

IN THIS ARTICLE

Strengthening Singapore's resilience to climate change involves a whole-of-nation approach to build strong partnerships among different sectors. This article explores the synergies among various agencies to reinforce public infrastructure and the complementary role of communities in realising citizen-initiated, community-scale projects to build resilience towards climate risks. It draws from CLC's research and ground observations from the ongoing Building Community Resilience project and relevant international cases.



Figure 1: Understanding climate change issues faced by residents of Cambridge Road. Source: CLC

Building Community Resilience: The Role of Communities in Tackling Climate Change

Sustainability, liveability and resilience are central tenets of Singapore's urban development. The Singapore Climate Action Plan, released in 2016, highlighted the future challenges the island-city state will face as weather patterns become extreme and unpredictable. It is vital for Singapore to ensure its preparedness by enhancing both its infrastructural (hardware) and social (software) resilience.

Based on this, a recent CLC study sought to examine how Singaporeans can develop and enhance community resilience to climate risks. Beyond fostering a culture of collaboration and co-ownership, there are opportunities to spur citizen-initiated actions and projects to adapt to climate change.

This article looks at the Cambridge Road neighbourhood—a pilot site for the CLC's Building Community Resilience project—to highlight characteristics that could contribute to enabling Singaporeans to withstand future challenges.

CLIMATE PROOFING SINGAPORE: SHARED OPPORTUNITIES AND COLLABORATIVE PARTNERSHIPS

Singapore has done well to engage citizens over a range of initiatives and platforms (Figure 2). Moving forward, the goal is to engage citizens in upstream stages of planning and implementation, and to collaborate on localised interventions through a process to build community resilience

(marked in the fourth quadrant). The objective is to achieve shared responsibility and collaborative partnerships among communities, the government and other stakeholders to deal with existential climate threats and increase their adaptive capacities through a whole-of-nation effort.

An integrated urban systems approach starts with cross-domain alignment

The Building Community Resilience Project aims to complement Singapore's infrastructural resilience with increased community resilience through cooperation with government agencies, communities and researchers. While it is more efficient to break down complex public policy problems into separate components to

Local solutions for addressing climate change can complement nationwide strategies.

be managed by various agencies, the interconnectedness of climate risks requires an integrated approach.

To develop a common understanding and envision opportunities for climate-resilient interventions, the CLC worked with representatives from HDB, LTA, NCCS, NParks, PA, PMO-SG, PUB, SLA, URA, MEWR, MCCY, MND and MOE. Through a series of multi-agency workshops and engagements, several key issues were identified to develop a common understanding of what resilience means in order to achieve alignment on a common set of resilience indicators and a spectrum of solutions (Figure 3) that can be collaborated with the community. By adopting an integrated urban systems approach, agencies identified the interrelationships between domains of the urban system and considered multi-sectoral efforts required to sustain community initiatives to build adaptive capacities.

Partnering communities to prepare for climate change

Ground sensing and preliminary findings highlight the potential for communities to play their part in initiating and championing ideas that could bring about social change and resilience to climate risks. Together with Participate-in-Design, Singapore-ETH Centre (Future Resilient Systems [FRS]), and the Lloyd's Register Foundation Institute for the Public Understanding of Risk (IPUR), National University of Singapore, the CLC conducted a three-month qualitative study, between October and December 2019, to understand the current state of community resilience at Cambridge Road.

