

A Way to Overcome Urban Water Crisis and Creating Livable Cities

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Urban Growth

Facing the global climate change, an increasing world population and the urgent need for protection of our natural resources, the topic of water and environmental protection gets top on the agenda. As Economic growth in Asian cities has drawn residents from the countryside into major cities creating an accelerated wave of urbanization, growing environmental threats and widening social inequality emerging from this massive development.

Threatening of Natural Resources

Though the Asia is still in stages of economic growth, managing water sources, controlling water pollution and ensuring a safe supply of drinking water are critical challenges for major Cities in Asia today as it seeks to balance its continued economic growth and sustainable development.

Between drought and rampant pollution, clean water is becoming increasingly scarce in some regions. Many regions are currently faced with a major problem of seasonal and regional water shortages, frequent drought, flood and waterlogging hazards.

Recent flooding in Beijing and Tianjin has proved that there is an extreme strong need for increased resilience of Cities.

Within many Urban Areas the shortage of water has also caused a switch from wetland to dryland and has rendered industrial production liable to interruption and seasonal suspension. However, over the years overpumping of ground-water supplies has caused a significant lowering of the water-table with adverse repercussions, including land subsidence.

Constrained by inadequate water supplies, many city governments are facing new challenges and recognize their responsibility of creating a new urban legacy of reducing pollution, recycling water and promoting more aggressive treatment of wastewater.

Some cities are not only short of water, they also have to struggle with most polluted or overexploited underground water. Groundwater quality has worsened over the years. Wastewater, often untreated, is often dumped into rivers and open channels. The immediate impacts of the rapid developments have included: heavily polluted waterways

due to the untreated wastewater discharged and the canal silted up with highly contaminated sediments, containing heavy metals and Persistent Organic Pollutants (POPs).

Need of a Mind Shift

Current developments are focusing on functional and operational aspects of the municipal infrastructure, with ongoing concreting and canalizing of the waterways which highlighting further a separation between the natural and built environment in many Asian cities. For example, on specific development efforts, urban designers and landscape architects have been charged with beautification of the riverbanks without an ability to consider a broader, municipal network of rivers and their respective impact on natural and urban settings. The result has been a limited improvement of the water cleansing infrastructure and a departure from an ecological approach to soil, water and adapted vegetation.

While national politicians and municipal governments are acknowledging a need for ecologically sensitive urban development strategies and shifting to comprehensive water-resource management approaches in their governance, or the rapid urbanization remains an ever-present threat to a livability of cities.

Urban Environment and Need for Ecology

Due to the separation between the natural water and green systems and the urban pattern of the city and the rapid urbanization coupled with an immediate stormwater run-off in a pipe system, the urban agglomerations are becoming increasingly dry. A disconnect between the functional solutions of water engineering and the aesthetic approach to urban and landscape design describes the core problem of recent urban developments.

The urban structures of cities are often dissociated from the organization of hydrology and natural systems, impeding the visual and spatial logic of urban watersheds.

A needed important approach to overcome this would be the interaction of water with the natural environment connecting to the urban pattern that could achieve a viable long-term situation.

Green Systems, Parks, Rivers, Green Corridors have to play a much more important role than just being decoration for streets and Buildings. Embedded in an overall Network, Green and Blue can play an essential role to protect, maintain natural urban systems and improve the live quality for citizens. We have to overcome old habits and attitudes of “buildings first and open space as green, blue and hard surface afterwards as just space in between”. City patterns have to be seen in the future as a functional system where just the surface is visible in our everyday life, but the invisible part supports our live with ensuring resources for the future needs.

Mayor landscape gestures in cities like forests, natural parks, rivers and urban green are important elements of a city and have to be defined very early in the beginning as the

main arteries and faces of the cities.

Concept of the Eco City District, Decentralization and Adaptation

Along with the rapid development, the total area covered by impermeable surfaces in cities has increased dramatically. During the heavy rain events, stormwater runoff results in overloaded rivers and raised dam structures safeguarding the cities from flooding.

In this situation, decentralized concepts are needed to improve the performance of cities with our natural resources and improvements can be applied on a city district level.

There are ecological benchmarks for Eco City Districts to achieve likewise decentralized water management and reuse, improvement for outdoor comfort, optimization of green volume, evaporation and introduction of natural elements to increase biodiversity. Some international benchmarking systems like DGNB are taking that already into account and developed rating systems for Eco City Districts.

Additionally, even resource protective infrastructure will get a key topic in order to increase the performance. The topic of social-cultural qualities of open space plays a role in the sustainable concept for city districts. It is a common sense that the hard factors of engineering even in an ecological way might not lead to a lasting success without bringing the soft factors of human life and activities in relationship to those urban concepts.

Smart Urban Solutions with Integrated Water Concepts

The integration of sensitive water concepts into our cities is essential to meet the future needs of smarter infrastructures.

Some cities like Singapore or Tianjin have shown progress on water conservation. Since 2005, our team has been involved in variety of projects in those areas embracing a renewed approach to planning and designing of a water sensitive urban development. Coping with imperil environmental conditions, our goal has been to always think beyond the actual task and consider every project, often not smaller than 250ha, as a puzzle piece of a larger system. We believe that every project has to contribute beneficially to a greater system in scale and approach while retaining local sensibilities for people and the environment. However, to conceptualizing solutions from a master plan level to an implementation effort, urged us to embrace and adapt to the local culture and considerations for active and passive use of open space and waterscapes.

