SPONGE WATERTIGHT CITIES
TO EFFICIENTLY MANAGE AND RECYCLE RAIN WATER

by Kim Assaël

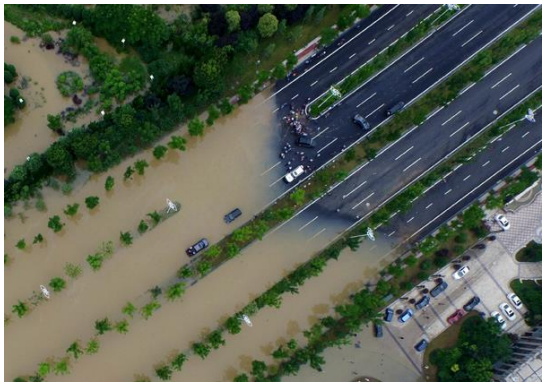
The China's central government planned the development of 16 *Sponge cities* to innovate old sewer system for draining rain water quickly and guiding it to collection facilities for recycling, with the aim to meet the target of 80% of urban areas collecting the 70% of the rainwater by 2030.

A"Sponge city" refers to a city where its urban underground water system operates like a sponge to absorb, store, leak and purify rainwater, and release it for reuse when necessary.

The Chinese government also encourages private investors to participate in the construction of the new sewer systems and asks financial institutions to provide support because it is an expensive project, even though the improvements can make financial sense in the long term.

Trillions of liters of water drop from the sky onto the world's cities each year. Heavy rain often results in floods in cities with outdated sewer systems and in a waste of a precious resource. With cities getting bigger and climate change threatening to bring more extreme weather, became urgent and evident the need to design new urban plans to efficiently manage and take advantage of rain waters.

Is this the context out of which the planning design of *Sponge cities* is arising, as a re-examination of the infrastructures of urban environment where almost every raindrop is captured, drained in a natural way, controlled and reused in urban planning. Essentially, the *Sponge city* during rainstorms allows surfaces throughout the city to absorb as much water as possible.



While in rural contexts the recovery of rain waters is part of the traditional knowledge of every village, contemporary cities are mostly impermeable systems that divert water into sewage drainages which often channel untreated water directly into local rivers. By regenerating and expanding its own freshwater eco-systems (rivers, lakes, urban wetlands, gardens, parks etc.) the Sponge city allows storm water to be absorbed by the soil, which also naturally purifies it and stores it as groundwater.

The World Resources Institute estimates that 21 million people worldwide are affected by river floods each year, a number that could rise to 54 million in 2030 due to climate change and socio-economic increasing development. Sponge

cities improves the capacity of the city to absorb water reducing the burden on urban sewage systems, mostly during extreme weather events. This will allow citizens to handle large amounts of water and also reuse rainwater during water scarcity.

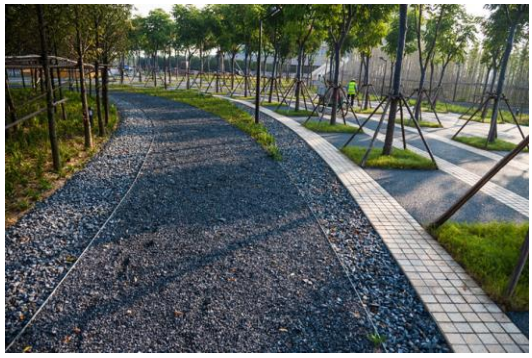
New sewer systems will drain rain water quickly and guide it to collection facilities. That water can either seeps into the soil to replenish the groundwater or be collected in underground cisterns for recycling. The collected water can be used as recharges of depleted aquifers or irrigation for gardens and urban farms. Some could replace the drinking water we use to flush toilets and clean homes. It could even be processed to make it clean enough to drink. The balmy gardens would reduce the tropical air temperature by around 1.3C nearby, reducing the energy needed to cool the buildings. By capturing storm water, beach pollution is also prevented. It enhances the community by increasing green space and improving infrastructure, and promotes sustainable low impact design.

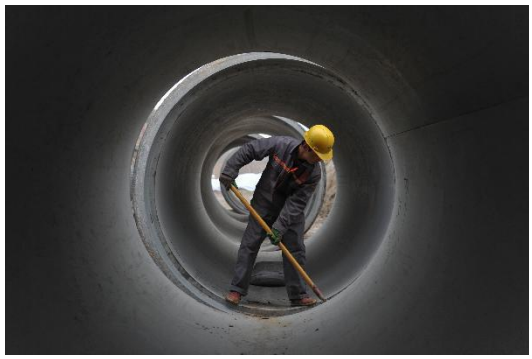
The China's central government has today the ambitious green infrastructure plan and the sponge cities innovative model can tackle the twin problem of rapid urbanisation, with 680 million urbanites, whose concrete landscape was not built adequately, and poor water management or scarcity. The designed infrastructure does reduce demand on costly drainage systems.

This innovative model designed for large cities, is being already applied today in particular experiences of many neighbourhoods in cities of different countries, demonstrating its relevance and effectiveness. In Chelsea, neighbourhood of New York, rather than drain into the sewage system, the project functions as a bioswale, diverting rainwater into the ground without overflowing the wastewater treatment plants. In Los Angeles a park-like facility will capture storm water, treat it to remove pollutants and then recharge the city's groundwater, making liters of water available to pump them out in case of droughts periods. In London, as in many other big cities, rooftop gardens are used to capture water in dense urban areas.

In China the sponge city's criteria inspired the construction of the new urban districts of Qunli Town, in Northern China, with a size of 2,733 ha. The storm water park cleanses and stores urban storm water, recharges the aquifer, protects native habitats and also offers recreational and aesthetic experiences. It can filtrate up to 500,000 m3 of storm water annually and has successfully solved the recent storm water inundation problems for an area of 3 km2 (10 times the area of the park), filtrating the storm water by a bio-swales system.

The new model of *Sponge Cities*, sustained by the Government, also represents a new paradigm of urban planning that promotes the participation of local governments, environmental groups, the private sector and citizens in the management of a strategic resource such as water, improving the urban context and its green spaces, its aesthetic value, traditional knowledge and social life.





To know more

[Chinawaterrisk.org website]

[6 Priorities for sponge cities in power to the people website]

[Article in changde.gov.cn website]

[Article in eenews.net]

[Article in chinadaily.com]

[Article in theguardian.com]

[Word Resources Institute website]

[Article in greenearthops.com]

[Article in engineeringnaturesway.co.uk]

[Article in caggregate.com]

[Article in ahbelab.com]

[Article in landscape institute website]