United Nations in 1988 by the two organizations of the World Meteorological Organization and the United Nations Environment Program and later endorsed by the United Nations General Assembly.[15] It is headquartered in Geneva and bases its assessments on published scientific literature. Various distillations of its findings are referred to as 'Representative Concentration Pathways' (RPCs) made for possible climate futures in terms of greenhouse gas concentrations expressed as carbon dioxide equivalent units.[16] Generally, there are four pathways with ranges of radiative forcing values into the future and relative to pre-industrial values. They are: RCPs at 2.6, 4.5, 6.0 and 8.5, respectively and also coinciding with different socio-economic pathways. These, in turn, have different peaks and long-term trends. The usual time of projection is 2100 and with far less certainty attached, 2300. The accompanying graph illustrates these trajectories and their relative temporal characteristics.

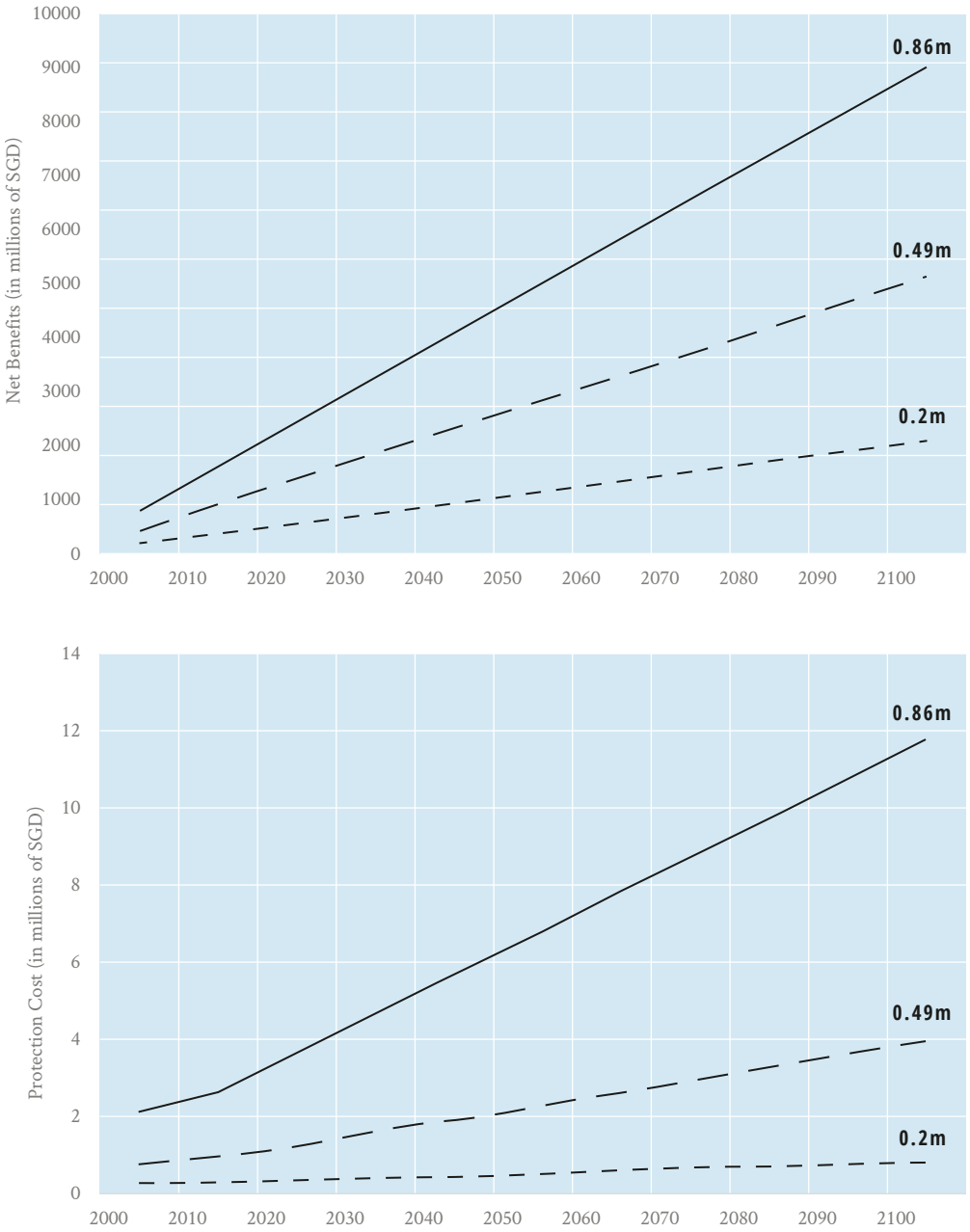
Studies of specific conditions pertinent to Singapore indicate the likelihood of a greater degree of sea-level rise compared with average global estimates due to so-called 'in-pipeline' levels for RCP4.5 and RCP8.5 due to long-term uptake of heat by oceans.[17] This also suggests sea-level rises in Singapore slightly higher than global averages by about five percent. Modeling suggests a lower bound of sea-level rise in 2300 under RCP4.5 at 0.36 to 2.10 meters and an upper bound under RCP8.5 of from 0.94 to 5.48 meters. Applying sensitivity testing to these results for adaptive purposes, such as construction of seawalls, an upper limit range of 1.0 to 2.0 meters rise for the 21st, 22nd, and 23rd centuries is suggested, with from 3.0 to 6.0 meters rise by 2300.[18] This and other studies imply average near surface temperature rises in Singapore of from 1.4 to 2.7 degrees centigrade under the RPC4.5 trajectory at 2070-2099, compared to 1980-2009 and 2.9 to 4.6 degree centigrade rises for the RCP8.5 trajectory over the same period. Rainfall is also likely to be affected becoming wetter during the winter season between November and January and dryer during the other months. With these fluctuations comes a higher probability of drought conditions as well as stormier weather and flash floods. Statistically, mean annual rainfall in 1980 was 2,192 mm rising to 2,727 mm in 2014, though distributed differently. Concomitant projection of sea-level rise across a number of studies suggest a 0.25 to 0.65 meters for RCP4.5 and 0.35 to 0.76 meters for RPC8.5 by 2100. Most of Singapore Island is 15 meters or more above sea level, with about 30 percent less than five meters above sea level mainly in the coastal areas. The time-average sea-level rise for 2050 was estimated to be about 0.25 meters for both the RCP4.5 and RCP8.5 trajectories.[19]

