SUSTAINABILITY LESSON FROM SOUTHEAST ASIA: SINGAPORE EXPERIENCE

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Abstract

To inaugurate the birth of International Journal on Livable Space (LivaS) it is proper to remind ourselves that livability requires holistic approach, strong vision, sustainable practice, and resilience. This keynote article will outline a story of Singapore, a tiny island nation without natural resources, in its continuous struggle for survival from the past to the present and towards the future. It will discuss various examples on different scale levels (city planning, architecture, design ideas, conservation projects, environmental practices, etc.), and focusing on how our planning and design disciplines can contribute to tangible efforts to achieve environmental, cultural, and economic sustainability in holistic way.

Survival and resilience: turning problems into opportunities

From past to present, South China Sea, Malacca Straits, and Java Sea can be perceived as the Mediterranean of Asia, where great civilizations met and international trades crossed, generating hybrid and unique cultures, urban forms, and architecture in Southeast Asia. Singapore is always at the middle of the cross-road, a hub of farfetched network trading networks. It was always caught in between conflicting political realms: between Ayutthaya and Majapahit in 14th century, between Malay-Bugis and Johor-Riau at the end of 18th to early 19th centuries, between British and Dutch in 19th century, and currently between Malaysia and Indonesia. For more than five hundred years the island city of Singha-Pura / Tanmahsi / Temasek / Singapura / Shonan-to / Singapore has survived numerous attacks, destructions, downturns, crisis, and has always been able to thrive and to regain its prosperity.

the environmental front. the In challenges and problems posed by climate change, global warming, scarcity of natural resources, and deforestation, has been affecting Singapore hard from time to time due to its lack natural resources, its tiny size, and closeness to the source of problems. The imminent end of fresh water supply from Malaysia, the impact of haze from slash-and-burn farming system in Sumatra and Kalimantan, the pandemic such as SARS and H1N1, the increasing cost of energy due to the dependency to import of fossil fuels, natural gas, and electricity, the almost total reliance to imported foods, the frequent tremors as impacts from rising frequency of earthquakes in

Indonesia, etc. are some of many current problems faced by Singapore. It is time for scholars, scientists, policy makers, decision takers, and all stake holders through innovations, inventions, and interventions to find the best solutions – not only for the sake of this nation, but also for the interconnected regions and the world.

Singapore's land size and the population number have been growing steadily from the past. Currently the area is around 700 square kilometer with 5 million populations. The growing land size is due to intensive reclamation, using sand and soil sourced from abroad (such as mostly Indonesia). Malaysia and However there is a limit to the extent of land reclamation because of the international boundaries, marine ecological concerns, and oppositions from neighboring countries.

The number of population has to be increased to create internal economic sustainability, especially during the time of crisis and to sustain continuous growth. economic which demand increasing productivity, replenishment of work force. and expansion of consumption. But there is also limit to the number of people and the population density that can be sustained by or to be accommodated in this island.

To preserve the already limited natural resources, the total footprint of the built-

up are has to be strictly controlled and cannot continuously expanded. Therefore, the only way to accommodate the growing population and at the same time to preserve the limited land, is by pursuing high-rise and high-density urban development policy, planning, and design. In order to be really "green", the amount of land to be set aside or to be reclaimed for plants and open spaces has to be increased.

Social-economic awakening: housing the nation

Singapore gained self-government status from the British in 1960, and after several years of political turmoil in relation with the newly established Malaysia, Singapore became an independent Republic in 1965. This young nation was plagued with unemployment, deterioration of environmental condition, uncontrollable spread of slums and squatters, socialpolitical conflicts, high crime rate, etc. To tackle these complex problems, the government set up two most important bodies: Housing Development Board and Economic Development (1960) Board (1961). HDB was given mandate to resolve the acute housing needs and to implement urban renewal program. EDB was to draw up and implement industrialization program in order to

create jobs and to bring in much needed capital to Singapore.