Human Experience in Cities

Developing human-scale ecological solutions respecting cultural and social fabric of the city is a key driver for our thinking. Public open space, such as parks, river corridors or other urban spaces, they have to fulfill more and more essential functions for providing lively experience for people. This could be offered in multifunctional places where citizens express themselves in many various ways and perform different activities. Individualization of the society is increasing and therefore spaces in cities have to be

multicultural and multifunctional. Bringing nature and biodiversity back to our cities offers the opportunity to get people in touch with native plants and urban wildlife. This starts to educate citizens to understand the value nature is offering us, and strengthen their awareness of the quality and sensitiveness of natural processes.

We are realizing often in our projects that socially activities, for example in newly established healthy water landscape environment is a thrilling enjoyment for all levels of the society. Open spaces have to create memories for all generations allowing them access to clean water and green spaces with biodiversity.

Steps Forward

The projects (such as Singapore Bishan-Ang Mo Kio Park and Kallang River Restoration) of Atelier Dreiseitl demonstrate recent achievements in Asia attempt to address water crises. With 20 % of the world's population and only 7% of global water resources, China has a severe regional water imbalance, with about four-fifths of the water supply in the south. There is no doubt that Tianjin is also facing a major challenge in managing its scarce water resources to sustain economic growth in the years ahead. The government continues to plan and carry out widespread reforms to tackle the water crisis. The Atelier Dreiseitl team has worked alongside its planners and designers to address the region's technical water resource issues as well as social issues of the region creating a new water infrastructure that will benefit future generations. Collaboration with the client, urban ecological, technical infrastructure and healthy urban environment for citizens have been a hallmark of our work in Tianjin and Singapore while the cities desperately attempts to meet the spike in demand for water.

If present trends of water shortage, water pollution and an ever decreased supply of safe drinking water are not reversed, the World Bank forecasts that by 2020 there will be 30 million environmental refugees only in China due to water stress. There is hope that governance of cities, with respect to increasing implementation of ecological urbanism, will get eased and those methods hopefully state of art in the future. Climate adaptation, specifically water focus, has to be on the agenda while we are looking not only on the fast developing countries in Asia. Cities with rich history have to struggle with Heat Island effect and flooding events, their livability depend on smart adaptations, where open space plays a key role to mitigate those effects.

The Role of Landscape Architecture

Our profession has certainly changed the traditional role putting the topic of interdisciplinary working style for smart urban inventions in big and small scale high on the agenda. Coping with engineer driven infrastructure and contributing in the planning process with sufficient input will be crucial to integrate soft factors into hard infrastructure of new and old cities. The core field to create beautiful, atmospheric, people-friendly urban environments will be still the key to raise people's excitement for city spaces with the goal to foster social stability in our extreme dense and fast growing cities. Landscape Architecture will be crucial to humanize our cities and create warm and friendly

environments where residents can even find recreational space, which provides experience like holidays and strengthen communities and social bindings. Informal spaces to meet neighbors, encourage people for casual communication is important also complimentary to the privacy in people's homes.

To design green and blue networks and recreate these live arteries even in existing cities, it appears important to integrate rainwater which is kept on the surface where it can be seen and easily maintained. Furthermore, streetscapes and park spaces are multifunctional and to be integrated as functional elements into the water infrastructure. Park areas will be designed to receive water with all its dynamics and variability, such as lakes, bio swales, retention areas that could be used as play areas or sport fields, when dry and flood retention areas during heavy downpours. Park areas next to rivers are of special attention as those areas with the right design can bring people close to water and provide always special destinations with wide views to the city skylines. Respectively they can accommodate flooding events and be defined as a new flood zones. The banks are being softly shaped and planted - a flourishing ecology will help rebalance the natural biology of the water in effort to cleanse itself. Accessible and restored ecological integrity of the river-canal can make it a community asset and a focal point for leisure and socializing.

Combined with the use of predominantly native plants, the blue-green network creates new habitats and landscapes for people and increase biodiversity.

Even streets are multifunctional, for traffic they can be shared space with a pedestrian feeling. They could also be used by neighbors children for play, walk and use it for any other kind of community activities. Simultaneously they could convey in heavy rain events stormwater and define flood paths to protect buildings.

Retention, purification, evaporation and infiltration must of course be integral elements in municipal water programs. As we know, Singapore is launching the "Active, Beautiful, Clean" Water program for the move of the city into a future with an improved performance for rainwater catchment but also as a design quality for the parks, plazas, streetscapes and waterways of Singapore. Integrating water in city design creates atmosphere, which is vital to our cities if they want to be unique, remarkable and contain a sense of home feel for the citizens. Helping cities and people on their journey to more livability in urban environment is the most adorable task for us in Landscape Architecture.

By contributing with simple clear solution to the complex organism of a modern city, we can regain the cities for people and can improve space in cities so that in the future humanity comes back and our next generation will benefit when children can experience nature again in our cities.