PHOTO: Wuhan city, China

FLOOD RESILIENCE IN CHINA

LIKE SPONGES

Following devastating 2012 floods in Beijing, flood prevention quickly climbed China's agenda. A year later, President Xi Jinping announced at a conference on urbanisation that cities should act 'like sponges'. Action soon followed.

The terminology was new; the idea was not: naturally accumulate, filter and recycle rainwater by replacing 'gray infrastructure' with 'blue-green infrastructure', through the implementation of techniques including permeable pavements, vegetated rooftops, rain gardens and wetlands. For years, cities in Australia, the US and the UK had quietly employed nature-based solution techniques in urban planning. But China – driven by sheer necessity – is blowing them out of the water. Since 2008, the number of Chinese cities struck by floods has doubled, while water conservation has dropped. The culprits? Rapid urbanisation and concrete. Between 2011 and 2013 alone, China used more cement than the US did over the entire course of the 20th century.

Until it got paved over, Wuhan was the 'city of a hundred lakes'. Now it is one of China's 17 'megacities', and its second fastest growing. When the Sponge City Initiative launched in 2015, low-lying Wuhan – located at the merging of the Yangtze and Han rivers – was a sure bet to be among the initial 16 pilot cities. The massive Wuhan floods of 2016 confirmed why. Following a week of torrential rain, Wuhan's drainage systems gave way; the inundation swept 14 people to their deaths and cost $326 million. It was a crisis that focused attention. To date, Wuhan has managed to transform 40 square kilometres of its public spaces into rain gardens, grass swales or low elevation green belts – at a cost of nearly $1.5 billion. Nine hours to Wuhan's east, a planned city near Shanghai called Lingang wants to become China's largest sponge city. The city government has already invested $119 million in pavements lined with trees and public squares full of plant beds. In central Shanghai, the focus has been on planting shrubs and trees on rooftops and wall gardens, all two million square metres of it. Further south, Liuzhou Forest City (not formally part of the Sponge City initiative) is under construction in Guangxi province. When it is inaugurated in 2020, the city will have 40,000 trees and one million plants covering its buildings, eventually hoping to absorb around 10,000 tonnes of CO_2 and 57 tonnes of pollutants.

Other large cities are cottoning on to the benefits of mimicking nature to increase resilience to climate change. In Berlin's Rummelsburg district, buildings are wrapped in green walls, roofs, and garden terraces, with thick tranches of soil up to 80cm deep, while roadside trenches between pavements and streets create miniature urban wetlands, helping retain water, feed water tables and evaporate water to help keep the city cool. The city of Colombo in Sri Lanka has been restoring its wetlands, without which the city could have faced losses from flooding amounting to about 1% of GDP. Naturally, the focus has been on enhancing climate resilience and reducing flood risk.

But China is where the action is. The scale of the Sponge City initiative, which now encompasses 30 cities, is only rivalled by its ambition: by 2030, the Chinese government expects all participating cities to ensure that 80% of urban land includes 'sponge-like features'. For China, 'taking

care of nature so it takes care of you' was enshrined in its Constitution in 2012. But instead of setting out to become an 'Ecological Civilisation', as was penned, with the objective of having 900 million people (70% of its population) living in cities by 2030, 'Ecological City' could be equally appropriate.

NATURE'S CLIMATE STATISTICS

The 21st century will be the urban century, as more than 2 billion additional people arrive in cities globally. Natural solutions in cities, such as urban wetlands and densely planted streets, can help cushion this rapid urbanization.

Trees and other vegetation, whether planted along a city street or in a park, provide a multitude of benefits to people, such as aesthetic beauty, enhancement of property values, erosion prevention, stormwater management and noise reduction. Green pockets also helps improve air quality and builds resilience to heat extremes by tackling heat island effects. For example, in London, it's estimated 8 million trees help save £260 million every year in buildings' energy costs.

In a 2016 report by The Nature Conservancy, Planting Healthy Air, which studied 245 cities with around 910 million people in them, it was found that trees deliver real benefits. Millions of people are being protected from a reduction in fine particulate matter and existing vegetation is already providing 68.3 million people with a roughly 0.5 to 2.0°C reduction in summer maximum air temperatures. Furthermore, they are cost-effective, where the median cost of tree planting is less than every other strategy considered, except for one. Trees, of course, also sequester carbon.

In fact, a 2018 analysis on the sponge city of Xiamen illustrates the potential of nature-based 'sponge features' absorbing carbon. If Xiamen successfully meets its planned vegetation and wetland targets on cue by 2020, the city is eventually expected to achieve emissions reductions amounting to about 67,000 tonnes of CO_2 per year – the equivalent of the atmospheric carbon mopped up by a 31,000 hectare forest.

KEY FIGURES

MORE THAN 98%

of China's cities flood regularly.

RMB 400 TO 600 MILLION ($US 60 TO 90 MILLION).

Cities such as Beijing, Chengdu, Chongqing, Shenzhen, Guangzhou, Shanghai and Wuhan all have large scale projects underway.

Flooding damage estimates range from

US$22 BILLION TO US$45 BILLION

30 CITIES, GOING ON 600.

MORE THAN 40,000 SQUARE KILOMETERS

(15,000 square miles) were newly urbanized in China over the past 35 years, as the number of cities climbed from 193 to 653.

PROJECT BACKGROUND

The Sponge City concept was launched in 2015 by the Chinese government.

EXECUTING ENTITY

Local governments.

FUNDING

The Chinese government. Under the program, pilot cities have received generous annual subsidies of 400 million yuan (US$58 million) to 600 million yuan from the Chinese government. From 2020, local governments are expected to fund them. But because sponge city elements do not cheap, public-private partnerships are expected to be forged.

SDGs

LOCATION

VIDEOS & STORIES

https://youtu.be/WEFj81wVT8M

https://youtu.be/6ypr6E23nuU

https://youtu.be/oSrNdhwTW_U

CONTACT

Chinese government.