Experts from abroad were employed to develop ideas, such as Prof Otto Koeningsberger, a German Architect-Planner. In 1963 he proposed integrated approach to housing, urban renewal, industrial development, and transportation, a plan that could cater to a future population of 4 million. The plan was inspired by the Ring City ("Randstad") concept with central water catchment area adopted in Netherlands, combined with the classic Garden City concept. The entire island would be transformed into a complete town, interconnected by a network of roads, where nobody lived more than 1.6 km from the sea or open space. Reclaimed land was planned for factories and business. This plan was developed with clear direction to achieve total urban

sustainability into the future.

Independent Singapore in 1965 still faced three biggest problems: unemployment, lack of proper housing, and lack of natural resources. The government tackled these issues by devising two plans: 1) development of manufacturing & service sectors (based on people and location), and 2) development of large quantity of low-cost homes, aimed at the creation of basic shelters, creation of jobs, reclaimed productive lands from squatters, and redistribution of population into less developed areas.



Figure 1: Henderson Waves, a pedestrian bridge at 90 meter above sea level to connect two hills as part of the Southern Ridges trail, a 9 kilometers park connector. Source: Author, 2015.

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Figure 2: The clean Singapore River with colonial district at the foreground and the high-rise commercial district at the background. Source: Author, 2015.

HDB took over from Singapore Improvement Trust (SIT) the pressing task of providing proper public housing for the entire population. SIT was set up by the British colonial government in 1927 and it functioned until 1959, with special tasks: to arrest the problems of urbanization, to improve the general physical environment, to widen existing roads to cope with the growing numbers of rickshaws, trolley, buses, electric trams, cars, to create open spaces, back lanes, modern sanitation, and to develop public housing (23,000 units over 32 years). This is one of the oldest large

scale modern public housing schemes in Asia. It was considered the only realistic means of housing the masses and at the same time eradicating the inner city slums and unhealthy living conditions. In 1965, the HDB managed to build 53,777 dwelling units and today over 85% of Singapore's population lives in HDB apartments, compared to only 9% in 1960. In 1964, a home ownership scheme was established, and in 1968, the Central Provident Fund allowed savings to be used for monthly repayments: as a result, in 1985, 76% of Singaporeans lived in apartments they owned.

The HDB apartments design addresses some basic constraints in Singapore, such as land shortage, an expanding population and reasonable prices. The large scale development of high-rise, high-density, low-cost, standardized constructions is the most logical solution. Typically, the HDB apartment is very functional, simple in shape and plan. The orientation of dwelling blocks, position of courtyards and balconies, are carefully considered to achieve climatic responsive buildings. The void space in every HDB block allows the free flow of pedestrians and nature (Figure 1).

Small-scale social spaces are created within a cluster of several housing blocks, containing playgrounds and a senior citizen corner. Next on the grouping scale is the neighborhood center, consisting of small shops, markets, nursery schools, clinics, and other public facilities for about 6,000 residents. The size of a neighborhood has been reduced since the 1970s to increase the sense of community. Beyond the neighborhood group is the town center with bigger markets, supermarkets, banks, health centers, post offices. schools. and other community facilities. The district space standards in the HDB New Towns are quite high, as only around a third of the

land is used for residential purposes, while the rest is dedicated to community support and service facilities.

Several HDB New Towns, with a population of about 250,000 to 300,000, were built and planned as self-reliant cities with their own social. administration, commercial, and employment facilities. To break the repetitive monotony of type design and to give a certain sense of identity, the façade, rooftop, floor arrangements, and detailing of a group of buildings in a neighborhood are presented with a particular theme or articulation (Figure 2).

Framework for development: long term vision and sustainable planning

The first Statutory Master Plan of Singapore was made during the colonial era in 1958, but not fully implemented until the Planning Act was implemented in 1960. This act was followed by the Concept Plan (1971), and series of Central Area Plans (1974-1979). In 1967 the Urban Renewal Department (URD) was set up under the HDB to tackle the physical, social. and economic regeneration of the Central Area, until 1974. On 1 April 1974 the Urban Redevelopment Authority (URA) was created as an independent statutory board under Ministry of National Development (MND) to take over the URD responsibility, with primary task to redevelop the Central Area and resettle residents affected by the redevelopment. Within the period of 1967-1989 a total of 184 hectares of land were cleared, assembled and sold under the URA Sale of Sites Program, resulting in the development of 155 projects. Through this program, Central Area was transformed from an area of slums and squatters into a modern financial and business hub.