More specific possible effects or impacts on Singapore generally intersect with six thematic clusters.[20] The first is coastline protection from inundation including possible coastal erosion and land loss. By and large the 180 kilometers of coastline is relatively flat and includes several components of essential infrastructure like the airport, port facilities and urban development at or below two meters above sea level. In this regard, the 'National Climate Change Strategy of 2008' calls for 70 to 80 percent of coastal protection by sea walls; although with inundation and potential loss of mangroves.[21] A second thematic domain is water resource management comprising flooding and deterioration of the water supply. Extreme weather events will likely cause inland flooding, especially during the monsoon season. Already the PUB has made significant reductions in flood-prone areas, from 3178 hectares in the 1970s down to 98 hectares

in 2010 and to 40 hectares by 2013. Adverse effects on reservoirs may come by way of higher levels of evaporation plus possible contamination through temperature rise, inducement of algae blooms and saline intrusion. However, in the latter case variable salinity level treatment processes already in place will be effective. The third thematic cluster concerns changes in biodiversity. At around 1.5 to 2.5 degree centigrade increases in temperature there will be impacts on plants and animals, as well as on soil formation, nutrient storage and pollution absorption. Public health, the fourth realm, will likely be affected through vector-borne disease susceptibilities, like dengue fever, and through increased heat stress, especially on elderly and infirmed inhabitants. Adverse impacts on the fifth cluster concerning buildings and related facilities, as well as the sixth cluster concerned with network infrastructure, will come largely by way of inundation within lower-lying areas.[22] To these six areas could also be added potential heat-island effects as more urbanization occurs, with concomitant impacts on public health from heat stress and on Singapore's energy budget for cooling. Also more indirectly climate change will pose an outside potential threat to Singapore due to fluctuations in supplies and prices in the global food supply. The island state currently imports as much as 90 percent or more of all its food.