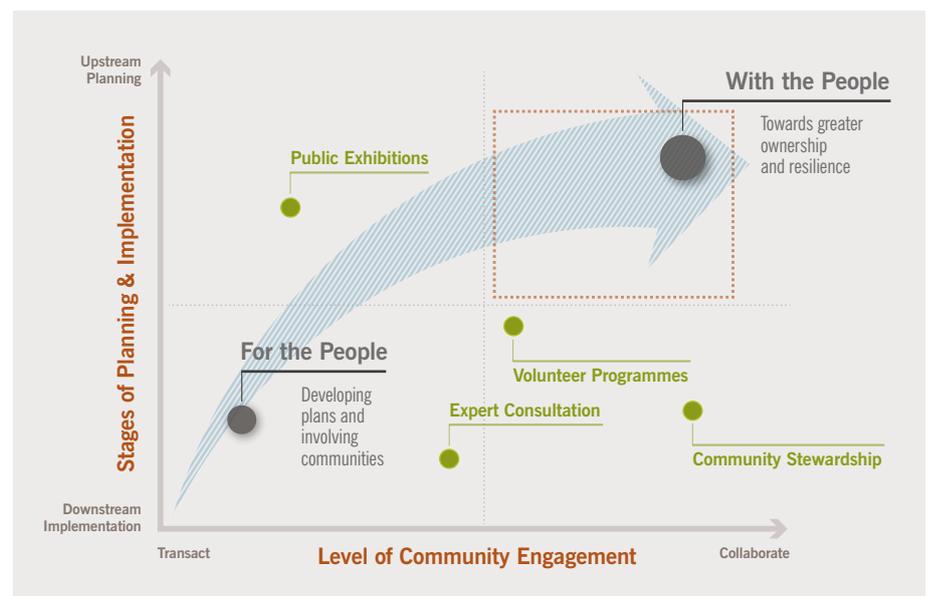


Figure 2: Illustration of the degrees of community engagement in Singapore at different stages of planning and implementation, and the value of incorporating greater collaboration in upstream planning. Source: CLC's Building Community Resilience Research & Workshop Insights 1

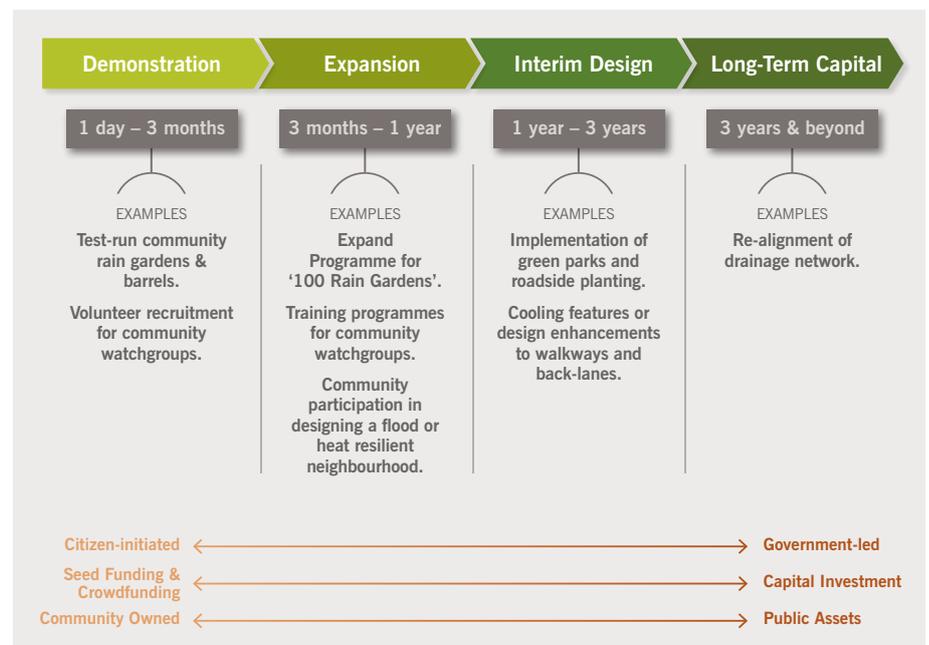


Figure 3: A framework illustrating the possible examples and spectrum of solutions categorised according to time- and cost-scale, and nature of governance/ownership on proposed interventions in response to climate change. Source: CLC's Building Community Resilience Research & Workshop Insights 1

A notable finding was the relatively high level of trust reported—a positive trait that could serve as the foundation for building community resilience.



Figure 4: Residents sharing their lived experiences and relations with neighbours during a focus group discussion. Source: CLC

The study adopted four different approaches to cover sufficient depth and breadth: 1) walking conversations with 25 grassroots members; 2) focus group discussions with 15 residents; 3) pop-up booth engagement with 171 respondents at Pek Kio Market & Food Centre; and 4) questionnaire-based survey of 133 respondents through intercepts.

The survey highlighted that residents felt most strongly about the sense of community and collective efficacy in their neighbourhood, despite reporting lower levels of community bonding and engagement. Residents also reported a high awareness of climate change issues, though they felt that more could be done in terms of crisis preparedness. A notable finding was the relatively high level of trust reported—a positive trait that could serve as the foundation for building community resilience.

The study provided insights on several potential entry points to translate current levels of climate change awareness into

actions, as well as strengthen the levels of trust and neighbourliness in responding to future shocks and stresses given Cambridge Road's unique local conditions.

Increasing self-efficacy as a community

There is a need to raise the self-efficacy of individuals and the community to address climate change. Focus group discussions revealed an uncertainty about possible actions residents could take and their effectiveness. A perceived lack of information on this front reinforces a belief among residents that they are unable to influence complex issues like climate change, and defer to the government instead. This corroborates the NCCS's 2019 public perception survey, where 9 in 10 respondents said they were aware of the impact of climate change.¹ However, a third of the respondents felt that individual action would only have minimal impact. A resident of Cambridge Road commented:

"I think the first serious communication that I received was the recent Prime Minister's talk about a S\$100 billion investment over the next 100 years. What would be good is for us to understand what we can do day-to-day to help".

There are opportunities to change this perception by imparting knowledge of likely climate-related impacts on Singapore and possible mitigation and adaptation actions. Targeted education and local solutions can complement nationwide strategies to reduce the perceived gap between community actions and climate risks. Communities can then appreciate their role in supporting Singapore's long-term plans and foster the propensity for calls to action, which would enhance collective self-efficacy.

A 'many helping hands' approach

While we recognise that citizen-initiated adaptations are not a silver bullet, they are a necessary parallel track to long term adaptation efforts. This is where

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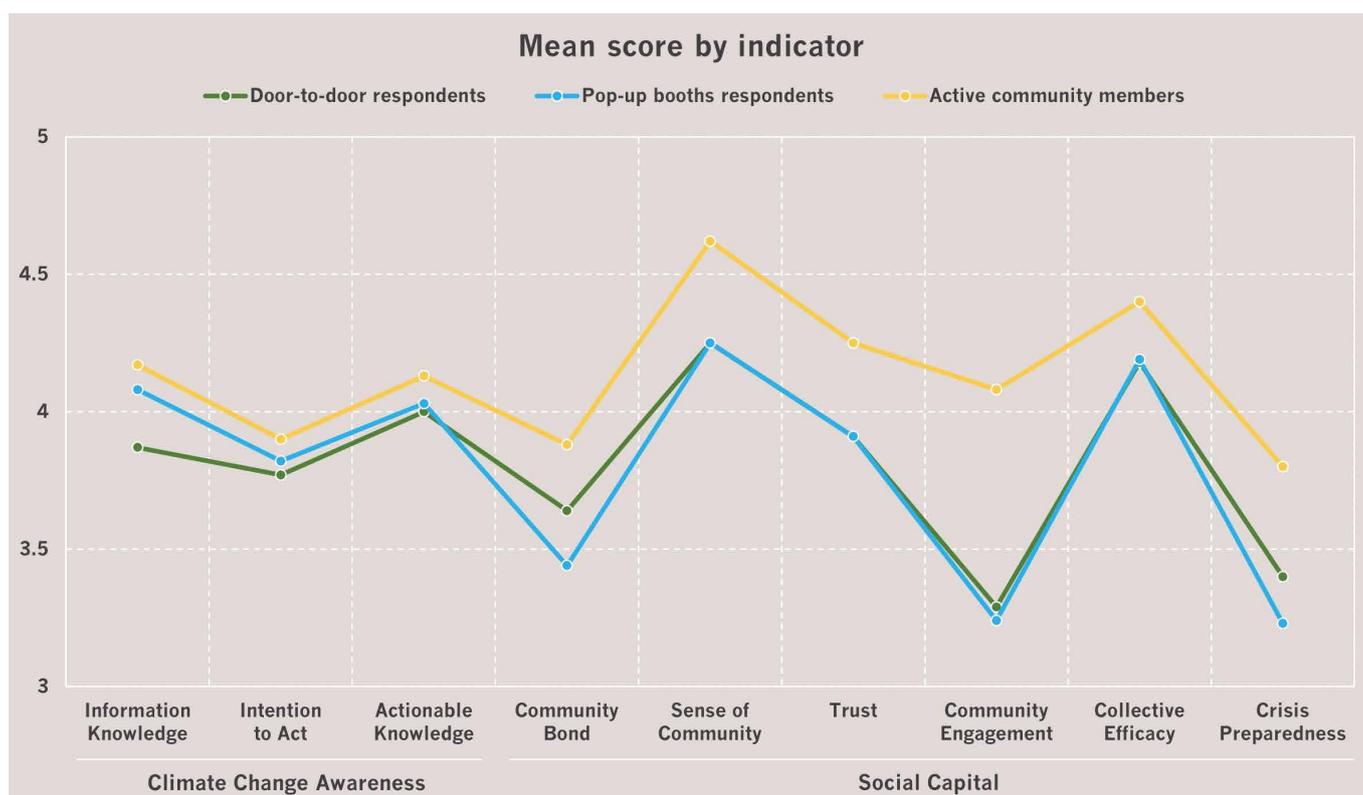


Figure 5: Findings of survey of 133 residents of Cambridge Road on current levels of climate change awareness and social capital. Answers to 35 questions were categorised into nine broad resilience indicators. Source: Singapore-ETH Centre (FRS) and CLC

a ‘many helping hands’ approach can encourage members of the community to participate and contribute to social change.

Singapore has built harmonious communities and cultivated a sense of belonging through place making and communal activities. Taking these a step further, we can enrich existing social programming through a climate lens to catalyse community action against climate risks and brainstorm ways to reduce its localised effects. This will also have a positive impact on the current levels of community bonding and engagement in building

up social capital, and hence a sense of crisis preparedness. As Deputy Prime Minister Heng Swee Keat noted:

“I hope that we can build a democracy of deeds where everyone chips in with our various strengths and passions to build a society we can all be proud of.”²

NETWORKS OF ACTION— RALLYING COMMUNITIES FOR A COMMON CAUSE

Climate change cannot be addressed by a single action. Instead, we must start by leveraging on social capital and strong community networks,

a vision emphasised by former Minister for the Environment and Water Resources Masagos Zulkifli:

“The government can make the right policies, but we need the strong partnership of all stakeholders... to take climate action and work together. This is a whole-of-nation effort.”³

Focus group discussions by the CLC and IPUR revealed the presence of high social capital in the Cambridge Road community. The survey of the wider Cambridge Road population conducted by Singapore-ETH Centre (FRS) also suggested a moderate to

“The immediate help is actually from neighbours and the community.”

high degree of a sense of community and trust among neighbours. The everyday interactions and motivations to help one another create an environment of trust and understanding that fosters mutual assistance and preparedness, especially in times of need. This was a sentiment shared by Mr Sim, a Carlisle Road resident:

“As neighbours, we should be closer than just friends because our brothers and sisters, or even relatives, may be living far away. The immediate help is actually from neighbours and the community.”

Communities build relations not only within themselves but also with the government. This is cultivated through existing touchpoints with the community on municipal and place making issues, which are currently actively carried out by URA for the Farrer Park development, transport and car-lite discussions with the LTA, and greening efforts in collaboration with NParks. The Community-in-Bloom programme, for example, has mobilised over 36,000 gardening enthusiasts at more than 1,500 community gardens. Beyond fostering community spirit through ornamental plantings and crops, there is scope to incorporate greater climate change awareness and education. The two existing Community-in-Bloom gardens in the Cambridge Road area can be adapted to be rain gardens and for providing some produce for the community.



Figure 6: Relating climate change to everyday life among residents of Cambridge Road. Source: CLC

Residents need not possess ‘green fingers’ in order to contribute. Often, they are keen to contribute in whichever way they can. One such avenue is to crowdsource ideas from community stakeholders and relevant experts such as artists and engineers, who might be living amongst them; and to rally the community to crowdfund initiatives to transform ideas into reality. In the case of the Luchtsingel Bridge in Rotterdam (see box story on Community Crowdfunding in Rotterdam), collective action of the community created a strong sense of ownership and awareness of the value of their actions, making the project and engagement much more meaningful.

Such an approach would allow residents to interact with their neighbours, partner agencies and community stakeholders to make quick and incremental enhancements to their community, for which they could see immediate impact and feel a sense of ownership and purpose. Here the focus is not on reinventing the wheel, but on incorporating multi-functional ideas and climate-resilient elements into the existing strong social compact, developed over the years through the good work of agencies in their various citizen-engagement programmes.

