ISSUE 18 • JAN 2021

URBAN SOLUTIONS

Adapting to a Disrupted World

A biannual magazine published by CENTRE for LiveableCities SINGAPORE

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CLC IS A DIVISION OF MND SINGAPORE

URBAN SOLUTIONS is a bi-annual magazine published by the Centre for Liveable Cities. It aims to equip and inspire city leaders and allied professionals to make cities more liveable and sustainable.

Set up in 2008 by the Ministry of National Development and the then-Ministry of the Environment and Water Resources, the Centre for Liveable Cities (CLC)'s mission is to distil, create and share knowledge on liveable and sustainable cities. CLC's work spans four main areas—Research, Capability Development, Knowledge Platforms, and Advisory. Through these activities, CLC hopes to provide urban leaders and practitioners with the knowledge and support needed to make our cities better. For more information, visit www.clc.gov.sg.

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ISSN 2301-3540 (print)
ISSN 2301-3532 (e-version)

E-version: www.clc.gov.sg/research-publications/publications/urban-solutions

Printed on Enviro Wove, a paper made from 100% pre-consumer recycled pulp.

MIX
Paper from responsible sources
FSC™ C123317

Cover Image: Workers at the construction site of Leishenshan hospital in February 2020. The hospital was built in 14 days to provide medical care to thousands of COVID-19 patients.
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Cities Embracing the New Normal

The COVID-19 pandemic was the defining event of 2020 and looks set to continue disrupting life across the world. At the same time, cities are grappling with how best to stave off or prepare for the long-term effects of the climate crisis. This has led to growing discussion about the "new normal" for cities in the face of such disruptions.

How have large-scale disruptions changed the way cities live, work and play? What are some good urban solutions that could help cities respond faster and better to unexpected disruptions and make cities liveable and sustainable in the long term?

City leaders and experts offer some key insights:

Ideas and practices for liveable and sustainable cities also support resilience and adaptability.

Some cities had a head start in responding to the pandemic because they were already innovating for the future.

Anne Hidalgo was already reimagining Paris as a 15-minute city for a more sustainable way of life, while Sharon Dijksma had introduced car-lite measures in Amsterdam to improve accessibility. The Singapore Food Agency was diversifying food sources and increasing local production based on its 30x30 plan. The pandemic was unexpected, but it was also a catalyst that accelerated plans already in motion.

Cities must innovate and plan for resilience to prepare for future pandemics and other disruptions.

Cheong Koon Hean urges cities to rethink planning and behavioural paradigms to build resilience. Chintan Raveshia notes this is already happening in Jakarta and London, where active mobility initiatives are boosting social resilience and lifting local economies.

Lawrence Wong shares Singapore's pandemic initiatives to safeguard lives and livelihoods, while Yuriko Koike discusses Tokyo's plans for a new normal that embraces diversity and inclusiveness.

As cities recover from the pandemic, this is a chance to build back better and opt for more sustainable ways of living and working to address the climate crisis.

Bill Winters discusses how financial organisations can support climate action by facilitating infrastructure investment to make cities greener and mitigate climate change risks.

The global pandemic has highlighted the importance of digital tools and accelerated global trends towards digitalisation. Desmond Lee shares how Singapore has harnessed technology and digitalisation to overcome physical constraints and make the city more resilient, sustainable and liveable.

As we reimagine our cities and continue to learn from one another , I wish you an enjoyable read and hope you find some useful insights in this issue to guide you in embracing the new normal.

Hugh Lim

Executive Director
Centre for Liveable Cities

IN CONVERSATION WITH
YURIKO KOIKE

The Mind, Skill and Body of the New Normal in Tokyo

Governor Yuriko Koike shares how the Tokyo Metropolitan Government is working to shape a "new normal" for the city that embraces diversity and inclusiveness and addresses the needs of the vulnerable amid the coronavirus pandemic.

Image: Tokyo Metropolitan Government

The COVID-19 pandemic has been an unexpected crisis for cities around the world as they try to manage the strain on public health infrastructure and maintain economic activity. How has Tokyo approached the crisis, and how has the city fared in tackling the crisis?

The focus of the Tokyo Metropolitan Government (TMG) is on containing and reducing the spread of infection while keeping the economy and social activities ticking, with the support of the people.

There is an expression derived from Japanese martial arts—"心 (Shin), 技 (Gi) and 体 (Tai)", or "Mind, Skill and Body". I always consider this philosophy when making policies.

Mind, Skill and Body—I always consider this Japanese martial arts philosophy when making policies.

"Shin" or "Mind" refers to the consciousness of people. The high social consciousness of Japanese people has received positive recognition overseas. I believe the high level of public health awareness has played a significant role in Tokyo's success in containing the coronavirus crisis.

Of course, every culture has its own customs. In Japan, we take off our shoes at home, have special toilet seats with warm water to wash, and wear masks, among other norms. Indeed, mask-wearing goes all the way back to the 1918 flu pandemic. It has been jokingly said that only bank robbers and Japanese people put masks on. However, mask-wearing has now become an international necessity.

A poster from the time of the 1918 flu epidemic exhorts citizens to "be fearful of the flu and germs" and warns that not wearing a mask is "a reckless act."
Image: Written by the Central Sanitary Bureau of the Ministry of Home Affairs, from the collection of the Library of the National Institute of Public Health, Japan

"Gi" or "Skill" refers to the ability to disseminate information using technology.

TMG launched a COVID-19 Information website at an early stage to deliver the latest information. This website has made its source code openly available and, as a result, more than 50 local governments across the country have launched their own websites using our source code. I have also been using YouTube to deliver live updates regularly in Japanese and English so that people can get accurate information in a timely manner. Since November, I have provided detailed information in simple Japanese, Nepali, Tagalog and other languages, to cater for foreign residents.

Governor Koike delivering the COVID-19 Monitoring Report, with information available from TMG's COVID-19 Information website. *Image: Tokyo Metropolitan Government*

When a cluster of infections occurs, TMG notifies users of infection information based on visitation history via email and a communication app. We have also posted robot concierges in some subway stations to enable passengers to receive guidance without direct human contact.

In addition, in cooperation with universities and other organisations, TMG is promoting the establishment of a coronavirus analysis method using virus analysis of sewage in order to detect the signs of a potential increase in infections.

Finally, "Tai" or "Body" refers to policies that support both "Mind" and "Skill".

TMG has asked a wide range of businesses including restaurants, bars, theatres, museums and sports gyms to display a rainbow-coloured COVID-19 safety sticker that shows they are taking steps to prevent the spread of infection. You can see more than a quarter of a million of these stickers all over Tokyo. Businesses must follow the guidelines for COVID-19 prevention in order to obtain the stickers and consumers are able to select among businesses by referring to the stickers. These safety stickers raise awareness among businesses and consumers and have contributed to a tangible reduction in the spread of infection.

TMG also understands the need for compassion and the diverse needs and concerns of citizens during such a difficult period. In October, we opened a newly designated facility for recovery where people who have mild or no symptoms can stay with their beloved pets such as cats, dogs, hamsters and rabbits.

> Tokyo's new normal includes washing our hands, wearing a mask, maintaining social distance, and avoiding closed spaces, crowded places and close conversation.

What will Tokyo's "new normal" look like?

Tokyo's new normal in this coronavirus age includes washing our hands and wearing a mask, maintaining social distance, and avoiding the three Cs—Closed Spaces, Crowded Places and Close Conversation.

Even before the pandemic, TMG promoted telework to improve productivity and support flexible working styles. Now, we are further promoting this effort to reduce human contact. TMG has also strongly encouraged the introduction of telework among small and medium-sized enterprises (SMEs) by subsidising costs for the necessary supporting equipment.

Compared to pre-pandemic levels, the rate of companies introducing telework in Tokyo has increased significantly and daily commuter congestion has eased. TMG aims for these practices to increasingly take root in society without losing the momentum brought on by these extraordinary circumstances.

On public transportation, TMG is promoting the avoidance of peak commuting hours as well as measures such as the use of bicycles. Together with office development in the city centre, TMG is working toward creating bicycle parking facilities.

We are also promoting the spread of bicycle-sharing services, one of the key means of transportation in parts of Tokyo. Due to the coronavirus outbreak, the number of new registrants for bicycle-sharing services has increased dramatically, with a 40% increase between March to April alone. Based on TMG's initiatives, the number of buildings with open, spacious design and high-performance ventilation has also increased.

TMG was already promoting these initiatives before the pandemic. With the spread of the coronavirus, I firmly believe that these trends will continue to grow.

What are the Tokyo Metropolitan Government's initiatives for sectors, groups and communities affected by the COVID-19 crisis?

I know that many have been greatly affected by the COVID-19 pandemic. I maintain the position that the key to supporting economic activity in Tokyo is to enhance assistance for SMEs.

SMEs, including sole proprietors, account for 99% of the companies in Tokyo. These SMEs are vital to the city's economic activity and industrial base. However, they have been severely affected by the pandemic. TMG has compiled 11 supplementary budgets so far this year to support these companies without delay.

> A holistic approach to sustainable recovery is essential in maintaining Tokyo's vitality.

As the pandemic continues, expecting and nursing mothers are naturally concerned about their own health as well as the health of their unborn babies and newborns. TMG offers subsidies for coronavirus testing for pregnant women who wish to be tested before delivery; and counselling support for pregnant women and nursing mothers infected with COVID-19, in which a professional provides health and post-natal advice over the phone.

Given the sudden negative impact on the employment situation, TMG hired people as part-time employees who had to leave their jobs for various reasons related to COVID-19, as well as people whose job offers had been withdrawn because of the coronavirus economic convulsions. These measures have led to the creation of much-needed job opportunities.

We need to keep our sights set on the future as we work toward the recovery of the economy, society, and even our own mindsets as we endure this pandemic. Around the world we see a trend of working toward economic recovery while also coping with climate change, but I want to propose a "sustainable recovery" model for people as a new perspective on living sustainable lives, not only in regard to climate change, but in other areas as well. A holistic approach to sustainable recovery is essential in maintaining Tokyo's vitality.

We realise that digital transformation will be critical in restoring connections between people who have been separated by the pandemic. Going digital can help foster communication and create a society where people can maintain their way of life in the face of such crises.

Rather than try to return to a pre-pandemic society, TMG must realise a Tokyo for everyone, where diversity and inclusiveness are embraced through the establishment of a new normal and digital transformation. TMG aims to create a resilient and sustainable society that generates new values by responding flexibly to change; creating spaces where people can connect despite quarantine measures; creating environments where children can learn; and creating a system in which people can work and gain an income with peace of mind, and continue their artistic, cultural and sporting activities.

A robot concierge.
Image: Tokyo Metropolitan Government

COVID-19 safety stickers displayed by businesses in Tokyo create public awareness and offer reassurance.
Image: Tokyo Metropolitan Government

The Tokyo Metropolitan Government has plans for a new disease control centre as a response to the pandemic and to prepare for future shocks and disruptions. What role will this centre play in the future of Tokyo's public health governance and how will it help to build resilience for similar epidemics?

The newly established Tokyo Center for Infectious Disease Control and Prevention or Tokyo iCDC is serving as a new permanent command post for conducting effective infectious disease countermeasures, including policy planning, crisis management, research and analysis, and information gathering and dissemination.

Under normal circumstances, Tokyo iCDC has been strengthening its fact-finding capabilities by training human resources in public health and establishing networks with local and international governments, research institutions and other organisations. And in times of crisis, Tokyo's know-how and strengthened capabilities can be leveraged as Tokyo iCDC shifts to emergency operation mode, responding swiftly and effectively to any situation.

> Rather than return to a pre-pandemic society, TMG must realise a Tokyo for everyone, where diversity and inclusiveness are embraced through the establishment of a new normal and digital transformation.

How will the Tokyo Olympics be planned and executed and how will public health safety concerns be addressed?

The Tokyo 2020 Games, scheduled to be held in 2021, will be a symbolic and significant Games to prove that people, all together from across the world, have defeated the virus and strengthened our mutual bonds.

In order to have a successful Games, we must make thorough preparations to provide athletes, spectators and all involved with a safe and secure environment.

TMG, together with the national government, the Tokyo Organising Committee and other organisations concerned have been working closely to come up with a wide range of measures to manage the coronavirus. This includes border control and infection prevention measures, such as regularly conducting PCR tests on the athletes, and the way we run the Olympic and Paralympic Village, for example how meals are served. We are also working together to ensure the stability of the medical system.

Through these numerous efforts, we believe that the Tokyo 2020 Games can rise to the challenge of our post-pandemic world. And our model—the Tokyo model—will be passed on to future Olympic and Paralympic host cities.

The information in this interview was correct as at 30 October 2020.

IN CONVERSATION WITH
LAWRENCE WONG

Big Lessons from a Small City

Lawrence Wong, Minister for Education, Second Minister for Finance and Co-Chair of the Multi-Ministry Taskforce on COVID-19 talks about Singapore's response to the COVID-19 pandemic and reflects on its long-term implications for the city-state.

Lawrence Wong at MTF Press Conference in December 2020 discussing plans for Singapore's vaccination strategy.
Image: Ministry of Communications and Information, Singapore

The COVID-19 pandemic has been an unexpected and formidable challenge for cities across the world. How is COVID-19 different from previous crises that Singapore has faced?

COVID-19, like SARS [Severe Acute Respiratory Syndrome], is a public health emergency. Singapore is always vulnerable to such threats because we are a small, high-density city, closely connected to the rest of the world.

We have a good response system that was developed and strengthened after the painful experience with SARS. It is a Whole-of-Government, even a Whole-of-Singapore approach, with tight coordination across agencies and all stakeholders, so that decisions and measures can be undertaken decisively and swiftly.

But this is also a completely new virus, with different characteristics from SARS. Hence, we couldn't rely solely on the SARS playbook. We had to adapt and improvise amidst a great deal of uncertainty, and do our best to deal with a rapidly escalating situation.

Despite Singapore's density and limited land availability, it has been able to provide for new infection control facilities for quarantine and patient care in a decisive and timely manner. What made this possible?

> It is a Whole-of-Government approach, with tight coordination across agencies and stakeholders, so that decisions and measures can be undertaken decisively and swiftly.

Space is indeed a key constraint for us.

This new virus is much more infectious than SARS. And people can get infected without showing any symptoms. That means that we need a lot more space to isolate and quarantine travellers and close contacts.

Hence, we had to adapt quickly and make the most of all our available resources. For example, we converted sites like vacated public housing flats and army camps into decantment facilities for migrant workers. At one stage, we even activated floating hotels for this purpose.

We also made use of empty hotel rooms as dedicated facilities to isolate travellers coming to Singapore. And we converted large spaces like the Singapore Expo and Convention Centre into Community Care facilities for infected patients with mild symptoms, so as not to overwhelm our hospitals.

This was truly a national-level response, with all hands on deck. Everyone worked round the clock to get these facilities ready in quick time, and we owe them a big debt of gratitude.

Singapore is a connected and global city whose economy is highly reliant on international trade and commerce, and the COVID-19 virus has unevenly affected different segments of society. What are some of the measures that have been taken to contain the spread of COVID-19?

To control the infection, we needed to introduce very restrictive measures like the Circuit Breaker [an elevated set of safe distancing measures aimed at significantly reducing movements and interactions in public and private places]. But we recognise that these measures come at a high price. We were well aware of the economic and social impact they would have on Singapore and Singaporeans. That's why we cushioned the impact with four Budget packages. And we stepped up our efforts to engage vulnerable seniors to mitigate the sense of isolation.

We also knew that we could not remain closed indefinitely, as we had to prioritise both lives and livelihoods. Hence, after the infection came under control, we embarked on a phased re-opening of our economy and our society.

> Resilience and sustainability have enabled us to tackle any challenges or disruptions that come our way.

How has Singapore's planning approach enabled it to prepare for and navigate ongoing climatic, social, public health and other disruptions?

Resilience and sustainability have always underpinned our urban development. These guiding principles have stood us in good stead to tackle any challenges or disruptions that may come our way.

For example, with 30% of Singapore less than five metres above sea level, any increase in sea levels caused by climate change could pose an existential threat to how we live. So we are taking actions now to ensure that all low-lying areas are adequately protected.

Likewise, COVID-19 will have long-lasting impact on the way we live and work, and the way that people interact with the urban environment. This warrants further study so that we can adjust and fine-tune our plans.

Ultimately, the key is to stay nimble and flexible, and to continuously adjust our urban plans to address any emerging global issues or trends, as well as the evolving needs of our people.

What do you think are some of the most likely long-term changes that disruptions such as COVID-19 will leave in terms of how we plan, develop, manage and govern cities?

We have always emphasised that this fight against COVID-19 is a marathon, not a sprint. Now with the arrival of safe and effective vaccines, we are seeing some light at the end of the tunnel. But there is still some way to go, and we must stay focussed and disciplined to complete our mission.

At some point, COVID-19 will pass, and the pandemic will be over. But there will likely be some long-term effects on how we live and use our urban spaces. One example is in the area of work. With companies and

Lawrence Wong visiting a lab at the National University Hospital.
Image: National University Hospital

employees getting used to working from home, we can expect people's commuting, retail consumption and lifestyle patterns to evolve as well. If this behaviour persists, it will naturally mean having to adjust how we plan for neighbourhoods and the Central Business District.

At the neighbourhood level, we will need to cater to more people working from home by strengthening the convenience and accessibility of amenities. It also lends greater impetus for developing the gateways and local hubs that were laid out in earlier Master Plans, to bring jobs even closer to home.

What are some key areas that cities should work on going forward to build up resilience over the long term?

For Singapore, resilience is indeed key to our survival. As a small city-state, we have a very small margin of error compared to larger, better-resourced nations.

So we must never rest on our laurels. We must keep on strengthening our capabilities and preparing for the next challenge—it could be another pandemic, a disease X in the future, or other existential challenges like climate change.

In tackling these challenges, we have to take a systematic and inter-disciplinary approach and avoid working in individual silos. We must also constantly re-examine our own assumptions, be prepared to push the boundaries, and develop new and creative solutions that may well be different from the status quo or conventional norms.

As disruptions become increasingly unpredictable, social resilience becomes even more important for societies to bounce back. In this regard, how have businesses and individuals supported the government's efforts in crisis response?

A city can only be as strong as its people. The ability of our people to stay resilient in the face of mounting challenges is crucial to Singapore's survival and liveability. In that respect, the pandemic has clearly demonstrated our mettle and brought out the best in Singaporeans.

During the pandemic, we've seen many examples of individuals and companies rallying together and launching numerous ground-up initiatives. The pandemic has also been a momentous shared experience for all of us and will define the collective consciousness of our generation.

