City Water Stories:
Kunshan

the international water association

Population
- 750,074 in 2000
- Growth at +9.92 %/year between the years 2000-2010

Geography
- Located in the in the Yangtze River Delta
- Total water area covers 23% of the city
- 62 rivers/canals and 41 lakes
- Area: 927.7km^2

Main challenge
- Low-lying city with increasing populations
- Growing concern for water quality and security

Main solution
- City as a water supply catchment; minimising stormwater discharge, reducing urban pollution, and mitigating flood risks

A City Built on Water

Just 50km outside of Shanghai, the city of Kunshan is bursting with water. With over forty lakes and one thousand kilometres of canals and waterways in total, water defines the urban fabric of this beautiful city, which is home to the most famous ancient water town in China "Zhou Zhuang."

Due to the city's low-lying nature, Kunshan has adapted to the risk of frequent inundation through adopting a polder landscape; a low-lying tract of land enclosed by dikes with connection to waterways through gates and pumps.

Climate change will likely increase the fragility of Kunshan in regards to stormwater management within the polder system. In addition, the water quality in the extensive network of constructed canals is degrading due to a combination of catchment pollution, poor circulation and rapid urbanization, even though the vast majority of its wastewater is collected and treated.

The City Water Group centrally manages water supply with 30-40% of local supply from lakes and the rest coming from the Yangtze River, which is obtained at a high energy cost due to pumping.

The Sponge City Vision

Kunshan's overarching strategy is to develop into a sponge city, through managing stormwater pollution at source and harvesting it as a resource for non-potable use to transform the city into a water supply catchment. This concept is coupled with polder-wide recirculation of canal water through precinct-scale wetlands nested within open space to maintain the water quality. This city-wide strategy is important, not only to reduce the urban pollution in regional waterways, but also to mitigate flood risks for downstream cities, and to ensure safe water supply in the context of population and urban growth by reducing the level of dependency on external source.

Natural drainage systems in urban areas filter and recycle the water and ensure peak flows are detained and safely conveyed to waterways. This concept is applied at small and large scales, with multifunctional areas combining blue, green and grey infrastructure as integral parts of the urban ecosystem.

Kunshan delivers cross-sectoral government-wide responses, involving the public and private sectors to capture all the opportunities to protect and enhance its canals and waterways, and to progressively transform the city both structurally and institutionally into a water-wise city.

Case Study: Kunshan Culture Plaza Wetland

In the Kunshan Culture & Arts precinct, water sensitive design is being implemented through constructed wetlands integrated into the public landscape by a multi-disciplinary project team. The system shows the effectiveness of wetland based recirculation for maintaining clean water, and demonstrates how public open space can provide ecosystem services beyond traditional amenity values in the urban environment.

中国昆山
Kunshan China

Kunshan's Journey to Become a Water-Wise City

A closer look at how Kunshan is satisfying the IWA Principles for Water-Wise Cities

1 Regenerative Water Services

Replenish Waterbodies & their Ecosystems

✓ Natural drainage systems and green infrastructure.

Reduce the Amount of Water & Energy Used

Reuse, Recover, Recycle

✓ Stormwater harvesting and reuse & self-contained projects across the city.

Apply a Systemic Approach for Integration with Other Urban Services

✓ Polders as a water supply catchment to reduce the water exporting from Yangtze therefore reducing energy.

Increase the Modularity of Systems and Ensure Multiple Options

✓ Natural drainage systems and wetlands.

2 Water Sensitive Urban Design

Enable Regenerative Water Services

✓ Multifunctional urban and public spaces with green infrastructure.

Design Urban Spaces to Reduce Flood Risks

✓ Managing stormwater flows – turning the city into a catchment.

✓ Biofilters to reduce peak flow.

Enhance Liveability with Visible Water

✓ Canals and urban water around the city, as well as green infrastructure.

Modify & Adapt Urban Materials to Minimise Environmental Impact

✓ Biofilters to treat elevated highway stormwater runoff to reduce pollution in waterways.

3 Basin Connected Cities

Plan to Secure Water Resources & Mitigate Drought

✓ Reuse projects for non-potable use.

Protect the Quality of Water Resources

✓ New treatment processes and natural drainage to treat the water.

✓ Self-contained stormwater treatment projects.

Prepare for Extreme Events

✓ Mitigate flood risks for downstream cities in the same basin given the uncertainty imposed by future climate change impacts.

4 Water-Wise Communities

Empowered Citizens

✓ Social research to understand community perception and willingness to pay towards green infrastructure.

Professionals Aware of Water Co-Benefits

✓ A strong multi-disciplinary team established with planners architects, landscape designers, ecologists and engineers.

Transdisciplinary Planning Teams

✓ Involving public and private sectors.

Policy Makers Enabling Water-Wise Action

Leaders that Engage and Engender Trust

✓ A shared Sponge City vision binding leaders to deliver a coordinated effort

5 Building Blocks for Kunshan on the journey to water-wise cities

Vision

Kunshan will deliver government wide responses, involve public and private sectors to protect and enhance its canals and waterways, and progressively transform into a water-wise city.

Governance

Kunshan Sponge City Committee

Knowledge & Capacity

Capacity Building and Training by CRC for Water Sensitive Cities

Planning Tools

Land development parcels comply with sponge city requirements will be given 15-20 RMB per m2 as incentive

Implementation Tools

Urban wetlands, natural drainage and infrastructure.