In 1980 URA prepared a comprehensive long-term plan for the Central Area including the development of Marina City on 690 hectares of reclaimed land. Three years later in 1983 the Urban Design Plan for the Central Area was created aimed to guide "an orderly and transformation of the city skyline and the creation of an environment interwoven with the historical, architectural and cultural heritage of the older parts of the city", followed by the announcement of Central Area Structure Plan in 1985. Thus URA was exercising its power to "develop" and at the same time to "conserve" the central area of Singapore.

URA Conservation Plan was announced in 1989. Historic districts like Chinatown, Little India, Kampong Glam, Singapore River - including Boat Quay and Clarke Quay - as well as residential areas like Emerald Hill, Cairnhill, Blair Plain, and secondary settlements like Joo Chiat and Geylang were given conservation status. The naming or labeling of these areas followed the Singapore Tourism Board "branding" strategy to sell Singapore as mass tourism destination, which turned the central areas of the city into "theme parks". This policy proofed to be successful in attracting many tourists to visit Singapore as unique destination.

In 1989 URA merged with the Planning Department and Research & Statistic Unit of the Ministry of National Development, and the new URA became a powerful the National planning and conservation authority in Singapore. URA's new mission was to plan and to guide Singapore into "a Tropical City of Excellence" with special identity as the city on the equatorial belt, distinct from the great cities of the West. For this URA drew 55 Development Guide Plans (GDPs), Detailed Plans for Implementation (DPIs), and Urban Design Plans. The Development Guide Plans are detailed guidelines at the local level, on how land can be used for (residential, commercial, industrial, or institutional), how densely built up developments can be, and how high building can go. These plans were implemented with transparency and certainty in the planning system. The Master Plan of 1998 consisted of the gazetted 55 DGPs.

Creating livable city: from Garden City to City in the Garden

In the Revised Concept Plan (2001) the key concept was to make Singapore into "Garden City in The Tropics". In here the "Ring City" concept was changed into a constellation pattern with a Downtown (Central Area) and a hierarchy of regional, sub-regional, and fringe-center networks. Singapore was subdivided into 5 new Regions: Central, North, North-East, East, and West. Every region (except Central) has a Regional Centre (hub). Each Regional Centre serves up to 800,000 people and will be a mini-Central Area with its own housing, work, & leisure facilities, to bring jobs closer to homes, to prevent overcrowding in the city central area. A New Downtown (Marina South) was developed as a selfcontained city within a city next to the existing CBD.

New technology corridors consisted of business parks, science habitats, highquality housing for "top international talents" were created. World class transportation system following "constellation" concept were planned and developed (extension of MRT system, creation of new inter-regional rail links to connect New Downtown to Marina Centre & other population catchment area outside the city, and new Intra-town LRT systems were built in Bukit Panjang and Sengkang).

The "Garden City in the Tropic" is realized by creating sense of "islandness" and adding greenery. Reclaimed lands are used for more beaches, marinas, seaside resorts. The waterline is embraced more closely; green landscape & water bodies are woven into the urban landscape.

Thanks to the high economic growth which brings prosperity to the nation, the people may now have wider choices of housing variety: high-density, lowdensity. city-living, community-living, garden-living, waterfront-living, islandliving, heritage-living, IT-homes, etc. Leisure facilities such as new entertainment complexes in the city and regional centers, interconnected parks, new coastal playgrounds, and the iconic Esplanade (Theatres on the Bay) were built in a short period of time.