This is why we initiated the Emerging Stronger Conversations [part of the Singapore Together movement that provides opportunities for Singaporeans to partner with the government and provide support for more citizen-led initiatives]—to give Singaporeans the chance to reflect on this experience and share their views on how to create a more caring, cohesive and resilient society.

Ministry of Education's Emerging Singapore Conversations.
Image: Ministry of Education

> Even the best-laid plans will go awry. What's more important is our ability to adapt, recover our footing and turn the situation around.

As we move forward, the Singapore Together Alliances for Action, which are industry-led coalitions, will transform these reflections into action and move on key growth areas for Singapore. Through close partnership between government and industry, we hope to quickly explore, prototype and implement new ideas in crucial sectors, paving the way to indeed emerge stronger.

What is the one thing you are most grateful for in terms of how Singapore has been able to weather crises such as COVID-19 so far? What is one thing that you wish we had been better prepared for?

Planning and preparation are indispensable but even the best-laid plans will go awry. In a crisis, we must expect and be prepared for the unpredictable. New issues will pop up; things will trip up; and we won't always get things right all the time. What's more important is our ability to adapt, recover our footing and turn the situation around.

Over the past year we have shown that we can do this as a nation, by staying united and working together in common purpose. That's the "Singapore Together" spirit that will enable us to win this fight against COVID-19, and to deal with any future challenges that may come our way.

PARIS

New Ways of Living for a Post-COVID Future

TEXT: TOH EE MING

Amid a devastating coronavirus pandemic, Paris inspires urban planners to rewrite the playbook on how to reimagine cities for a more sustainable future.

Paris mayor Anne Hidalgo (centre) campaigning on a cycle in June 2020. The 15-minute city idea was a central pillar of her re-election campaign. *Image: Alain Jocard / Getty Images*

> **The 15-minute city is a polycentric city, where density is made pleasant, where proximity is vibrant and where social intensity is real.**

As Parisians slept soundly in May, a crew of street workers worked steadily through the night, blocking off traffic and painting yellow bike icons on roads. The next morning, residents awoke to a city transformed—one in which they could go to work via miles of "corona cycleways" around Paris and outer suburbs.

This move to create pop-up bike lanes fast-tracked Paris Mayor Anne Hidalgo's grand plan to create a "15-minute city". Says Hidalgo: "My ambition is to transform Paris into a town where everything you need can be found within 15 minutes of your home, on foot or by bike."

According to Carlos Moreno, "Smart City" Special Envoy of the Mayor of Paris and Scientific Director, Panthéon Sorbonne University-IAE Paris, "The 15-minute city is a polycentric city, where density is made pleasant, where proximity is vibrant and where social intensity is real." Thought to fundamentally reshape how people move, work, live and play, these ideas have gained even more traction during the COVID-19 pandemic.

Reimagining the Way Parisians Move

Although cars have been king in Paris, with traffic snarls causing air pollution which kills 3,000 people a year, cycling advocates were hopeful that Paris would overcome these issues to become a leading cycling capital. This dream was fast-tracked during Paris's lockdown, as people avoided crowded buses and metros to reduce the risk of coronavirus transmission.

A Velib cycle sharing station on the Ile de la Cite, Paris. Use of shared cycles peaked in September 2020, exceeding 200,000 daily trips with over 400,000 subscribers using the system.
Image: Martyn Davis / Flickr

As part of reclaiming road space, arterials such as Rue de Rivoli are now reserved for cyclists, pedestrians and active mobility modes along with authorised vehicles and residents.
Image: Jean-Baptiste Gurliat / City of Paris

My ambition is to transform Paris into a town where everything you need can be found within 15 minutes of your home, on foot or by bike.

National bicycle group Vélo et Territoire said the number of French cyclists surged by 28% in May as compared to the year before. Parisians also enjoyed cleaner air during the lockdown due to the halt in road and air traffic, while areas with heavy traffic saw drops of 70% to 90% of nitrogen dioxide levels.

This trend aligns with Mayor Hidalgo's hopes to pedestrianise the city centre as part of the 15-minute city plan. When she was elected in 2014, she set out an ambitious plan to double the number of bike lanes from 700 to 1,400 km by 2020. In her 2020 re-election campaign, she vowed to remove 72% or 60,000 roadside parking spaces.

In 2016, she introduced the "Paris Breathes" initiative, which bans motor vehicles from entering certain parts of the city every first Sunday of the month. The city's electric buses, electric vehicles and bike rental systems are free that day.

Customer at a marketplace in Maubert. Markets in Paris reopened with strict spatial and health protocols in place to protect both traders and customers.
Image: Sophie Robichon / City of Paris

Changing the Way Parisians Work

With working from home set to become the new normal in light of the pandemic, the 15-minute city plan encourages workplaces to be located in proximity to residences. It suggests that the city add offices and neighbourhood co-working hubs, and encourages remote working and flexible hours.

French people have a legal right to ask their employers if they can *teletravail* (work from home).

Before the law was implemented in 2017, only 3% of full-time workers worked from home at least one day per week. By the end of March 2020, one quarter of French employees were working from home. Another poll also found that 71% of people who had never previously worked at home before the pandemic now wish to work from home at least one day per week.

> **Roads were converted into cycleways, libraries and stadiums could be used outside standard hours, while nightclubs could double up as gyms during the day.**

A traffic-free section of the right bank by the Seine in Paris. The project was implemented as part of Paris' ambitious plans to reduce the use of polluting private vehicles.
Image: Cecile Marion / Alamy Stock Photo

A Greener Way of Life

Hidalgo has been among the most high-profile city leaders on climate change since Paris hosted the COP21 summit at which the landmark 2015 Paris Agreement was signed, establishing the global goal to be carbon neutral by 2050. "Since 2014, we have already created 30 hectares of green areas and planted 20,000 trees. Work has been carried out to increase the share of local species most suited to adjust to global warming," says Hidalgo. Under her charge, Paris will plant urban forests around four iconic landmarks—The Hôtel de Ville, Opéra Garnier, Gare de Lyon and Seine quayside—building on a previously set goal for 50% of the city's surfaces to be covered by park and green roofs by 2050.

Paris's 15-minute city plan also looks to improve quality of life and reconnect neighbours by encouraging multiple uses for existing infrastructure. As Moreno notes, "Flexibility is at the core of the concept. During the pandemic, we've seen the conversion of parking spaces into cafés bringing joy and life to Paris." Roads were converted into cycleways. The 15-minute city plan also envisions that libraries and stadiums could be used outside standard hours, while nightclubs could double up as gyms during the day. Schools could function as parks and play spaces over the weekend. As Hidalgo says, "The objective is to remodel school courtyards and open them to everyone in the summer outside of school hours."

Urban farms are another way to help cities be more resilient. A long-time advocate for urban agriculture, in 2016 Hidalgo's administration launched Les Parisculteurs, a new platform which helped fund 38 new urban farms that produce 800 tons of fruit and vegetables a year. City planners are hopeful that ordinary Parisians will start to introduce more locally grown food into their consumption habits.

An urban farm in 20th arrondissement, Paris. Supported by the City's Les Parisculteurs initiative, urban farms help green the city and increase food production.
Image: Emilie Chaix / City of Paris

Patrons use the extended terrace of a cafe in Paris during COVID-19. Due to safe distancing measures, Parisian restaurants and bars will be able to extend the terraces of their establishments in the public space until June 2021.
Image: Paul Gueu / Shutterstock.com

> **The pandemic forced Parisians to stay at home, rediscovering proximity under constraint. The 15-minute city proposes a desirable proximity, a city that citizens want to live in.**

Building Back Better

Looking ahead, Hidalgo says, "We will continue our transition to gain additional space over cars for the benefit of pedestrians and cyclists by developing bicycle lanes and opening up the city center to pedestrians." The upcoming Olympic and Paralympic Games are expected to be the perfect catalyst for urban transformation, with efforts underway to create a park at Champ de Mars and render the River Seine clean enough to swim in by 2024.

With COVID-19 likely to be a chronic threat, urban planners face challenges in adapting to an uncertain future. Moreno thinks the 15-minute city is part of the solution in building urban resilience: "This [approach] proposes to tackle environmental, social and sanitary challenges that were revealed by the pandemic. These challenges are common to cities around the world, and it might be an answer for many of them."

Experts say that pedestrianising streets is only a start and more can be done. City leaders should prioritise investments like public transport and housing. They should also look beyond central Paris, and rethink how to make working-class neighbourhoods on Paris's outskirts more liveable.

Says Moreno: "The pandemic forced immobility and forced us to stay at home, rediscovering proximity under constraint. The 15-minute city proposes a desirable proximity, a city that we want to live in. This crisis is a big opportunity to change our lifestyle and define an urban organisation which addresses social and ecological challenges and supports sustainable economic development. But it is also about caring for all inhabitants and being close to public services."

The coronavirus pandemic has taught Paris an important lesson on the need to plan in a collaborative, interdisciplinary way—one that incorporates creativity and resilience to dream up new ways of living.

VIEWPOINT

CHINTAN RAVESHIA

Active Mobility Can Help Cities Bounce Forward

Southeast Asian cities are realising that active mobility is not just a transportation solution that solves traffic and environmental issues. With community and stakeholder participation, active mobility can boost social resilience and lift economies—much-needed catalysts in the aftermath of the global pandemic.

> Beyond enabling commuters to walk, cycle or travel using their personal mobility devices, active mobility represents a necessary paradigm shift for cities in the post-pandemic era.

The COVID-19 pandemic gave Southeast Asian cities a glimpse into a more liveable future, as lockdowns cleared skies and brought a rare respite from gridlock and pollutants. Some cities went further, leveraging the lack of road traffic to experiment with car-lite concepts such as turning roads into bicycle lanes.

Beyond enabling commuters to walk, cycle or travel using their personal mobility devices, active mobility represents a necessary paradigm shift for cities in the post-pandemic era.

Here are three ways that Southeast Asian cities can get on track for a brighter post-pandemic future.

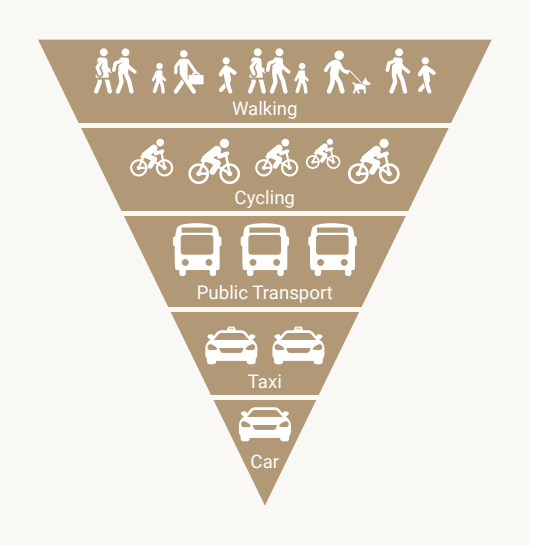
Tactical Urbanism—Do More With Less

Cities can start small with tactical urbanism initiatives. This involves changing existing places and city systems through low-cost, temporary community projects to improve the built environment and effect positive social and economic outcomes.

The low-traffic pandemic environment is the perfect time to change attitudes and behaviours towards active mobility. Although heat and humidity are oft-cited reasons in Southeast Asia for not walking more, a walkability study I led found that Kuala Lumpur and Singapore have dramatically different levels of acceptance to walking. Interventions to pedestrian infrastructure and street design make all the difference in influencing perceptions of walking.

The Jakarta “safe routes” project is a good example. Government agencies, public institutions and local residents collaborated on a temporary road intervention, painting a pedestrian path on shared streets to improve safety and accessibility for pedestrians to get to school, home and a mass transit station. This low-cost pilot successfully changed behaviours—traffic was calmer and 98% of students who walked from their home used the painted path.

There are opportunities to pilot new initiatives and build on existing ones. Jakarta has begun remediating its interwoven canals, which can be turned into active mobility corridors that stitch together disparate neighbourhoods and forge valuable inter-community networks. Ho Chi Minh City can leverage the transformation of a district in Thao Dien from a disused open area into a vibrant arts and entertainment venue in 2012, enhancing the precinct’s attractiveness and walkability.



Invert the Pyramid—Make Streets, Not Roads

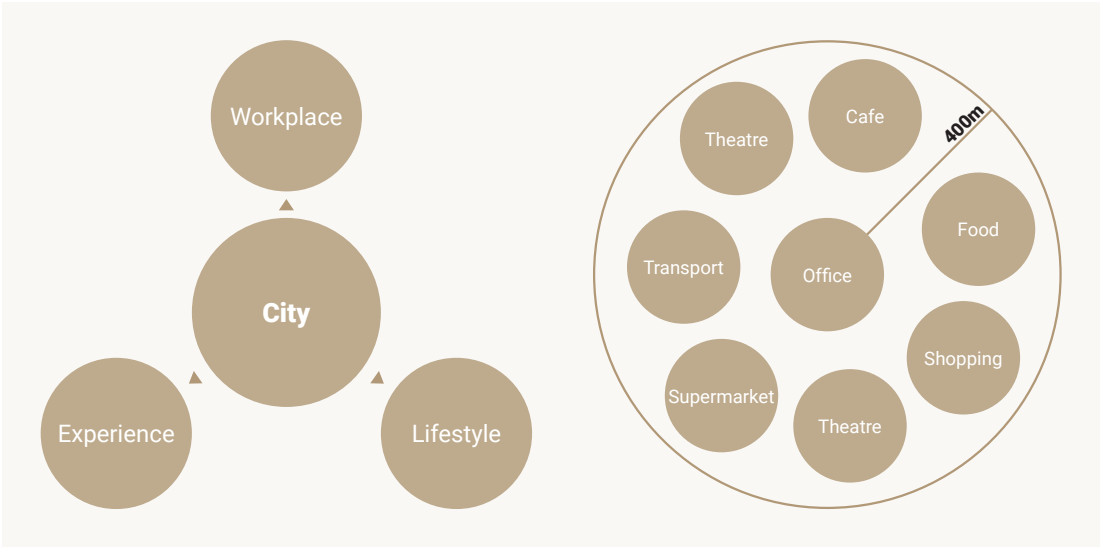
City planners have long planned roads before considering pedestrians' and cyclists' needs. While roads serve a purpose as corridors for movement, these wide swathes of tarmac often create severances within a city.

Streets, on the other hand, have a more diverse function. These are places where social and economic activity occur and deserve priority in urban planning. By prioritising streets, we are putting people and active mobility first and cars second. We must invert the pyramid and make more streets, not roads.

> By prioritising streets, we are putting people and active mobility first and cars second. We must make more streets, not roads.

By reconfiguring large sections of road space and car parking lots to be more "street-like", London has demonstrated the tangible economic effects of elevating the status of pedestrians. Its investment in walking and cycling infrastructure increased retail spend by 30% and rental values by 7.5%. The economic benefits extend to higher property prices, rental yields and more employment opportunities.

Going beyond a people-first approach, Arup's research has shown that a child-centric approach to urban planning can have highly



positive outcomes. A child's ability to get around independently and safely, play outdoors and connect with nature in an urban environment are considered strong indicators of high liveability standards and better mental and physical well-being for citizens of all ages.

Neighbourhoods as 'Campuses'

The pandemic compels rethinking of mono-use districts within a city. Due to lockdowns and work-from-home arrangements, businesses in areas such as Central Business Districts have been hit hard by the prolonged decline in human and economic activity.

Yet I have observed that 10-minute "campus-like" neighbourhoods offering a diversity of amenities and experiences within a short walk or cycle from each other have been more resilient during the pandemic.

Singapore's Tanjong Pagar is an example of a successful 10-minute campus neighbourhood. Co-located within this vibrant and walkable district is a mix of hotels, retail and food options, public and private housing, heritage shophouses and skyscrapers—all stitched together by corridors of green spaces, interconnected footpaths and streets. There is something for everyone, and the diversity of visual and sensorial experiences makes it attractive to stop, shop and walk—in turn, enhancing its resilience to the shock of the pandemic.

Active mobility is not just a transportation issue or a city planner's problem. We've long known about the economic, social, public health and environmental resilience of precincts that prioritise active mobility. We just need to be better coordinators of different disciplines to transform our physical environment and engineer lasting economic, social and environmental change.

While big infrastructural responses work from the top down, we must also start small with tactical urbanism, transcend siloes with a collaborative and ground-up community approach to understand diverse needs, and refocus on people over cars.

Every crisis is an opportunity to outdo our previous successes. In this era of disruptions, let us focus not just on recovery and bouncing back, but also on revolutionising and bouncing forward.

VIEWPOINT

SHARON DIJKSMA

Cars Were Guests on Amsterdam's Streets Even Before the Pandemic

Amsterdam has steadily been introducing car-lite measures in its quest to create a liveable and accessible city. Former Deputy Mayor Sharon Dijksma shares how the city's forward-looking actions gave it a headstart in responding to the COVID-19 pandemic.

Amsterdam's measures to shape a liveable and accessible city predate the COVID-19 pandemic. While the pandemic has presented the city with challenges, it has also accelerated our plans.

Building a liveable and accessible city, with clean air and more space for pedestrians, cyclists and children to play on the streets—this has been the main objective of my work for the city of Amsterdam.

Like many other cities in the world, we face a major planning challenge in the Metropolitan Area of Amsterdam. To accommodate growth, we need to build 290,000 more homes by 2040. Building this liveable and accessible city involves making the city future-proof. This is not an easy task because it consists of many smaller, interrelated sub-tasks.

To tackle these issues, we have developed a couple of agendas, one of which is to make the city car-lite. We will be removing about 10,000 public parking spaces by 2025. We also introduced what we call “knips”, where some main roads that run through the city are cut in two. This makes routes that would previously have passed through the city centre much longer, and directs more cars to stay on the peripheral roads of the city.

Importantly, creating a car-lite city is different from pursuing an anti-car-policy. We are not against cars and we know that we have many inhabitants who are dependent on their vehicles. That is why we are investing heavily in public transportation for the years to come. In fact, public transport is at the heart of our policies because it creates access to mobility for all. In 2018, the opening of the Noord-Zuidlijn, a metro connecting the northern part of the city with the centre and the southern part on the other side of the River IJ, led to huge social and economic benefits.

Other alternatives, such as walking and biking, are on our agenda as well. When redesigning streets, we made more space for pedestrians where possible. We created many “Fietsstraten”

> Because so many people already cycle or are pedestrians, there is a great acceptance that cars should be guests on the streets.

or bicycle roads. These roads used to be for cars, with a narrow biking lane next to it, and are now transformed into much broader “bike-first roads”, where cars are allowed as “guests” and can only drive at a maximum speed of 30 km/h.