90. LAND RECLAMATION OVER TIME IN SINGAPORE



91. ECONOMIC COSTS AND BENEFITS OF SEA-LEVEL RISE PROTECTION

In dealing with the adverse effects of climate change, the IPCC defines 'adaption' as the adjustment in ecological, social, and economic systems in response to actual or expected climate stimuli and their effects. 'Adaptive capacity', in turn, is the ability of such a system or systems to adjust to climate change involving potential damages. In Singapore at least two approaches could be possible. One would be a 'do nothing' approach, whereby land below sea-level rise would be inundated. Overall this would amount to a potential loss of from four to 17 square kilometers of dryland or from 0.6 to 2.7 percent of

the island's dryland area.[23] However, this would most likely not be viable for several reasons. First, apart from the essential infrastructure described earlier, one of the vulnerable areas are islands one of which hosts the world's third largest refining centre and a considerable source of Singapore's GDP. Second, other low-lying coastal areas also happen to be of high real-estate value and where the cost of building a seawall protection is outweighed by the loss of property value through inundation. In fact, study shows that for Singapore seawall or similar protection is viable and the best solution because the net present value remains positive. Over time, construction of seawall protection would need to be made upward incrementally, along with maintenance of the seawalls. In this regard, study results show that disruption every decade will likely be severe, though 20 to 30 year intervals would seem to be more feasible with cost variations of 194 and 367 percent respectively.[24] Payment for such operations could be levied across all Singaporeans in some form of a tax and under the rubric that all would benefit. Alternatively, costs could be borne by property owners along affected coastal zones.

Another trans-border phenomenon occurs periodically but with severe impacts. It is the harmful hazing of Singapore from slash and burn farming practices and forest fires for palm olive and other agricultural production, primarily from neighboring Indonesia during the winter months of the year, In fact recently in late November of 2013, the 'Pollution Standard Index (PSI) a usual measure of haze severity reached a record level of 401 units.[25] Now these occurrences are closely monitored and posted on line daily by Singapore's National Environment Agency, where for a 24-hour cycle levels of 0-55 are normal, 56-150 are elevated, 151-250 are high, and levels above 251 are very high and extremely hazardous for public health, often causing schools and other community functions to be closed down. Although it remains to be seen whether haze in Singapore can be prevented permanently, the Indonesian Government has undertaken serious efforts to curb the problems of haze and forest fires. Since 2015, three consecutive years have not seen any substantial hazing. However, strong business ties between the two countries further complicate the situation, and it is in the interest of the two countries to work together amicably to solve the problem.[26]

92. HAZE OVER SINGAPORE

The third potential trans-boundary threat, though not so direct nor regular, could come from risks associated with civilian nuclear power generation close to Singapore. Again this can be seen to stem primarily from Indonesia's nuclear program, as Malaysia though making nods in the nuclear direction have adequate fossil fuel for power generation. Although it is one of the world's largest natural gas producers Indonesia imports its oil and other energy fuel stocks. Consequently it has ramped up its nuclear power plant production with facilities on Madura Island in Eastern Java and on the Miura Peninsula on the northeast coat of Java. Targeting a 26 percent reduction in carbon dioxide emissions by 2020, Indonesia has been deliberately switching away from fossil fuels. Beginning in 1989 with the study that led to the Miura nuclear plant, four other plants are scheduled to open by 2025 aimed at a total of two percent of the nation's electrical production by 2017. Indeed, Indonesia is not alone in Southeast Asia or among ASEAN members in at least exploring if not committing to nuclear plant options. By contrast, in 2007, Singapore was alone in the ASEAN region in expressing caution and concern over safety and security of nuclear power plant facilities.[27] By the same token, its local petrochemical refining capacity is very high, much of it for export. In sum, in a manner similar to 'virtual water' in earlier discussion, these trans-boundary phenomena and effects muddle the almost pristine ecological capsule Singapore has created for itself by being the cleanest and greenest city in all of Asia, if not beyond, with exacting environmental laws, a place where smokers are shunned and where the cost of owning and driving a car are prohibitive.

