Sponge Cities Project, China

Background

Chinese cities have witnessed intense urbanization over the past three decades, due to rapid economic development. As China’s global economic dominance grows, challenges to Chinese cities in terms of environmental degradation and infrastructure failure also increases exponentially. It is estimated that more than 600 Chinese cities are exposed to frequent flooding, which has a huge social, economic and environmental impact.

As waterlogging is considered as one of the major underlying causes of these impacts, the management of urban drainage is a big challenge for both researchers and government authorities. In order to address these issues, the Chinese Govt. launched the Sponge Cities Project (SPC) in 2014, and selected 16 pilot cities for the same under phase one and 14 pilot cities in phase two.

Model sponge cities in China under (a) Phase 1; (b) Phase 2

Strategies and Interventions

The objective of sponge cities project is to use permeable surfaces and green infrastructures to mimic the natural water cycle in urban areas, and build resilience, as conventional engineering solutions cannot address the modern issues related to urban drainage and water management. The idea is to build the city as a ‘sponge’, which absorbs water, which would recharge the groundwater, reduce flood risks and enable re-use of rainwater and stormwater for various domestic and urban purposes.

The project aims that by 2020, 80% of urban areas should absorb and re-use at least 70% of the rainwater. In terms of scalability, the project aims that by 2020, 20% of selected cities areas shall adhere to sponge city
standards; and by 2030, 80% of the city shall adhere to these standards. Sponge features include permeable pavements, green roofs, SUDS techniques like swales, detention ponds, bio-retention areas, rain gardens, wetlands and other green infrastructure solutions.

Wuhan Sponge City Project

The city of Wuhan is located in eastern China, and has a population of 10.1 million (2018). It is spread across an area of 860 sq. km. It is located at confluence point of the Yangtze and Han rivers. Wuhan was once known as the ‘City of 100 Lakes’, with 127 lakes located in the central area alone in the 1980s. This number had reduced to 30 by 2016.

**Increase in built-up area in Wuhan, 1986 to 2016**

![Map showing increase in built-up area in Wuhan](image)

The SPC in Wuhan has identified a total of 228 projects in the pilot districts of Qingshan and Sixin to retrofit public spaces, schools and residential areas with sponge features. As per the sponge city targets, 170 sq. km. of the city area has to be retrofitted with sponge features. As of 2019, 38.5 sq. km. of the city has been retrofitted, with further areas being identified for implementation of sponge features, at a cost of ¥11 billion.

Most of the drainage infrastructure in China and Wuhan is designed to cater to 1-in-10-year storm. Once the sponge projects in Wuhan are completed, the city should be able to handle a 1-in-30-year storm, whereas some select spaces would be able to handle larger storms.

**Proposed improvements in Xinyuexie Park: Designed as a multi-purpose space for stormwater management**

![Proposed improvements in Xinyuexie Park](image)
Aerial view of flood-prone Wuhan, at the confluence point of the Yangtze and Han rivers

These projects are subsidised and funded by the govt., which is implemented under the direct and support of Ministry of Housing and Rural-Urban Development, Ministry of Finance and Ministry of Water Resources, Govt. of China.

Additional/ Further information: