



URBAN GOVERNANCE

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Building a Regenerative and Resilient Singapore: Perspectives from the Liveability Framework



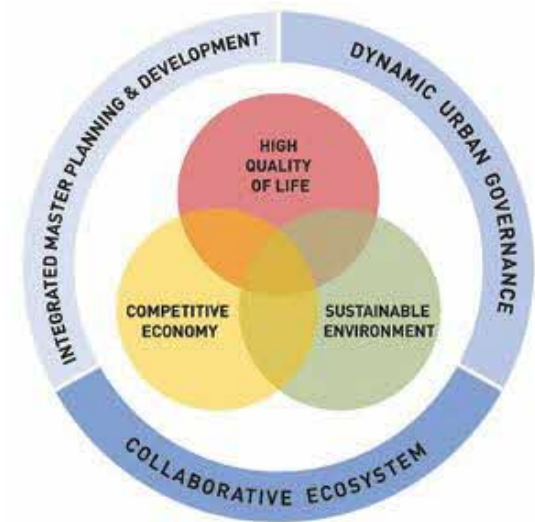
Accessible green spaces, as pictured, within Gardens by the Bay not only bring about ecosystem benefits but also serve as spaces of respite and recreation in the downtown of Singapore.
Image: Florian Wehde / Unsplash

Singapore, an island city-state of 735 km², is home to approximately six million people. Since independence, its land area has grown by about 26% through reclamation, while its resident population has tripled. Despite its high population density, Singapore is considered among the world's most liveable cities. This stems from a long-term, integrated approach to urban development, encapsulated in the Liveability Framework (LF) first proposed by the Centre for Liveable Cities in 2010. The LF serves as a guide for urban planning and policy development, describing the need to aim for a balance of three key outcomes: high quality of life, sustainable environment, and competitive economy.

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Liveability and the balance among these three desired outcomes are not static goals; as Singapore evolves, so too must its vision of liveability. Singapore faces new urban development challenges, such as ageing infrastructure, changing demographics, and the need to transform to a low carbon economy, amidst geo-political tensions and uncertainties.

In this period of polycrisis, greater focus has also been called on resilience as a critical component of liveability. It is not enough for a city to thrive under benign conditions; it must also have the capacity to absorb, adapt to, and emerge stronger from environmental, economic, and social shocks over the long-term. These factors necessitate an



The Liveability Framework for planning future liveable and sustainable cities, with resilience as an implicit yet fundamental element underpinning the dynamic interplay of systems and outcomes.
Image: Centre for Liveable Cities

evolution of the LF to reflect not only current realities but also future aspirations for Singapore.

The updated framework reflects this across several aspects: securing access to essential supplies and services that underpin a high quality of life; enhancing resource, climate, and social resilience for a sustainable environment; building economic resilience to withstand global economic fluctuations and disruptions for a competitive economy; and adopting innovative planning and governance approaches that enhance resilience in urban systems. The refreshed

framework also emphasises the need for a collaborative ecosystem and enablers that are not only instrumental in achieving liveability outcomes but are vital for fostering resilience for the future.

Building Resilience in the Urban Landscape

In response to the unpredictability of crises in today's interconnected world, resilience is very much embedded in Singapore's urban planning and development. By addressing potential vulnerabilities and leveraging its sustainable development strengths, Singapore is building resilience to sudden shocks and changing conditions across resource, climate, economic, and social domains.

Singapore's climate resilience strategy is illustrated through projects like the Marina Barrage, and the Active, Beautiful, Clean Waters programme, which



The Marina Barrage serves as a source of water for Singapore, provides flood control for low-lying urban areas, and is a venue for lifestyle attractions.
Image: Bob Tan / Wikimedia Commons

Singapore's growth as a city reflects a compact approach which balances quality of life with environmental and economic considerations.

demonstrate how infrastructure can be multifunctional. In the former example, flood control functions are integrated with recreational facilities. Resource resilience is also reflected in initiatives such as the Four National Taps water strategy—comprising local catchment, imported water, NEWater (recycled water), and desalinated water—as well as the '30 by 30' food security goal, aimed at enhancing domestic production to guard against the risk of large scale or prolonged supply disruptions.

In terms of economic resilience, Singapore is committed to strengthening its key sectors and enhancing workforce adaptability. For instance, its knowledge-based economy has been bolstered by the development of mixed-use innovation districts such as the upcoming Punggol Digital District, which integrate business, learning, and living spaces. The tourism industry has also been reinforced with new world-class attractions like Gardens by the Bay, which feature lush, accessible green spaces that enhance urban liveability in the city.

In recent years, Singapore's urban planning approach has been made even more robust. The latest Long-Term Plan (LTP, 2021), a strategic land use and transportation plan guiding development for the

next 40 to 50 years, reflects this evolution by adopting a scenario based approach. This allows urban planners to consider multiple pathways, thereby enhancing future optionality and the city's ability to adapt and address evolving demographic needs and unforeseen challenges.

Building upon the strategies outlined in the LTP, Singapore is currently developing the Draft Master Plan 2025. The Master Plan, a statutory land use plan that guides development over 10 to 15 years, provides detailed zoning and development guidelines, and actively incorporate extensive public feedback from Singaporeans through a series of workshops, consultations, and exhibition to gather diverse views and inputs as part of the Draft Master Plan 2025 review. With its shorter five-year review cycle, it enables consistent and regular opportunities for public to contribute and to share their views on their needs and aspirations, in support of the LTP's implementation, for a more responsive and flexible urban planning process.

Additionally, adaptive land use also allows for the inclusion of buffer spaces and reserve sites within towns to accommodate future developments as well as to meet unexpected needs.

Pioneering Regenerative City Approaches

Singapore's urban development has historically been, and will continue to be, influenced by its land constraints. Accordingly, Singapore's growth as a city reflects a compact approach which balances quality of life with environmental and economic considerations. This has sometimes required trade-offs. For instance, strict pollution controls posed challenges for investors in the past but have proven instrumental in ensuring a high quality of life for its residents.

As Singapore matures, its resilience journey will require innovation beyond traditional sustainability measures. The challenge is two-fold: rejuvenating an ageing cityscape and creating spaces that actively nurture nature. This requires a reimagining of urban development, and embracing a regenerative design approach that can actively restore and enhance environmental outcomes.

Designing with Nature

Recognising the intrinsically interconnected nature between human habitats and natural ecosystems, Singapore has started to embrace a paradigm shift towards symbiotic urban development. This shift centres on regenerative design, which reimagines urban spaces as dynamic, adaptive entities that can foster a mutually beneficial relationship between human activity and ecological health.

Singapore's pioneering efforts to integrate nature into the urban fabric, such as through vertical gardens, and urban forests, are not mere aesthetic additions but functional ecosystems that enhance

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People adopting active mobility options like cycling.
Image: Nguyen Thu Hoai / Unsplash

air quality, regulate temperature against the effects of Urban Heat Island, and provide habitats for diverse species.

More than just designing with nature in mind, it is also about maximising utility of our limited green spaces. Rooftop gardens doubling up as community spaces and urban farms, is one example. Alkaff Lake in Bidadari Park, which serves as both a recreational area as well as a flood management system, is another.

To enhance nature integration, Singapore is leveraging on data and science. This can be seen in the National Parks Board (NParks) island-wide Ecological Profiling Exercise, which utilises data and modelling to identify ecological corridors, to guide conservation strategies and urban planning. This data-driven approach ensures that urban development not only minimises disruption to natural habitats but actively creates corridors and spaces that support biodiversity.

Circularity and Resource Regeneration

Regeneration involves developing a circular economy through closed loops and upcycling, to optimise resource use. Singapore has already started to embrace circular economy principles through the development of Semakau Landfill, which integrates waste management and ecosystem conservation. This offshore facility uses incinerated ash and non-incinerable waste to create new

land, enabling a new ecosystem that supports diverse flora and fauna, such as mangroves and marine life.

Similarly, the Tuas Nexus Integrated Waste Management Facility, set for phased completion from 2026, combines water reclamation, solid waste treatment, and energy recovery, to create a closed-loop system that can potentially reduce annual carbon emissions by over 200,000 tonnes.



Alkaff Lake in Bidadari Park retains stormwater to prevent flooding. The accumulated stormwater is slowly discharged to Marina Reservoir.
Image: NParks

The Human Element in Resilience

Singapore recognises that a truly resilient city is not just about clever infrastructure, but also about the adaptability, cohesion, and resourcefulness of its people. This was evident during the COVID-19 pandemic, when Singapore was able to activate a robust community response for initiatives such as mask-making and social support groups for the hardest hit, such as migrant workers.