Car-sharing is another important measure. We give car-sharing companies a permit; in turn, they pay the city to be able to deploy a fleet of shared cars on the streets of Amsterdam. Together with these companies, what started as car-sharing is being transformed into a much broader system of shared mobility and mobility as a service. This ensures that in the future, more people will not have to own a car, a bike, an electric scooter or their own cargo bike. Instead, through a monthly payment plan, inhabitants can have access to mobility as and when they want it.

Our Action plan on Clean Air is crucial as well. We want to reach our goals in this field by investing in good charging infrastructure for electric cars, among other measures. Amsterdam already has one of the highest densities of charging stations in the world and we are working to expand the

network. Creating more strict environmental zones, where more pollutive cars are not allowed, also makes it possible for us to enhance the air quality further.

These measures predate the outbreak of the COVID-19 pandemic, and while the pandemic has presented Amsterdam with many challenges, it has also accelerated our plans. These are health-related in the first place and for the short term but had social objectives for the longer term.

We found that many of our goals and measures we had taken were applicable in responding to the pandemic as well. This enabled us to act quickly when the pandemic broke out.

This stands out most clearly in the creation of public space. More space was needed to prevent the spread of the pandemic, but this also intensified Amsterdam's space crunch and prompted us to reorganise our public space. As creating space was already at the heart of our policies, we were familiar with the measures needed.

The pandemic has been an urgent call to action for people to change their behaviour. People will work at home much more often and use public transport in different ways compared to previous years. Amsterdam's pandemic measures in the public space ultimately favour pedestrians and cyclists over cars, and aligns with plans to reduce space for cars. Because so many people already cycle or are pedestrians, there is a great acceptance that cars should be guests on the streets.

This article was written in November 2020, when Ms Sharon Dijksma was Deputy Mayor for Traffic and Transport, Water and Air Quality for the City of Amsterdam. Ms Dijksma is currently the Mayor of the City of Utrecht.

e ESSAY

PLANNING & GOVERNANCE
CHEONG KOON HEAN

Dr Cheong Koon Hean is Chairman of the Centre for Liveable Cities and former Chief Executive Officer of the Housing & Development Board and Urban Redevelopment Authority, Singapore.

Rethinking Planning Paradigms in the Wake of COVID-19

Singapore's public housing towns are designed using the neighbourhood concept, where localised facilities like shops, multi-generational playgrounds, community gardens and amenities take care of residents' most day-to-day needs.
Image: Centre for Liveable Cities

The COVID-19 public health crisis has transformed the way we live, work, play and learn—creating economic downturns and disrupting supply chains, among other upheavals. To ensure that cities and people are resilient against future pandemics, governments will need to re-think planning paradigms, innovate and inspire behavioural change.

> Physical and behavioural paradigm shifts must go hand in hand. For a city to be resilient, we need everybody to work together.

Over the last two decades, the world has seen up to five pandemics. The advent of COVID-19, one of the biggest public health crises of all time, has also forced us to reconsider deeply held beliefs about good city form and urban planning. What should we do to make our cities more resilient?

Changing Paradigms: Disrupted or Accelerated

Health concerns have always informed planning and urban design. Poor sanitation, crowded living conditions and pollution in Britain at the end of the 19th century sparked the Garden City Movement. Noted architects, such as Le Corbusier, were mindful of health considerations and lifted some of his buildings off the humid ground to avoid contamination.

Much of what cities are currently doing in response to the pandemic—from quarantines and lockdowns to working from home, wearing masks and so on—borrows from frameworks used to protect the occupational health of workers. These pandemic mitigation strategies will influence the way the built environment is planned and designed.

However, even as the world adopts these measures, there remain many uncertainties. How long will the pandemic last? Will there be recurring lockdowns? Will telecommuting and e-commerce be sustained? And what will the impact be—on productivity and creative collaboration, or on educational, dining and retail experiences?

While the future is likely to be some combination of physical and digital interfaces, the relative proportion will be important, because it will have an impact on the demand for real estate and the mode-share of public versus private transport.

While the future is likely to be some combination of physical and digital interfaces, the relative proportion will be important, because it will have an impact on the demand for real estate, for instance, or on the mode-share of public versus private transport.

There are some planning paradigms that drive the way cities are planned. For example, most cities are constrained by limited land. Driven by the imperative of efficiency, land use planning aims to optimise land and resources, which generally leads to higher density developments. Cities that thrive on trade, such as Singapore, have invested heavily in transport infrastructure like ports and airports. With globalisation, cities have also outsourced much of their production to cheaper locations.

Pandemics such as COVID-19 force us to re-think some of these paradigms. This is not to say that we need to throw out what we've been doing: indeed, many planning paradigms are likely to continue or even accelerate. But we may have to layer on new considerations.

For example, supply chain disruptions have derailed and slowed construction and manufacturing activities.

Geopolitical imperatives are driving a shift from globalisation to glocalisation. There are now calls to shift production of essentials and medical goods back home. Travel restrictions threaten the hub position of key cities and have decimated tourism. Such changes demand new strategies to ensure that economic activity and growth can continue. In terms of environmental and spatial considerations, there are also calls for de-densification, with a new focus on living conditions and spacing out peak commuter traffic.

How then do we find new ways to live, work, play and learn in the post-COVID environment? What shifts in urban planning and design do we need to make?

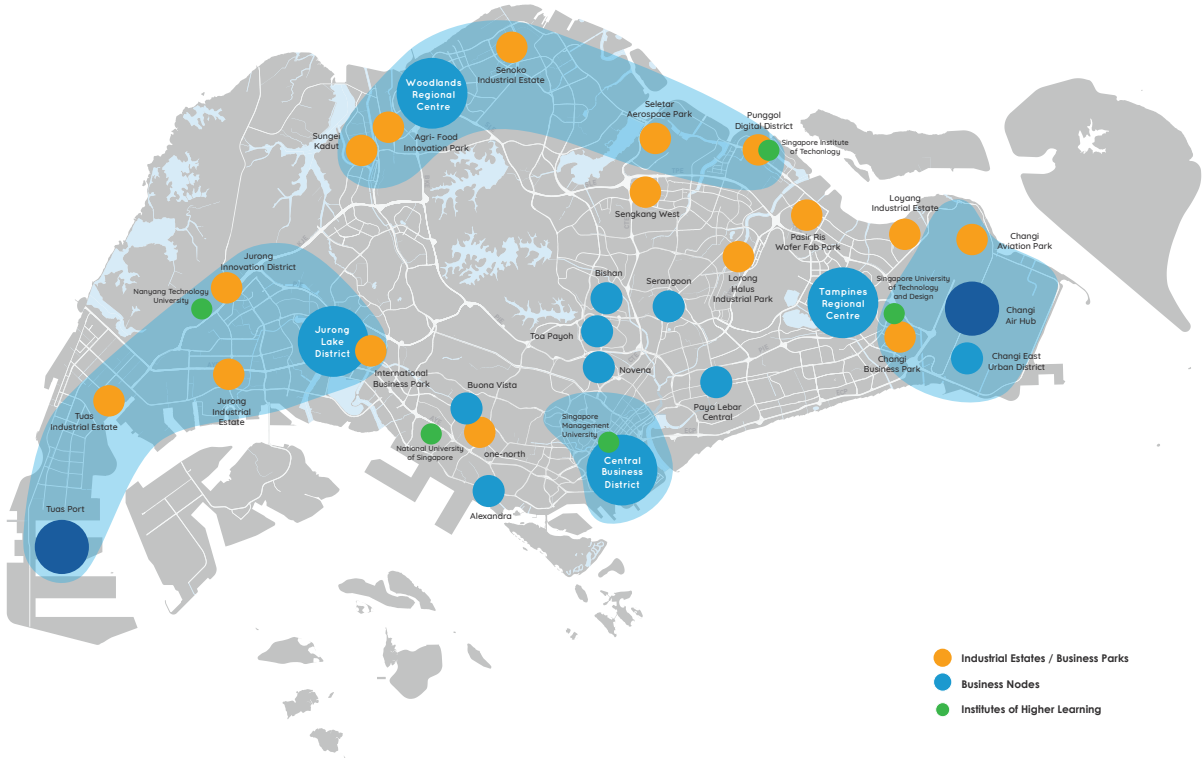
From Just-in-Time to Just-In-Case

One initial shift is to reframe our planning from a just-in-time to a just-in-case approach: to rethink efficiency versus contingency. To minimise supply chain disruptions, we may have to increase storage capacity to stockpile essential materials, chemicals and medical supplies, as well as build up selected local production capacity. Singapore feels this keenly, because we import almost everything.

Thinking just-in-case instead of just-in-time also means we need land and multifunctional spaces that can be converted very quickly into dormitories and healthcare facilities, or even quarantine facilities if large numbers of people are infected in a pandemic. Zoning regulations may need to be reviewed to afford more flexibility for land use.

Food resilience is another challenge—particularly for Singapore, which imports more than 90% of our food. A diversification strategy has served us well in the past, but many countries are also feeling the pressure of the global pandemic. So we need to identify even more food sources to ensure continuity of supply. Singapore is also ramping up local production and intensifying urban farming, targeting to produce 30% of our nutrient needs locally by 2030.

During the coronavirus pandemic, available land at Tanjong Pagar Terminal, Singapore was used to house COVID-care facilities.
Image: Hit1912 / Shutterstock.com



At the national level, Singapore has been developing as a polycentric city with regional centres in different parts of the city-state so as to bring work closer to homes.
Image: © Urban Redevelopment Authority. All rights reserved

> The key is to adopt a more decentralised spatial strategy—dividing up the city into various self-contained zones.

From Borderless to Bubbles

Another shift is from going borderless to creating bubbles. This means attempting to ring-fence clusters of infection within a specific geography—at different scales—to minimise the spread of infection. Hence, countries are creating travel bubbles and fast lanes for visitors from some countries with low rates of infection, while quarantining those from other countries with higher infection rates.

On a national scale, planning should aim to reduce the concentration of people in key areas such as the CBD and reduce peak-hour commutes on public transport. The key is to adopt a more decentralised spatial strategy—dividing up the city into various self-contained zones.

Fortunately, Singapore has already been developing as a polycentric city over the years: this spreads out jobs and amenities so workers do not have to travel across the island and crowd public transport to work in the CBD.

At the neighbourhood and district levels, there can be more self-contained neighbourhoods. In Singapore, more than 80% of the population are already housed in public housing towns, each comprising several neighbourhoods of about 4,000 to 6,000 units each, all well-served by shops and amenities and accessible by walking and cycling. Each neighbourhood is in effect a self-sufficient bubble, minimising the need for residents to travel to amenities elsewhere.

For individual buildings, we can decongest offices and space out workers, designing bubbles around each person with sufficient spacing, while compartmentalising common

spaces like pantries and toilets. We can consider contactless fittings and improve air quality with better air filtration systems. Restaurants will need more space because fewer people can be safely seated indoors. We can promote takeaway meals or more outdoor eating—Singapore's hawker centres are a good typology—and have more queuing space within and outside shops. For residences, we can design flexible layouts for multifunctional spaces to support working and studying from home.

From Densification to Distributed Density

Does this mean urban density is doomed? High density cities are hubs of innovation and engines of growth; they are more efficient and sustainable than urban sprawl, accommodating the large numbers that flock to a city for jobs and amenities. Interestingly, highly dense cities like Hong Kong and Taipei have contained COVID-19 reasonably well. The challenge is to find innovative ways to accommodate large numbers of people by combining design with lifestyle changes.

One design challenge is mass communal living in dorms, nursing homes and hostels—potential infection hotspots in a pandemic. For example, in a worker dormitory, distributed density means that groups of workers should be housed in different blocks, with each block ring-fenced to minimise inter-mingling. Singapore had to address these norms when a serious COVID-19 outbreak occurred in our migrant worker quarters. We will be building new quarters with better standards and more space per person in the longer term.

We need to re-establish confidence in the notion of density. This means liveable density and quality living conditions that can benefit all residents.

During the lockdown, Singapore deployed food vans to public housing apartments so the elderly could buy their groceries close to homes without having to travel to shops.
Source: The Straits Times © Singapore Press Holdings Limited. Reprinted with permission

From Liveability to Health and Wellness

Going beyond liveable cities, health and wellness must now be a priority in the design and planning of cities, to reduce the prevalence of pre-existing medical conditions that can increase health risks for patients infected with COVID-19.

Singapore has been growing as a "City in a Garden", using holistic and biophilic design principles to promote physical and mental wellbeing. For instance, we provide, within walking distance, more parks and spaces for exercise and relaxation. We adopt sustainable green building designs with better ventilation and air quality, which also reduces the urban heat island effect.

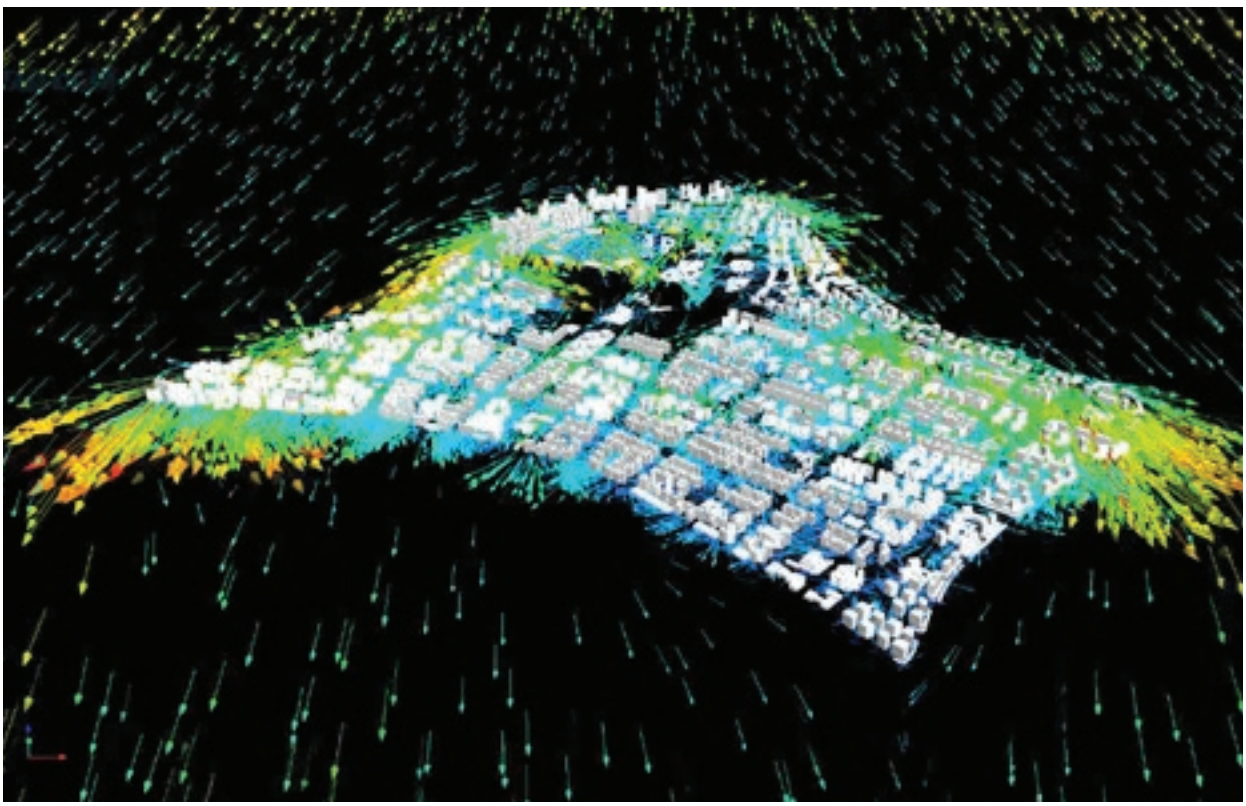
Here, the science matters. We developed a biophilic framework to guide the design and development of our public housing towns, based on research into how greenery contributes to health and wellbeing. At the town and building levels, we deploy tools like wind flow modelling to capture breezes and achieve better air quality while maximising natural ventilation and lighting.

We should also look into establishing bio-secure buildings, with filtration systems for better air flow and fewer high-touch surfaces; and incorporate inclusive design to support special needs groups and an ageing population.

Rethinking Urban Services

COVID-19 has accelerated digitalisation—but not everyone can go digital. It is important to minimise the digital divide. In Singapore, we set up a SG Digital Office to accelerate digital adoption in our community: helping hawkers to adopt e-payment solutions and seniors to develop digital skills, and putting in place very good digital infrastructure, such as high-speed broadband, so people can work and study from home.

Encouraging telecommuting and staggered work hours are ways to shave off the peaks and decongest public transport. Cities should also cater to alternative modes of transport, like cycling and walking.



Environmental modelling of Punggol Town allows HDB planners and architects to see the effect of urban design on environmental conditions.
Image: Housing & Development Board, Singapore

A digital ambassador speaks with a stallholder in Singapore as part of broad digitalisation outreach efforts to help businesses learn how to use digital tools.
Source: Lianhe Zaobao © Singapore Press Holdings Limited. Reprinted with permission

Innovation and Social Resilience

Land that is less needed for roads can go towards more greenery and public spaces. But there are other factors to consider: reduced commuter loads may affect the viability of public transport services, for instance. We should also plan for new delivery patterns from accelerated e-commerce, goods movement, urban logistics and the wider use of drones and robots for deliveries.

COVID-19 has led to increased waste production: mountains of biomedical, electronic and takeaway waste are growing. Cities must ramp up the disposal, processing and management of waste—but also educate people to reduce, recycle and reuse rather than throw things away.

COVID-19 has led to many innovations in a short time: the rapid development of diagnostic kits, cheaper ventilators, contact tracing applications, mask technologies and even antiviral drugs and prospective vaccines. Digital innovations in retail, learning, services, culture, the arts and telemedicine will reconfigure the way citizens live, work, play and consume services.

Following this crisis, there could also be greater use of prefabrication, robotics, artificial intelligence, automation and 3D printing, particularly in essential services and the construction industry so as to reduce reliance on migrant workers.

Going beyond COVID-19, cities should ride on this wave of innovation to boost opportunities for urban planning and to advance the healthy development of our cities.

But physical and behavioural paradigm shifts must go hand in hand. For a city to be resilient, everybody needs to cooperate and work together, and to change their social behaviours for the greater good.

Governments play an important role in supporting businesses and job creation, as well as setting legislation for stay-at-home rules and enforcing quarantines and border controls. But it is critical to build social capital and to persuade citizens to be part of the solution, so that they will chip in to help each other cope with new vulnerabilities.

ESSAY

SUSTAINABLE FINANCING

BILL WINTERS

Bill Winters is Group Chief Executive of Standard Chartered.

Closing the Funding Gap for Green Urban Infrastructure

Waterlogged street in Dhaka, Bangladesh.
Image: Nayan Kar / SOPA Images / LightRocket via Getty Images

There are insufficient funds going towards building the infrastructure needed to make cities greener and mitigate climate change risks, particularly in the developing economies. How do we plug this financing gap? Standard Chartered's Group Chief Executive Bill Winters outlines how financial organisations can support climate action.

> At present, there is not enough capital flowing to the countries where investing to achieve the United Nations' Sustainable Development Goals (SDGs) matters most.

The clock is ticking on climate change. Temperatures are rising, sea levels are going up and we have more greenhouse gases in our atmosphere than at any time in human history.

In a rapidly urbanising world, where two out of every three people are forecast to live in cities by 2050, this is a formidable challenge. Unless we act fast, 800 million people living in low-lying coastal cities—particularly in Asia and the US coast—will be hit by sea level rises and coastal flooding by 2050 according to the UN. As many as 1.6 billion city-dwellers will suffer the effects of extreme heat and 650 million will find it more difficult to access fresh water, according to the UCCRN Technical report.

There is no denying it—we need to start making our cities more sustainable and resilient now. But there is a big problem: a lack of funding to build the infrastructure needed to make cities greener and mitigate climate change risks.

Mind the Funding Gap

At present, there is simply not enough capital flowing to the countries where investing to achieve the United Nations' Sustainable Development Goals (SDGs) matters most. The UN has calculated a financing gap of at least US$2.5 trillion per year up till 2030 for emerging markets alone.

Looking more closely at infrastructure-focused SDGs reveals the scale of the problem—and the potential. Standard Chartered's Opportunity 2030 report reveals a US$10 trillion financing gap across 15 high-growth markets in Asia and Africa.

This presents a clear business case and investment opportunity for the private sector to contribute to three of the most tangible, infrastructure-focused goals—SDG 6: Clean Water and Sanitation, SDG 7: Affordable and Clean Energy, and SDG 9: Industry, Innovation and Infrastructure.

A surge in demand is coming for transport, housing, energy, digital connectivity and water. An enormous infrastructure buildout

> Measure, manage and ultimately reduce—this is our commitment to lessen our financing for activities that will accelerate climate change.

is needed. The challenge is to ensure that it happens sustainably and in a manner resilient to the changing climate.

None of this will be easy. Many governments may be financially constrained in the aftermath of the COVID-19 pandemic, having taken on more debt to shore up struggling economies. Investors too have been wary in the face of an uncertain outlook.

However, our research suggests the private sector appetite for sustainable finance is holding up. In fact, over the next three years, 42% of investors are considering putting 5-15% of their funds into sustainable investments, according to the Sustainable Investing Review 2020. We believe this trend is set to continue despite the significant disruption brought about by the pandemic.

Reshaping Financial Services for Sustainability

So how can we ensure that the work of financial organisations both promotes and entrenches sustainability, and attracts the new wave of investors looking for green returns?

Backing Projects

In 2019, Standard Chartered helped finance one of Singapore's largest-ever green loans for the acquisition of DUO Tower and DUO Galleria. Both buildings are renowned for their green credentials, including a rainwater harvesting system and a special glass exterior that keeps the building cool, reducing the need for air conditioning.

The Greater Bay Area in Hong Kong has also secured its first-ever green bond. The money raised will finance or refinance green assets to help create a low-carbon economy, including renewable energy, cleaner transport and wastewater management.

Singapore's DUO Tower is recognised for its green features.
Image: Fadh.graphy / Flickr

A solar array that Standard Chartered financed in Vietnam.
Image: Asian Development Bank

But finance for emerging markets has historically proved challenging. Truly transformative projects often cannot be funded by the public sector alone.

Innovative forms of finance such as blended deals are one way to unlock progress—with NGOs, governments, the private sector and insurers working together to help the world's poorest cities transition to low-carbon economies.

Standard Chartered participated in one such deal in January 2020. Working alongside the Asian Development Bank, we provided long-term financing to develop and operate a 50-megawatt photovoltaic solar power plant in Tay Ninh Province in Vietnam.

One of Tanzania's biggest-ever infrastructure projects is now underway, after Standard Chartered arranged US$1.46 billion of financing for the construction of a new railway. Not only will it reduce congestion and pollution in cities like Dodoma and Dar es Salaam, it is also notable for its diverse mix of investors and stakeholders.

The private sector plays a pivotal role in helping emerging economies realise the SDGs. Standard Chartered has committed to providing US$40 billion of project financing services for infrastructure that promotes sustainable development by the end of 2024.

Measuring Impact

Measure, manage and ultimately reduce—this is Standard Chartered's commitment to lessen our financing for activities that will accelerate climate change. To make good on our word, metrics are proving essential.

We have developed a Green and Sustainable Product Framework in collaboration with Sustainalytics, a leading provider of ESG and corporate governance research, so that funds can be directed to projects that will have a positive impact.

In the same way, we need to embed sustainability into the core thinking of mainstream financial markets.

In this area, we have two innovative partnerships. The first is a research project with Imperial College London, looking at how best to identify climate risks and include them in financial decisions. The second is working with Munich Re, using its software to allow companies to analyse the climate change-related risks for holding assets or liabilities in specific locations.

Unsurprisingly, data is also instrumental in the capital allocation process. Our Sustainable Finance Impact Report has shown that a dollar invested can have a

Extract from Standard Chartered's Sustainable Finance Impact Report.
Image: Standard Chartered

> We are prepared to move money away from activities today to avoid creating climate risks tomorrow.

significantly different outcome depending on where and how it is deployed. The greater the information at our fingertips, and the deeper our understanding of the issues we are working to solve, the better the decisions we can make to meet our sustainability goals.

Withdrawing Services

Our first instinct is always to engage with and support clients in their transitions to more sustainable pathways, if possible, by providing the capital to do so. But if needed, we are prepared to move money away from activities today to avoid creating climate risks tomorrow.

Power generated by burning coal is a major cause of pollution and must be actively avoided as cities grow their energy infrastructure to meet increased demand. At Standard Chartered, we are gradually withdrawing our services from clients who rely on coal for a large part of their income. From January 2025, we will only work with clients who are less than 60% dependent on earnings from thermal coal, with this threshold dropping to 40% in 2027, and then 10% in 2030 (based on % EBITA at group level).

The example of coal is relatively clear-cut. The difficulty comes in measuring the impact of more complex activities, like city infrastructure projects, which may have a negative impact on wetlands, forests or peatlands.

That is why everyone—banks, city planners and NGOs—needs an established methodology to measure CO_2 emissions from planned developments to help us all manage the climate impact.

We have reviewed more than 1,100 client relationships and transactions, checking their compatibility with Standard Chartered's position statements on industries such as power generation, agriculture, transport and mining.

Findings from Standard Chartered's $50 Trillion Question Survey show that sustainable investment is growing but not enough is reaching the markets that need it most. The survey was conducted between July and August 2020 among a panel of the world's top 300 investment firms, with total assets under management of more than US$50 trillion.
Image: Standard Chartered

COORDINATING FINANCING FOR TANZANIA'S RAILWAY PROJECT

Tanzania's new 550 km railway will link the capital city of Dar es Salaam with the commercial hub of Dodoma, before further connections are built to Rwanda, Uganda and the Democratic Republic of Congo.

There are many benefits for Tanzania's people: it allows for the economic development of the region, with increased trade and job creation. It will also provide communities living alongside the railway with better access to social services, healthcare and education. Every train is estimated to take about 500 lorries off the highway, significantly cutting pollution and congestion.

In terms of the US$1.46 billion investment needed, Standard Chartered has overcome one of the most common challenges experienced by African governments in accessing funds. The bank's long-term financing proposal—backed by Export Credit Agencies (ECAs) and a diverse investment community—meant Tanzania's government could start building without having to source for additional financing as the project progressed.

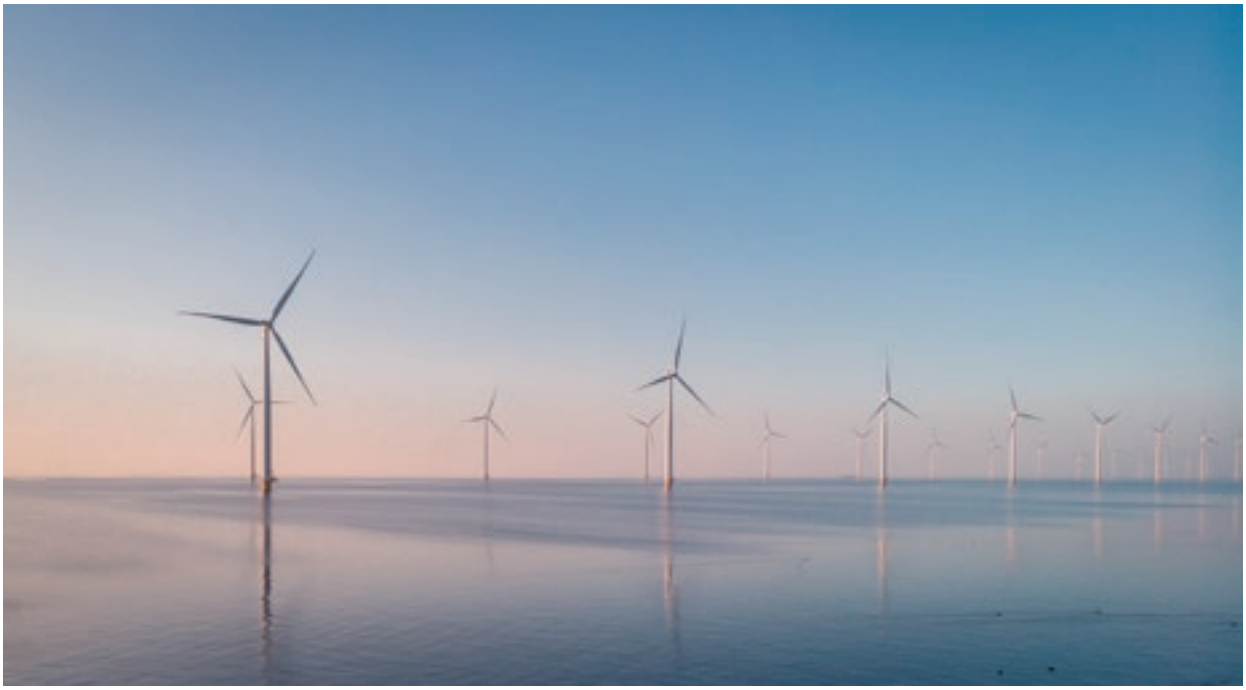
Standard Chartered drew on expertise from around the world, bringing together international and domestic investors with complementary objectives, including ECAs to guarantee the loans. We had existing relationships with both Tanzania's Ministry of Finance and the Turkish rail contractor Yapi Merkezi, and an agreement from the start to ensure the project would be built in line with international best practices.

The project's social and environmental credentials were key to investors. The ECAs, for example, established criteria such as livelihood restoration, biodiversity and community engagement. The Ministry of Finance's commitment to independent monitoring of the project management was also key.

Standard Chartered coordinated the demands of all parties and changed the accepted norms of how such deals are structured, using its experts to review the economic, social, environmental and other risks.

The offer was heavily oversubscribed, proving that there is investor appetite for well-planned, well-executed projects that meet international standards and have demonstrable benefits for the local community.

Dar es Salaam, one of the cities that will be linked by the new 550 km railway line in Tanzania.
Image: K15 Photos / Unsplash



Off-shore wind farms offer a reliable source of energy.
Image: Getty Images

> Real progress requires multilateralism and partnerships at every step of the journey.

The Power of Collaboration

No single organisation can plug the sustainable financing gap alone. We must all work together to share best practices and develop a common set of standards.

The Taskforce on Climate-related Financial Disclosures has developed a new way of reporting CO_2 emissions alongside financial results. The Taskforce for Scaling Voluntary Carbon Markets, which I chair, is bringing together the entire carbon value chain to create a blueprint to enable private sector companies to reach their net-zero goals and sustainability-related aspirations through a liquid, transparent and reliable carbon market.

Real progress requires multilateralism and partnerships at every step of the journey. We must continue to learn from one other and extend a helping hand to those who need it most, as we work for the greater good.

Creating a Sustainable Legacy

As cities grow and develop, sustainability must be built into every level of organisational decision-making. At Standard Chartered, our position on climate change not only informs all our decisions on project finance but also gives us a sense of purpose. A sustainable city is a liveable city—one that has not just environmental benefits, but health and economic ones, too.

By directing the flow of money to infrastructure projects that will leave a positive legacy, we want to play our part in creating a more sustainable and resilient world for generations to come.

e ESSAY

SMART CITIES
DESMOND LEE
Desmond Lee is the Minister for National Development and Minister-in-charge of Social Services Integration in Singapore.

Singapore's Smart Nation Journey

In Singapore, students and the community are being introduced to fields such as robotics to familiarise them with emerging technologies.
Source: The Straits Times © Singapore Press Holdings Limited. Reprinted with permission

As the global pandemic opens up new opportunities and ways of thinking, Singapore's experience shows that technology and digitalisation, if harnessed well, can be instrumental in helping cities emerge from difficult times to become more resilient, sustainable and liveable.

> The COVID-19 pandemic has highlighted the importance of digital tools and solutions, and accelerated global trends towards digitalisation.

Singapore is an island city-state. We are only 720 km^2 in size—you could drive from end to end in under an hour—and we are one of the most densely populated countries in the world. We have no natural resources other than the creativity and industry of our people. These are severe constraints that any country would struggle to overcome.

In the face of these challenges, technology has been Singapore's ally. Over the decades, we have used engineering and other innovations to moderate, and sometimes even transcend, these physical limits. We have expanded our land area by a quarter by reclaiming land from the sea. We have also made our water supplies more resilient by harvesting urban stormwater on a large scale, recycling wastewater, and desalinating seawater.

COVID-19: Managing the Pandemic While Accelerating Digitalisation

Technology has continued to evolve, and Singapore is determined to harness it for good. Smart and digital technologies can help us and other countries solve problems, unlock opportunities, and improve people's lives.

This is true not only in calmer times, but also in times of crisis. If anything, the COVID-19 pandemic has highlighted the importance of digital tools and solutions, and greatly accelerated global trends towards digitalisation.

With video conferencing technology, we can safely connect with colleagues and clients even when working from home. We have also used this to keep in touch with family and friends during circuit breakers and lockdowns, while using food delivery apps to get meals delivered to elderly parents. Even as we remain separated to prevent the virus from spreading, technology has been a silver lining in this dark cloud, helping to bridge physical and emotional distances.

Technology has also enabled our children to continue their studies at home during the pandemic. With a public health crisis like this, it is so easy to lose a whole generation of young people if they are unable to attend school for long periods.

The global pandemic has also shown that digitalisation not only makes our lives more convenient, it can be a lifesaver. In Singapore, we have had to come up with apps and technologies quickly to trace

The nationwide use of the TraceTogether app and the national digital check-in system SafeEntry, together with strict temperature checks and safe distancing, have boosted contact tracing efforts and allowed Singaporeans to resume their lives with a degree of normality.
Image: kandl stock / Shutterstock.com

> For a city-state as small and dense as Singapore, good planning, augmented by technology, allows us to make much better use of scarce land.

and contain COVID-19 infections. The TraceTogether app and the national digital check-in system, SafeEntry, have enabled health authorities to swiftly and effectively conduct contact tracing. This has been a gamechanger as we strive to keep Singaporeans safe, and as the country gradually resumes some form of normality.

Integrating Technology Into Planning

Harnessing technology is not new to Singapore. Prior to the pandemic, we have already been consistently using digital tools to help us better plan, develop and manage our city. The pandemic has accelerated this process and spurred us to make better use of these tools in various dimensions, including public health.

For a city-state as small and dense as Singapore, good planning, augmented by technology, allows us to make much better use of scarce land.

Our urban planners have developed a range of digital planning tools, including ePlanner, which helps analyse datasets from different agencies to improve the design of urban spaces. With ePlanner, our planners can not only identify areas with higher concentrations of elderly, but also analyse travel patterns to assess how easily they can access healthcare facilities. This is especially critical as Singapore's population ages. This additional information helps identify and fill gaps to meet seniors' needs.

Getai shows—cultural performances traditionally staged for live audiences during the Hungry Ghost Festival—were live-streamed to ensure safe distancing during the COVID-19 pandemic.
Image: REUTERS / Edgar Su

A cinemagoer checking in using the TraceTogether app.
Image: Centre for Liveable Cities

> Digitalisation will play a greater role in the lifecycle of built infrastructure: from conceptualisation and design to construction, facilities management and maintenance.

Designing, Building and Managing HDB Towns

With more than 80% of Singaporeans living in public housing, digitalisation has also helped to better design, build and manage public housing towns. The Housing & Development Board (HDB) uses environmental modelling tools and computer simulations to analyse wind flow, solar heat and noise within upcoming towns, allowing the design and positioning of newly built homes to conserve energy and optimise comfort. This has been applied on a town-wide level for the very first time in Tengah New Town, which is now being built. Singapore is an equatorial, dense and urbanised city-state, and this technology, far from being purely theoretical, can bring about real benefits.

HDB also has a "Smart Hub", which acts as a "brain" for municipal operations. It is a central data repository that collects, integrates, processes and analyses data on municipal services across public housing towns. HDB's planners use it to better understand the usage patterns of common amenities, so they can schedule maintenance works promptly and even pre-emptively.

Transforming the Built Environment Sector

In future, digitalisation will also play a greater role in the life-cycle of the built environment infrastructure that we enjoy today: from conceptualisation and design to construction, as well as facilities management and maintenance.

An artist's impression of the upcoming Tengah New Town, which incorporates smart and sustainable technology such as the world's first large-scale residential centralised cooling system, photovoltaic panels, electric vehicle charging points, and other smart energy and water saving solutions.
Image: Housing & Development Board, Singapore

Functioning like a "brain", the Housing Board's Smart Hub programme collects, integrates and analyses data on municipal services across Singapore's public housing towns, with the aim of improving and optimising estate services.
Image: Housing & Development Board, Singapore

This pandemic has shown us clearly that Singapore needs to embrace digitalisation and move away from a heavy reliance on manual labour. Embracing digital tools and technology also creates opportunities to upskill Singaporeans and create new jobs. This transformation also greatly enhances the cost-efficiency of managing and maintaining buildings. A building's overall life-cycle costs—including energy use, maintenance and facilities management—can be more than four times greater than the initial construction cost. This can be lowered by using technology to design, build, manage and maintain buildings more efficiently.

Many of our government agencies and private developers have begun to embrace these changes. JTC, which manages industrial estates, uses a range of digital tools to track, analyse and optimise the performance of buildings, gather feedback from tenants, and automatically route the information to a facilities team for quick action. Its headquarters has a command centre that is plugged in to sensors in its industrial buildings across Singapore, allowing it to closely monitor the performance of chillers, lifts and other facilities.