Community Crowdfunding for Connected Neighbourhoods— Luchtsingel, Rotterdam, The Netherlands

OVERVIEW

Several areas around Rotterdam Centraal station have limited connectivity due to the network of roads and inter-city railways that segment the city, hindering walkability.

INTERVENTION

Local architecture firm, ZUS, kick-started a community crowd-funded bridge for an uninterrupted main pedestrian thoroughfare from Rotterdam Centraal to the Laurenskwartier district, located north of the railway line.

The crowdfunding campaign allowed residents to purchase a plank for 25 euros (\$39) and have their names inscribed on it as a show of support. The firm then worked closely with developers and other stakeholders to construct the bridge. This multi-sectoral approach received support from the city council, which provided additional funding and facilitated regulatory approvals.

LESSONS

Rallying residents around a shared problem and taking a crowdsourcing approach enhanced the identity and resiliency of Rotterdam residents. The collective action of the community created a sense of ownership and increased residents' awareness of the value of their actions in long-term city planning and collaboration. This provided residents with a greater sense of purpose—making the project and engagement much more meaningful.

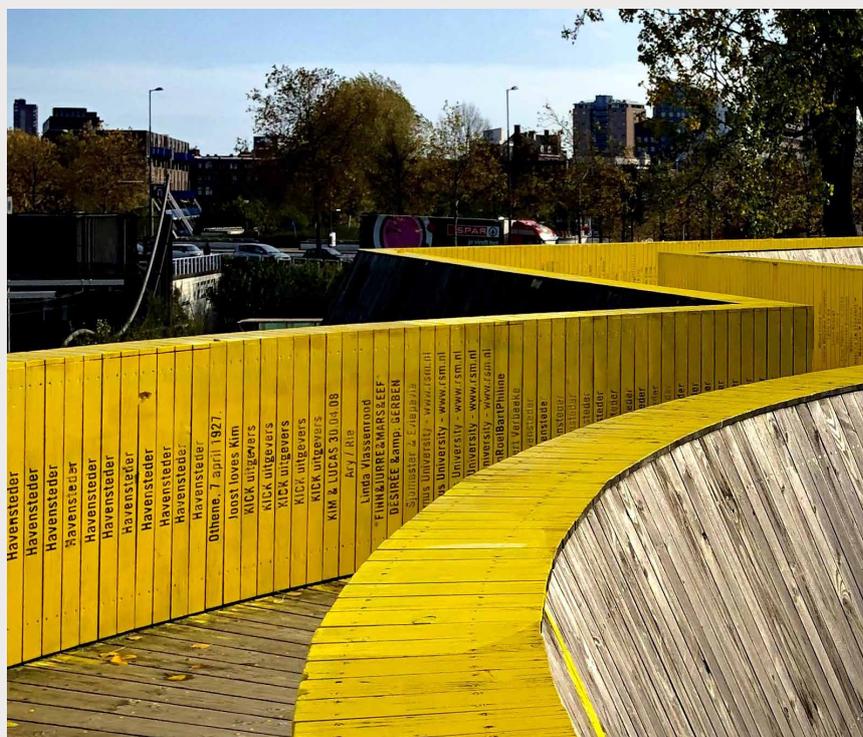


Figure 7: Names of residents and donors inscribed on the bridge. Source: Elaine Tan