This strong sense of community is fostered through public engagement and stewardship. Acknowledging that community support is essential for environmental resilience and addressing climate change, Singapore leverages policy, education, and community involvement to involve its citizens in adopting greener lifestyles, and to promote environmental consciousness from the ground up.

Public participation is another invaluable part of the planning processes, as demonstrated by the latest Long-Term Plan Review. This extensive engagement, involving over 15,000 residents, helped ensure that long term plans could take in the needs and aspirations of the wider community.

Additionally, Singapore is also cognisant of the need to focus on long-term changes, such as demographic shifts. A key concern is its rapidly ageing population, brought about by greater longevity and falling birth rates. By 2030, one in four Singaporeans will be aged 65 and above, up from one in ten in 2010. Such a demographic transition can present significant challenges, if the city is not prepared.

Singapore's future resilience can, however, seek to tap on its ageing population as an asset. By harnessing this 'longevity dividend', Singapore can transform demographic change into opportunity. To achieve this, urban planning should allow for future development that strengthens the social fabric, complements new social norms, and bonds a more age-diverse community.

The Age Well SG programme, launched in 2023, is one such example of an overarching initiative that aims to raise seniors' quality of life by improving their physical living environment, encouraging active ageing and strengthening support mechanisms. Part of this initiative also involves increasing the supply of Community Care Apartments that offer innovative ageing-in-place solutions such as senior-friendly features and integrated care services.



Residents of Cambridge Road neighbourhood participating in a green corridor planting activity. Beyond providing an opportunity for community bonding, this activity also contributes to improving walkability and thermal comfort for pedestrians.
Image: Centre for Liveable Cities

A growing number of Active Ageing Centres further strengthens social networks, promotes cohesion, and combats isolation among seniors. These robust community support networks develop social capital that can be called upon during crises.

With an ageing population, the Agency for Integrated Care (AIC) is also supporting persons with dementia through the Dementia Friendly Communities initiative, which aims to raise awareness, reduce stigma, and create a more inclusive society. In this initiative, CLC worked with AIC to lead Singapore's first evidence-based study on Dementia-Friendly

Neighbourhoods. This subsequently prompted the implementation of infrastructure like sensorial gardens and wayfinding installations to help persons living with dementia to navigate their neighbourhoods safely and interact with their communities.

These initiatives create age-friendly urban spaces and foster intergenerational connections, contributing to a society that thrives amidst an ageing population. As Singapore adapts to changing demographics, such efforts will be crucial in maintaining resilience and social cohesion.

Harnessing Collaborative Ecosystems

Developing a robust collaborative ecosystem that supports public, private, and people partnerships is vital to Singapore's resilience-building efforts. In recent years, Singapore has actively engaged the community in protecting shared resources and participating in policy formation. Public-people collaborations such as "reimagining the Rail Corridor and co-create plans for its future" has led to tangible improvements, such as enhanced safety and connectivity of bridges near Bukit Timah Railway Station and the formation of Friends of the Rail Corridor to foster community stewardship. Similarly, partnerships between the Public



Wayfinding installations to support residents with dementia have been implemented in selected areas of Yio Chu Kang.
Image: Centre for Liveable Cities

Liveability is a continuing process of adaptation and growth that requires the embracing of new paradigms such as regenerative design and development to help build urban resilience.

Conclusion

Utilities Board (PUB) and the private sector have helped to build up Singapore's water resilience through technological innovations.

Being renewable energy challenged, Singapore recognises that domestic efforts alone are insufficient, and international cooperation and knowledge sharing are needed to help build resilience. This can be seen in how Singapore has sought regional power connectivity for energy security, and also identified cross-border partnerships as a potential way to achieve effective circularity in resource management and waste reduction.

Singapore's journey, as reflected in the refreshed Liveability Framework, demonstrates an ongoing commitment to both liveability and urban resilience. This effort, underpinned by data-driven decision-making and cross-sector collaboration, recognises that liveability is a continuing process of adaptation and growth that requires the embracing of new paradigms such as regenerative design and development to help build urban resilience.

Just as every city has unique approaches to building resilience that can be learnt from, Singapore too can offer valuable insights to accelerate collective learning and adaptation, and also learn from others to improve our readiness for whatever the future may bring to all of us. 🌐

To access the Liveability Framework e-publication, *Building Liveable and Sustainable Cities: A Framework for the Future*, please scan the QR code on the right:

