

*chapter*

# 01

INTRODUCTION

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**T**his book is about Singapore's development into a city in which water and vegetation, along with associated environmental, technical, social and political aspects have been harnessed and cultivated into a livable sustainable way of life. It is also a story about a unique and thoroughgoing approach to large-scale and potentially transferable water sustainability, within largely urbanized circumstances, which can be achieved, along with complementary roles of environmental conservation, ecology, public open-space management and the greening of buildings, together with infrastructural improvements.



1. SATELLITE IMAGE OF SINGAPORE

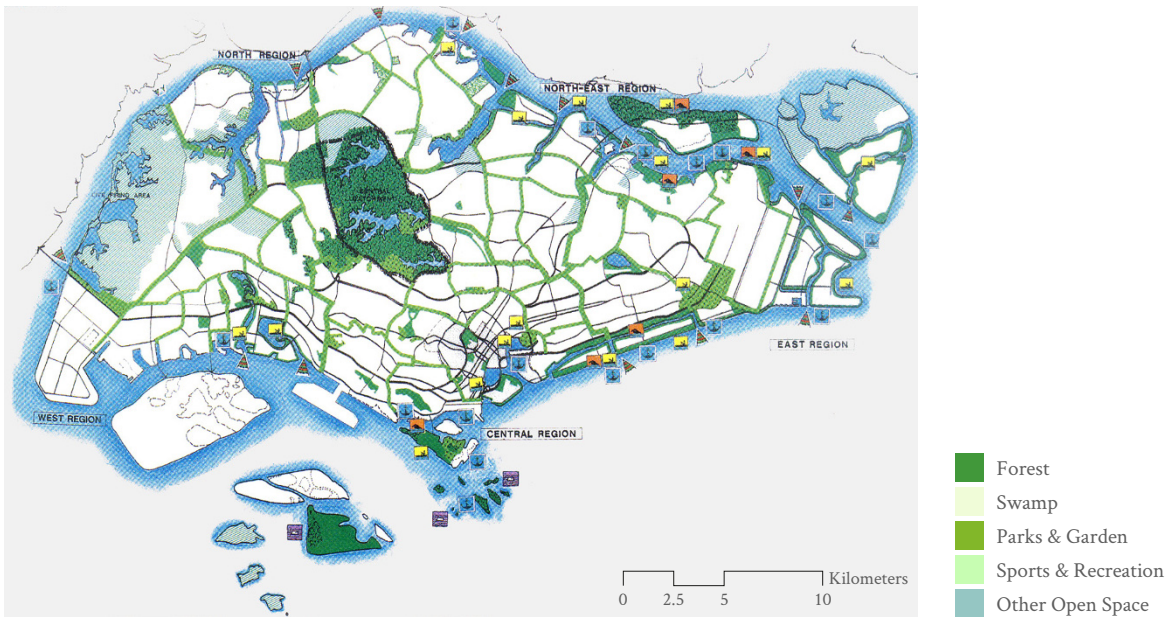
a .

## ASPECTS OF 'BLUE' AND 'GREEN'

In the context of this book, 'blue and green' or 'blue-green' network planning and programs seek to protect the hydrologic and ecological values of Singapore's urban and other landscapes and to provide resilient measures to address threats and environmental degradation, such as water dependency on others and deforestation. Overall, 'blue-green' planning has become increasingly observed as governments and the entities involved are subject to unprecedented rates and volumes of urban growth, coupled with loss of habitat and biodiversity. According to international expert panels the next two decades are likely to present wider opportunities for mitigation efforts and the instigation of sustainable ecosystem practices. Even sizeable international institutions such as UN-Habitat are often involved in supporting such practices, particularly in collaboration with local municipalities and government organizations. Generally, 'blue-green' networks expand the rehabilitation of the 'blue' water cycle within urban areas, as well as complementing conventional engineering solutions, or so-called 'grey networks'.<sup>1</sup> Singapore's recent Active, Beautiful, Clean Waters

Programme (ABC Waters Programme) is a strong example of this approach.

More specifically, 'blue-green' networks consist of 'blue' water-based elements, 'green' vegetated-based elements, 'green' technologies and often low-carbon and climate resistant infrastructure. There, 'blue' elements usually comprise rivers, streams, storm-water drains, irrigation channels, canals, wetlands, freshwater bodies and swales. 'Green' components usually include: roadside trees, recreation zones, playgrounds, parks, forests, greenways and riparian strips. Larger spatial organizations range from catchments to sub-catchments at a neighborhood level, and to micro-catchments at urban block levels. By way of orientation, 'blue-green' networks seek to recreate a natural water cycle while contributing to the amenity of urban areas through water management and green infrastructure together.<sup>2</sup> In short, the aim is to contribute to and protect hydrologic and ecological values of urban landscapes, while providing resilient and adaptive measures to address future changes in environmental conditions and related activities.



2. THE GREEN AND BLUE PLAN ARISING FROM THE 1991 CONCEPT PLAN

b.

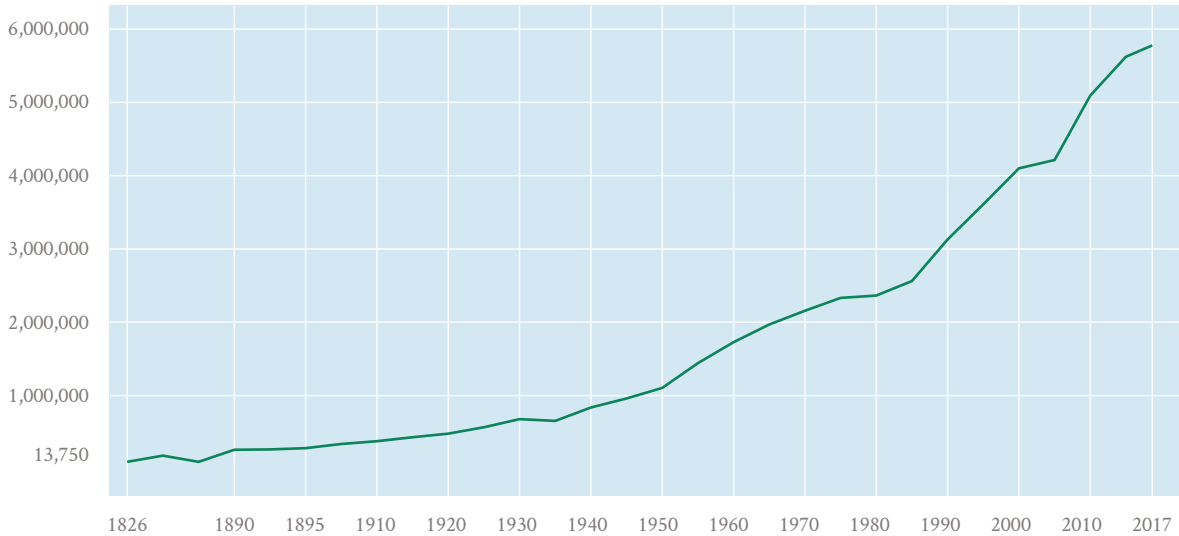
## SINGAPOREAN SIGNIFICANCE OF 'BLUE AND GREEN'

When one thinks of Singapore and what it produces economically as a nation state, one cannot point to a particular line of automobiles, consumer goods or other products. Its Gross Domestic Product (GDP) is high and heavily weighted towards the service sector with around 73.4 percent and industry with the remaining 26.6 percent of the total.<sup>3</sup> It is, after all, a highly-developed, free-market economy that is very open to the world and with little corruption, low tax rates, as well as being the most pro-business and third highest GDP per capita in purchasing

parity terms in the world. Its government-linked companies, like Singapore Airlines, PSA Corporation Limited, Sing Tel, and the ST Engineering and Media Corporation play significant roles, as do its property development enterprises like Capitaland and Keppel Land. Major sources of revenue are electronics, chemicals, and, of course, services. Singapore also relies on an extended concept of intermediary trade in these regards, by purchasing raw goods and refining them for export, through one of the busiest harbors in the world. In this entrepôt-like tradition

gross exports amount to about \$330 billion (2016) in pharmaceuticals, petroleum products and equipment, with inputs of about \$283 billion (2016), also in equipment, fuels and machinery, alongside of food and consumer goods.<sup>4</sup> A good number of Singaporeans work in the civil service, with a ratio of 1:71.4 of civil servants to population, compared to the U.K. with 1:118, China with 1:108,

but with Malaysia with 1:19 and Russia with 1:84.<sup>5</sup> In short Singapore is neither a conspicuous maker of particular products, nor a place with numerous employees on state payrolls. Nor is it conspicuously innovative, largely copying from others or applying rather than inventing leading-edge technologies or manners of doing things. By contrast, it is highly pragmatic in these regards.



**3 A. THE POPULATION OF SINGAPORE, 1826–2017 \***

\*Differential recent rates of growth due to immigration of non-resident population.

	TOTAL POPULATION	NON-RESIDENT POPULATION	NON-RESIDENT %
<b>2000</b>	4,027,887	745,524	18.7
<b>2010</b>	5,076,732	1,305,011	25.7
<b>2015</b>	5,540,000	1,600,000	28.9
<b>2030</b>	6,700,000	3,015,000	45.0

**3 B. SINGAPORE’S TOTAL AND NON-RESIDENT POPULATION**

What Singapore is noteworthy for, however, is, in a way, itself and the character and distinction of its city making. It has an unparalleled and extraordinary public housing program supporting over 80 percent of its resident population. It boasts a plethora of entertainment, sports and other venues. It is one of the world's downtowns with respect to shopping and life-style activities. In fact Singapore receives over fifteen million visitors per year, a number that has risen steadily, particularly over the past dozen years and mostly from other parts of Asia.<sup>6</sup> It is environmentally squeaky clean and at the forefront of the marriage between ecology and urban development. In short for all those who come from elsewhere in the world it is a hospitable, safe, clean and easy place to be and to enjoy a variety of pursuits. Underlying all of this

attractiveness, however, is an island city-state that is 'green and clean' as advertised as well as resplendent in its aqueous environments. Its liveability and attractiveness, in short, derives strongly from its 'blue-green' environment co-mingling with its urban landscapes. In part this is strategic in the sense of water resource sustainability. However, it is also symbiotic in the sense that 'blue' and 'green' must go together to become such an integral part of Singapore. Moreover, it is for this reason that the 'blue-green' aspect is the most significant contribution that Singapore has made, even if, at times, it seems to simply lurk in the background. Certainly from the standpoint of the authors of this book it is the most significant part of Singapore, the scope of which also makes it entirely distinctive and one of a kind.

	GDP (BN)	GDP/CAP (K)
NEW YORK	1,558	120
TORONTO	305	116
BOSTON	382	81
SEOUL	688	69
LONDON	542	63
SINGAPORE	306	55
HONG KONG	291	40

#### 4. ECONOMIC INTENSITY OF SINGAPORE AMONG SELECTED CITIES IN 2013



C.

## ORGANIZATION OF THE BOOK

The remainder of the book is organized into five chapters. Chapter two which follows, deals with the early days of Singapore, dating from early sightings by Chinese mariners and others, to power struggles among competing regimes and the development of Temasek as a relatively early rudimentary settlement on the island. It also spans to the British colonial period beginning with Stamford Raffles and ending with devolution of the British colonial possessions in and around Malaysia after the occupation by the Japanese. This is followed by the break with the Malay Federation and the formation of an independent island city state in 1965. Throughout, while there is a certain amount of historical politically-driven narrative, concentration is also placed on the physical character of Singapore's changing landscape.