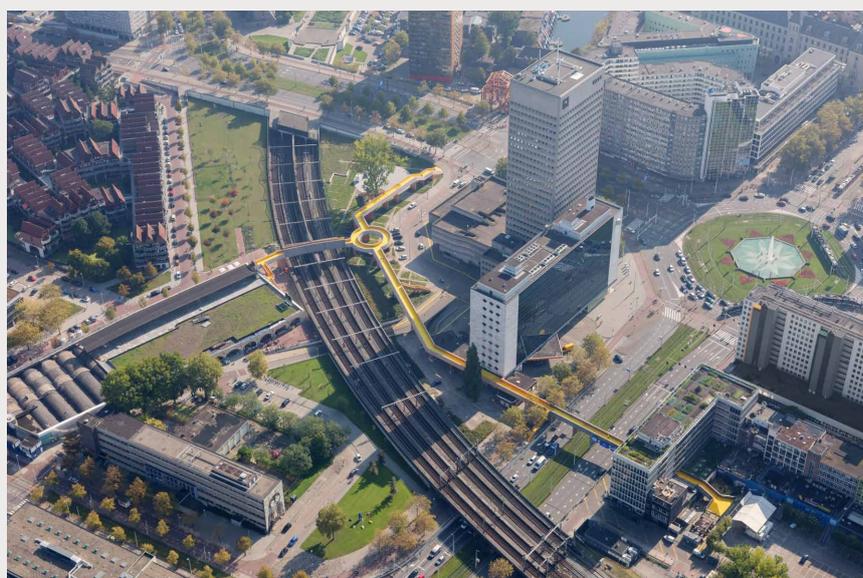


Figure 8: The Luchtsingel Bridge providing connectivity across the railways. Source: Ossip van Duivenbode

BUILDING PRIDE IN THE COMMUNITY'S UNIQUE PLACE CHARACTERISTICS

In enhancing the adaptive capacities of communities to the impacts of climate change, it is equally important to recognise the dynamics of local conditions. Differences in building typology, networks of green and blue spaces and social demographics influence the ability of people and the urban system to respond and adjust.

At the Cambridge Road project site, drainage improvement works have, over time, helped to attenuate the situation of a low-lying, flood-prone area. While flash floods do occur from time to time, our interviews and surveys revealed that long-time residents have developed a certain level of resilience with experience, awareness and knowledge as shared by a resident of 50 years:



Figure 9: Residents in conversation over a flood gauge—a remnant of Cambridge Road's flood-prone history—during the walking conversations Source: CLC

“I built this wall in front of my house because water flowed in through the windows during the 1969 flooding. I also made boards to

block off the steps. With the drainage systems and the raised roads, it is definitely a lot better in the last few years.”

Harnessing the Potential of Local Characteristics—*Retain Your Rain* Programme, Norfolk, United States

OVERVIEW

The coastal city of Norfolk, Virginia, faces increasing threats from tidal to pluvial floods annually. This phenomenon has worsened with rising sea levels and intense rainfall. As part of its Resilient City strategy, Norfolk has applied small and medium-scale efforts to adapt.

INTERVENTION

Developing small-scale projects in flood-prone neighbourhoods allowed people to live, adapt and thrive with water. Residents attended workshops to learn about the flows of water and the ‘storage’ and ‘infiltration’ functions of their neighbourhood, based on ground conditions. The demonstration of small-scale green infrastructure like rain barrels, planter systems and blue

and green roofs allowed residents to hold rainwater where it falls and help reduce the surface runoff, thereby addressing the flooding issue. This built awareness and helped empower neighbourhood champions to lead and grow these projects.

LESSONS

The Norfolk Resilience Office framed localised demonstrations to encourage collective community effort in addressing the issue of flooding. Residents contributed to making their neighbourhoods more porous and understood how it fits within the climate system. The process of leading communities through cost-friendly and simple-to-configure short-term projects can sustain long-term effects that spin off from the main project.



Figure 10: Rain barrels made by residents of Norfolk as part of the Retain Your Rain Programme. Source: The City of Norfolk, Virginia

