

He's Got a Plan for Cities That Flood: Stop Fighting the Water

A landscape architect in China has a surprising strategy to help manage surges of water from storms supercharged by climate change.



Kongjian Yu at his office in Beijing. “We’ve been using the conventional drainage infrastructure for 200 years and we haven’t solved the flooding problem,” he said. Credit...Mark Schiefelbein/Associated Press

By Richard Schiffman, The New York Times

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Cities around the world face a daunting challenge in the era of climate change: Supercharged rainstorms are turning streets into rivers, flooding subway systems and inundating residential neighborhoods, often with deadly consequences.

Kongjian Yu, a landscape architect and professor at Peking University, is developing what might seem like a counterintuitive response: Let the water in.

“You cannot fight water,” he said. “You have to adapt to it.”

Instead of putting in more drainage pipes, building flood walls and channeling rivers between concrete embankments, which is the usual approach to managing water, Mr. Yu wants to dissipate the destructive force of floodwaters by slowing them and giving them room to spread out.

Mr. Yu calls the concept “sponge city” and says it’s like “doing tai chi with water,” a reference to the Chinese martial art in which an opponent’s energy and moves are redirected, not resisted.

“It’s a whole philosophy, a new way of dealing with water,” he said.

Through his Beijing-based company, Turenscape, one of the world’s largest landscape architecture firms, Mr. Yu has overseen the development of hundreds of landscaped urban water parks in China where runoff from flash floods is diverted to soak into the ground or be absorbed into constructed wetlands.

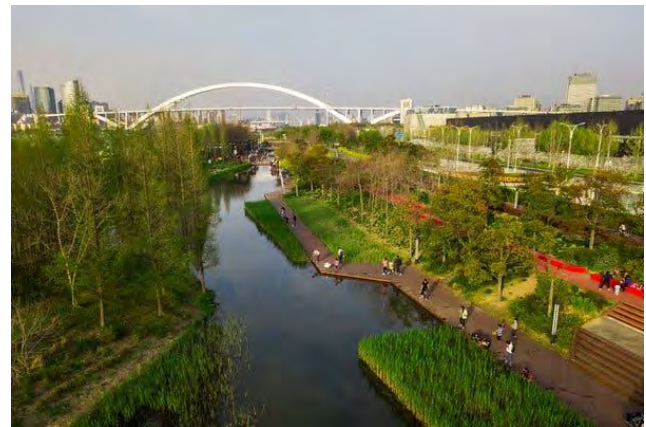
Mr. Yu said growing up in a village in Zhejiang Province toward the end of the Cultural Revolution showed him how earlier generations in rural China had “made friends with water.” Farmers in his region built terraces, berms and ponds to direct and to store excess water during the rainy season.

That stood in sharp contrast to the urban landscapes in modern China. Traditionally, cities in China would set aside areas capable of absorbing floodwaters. But such nature-friendly urban design largely ended with the Industrial Revolution, Mr. Yu said. More recently, millions of acres have been paved over to build cities, some of them rising up virtually overnight.



Shanghai Houtan Park in 2006.

Credit...Courtesy The Cultural Landscape Foundation



The same area in 2018.

Credit...Courtesy The Cultural Landscape Foundation

“We’ve been using the conventional drainage infrastructure for 200 years and we haven’t solved the flooding problem,” he said, noting that much of China has a monsoon climate subject to extremely heavy bursts of rain that pose an increasing hazard as climate change advances. That’s because warm air can hold more moisture, resulting in heavier rainstorms.

Currently, [65 percent of urban areas](#) in China experience some degree of flooding each year, according to Mr. Yu. The country is currently the world's largest producer of greenhouse gases. The United States is the largest historical emitter.

“The concrete drainage systems that came here from the West just can't handle it,” Mr. Yu said. “We need a new solution.”

The sponge city program was formally inaugurated by President Xi Jinping in 2015 with pilot projects in 16 Chinese cities and has since expanded to more than 640 sites in 250 municipalities around the country.

You can see the concept in Houtan Park, a mile-long strip of greenery along the Huangpu River in Shanghai that Mr. Yu designed on a former industrial site.