Concept Plan 2001 proposed some new key ideas, such as: New homes in familiar places, High-rise city living ("a room with a view"), More choices for recreation, Greater flexibility for businesses, A global business center, An extensive rail network, and Focus on identity. Housing development was projected for 5.5 million populations. This means that an addition of 800,000 new homes on top of the existing 1 million homes today was needed. The people **LivaS**: International Journal on Livable Space Johannes Widodo

were given wider choices of housing types and locations. New homes in established existing areas were added, The "City in a Garden" became the key idea for urban planning and design, by adding more green spaces from 2,500



Figure 3: Marina Bay which is now turned into a lake after the construction of the Marina Barrage with the new Marina Bay Sands Integrated Resort at the background Source: Author, 2015.

and more housing in the West Region, closer to the work areas (in Tuas and Jurong) were planned. There will be more innovative housing (higher density, higher floors, experimental designs, integrated amenities) and more variety of mixed-density housing: low (5 stories and less) – medium (plot ratio 1.4 to 2.1, height up to 24 stories) – high (plot ratio above 2.1). HA to 4,500 HA, providing more accessible green spaces: park connector network, making parks with distinct central characters, opening the up catchment area for low impact recreational uses (such as hiking, canoeing, cycling), keeping rustic areas (Pulau Ubin, Lim Chu Kang, Sungei Khatib, Bongsu at Simpang, Sungei China Mangrove), and adding more sport facilities & new art spaces.

To make the city economically more sustainable, high value-added Industries (such as electronics. chemicals, pharmaceuticals, biomedical sciences, engineering), and Global Business Centre (for financial and services sectors in Central Area) are developed. Greater flexibility for businesses is accommodated in the new zoning system. Industries & businesses close to MRT stations are intensified. More jobs closer to homes are created. Extensive rail networks, "orbital" & "radial" lines will be built, an addition to the existing 93 km into a total of 500 km in the future (Figure 3).

Preserving and strengthening Identity has become a prominent policy to make Singapore a "Home", distinctive city with rich heritage. Conservation of built heritage will also focus at the diversity of people, cultures, places, buildings, and memories. Identity in New Towns is created by integration of existing features (landmarks, natural elements). Identity in Familiar Places is strengthened recognizing the by "anchors" amid change and renewal (icons, activity nodes, focal points, essential routes, gathering places).

Since 2001 to present the conservation policy in Singapore has been evolving from a formalistic into a more holistic one. So far, more than 6,500 buildings and structures across the country have been conserved, despite Singapore's limited land and a relatively short history. Retention of identity through conservation will become more important as more of the urban area becomes developed and redeveloped to cater to the needs of a bigger population.

Towards the future: resilient city

Contemporary Singapore is a city striving to become more and more sustainable economically, socially, environmentally. The new developments, such as Resorts in Sentosa Integrated and Marina Bay, the cultural and entertainment districts in Bugis area, the new shopping malls in Orchard and heartlands, and also the new research centers and hi-tech industrial areas, are some examples on the social-economic front.

New Water projects, Marina Barrage, Southern Ridges park connector, Zero Energy Building, Green Building Accreditation scheme, Sustainable Singapore Blueprint inter-ministerial policy, etc. are some examples from the Environmental sustainability front. This city-state is not just pursuing a "green" agenda, but also "blue", since water is becoming the main strategic resource for the future, under the concept of "ABC": Active, Blue, and Clean.

At present and towards the future, the city is continuously facing new challenges, such as ageing society, cracks in social-cultural fabric, scarcity of land for further developments, shortage of basic living support system (energy, water, food), security and health threats, global economic instability, etc. To sustain the livability, new innovations and workable plans shall be produced continuously, such as: Underground Habitat, Vertical Kampung, Energy and Food Sovereignty, Car-Light and Walkable City, etc.

Singapore story to become sustainable and livable city is about ongoing story of struggle against all odds, about failures and success. But one thing is certain, that other nations may learn a lot not only from Singapore's resilience, experiences, and ideas, but also from its failures and revival.

References and Further Readings:

Tan, Sumiko. (1999). Home. Work. Play". Singapore: Urban Redevelopment Authority.

Lee Kuan Yew. (2000). "From Third World to First – The Singapore Story: 1965-2000 – Memoirs of Lee Kuan Yew". Singapore: Times Media.

Widodo, Johannes. "Modernism in Singapore". The DOCOMOMO Journal, 29 (September 2003): 54-60. (France). Tan Yong Soon, Lee Tung Jean, and Karean Tan. (2008). "Clean, Green, and Blue: Singapore's Journey Towards Environmental and Water Sustainability". Singapore: ISEAS.