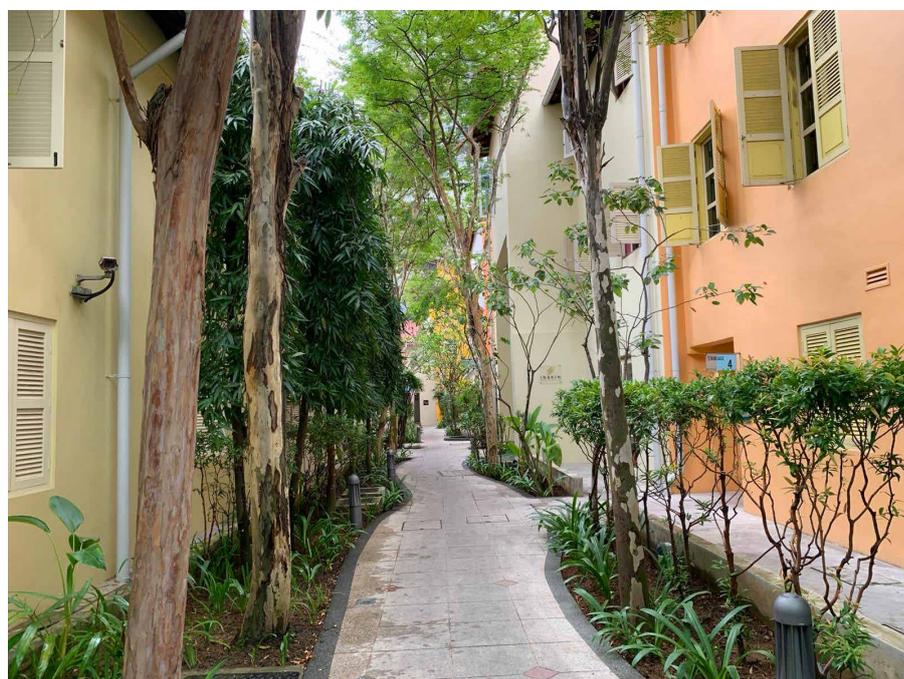


Figure 11: (Left) An example of the current underutilised back alleys in the Cambridge Road area. Source: CLC. (Right) An example of back alley greening features in Singapore that could be explored in the Cambridge Road area. Source: Michael Koh

While some new residents were surprised to hear that Cambridge Road was geographically low-lying and one of the flood-prone areas of Singapore, they were aware of the need to rebuild their houses on a platform and noticed that HDB blocks were built on higher ground. Taking a leaf from the ‘Retain Your Rain’ project in Norfolk (see box story on Norfolk), it is possible to map out the community assets in the neighbourhood and turn disadvantages into opportunities. Instead of seeing the neighbourhood as ‘flood-prone’, the community can potentially harness water that channels through into ‘rain gardens’ and ‘water playgrounds’.

Other unique assets in Cambridge Road include the strong presence of various associations and places of worship, which could serve as refuge points during floods, or even smoke haze or heat waves (see box story on Project OASIS). Making reference to the former Norfolk Primary School site in the area, which is currently vacant,

a young respondent suggested other opportunities for the community:

“Old school sites can be used as community gardens to grow food, and we can tap on the experience and skills of elderly residents.”

LEVERAGING ON AND INCREASING SPACES FOR ADAPTATION

By recognising their local situations, communities can work together to prioritise the types of adaptations required. This would help to address issues at hand, while deepening community bonding, cooperation and cohesion.

Water-related risks are now less of an issue for the residents, who are instead more concerned with heat. Residents attributed some of these issues to the increasingly concretised nature of the built-up environment, the urban heat island effect and the lack of shade and thermal comfort for walking.

Some highlighted these as reasons that discourage them from walking, preferring to drive to the market despite it being a mere six-minute walk away. As a respondent at the pop-up booth put it:

“We have so many void decks and underutilised spaces (like back alleys) in Singapore. Imagine making them eco-friendly, green and cool?”

In our interactions, community members gave positive feedback on the agencies’ efforts and highlighted opportunities to tackle climate change through small-scale improvements, such as currently underutilised back alleys. Some residents suggested that concrete back alleys be ‘softened’ with greenery to lower the microclimate and improve walkability for residents who use them as short-cuts to get around the neighbourhood. Green-fingered champions can educate others on incorporating water-retention features into greenery to capture excess rainfall, thereby achieving multiple benefits.

Collective action of the community created a strong sense of ownership and awareness of the value of their actions, making the project and engagement much more meaningful.

Battling Heat and Building Resilience— Project OASIS Schoolyards, Paris, France

OVERVIEW

In 2003, Paris suffered a heatwave that killed more than 700 residents. The densest capital in Europe, Paris has only 14.5 m² of green space per inhabitant, compared to London's 45 m² or Rome's 321 m². In response, Paris increased the provision of accessible green spaces by activating 70 hectares of schoolyards and colleges.

INTERVENTION

Paris launched Project OASIS (Openness, Adaptation, Sensitisation, Innovation, and Social Ties) in 2018 at three pilot schoolyards (out of a total of 761) and consulted the community on the greening of concrete yards, improving flood management and storm water drainage, cooling fountains and creating natural or artificial shade.