Planning Nature Areas and Parks

Moving from urban to green takes just minutes in small Singapore. Therefore, we have to harness technology and its tools to help us better plan our green spaces. Unlike in larger countries, where many cities have ample space for parks as well as large tracts of nature reserves, Singapore's nature reserves are in the very heart of the city, surrounded by buildings.

Geospatial modelling tools have helped boost the conservation of local biodiversity, such as migratory shorebirds, forest birds, butterflies, coral reefs and mangroves. The National Parks Board (NParks) uses GIS modelling, for example, to determine the path of least resistance for forest birds and butterflies across the urban landscape. Connective "nature ways" can then be created for these creatures to move between green spaces in the city.

NParks is also using predictive models to understand how coral reefs, mangroves and intertidal flats

Young students assisting elderly participants at an inter-generational IT workshop. Singapore has intensified its efforts to increase the digital literacy of groups such as the elderly and the lower-income.
Source: The Straits Times © Singapore Press Holdings Limited. Reprinted with permission

are connected within Singapore's coastal waters. This assists urban planners in crafting management strategies to safeguard valuable areas of biodiversity. In tiny Singapore, the tension between development and conservation is a day-to-day reality for our planners. Technology enables us to make optimal decisions within very narrow margins.

Insights from highly technical models can even lead to ambitious national policies such as the creation of protected nature parks. Satellite tracking of migratory shorebirds has helped determine that our small island is a major pitstop along their long-distance migration routes. As they stop over in Singapore, many of these birds roost in Sungei Buloh Wetlands Reserve while they forage for food at the nearby mudflats in Mandai. Understanding this key ecological relationship enabled our decision to conserve Mandai Mangrove and Mudflat as a nature park.

Conserving and protecting these habitats may seem like a simple act, but it has far-reaching effects. Satellite tracking supports the long-term survival of these birds, some of which are globally endangered.

Active Citizenry

Technology also allows Singapore to harness the energy of greater citizen participation. It meets the aspirations of citizens who wish to play a greater part in making decisions on matters that impact them.

One example is the OneService mobile app, which was created to enable residents to give feedback easily on-the-go. When residents encounter municipal issues, the feedback they submit through the app is automatically routed to the relevant agency-in-charge. The app's geo-tagging and photo-taking functions enable municipal officers to pinpoint the exact location and nature of the issues, and to respond promptly. The app is regularly being tweaked and improved—for example, a feature was recently added for residents to participate in surveys on topics such as local improvement works, empowering them to take small but meaningful action on issues that concern them.

> Technology allows Singapore to harness the energy of greater citizen participation and meet the aspirations of citizens who wish to play a greater part in making decisions on matters that impact them.

Making Technology Inclusive for All

Worsening inequality is a major problem globally. How do we ensure that everyone—from rich to poor, young to old, and across all ethnicities—experiences these technological benefits? Singapore has been working hard to ensure that, in becoming a Smart Nation, no one is left out.

In May 2020, Singapore set up an agency dedicated to raising the digital literacy of groups such as the elderly and the lower-income, and to accelerate how quickly they adopt digital tools. The SG Digital Office organises classes for senior citizens to pick up various simple digital skills, such as creating secure passwords, making e-payments, making video calls to loved ones, searching for information online, and importantly, how to guard against cyber scams even as they explore this new digital world.

The private sector and civil society are also pitching in. Several telecommunications companies have launched subsidised mobile and data plans for seniors, while the Ministry of Education has partnered NGOs and businesses to provide low-income families with subsidised personal computers and options for free broadband connection.

Future-Proofing Singapore

2020 has been a troubling year for the world. The COVID-19 pandemic is an unprecedented global crisis that continues to have far-reaching impacts on economies and peoples' lives. Yet we should keep in mind that, prior to the COVID-19 pandemic, the world was already grappling with complex and growing problems such as climate change and urbanisation, and adapting to technological and social disruptions.

While the global pandemic is a major crisis, it can also trigger societies to act more boldly to find solutions to these challenges, opening up new opportunities and ways of thinking.

Technology and digitalisation should play a key supporting role in these efforts. Singapore's experience has shown that these tools can enhance our strengths and even transcend our limitations. If harnessed well, technology will be instrumental in helping cities and countries emerge from difficult times to become more resilient, more sustainable and more liveable.

ESSAY


COMMUNITY RESILIENCE
DANIEL P. ALDRICH AND NORIO SIM

Daniel Aldrich is Professor of Political Science, Public Policy and Urban Affairs at Northeastern University, where he directs the Security and Resilience Studies Program. Norio Sim is a researcher at the Centre for Liveable Cities, focusing on urban resilience and climate change.

Building Community Resilience for Future Epidemics

Leveraging on social networks, volunteers checked in on elderly residents in villages of Kenya to ensure they were well taken care of during the pandemic.
Image: Denis Ngai from Pexels

Beyond physical infrastructure and good decision-making, varied social ties and the collective actions and behaviours of people can build up a community's resilience to future pandemics and other shock events.

> Social infrastructure captures the interpersonal connections that tie people together. Societies require webs of ties to operate successfully under all circumstances.

As countries around the world fortify their defences to deal with the ongoing COVID-19 pandemic, what has emerged as a key success factor is the collective actions and behaviours of people. This essay discusses the importance of social ties and connections for building up reservoirs of resilience for future epidemics.

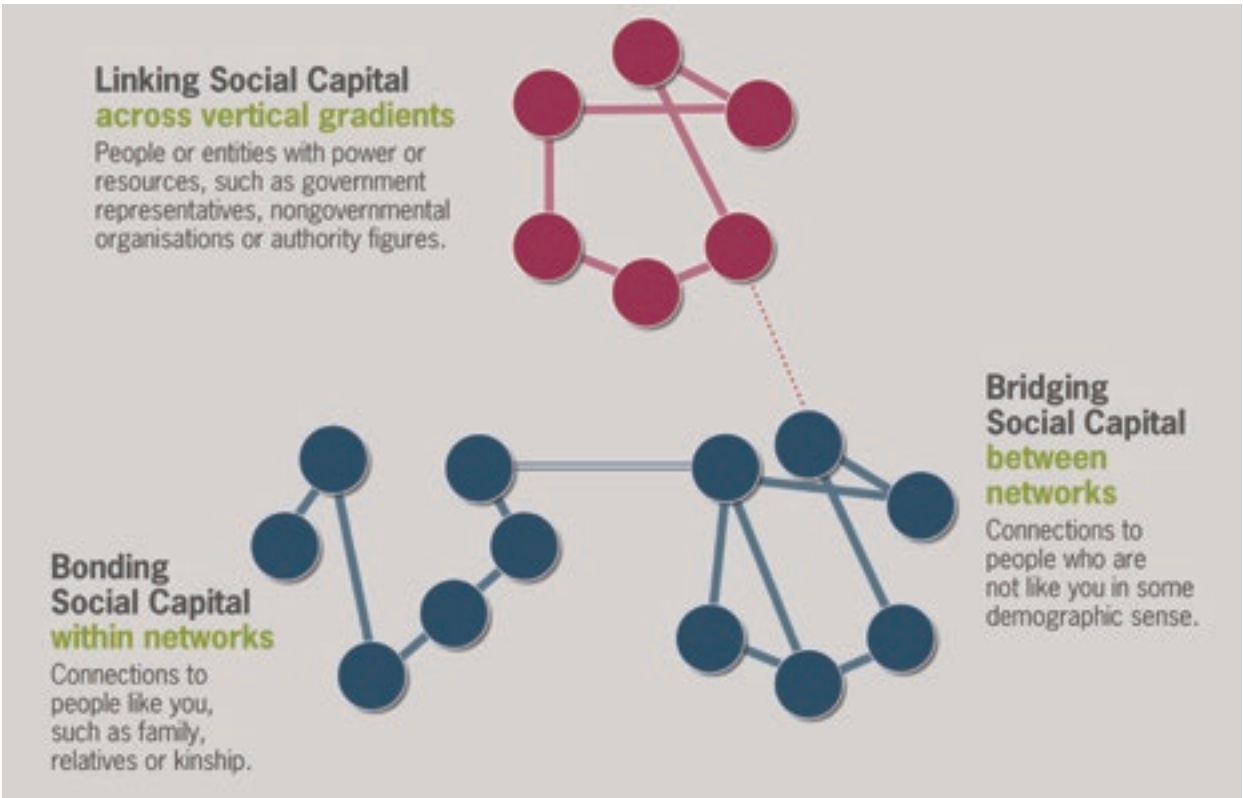
Social Infrastructure and Shocks

Cities face stressors and shocks—some with regularity, such as climate change-enhanced extreme weather events including typhoons, hurricanes, and flooding. Other shocks come with less predictability, such as the ongoing COVID-19 pandemic which has claimed more than 1.3 million lives globally.

When we envision the ways that planners and decision makers can mitigate the impact of such events, what first comes to mind may be obvious defences such as walls, plexiglass shields, and other aspects of the built environment.

These types of physical infrastructure—which include defences against tsunami, flooding and disease—are the most visible means of reducing the damage from shocks. For example, if we are concerned that sea water will regularly inundate a residential area near the coast, engineers may plan and build a seawall to keep the community dry. But while this type of infrastructure is obvious to construct and within the standard operating toolkit of many city designers, another type—*social infrastructure*—may play a more important role.

Social infrastructure captures the interpersonal connections that tie people together. Whether from neighbour to neighbour, or a local business person to an elected leader, societies require webs of ties to operate successfully under all circumstances. These connections come in different categories, depending on the types of people that they connect.



The interplay between bonding, bridging and linking ties illustrates different forms of social capital.
Image: Daniel Aldrich

Social Infrastructure: The Trio of Connections

Social scientists define the most common connections as bonding social capital. This describes the connections between family and kin. Bonding social ties delineate ties between people who are often quite similar; they may share an ethnicity, religion, or nationality. We know that people often find it most comfortable to interact with people who look, sound and think like them. In some cities, communities have strong ethnic identities—such as Chinatown or Koreatown in California cities. Other communities, such as those in Singapore, push residents away from bonding towards another type of connection: bridging social capital.

Bridging social capital details ties between people who may not look, sound or think alike. Instead, they are often tied together by an institution or interest. For example, when parents pick up their children from school, they meet recent immigrants, long-time residents, people who look like them, and people who do not. Similarly, a workplace can be the location where people make connections to people from different backgrounds. These ties are less common but bring an important diversity in thought and information.

The final type of connection is the vertical tie known as linking social capital, and it brings together citizens with those in positions of power and authority. It may be the connection between a kindergarten teacher and city mayor, or between a local resident and the prime minister. These connections are far

Mothers of the BoTu neighbourhood in Rotterdam interacting with King Willem-Alexander and Mayor Ahmed Aboutaleb.
Image: Resilient City Network

While safe distancing protocols keep us physically separated, our connections can nevertheless bring critical resources and assistance during this difficult time.

more rare than bonding or bridging ties but can bring the possibility of a channel of resources and information that would otherwise not be available. For instance, the SG Cares movement in Singapore encourages communities to work together with social services and government agencies to care for the vulnerable in society, whether they are low-income citizens or those who have seen better times but now face difficulties.

Resilient communities and societies need deep reservoirs of all three types of social connections to be able to mitigate shocks, navigate recovery, and return to a feeling of normalcy afterwards. These ties are critical because they bring with them important elements of everyday life and survival, including information, the ability to carry out collective action, and mutual aid. Extensive research on heat waves in North American cities has found that simply being old—a category many see as vulnerable—is not a strong predictor of the worst possible health outcomes, namely death. Instead, individuals who are elderly, isolated and without a social network are the most vulnerable. They are least likely to leave apartments to seek safer, cooler shelter elsewhere. This is where social networks, through neighbours and friends, can provide an elderly person dwelling alone with vital information or physical assistance should they be too ill to move. Those without such ties face more challenges in surviving a heat wave.

Public Health and Social Infrastructure

A number of communities around the world have been able to remain resilient in the face of the pandemic, and we can glean important lessons for the future of urban planning. The pandemic is an external stressor that is volatile, unpredictable, scaled up and beyond any one country's sphere of control. However, we can build on the existing layers of social resilience and achieve a new level of normalcy.

COVID-19 paves the way for social ties to build resilience in residents, neighbourhoods, and cities. While safe distancing protocols keep us physically separated, our connections can nevertheless bring critical resources and assistance during this difficult time. Across the United States, for example, neighbours have organised to deliver food, water, and supplies to people unable or unwilling to leave their homes. They have also used paper notes to communicate with people who don't have access to mobile phones and the internet, along with more high-technology platforms such as Facebook to organise in virtual space.

Through online birthday parties, anniversary dinners, and communal events, people are staying socially connected even while physically distanced. In the United States, musicians have been performing in parks to physically distanced crowds. Religious organisations have also been holding car-based services, with the leader standing on a platform and congregants in their vehicles. These activities provide the chance to renew relationships and strengthen our belief that we are not alone and others in society face similar challenges. Such deep reservoirs of social ties allow us to weather the physical and mental challenges of this pandemic.

Understanding community assets and the presence of institutional arrangements to facilitate social ties between residents and stakeholders within the community is paramount to building social trust. In Singapore, reciprocity towards healthcare workers was showcased with the MoCa Cares for Nurses initiative by the Moulmein-Cairnhill Constituency Office. They offered free lunches and priority queues for healthcare workers as a symbol of community support. These community-led efforts were all the more crucial during the COVID-19 pandemic for providing assistance, such as job support opportunities for residents, and creating an ecosystem for volunteerism and the community spirit to thrive. Beyond the COVID-19 responses, residents of the Moulmein-Cairnhill constituency have also formed a volunteer group to look into ways communities can partner government agencies to address local climate change issues.

In Los Angeles, volunteers and community organisations rallied to distribute food to people in need during the COVID-19 pandemic.
Images: Joel Muniz on Unsplash

Drive-in church services in Florida allowed people to continue religious observances with other members of the community.
Image: SOPA Images Limited / Alamy Stock Photo

Former adviser of the Singapore Moulmein-Cairnhill constituency, Melvin Yong (centre), led the MoCa Cares for Nurses initiative to show support and care for healthcare workers.
Image: Melvin Yong

Social Infrastructure in Times of Need

Even before shocks arrive, deeper reservoirs of social ties help communities engage positively with authorities and make decisions that reduce their vulnerability to the event. Research using mobility data on more than a million North Americans living in low-lying, coastal areas revealed that while the majority moved from high-risk flood areas to areas further inland before the arrival of major hurricanes, many did not leave despite warnings from authorities.

A strong predictor of whether residents would leave vulnerable cities before hurricanes arrived was the degree of bridging and linking ties within the community. Where people had more of these ties, they were more likely to leave potential danger zones and find safe shelter elsewhere. With multiple sources of information, residents could better accept advice from authorities and see it as legitimate.

Once shocks arrive, societies have been able to draw on social infrastructure to get through calamities. For example, after Japan's triple disasters—a 9.0 magnitude earthquake, tsunami waves above 30 m, and nuclear meltdowns at Fukushima—people living in the Tohoku region faced a number of different challenges. This included the deaths of loved ones, loss of possessions, and well as anxiety and fear resulting from the atomic accident. Through rigorous research, it emerged that the most important factor in fighting post-traumatic stress disorder and anxiety was bonding social ties. People with stronger connections to neighbours and people living near them had the sense that they were not going through it by themselves, and had a shoulder to lean on.

As COVID-19 reached Japan in the spring of 2020, communities with stronger linking ties—connections to decision makers and government agencies—were able to reduce the likelihood of infections; that is, where local citizens trusted the information from government, believed in the science advocated by medical experts, and were willing to undertake collective action. COVID-19 infection rates could be slowed tremendously when communities took on physical distancing, mask wearing, and remote working, limiting their daily mobility and reducing their chances of exposure.

Citizens in Tokyo followed regulations of mask wearing, temperature taking and social distancing.
Image: Kyodo News

Civic stewardship groups in Singapore provide opportunities for citizens to beautify the environment while fostering strong community bonds and a sense of ownership.
Image: National Parks Board

> When building new policies and programmes, designers and city planners must think about the potential consequences for bonding, bridging and linking ties.

Takeaways for Community Resilience

Given the importance of social infrastructure in responding to shocks and during epidemiological crises like COVID-19, urban leaders and city managers can learn many lessons. First, social infrastructure—like its physical counterpart—can be built and strengthened; that is, our stores of trust, interactions, and reciprocity are not set in stone.

The Ibasho programme, initiated in Japan, the Philippines, and Nepal to build social connections among elderly displaced by shocks, has shown that even among the elderly—many of whom are typically less likely to build new networks—social ties can be created and widened. Through the programme, people strengthen their social ties, increase their sense of efficacy, and deepen their ties to the community.

In particular, cities should review their investments in mitigation and adaptation, and ensure that they are at least maintaining, if not increasing, social infrastructure. Many decisions about zoning, new construction, and even education can fracture existing ties. When building new policies and programmes, designers and city planners must think about the potential consequences for bonding, bridging and linking ties. Singapore, for example, deliberately invests in bridging ties by creating housing patterns which bring together people from different nations and cultures.

Decision makers and leaders should also make a concerted effort to invest and maintain horizontal and vertical connections between and to residents. While we may take social infrastructure for granted, and physical infrastructure may be a more obvious and standard way to protect societies, social ties remain key to building and maintaining resilience in communities.