d. DEALING WITH FUTURE UNCERTAINTY

At the risk of being overly repetitive, with regard to water security, to maintenance of a 'clean and green' island state, and to the idea of a 'City in Nature', Singapore is very well positioned and seems more than likely to succeed. In short, those aspects in this book which are essentially internal and local to Singapore as a circumscribed entity and over which it has more or less full control, are demonstrably well addressed and tractable. More particularly, this is probably strongest in the cases when the issues at hand are or can be framed as being technocratic and resolved pragmatically. However, as pointed out at several junctures in the book, some hyper-objective and virtual aspects of Singapore and, therefore, existing outside its circumscribed boundary, can lead to challenges from the outside to the island state's equilibrium and state of being, or they exist in a manner which probably escapes the dominant technically-inclined modes of thinking and action now in play. This applies to challenges around climate change discussed earlier, as well as to other existential threats to its way of life, such

as diminished environmental quality due to the actions from others outside. Also implications of demographic shifts to many more non-Singaporeans in order to maintain high levels of living standards and wealth carry socio-political risks of possible and destructive discord, quite apart from further disjunction between the 'haves' and 'have nots' in the country.

What might or can be done is a matter largely of conjecture, although several courses of action seem to be attractive if not entirely necessary. First, Singapore needs to be seen more clearly, internationally, as resolving its issues. This would include beginning to take concrete steps to 'wall out' and to assimilate sea level rise and to be seen to exercise responsible judgement in reducing accumulation of virtual water resources. This can be done through continued innovation of water treatment processes, like NEWater and desalination, especially in response to increasingly more variable feed water qualities occasioned by climate change. Also Singapore can consider self-imposition of something like a 'virtual water tax' when making trade and other agreements with foreign countries for the importation of food and industrial products. Nevertheless, pursuit of complete domestic water independence, though technically feasible, may not be the right political play, as evidenced by recent rising tensions with Malaysia.[28] Amicable interdependence in trans-border circumstances might will be a superior and more pragmatic strategy. Then too, achievement of greater labor efficiencies, almost across the board, could result in a more balanced and harmonious community of Singaporeans in the future. In turn, these efforts would allow Singapore to take a higher moral tone in the world in pushing others towards better environmental outcomes and to everyone's benefit. Part of this *moral suasion* should also include technical transfer of Singapore's by now considerable knowledge and expertise in managing the water sector.

A second course of action would comprise more sustained and better efforts towards innovation. This would seem most likely to occur in the realm of assemblage and operation of environmental as well as other related technologies. Certainly the recent step taken by Singapore to strengthen tertiary education and research sponsorship are good and necessary steps. The stronger orientation of educational programs towards work-place skills and industry-led research agendas will come into play. This would also seem to point further in the direction of innovation and, with success, a lessening of the need to import migrant workers and at both ends of the socio-economic spectrum.[29] Care in these regards must also be exerted to curtail any claims by others of xenophobic behavior on the part of Singaporeans. Also linked closely to these kinds of issues is maintaining a well-informed and accepting citizenry or having everyone on the proverbial same page, so to speak. This has been one of the successes of many of the programs described here, but will become more difficult, potentially, as socio=political pressures mount and higher degrees of uncertainty about viable futures begin to surface and finally become rife. Here Singapore is certainly a victim of its small size. However, as shown at other times this relatively small size can be turned into a positive asset.

endnotes

1. Yeo, H. 2017. "Building a City in Nature". *CLC Insights*, 24, p.3f.

2. Tan, Kenneth Paul, "The ideology of pragmatism in Singapore: neoliberal globalization and political authoritarianism". *Journal of Contemporary Asia*, 42, no. 1 (2012): 67-92.

3. Singapore General Election Results of 2015 had the People's Action Party (PAB) garnering 69.6 percent of the vote for 82 seats. A gain of 9.72 percent more on the previous General Election.