The enhanced adaptability of school sites improved the social infrastructure of surrounding communities by positioning schoolyards as spaces of respite from heat. During future heatwaves, residents will know where to seek shelter and assistance.

LESSONS

Taking communities through the ideation and development process serves to increase the effectiveness of the intended solutions. Not only are residents made aware of opportunities in their neighbourhood, they understand the functions and available resources they can benefit from. Leveraging on simple, localised solutions, it is possible to build up the community's knowledge, awareness and adaptive capacities to the effects of climate change.

CONCLUSION

With a suite of existing initiatives in Singapore—like Remaking Our Heartlands, Estate Upgrading Programme and Community Improvement Projects—there are many opportunities for citizens to be involved in the planning of their neighbourhood and create spaces for climate change adaptation. This process would also allow policymakers to understand how communities prioritise problems and solutions in light of climate change. By involving communities as collaborators of solutions rather than consumers, we can forge and strengthen the layer of community and climate resiliency into the solutions as a nation.

The CLC, together with agencies will continue to work with and support residents of the Cambridge Road neighbourhood to contribute and pilot their ideas for combating climate change. Since mid-February 2020, the CLC and agencies have facilitated weekly meetings with community champions to work towards prototyping solutions that will build pockets of resilience and strengthen social networks. The ongoing public health situation due to the COVID-19 pandemic has not deterred the engagement process. Weekly meetings have moved to online platforms and community champions have been quick to adapt and reach out to their social networks to sustain their efforts.



Figure 12: Retrofitted schoolyards with porous spaces and expanded play areas of Project OASIS in Paris.
Source: 100 Resilient Cities

On a parallel track, the CLC is continuing to partner academic experts in defining and measuring community resilience over a period of longitudinal study with robust indicators. Instead of conducting face-to-face surveys, the CLC is now administering these online and working through the strong social networks built up over the past months. This allows the CLC to continue to track the changes in community resilience and inform future citizen-engagement efforts and neighbourhood enhancement programmes as Singapore battles the pandemic and progresses towards a whole-of-nation effort to tackle complex and cross-cutting challenges collectively. Beyond enhancing physical infrastructure, the community engagement process can build up social infrastructure to enhance local knowledge of available resources and assets in coping with climate risks and construct a sense of shared ownership, responsibility and preparedness.



Figure 13: Local champions in active discussions during one of their weekly meetings to fine-tune proposed ideas for their neighbourhood. Source: CLC



Figure 14: Mood board showing the local champions' vision for their neighbourhood to include extensive greenery for shade and comfort. Source: Our Green Pek Kio Community Champions



Figure 15: CLC and local champions transitioning to online platforms to continue discussions on proposed ideas for their neighbourhood. Source: CLC

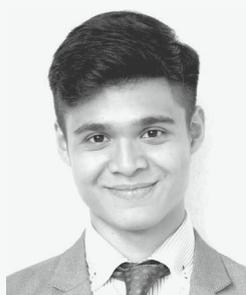
Notes

¹ National Climate Change Secretariat, Strategy Group, Prime Minister's Office, "Climate Change Public Perception Survey 2019", 16 December 2019, <http://www.nccs.gov.sg/media/news/articles/detail/climate-change-public-perception-survey-2019>

² Ministry of Finance, "Speech by Mr Heng Swee Keat, Deputy Prime Minister and Minister for Finance, at the Closing Session of the International Conference on Cohesive Societies, 21 June 2019, at Raffles City Convention Centre", transcript, <https://www.mof.gov.sg/Newsroom/Speeches/speech-by-mr-heng-swee-keat-deputy-prime-minister-and-minister-for-finance-at-the-closing-session-of-the-international-conference-on-cohesive-societies-21-june-2019-at-raffles-city-convention-centre>

³ Ministry of the Environment and Water Resources, "Speech by Mr Masagos Zulkifli, Minister for the Environment and Water Resources, at the Year Towards, Zero Waste Appreciation Lunch, Pan Pacific Hotel, on 25 November 2019", transcript, <http://www.mewr.gov.sg/news/speech-by-mr-masagos-zulkifli--minister-for-the-environment-and-water-resources--at-the-year-towards-zero-waste-appreciation-lunch--pan-pacific-hotel--on-25-november-2019>

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