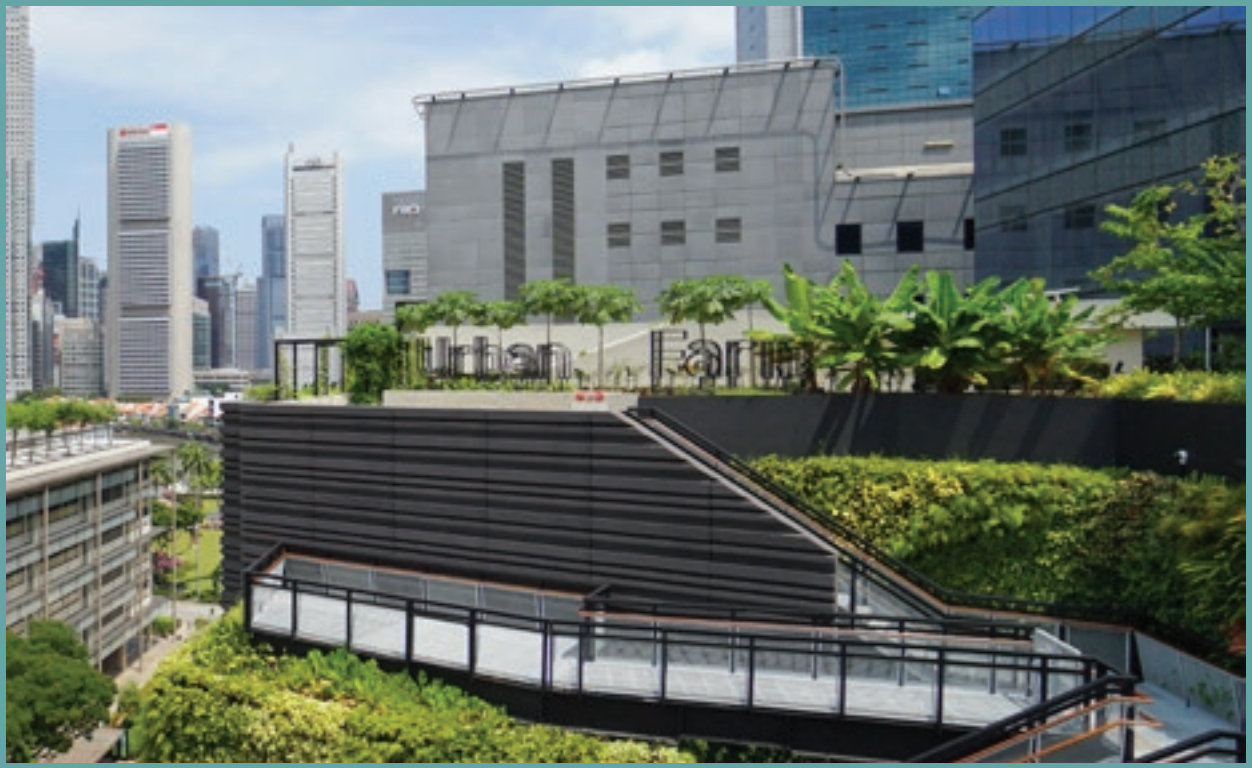
ESSAY

FOOD SECURITY

LIM KOK THAI

Lim Kok Thai is Chief Executive Officer of the Singapore Food Agency, which oversees the city's food safety and food security.

Singapore: Food Security Despite the Odds



Rooftop urban farm at Funan Mall, Singapore.
Image: nuttstock / Shutterstock.com

To ensure food security, the Singapore Food Agency adopts the strategy of "three food baskets", the foremost being the diversification of food sources. It also boosts local food production through funding for agriculture research and technology adoption, creative planning of farm spaces, and efforts to drum up community support for local farmers.

> Singapore has been planning for long-term food security through the strategy of "three food baskets"—diversifying food sources, growing locally and growing overseas.

As with most issues that impact national security in Singapore, it often seems that the odds are stacked against us. Food security—access to safe and nutritious food—is a challenge on several fronts. Singapore is a small city-state with limited resources, with only 1% of land available for food production, and over 90% of food is imported from an increasingly disrupted world.

The COVID-19 pandemic has further amplified the gravity of safeguarding food security. The city-state has been proactively planning for long-term food security through the Singapore Food Agency's (SFA) strategy of "three food baskets"—diversifying food sources, growing locally and growing overseas. This approach has served the city well in securing a supply of safe food.

Diversified Sourcing Is Key

Singapore's food importers leverage the nation's connectivity and the global free trade environment to import from multiple sources in about 170 countries and regions worldwide. Should there be a disruption to any one source, importers are able to tap alternative food sources and ensure supply remains stable.

It is an ongoing effort to avoid being over-reliant on a single source and to mitigate the impact of food supply disruptions. With eggs, for example, importers made great efforts to diversify from traditional sources around the region and expanded the import network to include new sources as far away as Europe.

Lockdown measures brought about by COVID-19 underscored Singapore's vulnerabilities to supply disruptions in food. It was not by luck that the city's food supply remained stable and market shelves continued to be promptly restocked—it was the result of a deliberate whole-of-government strategy to diversify food sources.

To keep the city's diversified food supply lines intact amid the COVID-19 global pandemic, SFA worked with the Ministry of Trade and Industry and Enterprise Singapore (ESG) to monitor Singapore's food supply situation. Together with the Ministry of Foreign Affairs, these economic agencies worked with like-minded countries to keep trade links open.

In March 2020, Singapore, along with Australia, Brunei Darussalam, Canada, Chile, Lao PDR, Myanmar, New Zealand, and Uruguay, affirmed our commitment to maintaining open and connected supply chains.

Unlocking sea space for sustainable fish farming would help boost local production of fish and enhance food security.
Image: Singapore Food Agency

Local Production: An Important Buffer

In attempting to beat the odds, Singapore is compelled to push the frontiers of innovation to grow food in our city. Local production provides an important buffer in times of food supply crises. Singapore must grow its own food, not just productively, but also in ways that must be sustainable for the environment and the future.

SFA drives innovation in local farms with the ambitious goal of producing 30% of Singapore's nutritional needs by 2030 as part of our "30 by 30" plan. To meet this goal, we need a holistic and long-term approach to space-planning, boosting agri-food technology and developing local agri-specialists.

To facilitate and support the establishment of hi-tech and productive farms in Singapore, SFA tenders out land based on qualitative criteria such as production capability, production track record, relevant experience and qualifications, innovation and sustainability.

In addition, a masterplan for the greater Lim Chu Kang (LCK) region, spanning about 390 ha (3.9 km^2) of land, will be undertaken in consultation with stakeholders over the next two to three years. The redeveloped LCK agri-food cluster will produce more than three times its current food production. SFA will explore the development of shared facilities to lower production costs and conserve resource use, as well as put in place water, electricity and transport infrastructure that support hi-tech farming systems and circular economy principles.

Building on these efforts to grow Singapore's agri-tech sector, SFA will continue to partner with the Economic Development Board and ESG to attract best-in-class global agri-tech companies, as well as to nurture promising homegrown agri-tech companies into local champions and help them to expand overseas.

Exploring Alternative and Underutilised Spaces

Urban food solutions are expected to play a key role in global food security. While there are progressive enterprises operating out of farmlands and industrial estates, some agricultural game-changers are also taking root in unconventional areas—indoors, on rooftops and in underutilised spaces.

Besides managing land space, a broad scan of the deeper Southern Waters was conducted to identify potential aquaculture sites where sustainable farming systems could be adopted.

By redeveloping and repurposing rooftops and underutilised spaces in the cityscape, farming is starting to take root through local farmers such as City Sprouts and Citiponics.

SFA worked with the Singapore Land Agency (SLA) to transform the former Henderson Secondary School site into Singapore's first integrated space comprising an urban farm, childcare centre

City Sprouts is a social enterprise that strives to encourage urban farming while building meaningful relationships between communities.
Image: City Sprouts

In a high-density, urban environment like Singapore, alternative spaces such as rooftops of car parks are being adapted for urban farming.
Image: Singapore Food Agency

and nursing home within a state property. The farm space within the site was awarded in May 2019 to City Sprouts, and has become a vibrant destination for young and old to learn about urban farming and enjoy a relaxing day out.

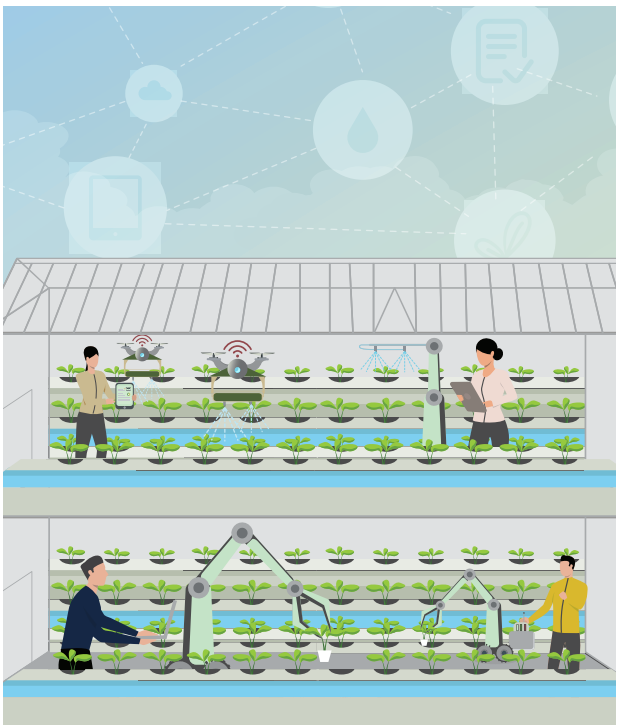
Citiponics, the first commercial farm located on a multi-storey carpark in a residential neighbourhood, harvested its first yield of vegetables in April 2019. In September 2020, another nine sites at multi-storey carparks were awarded for urban farming. The successful bidders included proposals for hydroponic and vertical farming systems with a variety of innovative features, such as IoT, blockchain technology and automated climate control. These sites have the potential to collectively produce around 1,600 tonnes of vegetables annually.

Supporting Tech-Adoption in Local Farms

The Agriculture Productivity Fund (APF) supports local farms in their capability development and drive towards higher productivity. Through APF, SFA co-funds the adoption of farming systems to better control environmental variables, test-bed technologies and boost production capabilities. Between October 2014 and September 2020, a total of almost $42 million has been committed to 115 farms.

In addition, the government has set aside $144 million for research and innovation efforts in the farming sector. The research and innovation programme focuses on three main areas: improving sustainable urban food production techniques; furthering advanced biotech-based protein production; and developing innovations in food safety science.

The COVID-19 pandemic presented greater impetus to speed up local food production capacities. In September 2020, SFA awarded $39.4 million to nine companies under the 30x30 Express Grant to quickly ramp up food-farm outputs over the next six to 24 months.



Currently, an average vegetable farm in Singapore occupies around 2 ha (20,000 km²) of land and produces about 130 tonnes/ha/year. In contrast, a hi-tech, high productivity vegetable farm has the potential to produce over 1,000 tonnes/ha/year with less than one ha (10,000 km²) of land.
Image L-R: Centre for Liveable Cities, Singapore Food Agency

Given Singapore's land constraints, farming at sea is made more productive, sustainable and climate-resilient through technological innovations at farms like Eco-Ark.
Images: Singapore Food Agency

> Eco-Ark keeps fishes in tanks that are isolated from the external environment. This offers protection from plankton blooms, oil spills, waste discharge and warming waters.

Controlling Environmental Variables for Exponential Growth

Rapid progress in agri-tech has now made it possible to intensify urban food production in a sustainable and climate-resilient way.

A case in point is Eco-Ark—a purpose-built, floating, closed containment aquaculture system developed by an APF recipient, Aquaculture Centre of Excellence Pte Ltd. Eco-Ark keeps fishes in tanks that are isolated from the external environment, so variations in temperature and oxygen can be controlled. This offers protection from plankton blooms, oil spills, waste discharge and warming waters—all factors that can wipe out fish stocks. With technology, seawater and used water are treated and reused efficiently. The facility is expected to produce 166 tonnes of fish annually, more than 20 times higher than the minimum production level set for Singapore coastal fish farms today.

Farming on the Cutting Edge

With advanced robotic and digital systems increasingly being used in farming, Singapore's vegetables farmers have also become innovative agri-engineers and specialists in their own right.

With support from the 30x30 Express Grant, Indoor Farm Factory Innovation Pte Ltd will set up an indoor vegetable farm with a vertical integration growth system up to 8 meters in height in a fully controlled and pesticide-free environment. The farm will leverage AI farming systems integrated with IoT monitoring, dosing irrigation and an advanced environmental control system to achieve optimum growing conditions all year round.

Seng Choon, a chicken egg farm that has been in business for more than 30 years, has also proved itself a modernist in its operations. The company uses a computer that scans eggs to ascertain if they are clean; while feeding systems, temperature controls and waste cleaning systems have been automated with SFA's support.

Automation is a key component at Seng Choon, a chicken egg farm, where many of the farm's processes are done by machines or with minimal handling.
Image: Singapore Food Agency

SFA Operations Centre serves as an experimentation laboratory to trial the use of advanced analytics and data visualisation for food supply traceability, food safety alerts and food recall.
Image: Singapore Food Agency

> While the COVID-19 pandemic led to import restrictions, it also helped to accelerate support for local produce.

Co-creating the 'SG Fresh Produce' logo to promote and help customers better recognise local produce. *Image: Singapore Food Agency*

Developing Agri-Specialists

For Singapore, the farming scene no longer comprises sprawling lands or rows of manual workers. The "future" of farming, in terms of hi-tech systems, engineering precision and sustainable concepts, is a necessity that has already arrived.

Singapore needs to redouble efforts to prepare citizens for career opportunities in the growing agri-food sector. SFA has started work with schools and educational institutions to develop and build curricula in relevant areas. To train the agri-food industry's manpower and talents, SFA collaborates with Workforce Singapore, SkillsFuture Singapore, the Employment and Employability Institute, polytechnics and Institutes of Technical Education to develop agriculture and aquaculture programmes.

Growing Public Support for Local Produce

Singapore's efforts in ensuring food security would not be complete without support from consumers. To raise public awareness of local produce, SFA and the Singapore Agro-Food Enterprises Federation (SAFEF) continue to organise SG Farmers' Markets, and jointly launched the "e-SG Farmers' Market" section on the popular Redmart online shopping app. We also partner with grocery stores regularly to drive consumer purchases.

To boost recognition of local produce among consumers, SFA brought the industry and public together to create a new "SG Fresh Produce" logo. Farmers have been using this emblem on their packaging since August 2020. A website was also launched to provide a trove of information on locally farmed food.

While the COVID-19 pandemic led to import restrictions, it also helped to accelerate support for local produce. Eric Neo, Executive Chef at Intercontinental Singapore, shared with SFA that he turned to local produce as an alternative when European imports became unavailable. He believes that many chefs would have followed suit and "can see the superior quality of these produce". Neo said: "It is every chef's dream to use local produce. Local chefs using local produce—that's something to feel proud of."

Encouraging words from supporters such as Chef Neo are a boost to SFA's efforts in raising public and industry awareness of the merits of local produce. With public support for local farmers and other key measures, Singapore can beat the odds in ensuring food security in this ever-evolving, ever-disrupted world.

ESSAY

RESILIENT CITIES
KEVIN FAN HSU

Kevin Fan Hsu leads the environmental research cluster at the Centre for Liveable Cities. His work focuses on climate change, urban resilience and sustainable districts.

Reframing Public Spaces as Civic Goods for Resilient Cities

"Human parking spaces" in Mission Dolores Park in San Francisco, May 2020.
Image: Courtesy of Natasha Chu

The COVID-19 pandemic has shown that public spaces are essential for community resilience and quality of life. Beyond disaster responses and protective infrastructure, city resilience frameworks must incorporate access to public space and evaluate how amenities such as walking paths and informal spaces are distributed.

As COVID-19 sweeps through cities around the world, governments have ordered businesses to shut and residents to shelter at home. This extraordinary combination of physical distance, emotional isolation and limited mobility—often for weeks or months on end—has exacerbated existing urban challenges while revealing opportunities for action. Cities must embark on serious soul-searching to re-examine the values they believe will truly matter in a "new normal".

A Renewed Mandate for Resilient Design

While urban planners typically regard open spaces, such as parks, as desirable amenities, the ongoing pandemic shows these are not only beneficial but also vital. Once viewed as spaces for leisure, sport or monuments, parks are now also appreciated for their social, economic, cultural and environmental value. Planners increasingly recognise how parks nurture civic identity and boost physical and mental health. Still, open spaces too often are an afterthought—a box for developers to tick. Many cities in the developing world still lack sidewalks, much less adequate open space for residents.

This must change. COVID-19 heightens the urgency for planners to ensure that high-quality public spaces, with sufficient area for physical distancing, are available to all. It is crucial for liveability and, in times of pandemic, basic survival.

Parks and plazas are generally considered "social" places: William Whyte's seminal studies of New York suggested that "what attracts people most…is other people." While the social nature of our species gives this continued merit, what has attracted people in the current crisis is the absence of other people.

Future designers must accommodate these competing uses, so that parks can host social gatherings in normal times, while enabling safe distancing for park-goers during a pandemic. Their design approach must also be climate-sensitive: in tropical cities, heat and humidity leave monumental lawns without shade (popular in temperate cities) conspicuously empty—a missed opportunity for other suitable uses.

Conventional ideas of "accessibility" are also due for a rethink. Cities must emphasise the quality of open space, not merely its presence. There are vast differences among

> COVID-19 heightens the urgency for planners to ensure that high-quality public spaces, with sufficient area for physical distancing, are available to all.

To better serve users, public space designers must take into account climatic conditions. In the tropics, people tend to avoid places without shade, which can become unbearably hot in the daytime.
Image: Centre for Liveable Cities

a tiny pocket park within walking distance of one's home, a privately owned, publicly accessible open space that can be chained shut by a company, and a large public commons that supports physical activity. Evaluating quality and access must also prioritise equity. When planners measure ease of access across households, they can also account for factors such as income, ethnicity, language, physical ability, gender and age, to ensure that all residents have equal access to public spaces, and to identify areas that need improvement.

Valuing Informal Places, Promoting Public Goods

Many informal spaces, often taken for granted, are shut and sorely missed during the pandemic. Though not marked as parks on government land-use maps, they still serve important social functions. Singaporeans, for example, gather in local coffee shops or *kopitiam*, hawker centres that serve meals, and the void decks of public housing blocks. While traditional parks are still needed, the value of informal spaces should not be underestimated.

As cities look to the future, planners can strive to identify and track these informal spaces—observing and engaging with the public where they spend their time rather than hosting a town hall meeting. After mapping and inventorying these spaces, planners can better recognise what the public values and incorporate their preferences into development plans.

Even without a pandemic, the need for genuinely public spaces pervades many cities in Asia. The public can visit shopping malls to shop, eat and enjoy air-conditioning, but these privately owned complexes are still "financialised" spaces that value people only by their spending, and may thus be exclusionary.

Cities would do well to ask themselves: do they really need another shopping mall? Or are there public alternatives, such as parks, hiking trails and accessible waterfronts, that would better serve citizens, both in good times and bad? In Hong Kong, for example, malls continued to operate during the pandemic, but many residents chose to hike in country parks rather than shop in stores. Their preference for natural landscapes proves the point of Hong Kong's urban activists, who have consistently resisted proposals to open cherished nature areas to real estate development.

Seize the Moment: Stakes are Low, Willingness Is High

With street activity on hold, cities have a moment to breathe. It is an opportune moment to reconsider the balance of streets for cars versus people, and to ask whether valuable land should be held hostage to automobile traffic and parking lots. From January through May this year, more than 50 cities, ranging from Boston and Cologne to Lima and Sydney, closed at least one road or lane to motor vehicles, allowing the public more space to exercise. A good proportion of these experiments proved popular with residents and may become permanent.