4. Interview with Mr. Tan Nguan Sen, Chief Sustainability Officer, PUB on 7 February 2017.

5. Leo, David. 1995. *Kiasu, Kiasu: You think What?* (Singapore: Times Editions, 160 pages).

6. A dictionary of Singlish and Singaporean English (https://www.singlishdictionary.com/singlish_k_htm).

7. Savage, V. R. and L. Kong. 1993. "Urban Constraints, Political Imperatives: Environmental 'Design' in Singapore." *Landscape and Urban Planning*, vol 25, pp.37-52.

8. Leitman, J. 2000. *Integrating the Environment in Urban Development: Singapore as a Model of Good Practice.* (Working Paper Series no.7. Washington, D.C. The World Bank), pp.10-11 and World Bank, 2006. *Dealing with Water Scarcity in Singapore: Institution, Strategies and Enforcement.* World Bank Analytical and Advising Assistance Program, China: Addressing Water Scarcity, Background Paper no.4, The World Bank, July.

9. Leitmann, 2000, P.10.

10. Tan, L. H. H. and H. Neo, 2009. "Community in Bloom: Local participation of community gardens in urban Singapore." *Local Environment*, 14:6, pp.536-537.

11. Tortajarda, Celia and Yugal Joshi. 2013."Water Demand Management in Singapore Involving the Public" *Water Resource Management*, vol 27, pp.2729.

12. Soh, E. Y. and Yuen, B. 2005. "Government-aided participation in planning Singapore. *Cities*, vol 23,no 1,pp.34-35.

13. Tan, L. H. 2012. "Revitalizing Singapore's Urban Waterscapes: Active, Beautiful, Clean Waters Programme" *Urban Solutions*, Issue 1, July, PP.14-15.

14. Ho, K. L. 2000. *The Politics of Policy Making in Singapore* (New York: Oxford University Press).

15. IPCC – Intergovernmental Panel on Climate Change (Website).

16. Palmer, Mathew, Jason Lowe, Dan Bernie. et al.2015. "Chapter 10: Long-term Projections of Sea Level, Temperature and Rainfall Change" in Meteorological Service Singapore, Centre for Climate Research and the UK Met Office, Exeter UK. *Singapore 2nd National Climate Change Study*, p.2f.

17. Palmer, p.5.

18. Palmer, p.18.

19. All based on Palmer, p.18 and on Marzin, Charlene, Adrian Hines, James Murphy, et al. 2014. "Executive Summary", in Meteorological Singapore, Centre for Climate Research and the UK Met Office, Exeter, UK. *Singapore 2nd National Climate Change Study*, PP.8-9.

20. Marzin, 2014, p.2.

21. Bhullar, Lorrean. 2013. "Climate Change Adaption and Water Policy: Lessons from Singapore". *Sustainable Development*, 21:3, p.158.

22. All based on Marzin, pp.1-10.

23. Ng, Wei-Shiwen and Robert Mendelsohn. 2005. "The Impact of Sea Level Rise on Singapore". *Environment and Development Economics*. April, 10:2, p.213.

24. Ng and Mendelsohn, pp.211-212.

25. BBC NewsAsia. "Singapore haze hits record high from Indonesian fires". 21 June, 2013.

26. David, Randy. 2013 "Haze over Singapore". *Inquirer.Net*, quoting Irene Ng in paragraph 7, posted online in the Real Singapore (6/19/13).

    This vested interest of Singapore in the economic growth involved was described as such by a parliamentarian of the Singapore government.

27. Gunn, Geoffrey. 2008. "Southeast Asia's Looming Nuclear Power Industry". *The Asia-Pacific Journal*, Feb. 1, vol 6, no 2.

28. Tommy Sheng Hao Chai. 2018. 'Water Tensions Between Singapore and Malaysia Begin to Boil Over,' *The News Lens*, July 23 article. https://international.thenewslens.com/article/100407 (accessed 10 January 2019).

29. For instance, the next phase of development of the Singapore University of Technology and Design proposes to focus on skill sets and abilities needed by industry in Singapore.