Terraces planted with bamboo and native forbs and grasses are bisected by wooden walkways that zigzag between ponds and constructed wetlands. The wetlands filter water, slow the river's flow and provide habitat for waterfowl and spawning fish.

The goal, at least on paper, is that by 2030, 70 percent of the rain that falls on China's sponge cities during extreme weather events should be absorbed locally rather than accumulate in the streets.

Whether enough land can be converted is a key question.



**Mr. Yu, who studied landscape architecture in China and at Harvard, with hand-drawn landscape designs.
Credit...Mark Schiefelbein/Associated Press**

Edmund Penning-Rowell, a research associate at the University of Oxford who focuses on water security, said the scale of the sponge city projects would have to be huge to cope with flooding on their own. “Take New York City,” he said. “How many Central Parks would you need to absorb this kind of problem? You’d probably need half of Manhattan.”

Zhengzhou, in northeastern China on the banks of the Yellow River, was an enthusiastic early adopter of the sponge city concept, spending hundreds of millions of dollars building related projects from 2016 to 2021. But torrential rains inundated much of the city in July 2021, creating [scenes of destruction and killing hundreds](#), including at least 14 in a subway tunnel.

Why were the floods so disastrous in Zhengzhou? Mr. Yu said some of the money earmarked for sponge projects was diverted to other programs and that the land set aside for them was insufficient. If permeable surfaces or green spaces make up 20 to 40 percent of a city’s area, he said, “you can virtually solve the problem of urban inundation.”

Niall Kirkwood, a professor of landscape architecture at Harvard who has known Mr. Yu for years, acknowledged that it can be difficult, and sometimes impossible, to convert land in city centers that have already been densely built. Still, he said, Mr. Yu’s impact as an innovator has been incalculable.

“He’s created a clear and elegant idea of enhancing nature, of partnership with nature that everyone, the man on the street, the mayor of a city, an engineer, even a child, can understand,” Professor Kirkwood said.

Where large tracts of land are not available, sponge city projects are replacing concrete and asphalt with permeable pavement, installing green roofs and creating trenches called bioswales that channel storm-water runoff and use vegetation to filter out debris and pollution.

The sponge city concept is not unique to China. One of Mr. Yu’s projects abroad is the Benjakitti Forest Park, a maze of ponds, trees and miniature islands in Bangkok that was opened to the public in 2022 and occupies more than hundred acres on the site of a former tobacco factory.

Separately, in 2007 the Dutch government began a program called Room for the River that consists of more than 30 projects around four rivers, including the Rhine. The idea is to restore natural floodplains in key areas around sites that need protection. The Danish capital, Copenhagen, is using “floodable parks” that turn into temporary ponds during heavy rains. [Philadelphia and Malmo, Sweden](#), also have projects.



The site of Benjakitti Forest Park in Bangkok in 2020.

Credit...Courtesy The Cultural Landscape Foundation



The park, which was rehabilitated by Mr. Yu's firm, in 2022.

Credit...Lauren DeCicca for The New York Times

In addition to flood control, these projects have the advantage of being an inexpensive way to recharge local aquifers and a low-tech adaptation to help overheated city neighborhoods, because evaporating water has a cooling effect.

John Beardsley, the curator of the Oberlander International Landscape Architecture Prize, which was awarded to Mr. Yu last year, echoed Professor Kirkwood, saying Mr. Yu's impact on policy in China, a country that has been more likely to imprison environmental activists than take their messages to heart, has been astonishing.

Mr. Beardsley attributes this to Mr. Yu's adroit political skills and infectious enthusiasm, as well as the Chinese government's powerful incentive to appear to be addressing the problem of urban flooding, which has grown alarmingly in recent years.

"Kongjian has managed to be very critical of the government's environmental policies while still maintaining his practice and his academic appointments," he said. "He's both brave and deft in this regard, threading a very narrow needle."

"Sponge cities isn't a total solution, but it makes a significant impact," Mr. Beardsley said. "I mean, we need to start doing something."



Credit...Courtesy The Cultural Landscape Foundation