Upgrading walking paths gives more space for residents to enjoy the outdoors, both improving liveability and strengthening sense of place. Adding cycling lanes or pedestrian-only areas is sometimes opposed by retailers, who mistakenly believe that reducing parking spaces will negatively impact their businesses. The opposite is true: greater foot and cycling traffic can drive spending and boost sales. With great change already afoot, cities can seize the moment to improve sidewalks, return parking lots to pedestrians and complete cycling infrastructure, without triggering the usual predictions of economic disaster. The non-profit Regional Plan Association in New York released a proposal for an expanded network of linked cycling paths throughout the city, while New Zealand will support cities with an "Innovating Streets for People" fund. If dovetailed with pandemic resilience-building efforts, swift action on such projects can overcome the usual inertia and deliver results.

Decentralising Jobs, Revitalising Historic Neighbourhoods

Spurred on by COVID-19, transformative change can also distribute amenities citywide, instead of clustering them in a Central Business District (CBD). The mayor of Paris has floated the concept of a "15-minute city" where housing, work, groceries, healthcare, education and leisure are accessible to local households on foot or by bicycle. Historic mixed-use hutong neighbourhoods, such as Da Shi Lar (大栅欄/大栅栏) in Beijing, serve as inspirations: they offer most necessities that residents need, in closely nestled courtyards and alleyways. By contrast, the glut of segregated housing estates constructed in recent years provides far fewer amenities and services.

CBDs are frequently congested during the day while hollowing out at night. Now is the time to create and distribute job opportunities and foster "complete" neighbourhoods that contain a full suite of amenities needed for everyday life. Working from home has proven feasible, while community-serving small businesses, from dry-cleaning to professional services, can also be encouraged. Co-working spaces in neighbourhoods could support entrepreneurs, remote teams and knowledge-based industries. Millennials, who prefer flexible but social spaces, may appreciate the opportunity to live and work in revitalised, historic neighbourhoods, with adaptive reuse projects reducing the need for premium downtown office space. Working close to home will also facilitate greater interaction with neighbours and engender closer community bonds.

Accessible and Equitable Public Space in a "New Normal"

As countries emerge from the pandemic, insights about public space can positively influence how cities are planned and managed. Planners can think of public spaces not only for recreation, but as a critical element of resilience. Parks must accommodate diverse and distanced activities, and change function during public health crises. Informal spaces, sidewalks and cycling paths are other excellent public amenities to expand quickly and inclusively. With some imagination, these features can rise above being mere mobility corridors to enhancing quality of life. In this process, historic districts can inspire planners seeking to decentralise jobs and amenities, in pursuit of "complete" neighbourhoods. Access, quality and inclusiveness of public space will be new fundamentals for resilient cities adapting to the "new normal".

C CASE STUDY

WUHAN | LEISHENSHAN HOSPITAL

Digital Solutions for Pandemic Response

To minimise cross-infections from ventilation systems, and reduce contagion between COVID and non-COVID patients in medical facilities, Dassault Systèmes partnered China's Central-South Architectural Design Institute to simulate and analyse virus dispersal systems in Wuhan's Leishenshan Hospital. The results have implications for hospital engineering, construction and operations.

Dr Song Yang, Ms Dai Fengyu and Mr Hu Liangbo, Dassault Systèmes, China.

View of Wuhan skyline.
Image: sleepingpanda / Shutterstock.com

Hospitals in a pandemic create a particular challenge—the congregation of staff, visitors and patients means hospitals risk becoming places of contagion.

The Challenge

Wuhan, the capital of Hubei Province, is one of China's largest and most populous cities, with a population of over 11 million and a major transportation hub. In early 2020, Wuhan experienced a significant outbreak of the COVID-19 virus.

To provide medical care to thousands of COVID-19 patients and address the shortage of healthcare facilities, a makeshift, modular field hospital—Leishenshan Hospital—was built. Innovative digital and technological solutions using Building Information Modelling were employed to construct the hospital in a record 14 days.

Hospitals in a pandemic create a particular challenge—the congregation of staff, visitors and patients means hospitals risk becoming places of contagion.

As the virus that causes COVID-19 is mainly transmitted through droplets from an infected person's coughs, sneezes or exhalations, a critical aspect of the hospitals' construction was ensuring that the ventilation systems would protect the safety of doctors and patients while the hospital was in operation.

To minimise the risk of contamination, an understanding of the airflow schemes within an existing or to-be-built facility was needed.

Aerial view of the Leishenshan Hospital in April 2020.
Image: Noel Celis / AFP via Getty Images

> The aim: to minimise cross-infection from the ventilation systems and mitigate the impact on the external environment.

The Solution

Dassault Systèmes worked with China's Central-South Architectural Design Institute (CSADI), which designed Leishenshan Hospital, to simulate and evaluate virus dispersal within the hospital. The aim: to minimise cross-infection from the ventilation systems and mitigate the impact on the external environment.

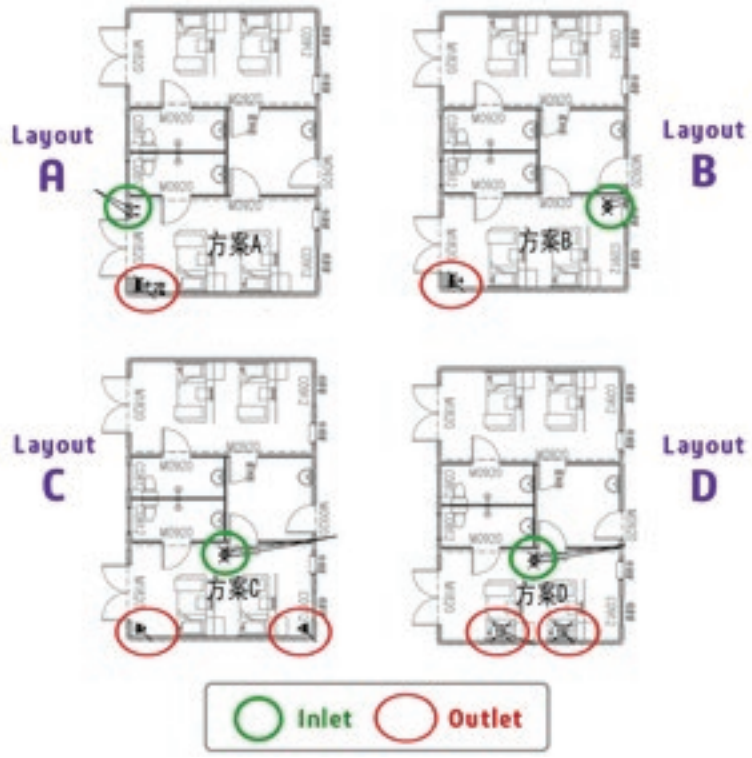
CSADI used Dassault Systèmes' SIMULIA XFlow software, a computational fluid dynamics software powered by the cloud-based 3DEXPERIENCE platform, to simulate indoor and outdoor dispersal of fluids and virus contamination within the hospital's ventilation systems.

CSADI and Dassault Systèmes designed four ventilation layouts:

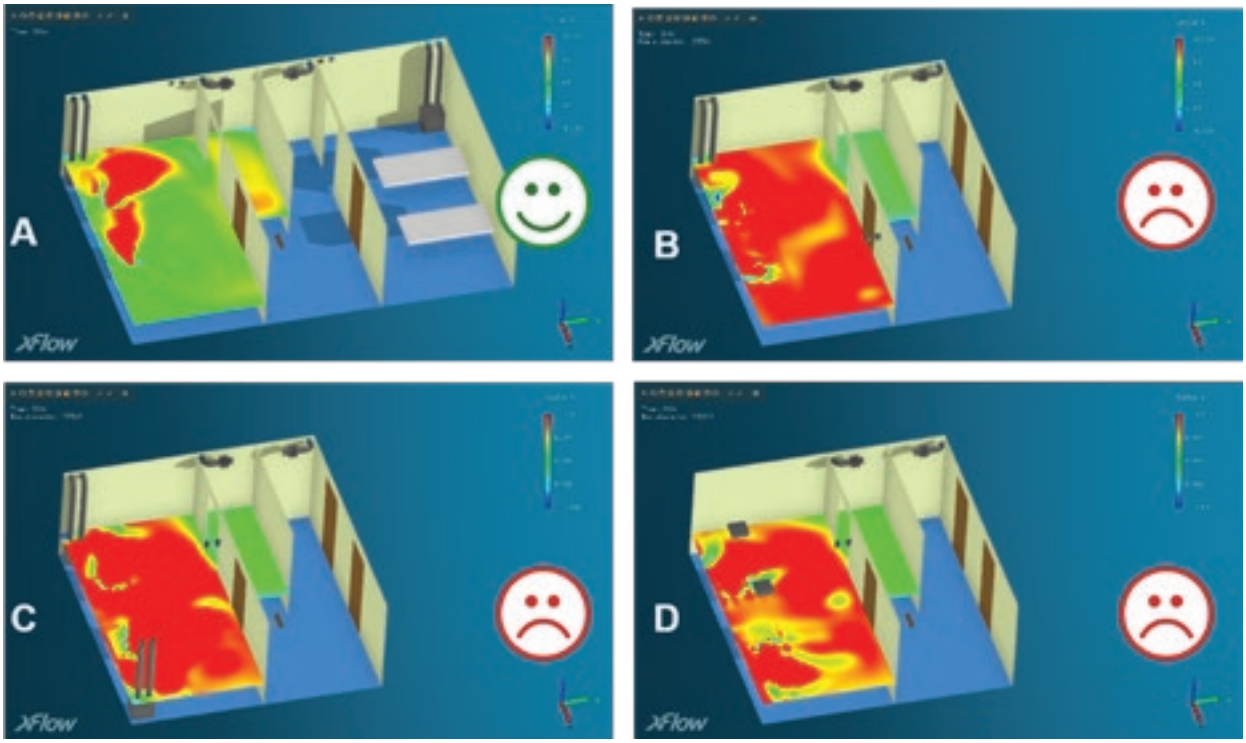
- Layout A: Incoming airflow from the lateral top and the ventilation outlet located in the same corner of the room
- Layout B: Incoming airflow from the ceiling lateral top and the ventilation outlet located in a corner on the other side of the room
- Layout C: Incoming airflow from the middle of the ceiling and the ventilation outlet located in two corners of the room
- Layout D: Incoming airflow from the middle of the ceiling and the ventilation outlet located above the patient's head

Workers at the construction site of Leishenshan hospital in February 2020.
Image: An Yuan / China News Service via Getty Images

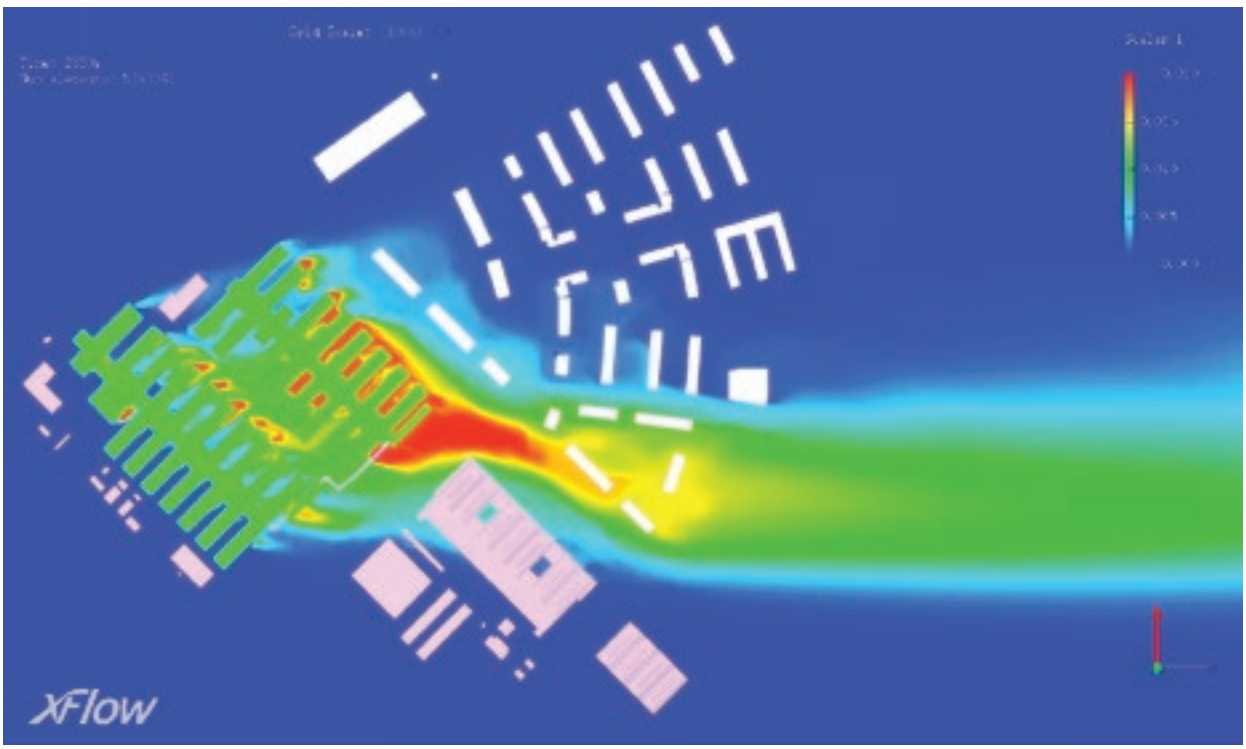
Layout A's forced convection resulted in airflow going directly to the ventilation outlet, whereas the other layouts showed severe pollution dispersion throughout the entire room.



Proposed air supply and exhaust solutions for the isolation wards.
Image: Dassault Systèmes



Pollution concentration distributions for each of the proposed layouts.
Image: Dassault Systèmes



Simulation of external wind forces in the area surrounding the hospital.
Image: Dassault Systèmes

> The simulation results for Leishenshan Hospital helped Dassault Systèmes to improve the separation in other hospitals for floors occupied by COVID-19 and non-COVID-19 patients.

The indoor simulation was used to counteract negative effects from unplanned ventilation risks. After comparing the pollution concentrations for different ventilation layouts in hospital rooms, the simulation results identified Layout A as the best solution for suppressing pollution dispersion. Layout A's forced convection resulted in airflow going directly to the ventilation outlet, whereas the other layouts showed severe pollution dispersion throughout the entire room.

An outdoor simulation was also done to mitigate any impact on external communities, crowds and hospital surroundings. These simulations used basic environmental data such as wind direction and wind speed. The main buildings of the hospital, office areas and surrounding residences were modelled and included in the analysis.

This analysis highlighted areas that were more affected by the Northwest wind in winter, as well as areas with the highest concentration of virus pollutants. The analysis provided suggestions for better pollution discharge in isolation wards to protect medical personnel and optimise design solutions to meet pollutant dilution requirements.

The Outcome

The simulation results for Leishenshan Hospital helped Dassault Systèmes to improve the separation in other hospitals for floors occupied by COVID-19 and non-COVID-19 patients. Applying the same experience to the Marange Silvange Hospital in France, for example, minimised the risk to elderly patients sharing the same ventilation system as COVID patients.

The 3D cloud-based collaborative platform replaced an older, slower document-based approach. "Applied systematically to design, engineering and manufacturing, [the 3DEXPERIENCE platform] provides seamless remote collaboration at any time," said Ying Zhang, Managing Director, Greater China, Dassault Systèmes.

New hospital engineering, construction and operations processes that leverage the 3DEXPERIENCE platform can be developed. Dassault Systèmes and Aden Group, one of Asia's largest integrated facility management companies, are collaborating on the development of a turnkey, ready-to-use infectious disease hospital solution, Akila Care, for countries severely impacted by COVID-19. The solution relies on a virtual collaborative environment for the design, simulation and development of hospitals that can be built to be operational within 150 days.

"The 3DEXPERIENCE platform is the catalyst and enabler of such radical transformation," said Bernard Charlès, Vice Chairman and CEO, Dassault Systèmes. "Together we have already shown how simulating virus contamination and diffusion within the Leishenshan hospital's ventilation system can help to address urgent healthcare needs, and now we will work together to apply our knowledge and know-how to all aspects of the hospital lifecycle."

When used beyond healthcare planning, systems supported by the 3DEXPERIENCE platform will enable cities to track and plan thousands of parameters—ranging from existing buildings to information on soft mobility, urban heat island effect and pollution. Using this technology, cities can measure and anticipate major demographic, economic and environmental changes, enabling city leaders, policymakers and planners to deliver on sustainable goals and increase quality of life in the long term.

BANGKOK | CHULALONGKORN UNIVERSITY CENTENARY PARK

Landscape as an Opportunity in Crisis

Faced with Bangkok's land subsidence and rising sea levels, landscape architect Kotchakorn Voraakhom and her team at Landprocess took the opportunity to design a park to address the city's urban flood crisis.

Victoria See is a researcher at the Centre for Liveable Cities, working on urban design with an interest in urban spatial analysis and heritage.

Low-lying topography and urbanisation mean that flooding is a key issue in Bangkok.
Image: Braden Jarvis / Unsplash

The Challenge

Bangkok sits on the soft marine clay and aquifers of the Chao Phraya river delta. The city has a low lying topography averaging 1.5 m above mean sea level, with its lowest point at 0.5 m below mean sea level. Even with improved groundwater management, the city continues to sink a net 2 cm every year. Recent forecasts estimate that nearly 40% of the city may experience flooding annually by 2030, with almost the entire city at risk by 2050. With its high population density, this puts Bangkok within the top 10 city populations most exposed to flooding.

Concurrently, Bangkok's densification over the last two decades has reduced green spaces from 40% to less than 10% of the city. This is an average of 3.3 m^2 of green space per person, a third of the World Health Organization's recommendation. This also reduces pervious ground for stormwater infiltration, accelerating stormwater runoff and flooding.

In contrast to the densely built environment around it, this site in the heart of the city was transformed into a public park to collect, treat and hold stormwater runoff.