Chapter three follows on with Prime Minister Lee Kuan Yew's admonition to Singaporeans to make their environment 'clean and green', as both a practical way of improving the chances of attracting outside foreign investment, achieving a certain equity in environmental quality among a very mixed population and as a metaphor for what Singapore should be like as a place.<sup>7</sup> In this last regard, parallels are drawn with other metaphors shaping urban life elsewhere, such as American pastoralism, the machine in the garden and even Italian versions of city and countryside. Efforts in Singapore to vivify its metaphor around 'blue and green' are also discussed, along with how they have become socialized and made more habitual in Singaporean life.

Chapter four examines the difficult issue of achieving water sustainability for Singapore, through water

importation and finally three other 'National Taps'. These include: improvement of water catchment facilities; production of NEWater from effluent and a closed loop system of reticulation and storage; alongside of desalination. Foregrounded is also the radical revision of water capture, treatment, and re-use that has and is occurring in Singapore. While specific technologies may not be uniquely Singaporean, the scope, relative scale and sophistication of implementation is rivalled by few, if any, other applications in the world.

Chapter five, dealing with the 'green' aspect of the 'blue-green' arrangement presents the alibi for water capture and treatment operations in the form of deliberate movement from the idea of a 'garden city' to a 'city in nature' and of a tropical kind. It also covers the harnessing of higher levels of biodiversity to achieve such a 'natural' condition and to facilitate water treatment by way of cleansing sequestration. Increasingly sophisticated management of plant life and public open space in Singapore, including programs in direct connection with active waterways are also described and discussed, along with far-reaching research programs.

Finally, chapter six offers opinion about the relative success of Singapore's 'blue-green' plans and likely follow-on engagements. This will include some identification of what might be seen as existential threats to this success from outside of Singapore. Discussion will also speculate about collective habits of mind and behavior that have been instrumental in leading to success, as well as visionary modes of leadership, perseverance and pragmatism. On the whole there has not been anything lucky or

flukey about what has been achieved, leading to the topic of transferability to other circumstances elsewhere in the world and how that might be made successfully.<sup>8</sup>

Although most of the focus of the book is upon 'blue and green' programs in Singapore in the relatively recent times of the past 50 or so years, discussion at times will extend back into the British colonial period, if not before, as suggested by chapter two. This is done to underline several aspects or trends

in Singapore's history and development. The first concerns the island state's capacity to re-invent itself, sometimes dramatically and not always to the longer-term good. A second concerns the ending of one era forming the initial conditions for a subsequent round of developments. Part of Singapore's persistence with ideas about the perfectibility of the city, for instance, hinges on a pragmatic reflexivity to prior conditions and events. Finally, it is within the long *durée* of development that the unique qualities and values of Singapore have been shaped.



# end notes

1. As described by texts like Hoyer, J.; W. Dickhaut; I. Kronawitter and B. Weber. 2011. *Water Sensitive Urban Design* (Hamburg: Jovis). And “Blue-Green Cities” [https://en.wikipedia.org/wiki/Blue\\_Green\\_Cities](https://en.wikipedia.org/wiki/Blue_Green_Cities).
2. *Op cit.*
3. Singapore Department of Statistics (DOS) on Gross Domestic Product by sector.
4. Singapore Exports 1964-2017. <https://tradingeconomics.com/singapore/exports>
5. See the Public Service Commission of Singapore and statistics by country in [https://en.wikipedia.org/wiki/Category: “Civil\\_Service\\_by\\_Country”](https://en.wikipedia.org/wiki/Category:Civil_Service_by_Country).
6. Singapore 2014 Tourism Sector Performance, International Visitor Annual Statistics.
7. Lee Kuan Yew, Opening Speech of the “Keep Singapore Clean Campaign”, 1 October, 1968.
8. Interview with Dr. Liu Thai Ker, Former CEO of HDB and URA and Chairman of CLC on 18 August, 2017.



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