The Solution

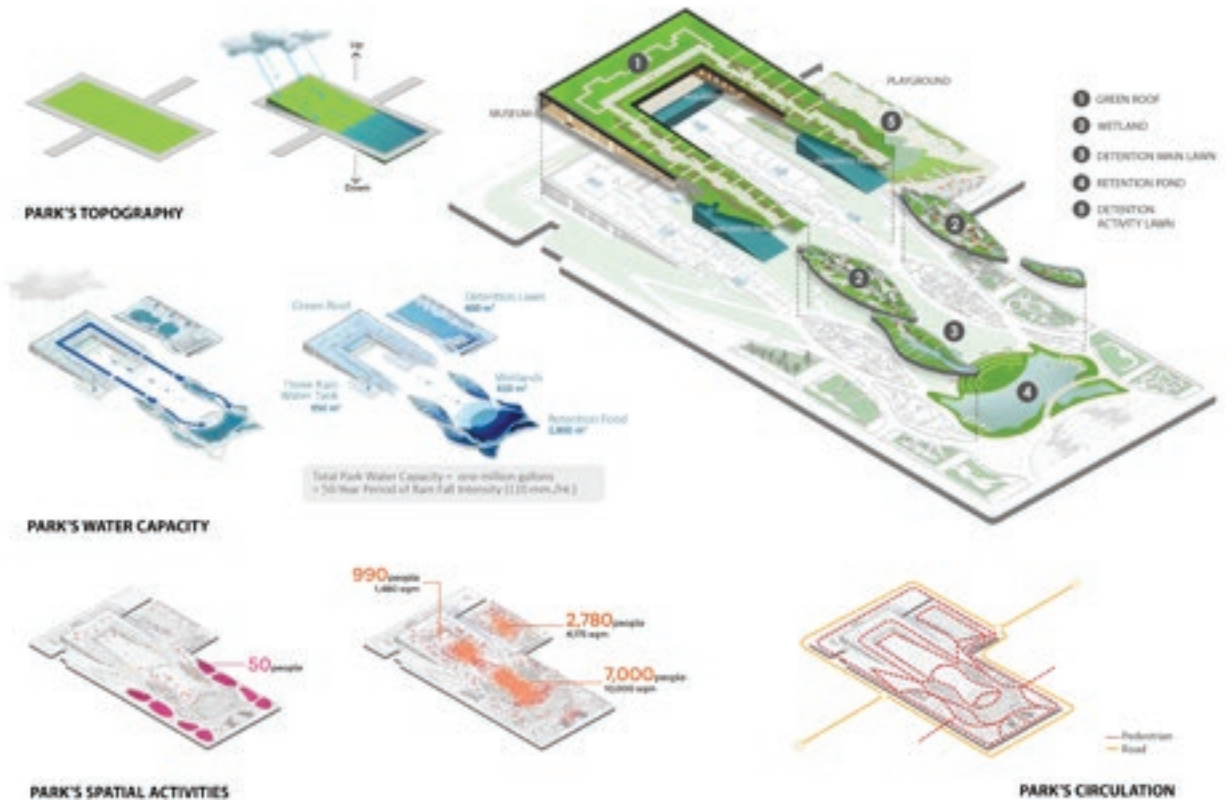
Located between commercial, education and government institutions in the Pathumwan district, the Chulalongkorn University Centenary Park was commissioned to celebrate the 100th anniversary of the university's founding, and extend the axial "green corridor" westward from the main campus. This formed the basis of the project's key objectives—to fulfil the university's vision, to connect the various zones, and to counter the tendency towards hardscape development in the city.

In 2017, the park was opened as a green facility to mitigate urban flood disaster risk. In contrast to the densely built environment around it, this 0.04 km^2 site in the heart of the city was transformed into a public park to collect, treat and hold stormwater runoff.

The park features a 5,200-m^2 green roof inclined at 3° to harness the power of gravity and direct rain and runoff to three underground tanks and four constructed wetlands. Cascading weirs and retention ponds further slow the rate of water runoff across the site.

The retained water can irrigate the park for up to a month during normal conditions, and can overflow onto the inclined lawn to hold double its usual capacity during heavy floods. Collectively, the landscape's maximum water capacity takes into account the type of intense rainfall events that are projected to recur every 50 years.

Low maintenance native grass, weeds and water plants increase water aeration, filtering the water as it flows to the lowest end of the



Water systems are integrated with mobility networks, nature, education and programming.
Image: Landprocess

The Chulalongkorn University Centenary Park is an example of green infrastructure that tackles flood resilience.
Image: Landprocess

The park features eight "landscape outdoor classrooms" of differing biomes and designs, a museum and the green roof.

park, while recreating a healthy ecosystem by attracting local birds and insects.

The park also collects wastewater from its surroundings and passes it through a series of internal wastewater filters before routing the cleaned water back to the vicinity. This helps to supplement the water supply of the Pathumwan district while gradually normalising passive rainwater collection on a daily basis.

To make the park accessible to pedestrians and cyclists, a 1.3-km road perpendicular to the park was revamped by reducing four vehicle lanes to two. Corridors of rain gardens line both sides of the road to reduce runoff from the hardscape while providing shade to commuters.

The project team also used the park design to enhance public education about waterscapes and nature. The park features eight "landscape outdoor classrooms" of differing biomes and designs, a museum and the green roof. To encourage public interaction with the blue infrastructure, stationary water bikes along the retention pond are plugged into the park's water aeration system.

A variety of community spaces support biophilic educational and recreational programming.
Images: Landprocess

The park strives to encourage human interaction and education through design.
Image: Landprocess

> The park has introduced the people of Bangkok to new possibilities of living with water without fear, even in the face of climate change.

The Outcome

The park has introduced the people of Bangkok to new possibilities of living with water without fear, even in the face of climate change. Connected to well-established commercial areas, the park supports a variety of recreational and public uses while providing a green lung within the city, demonstrating that landscape architecture can be a lens through which the built environment is reconsidered. With an estimated 1,000 visitors per day and many notable design awards such as the World Landscape Architecture 2019 Award of Excellence under the Built-Large category, the park has encouraged other landscape architecture projects to follow suit—the Green Bangkok 2030 initiative, for example, aims to increase green spaces in the city to 10 m^2 per resident.

While a single park cannot control flooding across an entire city, the consistency of the park's messaging, down to its redesigned road, demonstrates the potential every project has to spur innovation for a more sustainable and resilient future amidst urbanisation and climate change.

C CASE STUDY

SINGAPORE | PUBLIC HEALTH PREPAREDNESS CLINICS

Planning for Public Health Crises

Based on lessons learned from the SARS outbreak, Singapore introduced a city-wide network of Public Health Preparedness Clinics that, together with sound urban planning policies, has enabled the city to manage the COVID-19 pandemic effectively.

Ami Firdaus is a researcher at the Centre for Liveable Cities, focusing on a systems approach to public health.

Two patients being attended to near the SARS tent at Tan Tock Seng Hospital during the SARS outbreak in 2003.
Source: The Straits Times © Singapore Press Holdings Limited. Reprinted with permission

The Challenge

In 2003, Singapore experienced an outbreak of Severe Acute Respiratory Syndrome, commonly referred to as SARS. The outbreak posed a significant challenge to the city's public health system and resulted in 238 infections and 33 deaths.

The SARS outbreak highlighted the lack of a community-level early warning system to detect emerging infectious diseases, and frontline support to contain cases of infection in times of public health emergencies.

It also underscored the challenge for public hospitals of mustering adequate facilities, medical supplies and trained manpower to meet a public health crisis, as well as the risk that public hospitals could themselves become nodes of infection—as happened during the SARS crisis.

The city's health authorities recognised the need for an agile, well-distributed and intelligent system that could screen patients at the community level while adapting to changing needs in the event of a public health emergency.

Given that existing primary healthcare services in Singapore are predominantly anchored by the private sector in terms of overall primary care attendances, this required a system that could leverage existing private primary care infrastructure and manpower.

GP clinics were quickly converted into pandemic-ready clinics and given priority access to masks and Personal Protective Equipment (PPE).
Source: The Straits Times © Singapore Press Holdings Limited. Reprinted with permission

> The PHPC network is underpinned by urban planning policies that make primary healthcare accessible to most of the population.

The Solution

To bridge the gap in frontline infrastructure for support at the primary care level during public health outbreaks, Singapore's Ministry of Health introduced the Public Health Preparedness Clinics (PHPC) Scheme in 2015.

Under this scheme, existing primary care clinics can enroll in the PHPC scheme to take on a public health response role. These clinics would act as coordinated outposts in a national healthcare network that serves as an intermediary between communities and hospitals, with standardised protocols for testing and escalation to hospitals if needed.

During the COVID-19 pandemic, eligible individuals could locate the PHPC closest to their homes on the phpc.gov.sg website in order to obtain subsidised consultation and treatment for their respiratory infections. The subsidies are also available at 20 polyclinics across the island.

The PHPC network, together with the polyclinics, thus acts as the first line of defence in the event of an infectious outbreak and helps to ensure the appropriate allocation of resources in screening patients with respiratory symptoms. At the same time, PHPCs and polyclinics also provide surveillance and case-finding through the Swab-and-Send-Home (SASH) programme within the community, for individuals presenting with acute respiratory infection symptoms.

The PHPC network is underpinned by urban planning policies that make primary healthcare accessible to most of the population. In planning for public housing

Between 18 February and 17 March 2020, 68.4% of locally transmitted cases had visited a PHPC before being diagnosed.

neighbourhoods, the Housing and Development Board (HDB) makes provisions for the inclusion of commercial facilities such as private primary care clinics. The 2020 Healthcare Masterplan, released in 2012, prioritises access to primary healthcare by ensuring that citizens have primary care facilities close to their homes. There are over 1,150 Community Health Assist Scheme (CHAS) medical clinics islandwide, where eligible individuals can access subsidised primary care services. About 99% of eligible patients have at least one CHAS medical clinic close to their homes, within 400 m or 10 minutes by public transport, and more than 97% have more than one CHAS medical clinic close to their homes.

The Outcome

The PHPC network has been activated several times since the establishment of the scheme, for example during the 2009 H1N1 influenza pandemic and seasonal periods of haze in 2013 and 2015.

It also proved its usefulness during the COVID-19 pandemic beginning in 2020. PHPCs were progressively activated from 18 February 2020, early in Singapore's COVID-19 crisis. By the end of 2020, more than 960 PHPCs had been activated out of over 1,550 GP clinics.

With the support of PHPCs, Singapore was able to screen, detect and contain a significant number of COVID-19 cases within the community. Patients who had been tested for COVID-19 at PHPCs were legally required to self-isolate at their places of residence or dedicated isolation facilities during the period of their medical certification (MC) or until they receive negative test results, thus reducing possible community transmission.

The PHPC scheme showed good early results in managing the COVID-19 outbreak in Singapore. Statistics suggest that most locally transmitted COVID-19 cases were detected via the PHPC network. For example, in the early weeks between 18 February and 17 March 2020, 108 of the 158 locally transmitted cases (68.4%) had visited a PHPC before being diagnosed.

The COVID-19 pandemic brought renewed focus on the role of primary care physicians as the first contact points between suspected cases of infection and a city's healthcare system. Singapore's integrated approach to planning for public health demonstrates the effectiveness of decentralisation and modularity in urban planning for public healthcare.

As communities around the world strive to create healthy and resilient cities, they could start by examining the intersection between the accessible distribution of primary care and the development of supporting urban planning policies.

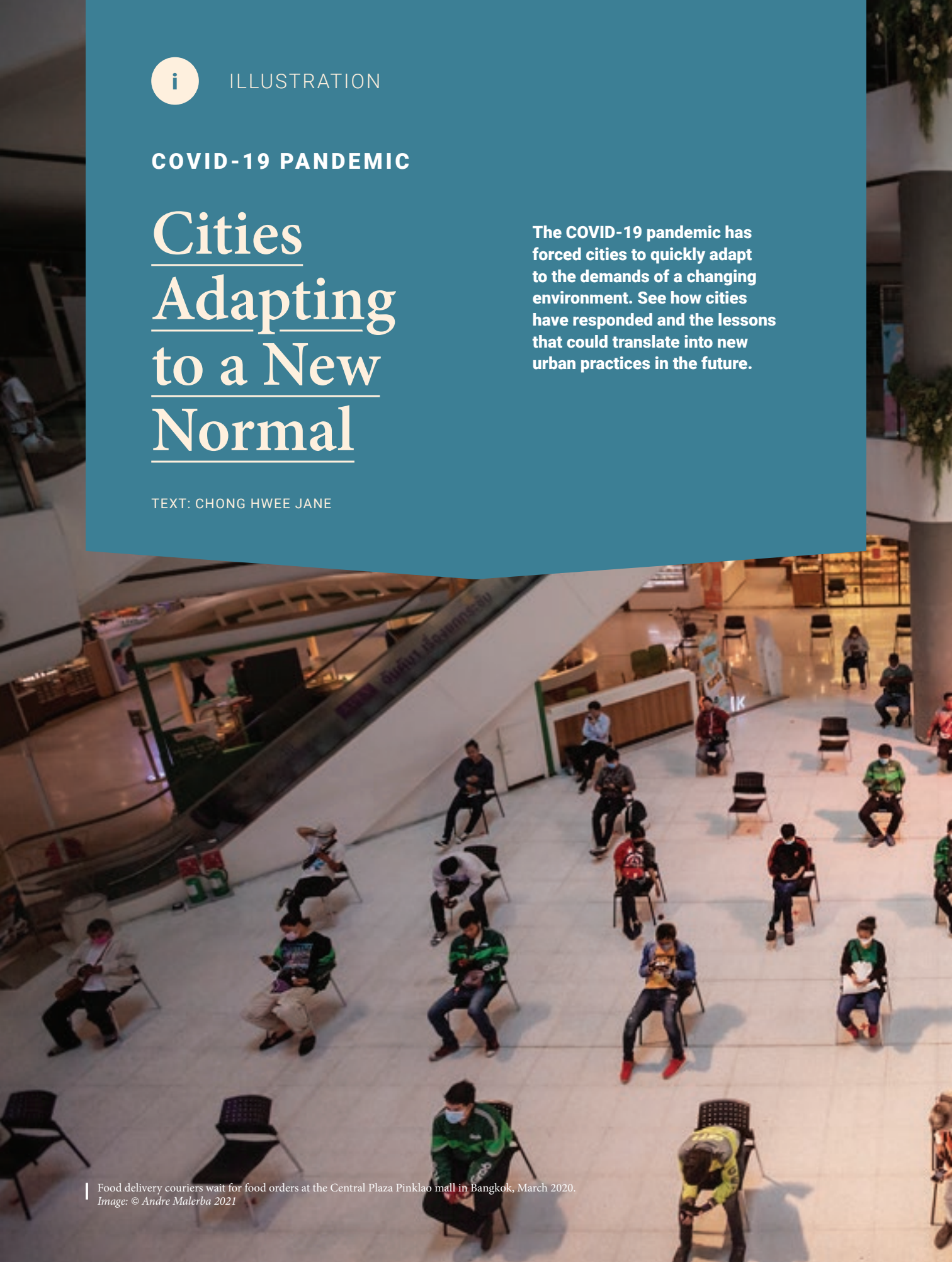
ILLUSTRATION

COVID-19 PANDEMIC

Cities Adapting to a New Normal

The COVID-19 pandemic has forced cities to quickly adapt to the demands of a changing environment. See how cities have responded and the lessons that could translate into new urban practices in the future.

TEXT: CHONG HWEE JANE



Food delivery couriers wait for food orders at the Central Plaza Pinklao mall in Bangkok, March 2020.
Image: © Andre Malerba 2021

Food Delivery Services – Bangkok, Thailand

Food delivery services have proliferated as cities entered various degrees of lockdown, with large numbers of delivery couriers gathering to collect food orders during mealtimes. To reduce the transmission of COVID-19, people have been encouraged to maintain a safe distance from others, which has affected how food delivery couriers gather in public spaces.

Emergency Bicycle Lanes – Bogotá, Colombia

Bogotá has expanded its bicycle network by adding 76 km of temporary bicycle lanes to enhance mobility for essential workers and reduce crowding on public transport. In other cities, COVID-19 has accelerated the adoption of temporary road closures for pedestrians and cyclists, which may serve as trials for future plans to permanently go car-lite.

Cyclists use a temporary bicycle lane converted from a traffic lane.
Image: Guillermo Legaria / Getty Images

Lift Up Local – Tampa, Florida

Tampa's Lift Up Local Economic Recovery Plan temporarily waived permit applications and fees for local F&B and retail businesses to expand outdoor capacity and serve more customers safely. Such short-term policy adaptations allow cities to quickly support local businesses in post-pandemic recovery, while enriching street life and piloting Open Streets measures.

Diners enjoy their meal at outdoor seating on a temporarily closed lane.
Image: City of Tampa

A father and child watch as a herd of wild boars dig up public vegetation in Haifa, Israel, April 2020.
Image: EPA-EFE / Abir Sultan

Image: Oren Chen / Israel Nature and Parks Authority

Wildlife in the City – Haifa, Israel

From Llandudno, Wales, to New Delhi, India, the lockdown-induced drop in human activity has drawn wildlife closer to urban centres but has also raised questions about altered animal behaviour in the longer term. In Haifa, once-nocturnal wild boars enter neighbourhoods in search of food throughout the day, exasperating residents concerned about safety and property damage. Haifa's ban on culling the animals has led some to take desperate measures: 11 wild boars were found poisoned to death in Nesher, a neighbouring city in the Haifa district.

A man tends to the vegetables on his rooftop farm in Jakarta.
Image: Anton Raharjo / Anadolu Agency via Getty Images

Urban Farming – Jakarta, Indonesia

Citizens are making the most of their limited space for urban farming in land-scarce Jakarta. COVID-19-induced disruptions to food supply chains have led to a growing awareness of food security issues, with many picking up gardening to boost mental wellbeing and supplement personal food supplies. Cities can ride on this ground-up interest in urban farming to rethink how land and unused spaces can be used for urban agriculture to boost their cities' food security and nutrition.

Life on Balconies – Rome, Italy

Amid COVID-19 lockdowns, apartment dwellers rediscovered balconies as valuable spaces to connect with neighbours and the outdoors while maintaining a safe distance. As cities become more dense, it is critical to rethink how living spaces are designed so that they remain liveable and resilient under any circumstance.

A personal trainer leads an exercise class from her balcony during Italy's lockdown.
Image: REUTERS / Remo Casilli

Drive-in Cinemas – Seoul, South Korea

Drive-in cinemas have experienced an unexpected revival as people seek out physically distanced entertainment alternatives. The drive-in format has been quickly adapted for music festivals, opera performances, political and religious gatherings and even museums, yet this increase in car-centric entertainment runs counter to the pre-pandemic movement towards car-lite cities. As cities of the future seek to reduce reliance on privately owned cars, the future of such drive-in venues remains to be seen.

People watching a movie at a drive-in cinema in Seoul, March 2020.
Image: Ed Jones / AFP via Getty Images

Spot, the Safe-Distancing Robot – Bishan-Ang Mo Kio Park, Singapore

While the use of robots to increase productivity is not new, the pandemic has accelerated the adoption of robots as a means of protecting workers' health and safety. Robots like Spot not only reduce the manpower required for labour-intensive work like patrolling large areas, but also lower transmission risks by minimising physical contact between staff and park visitors.

Spot patrols park areas with high visitorship to remind park-goers to practise safe distancing.
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