Effective Models of Resilient and Integrated Urban Water Management



Recommendations

Headline Recommendation

Implement an integrated approach to urban water management in line with the Habitat III New Urban Agenda, aiming at more adaptable and resilient infrastructure

Detailed Recommendations

- City and state/provincial leaders should embrace an integrated approach to urban water management, including a basin-wide perspective and coordinated approaches to green and grey water infrastructure, in line with the Habitat III New Urban Agenda.
- Design and deliver urban water and sanitation infrastructure and services which are adaptable to changing population and circumstances, such as decentralized systems.
- Support the New Urban Agenda's push to give "particular consideration to urban deltas, coastal areas and other environmentally sensitive areas", and "to integrating appropriate measures into sustainable urban and territorial planning and development."

Challenges

Challenge at the global scale. By 2050 the global urban population is projected to double to reach 7.3 billion people¹. The water needs in cities will grow from 15-20% of the global consumption to 30%, while the supply of freshwater resources remain unchanged. The unprecedented concentration of demand is already putting pressure on water resources and infrastructure particularly if the ambitious goal of universal access to safe drinking water and decent sanitation for all is to be met. Cities are significant sources of contamination of freshwater resources. Globally, 80% of wastewater – mostly originated from human settlements – is still discharged without proper treatment.²

Challenge to the most vulnerable regions. The fastest urbanization process is taking place in countries and regions with relatively scarce water resources.

Many cities are located at the crossroads of rivers and seas, which offers trade opportunities on one hand but makes them more vulnerable to water related disasters on the other. Floods, hurricanes, and droughts, which accounted for 74 percent of the economic losses recorded over the past 30 years (\$2.6 trillion of the total \$3.5 trillion), will increase in frequency and intensity. People living in urbanized deltas – about 500 million people – and people in monsoonal basins – about 1 billion people – are especially vulnerable.³

Competing economic interests. The rapid urbanization process is contributing to concentration of industries and services, driving economic growth. Concentration of population and economic assets leads to the growing competition for water and increased output of urban waste water. Decoupling the development of urban water supplies from waste water management puts additional pressure on the water resources, ultimately undermining the long term reliability of water supplies, and increases the challenges to the ecosystem services along the river basin or aquifer.

¹ UNDESA (2015) World Population Prospects: The 2015 Revision https://esa.un.org/unpd/wpp/publications/files/key_findings_wpp_2015.pdf

² UN-Water (2017) UN World Water Development Report, Wastewater: The Untapped Resource http://www.unesco.org/new/en/natural-sciences/environment/water/wwap/wwdr/2017-wastewater-the-untapped-resource/

³ World Bank (2014) Water Resources Management: Sector Results Profile http://www.worldbank.org/en/results/2013/04/15/water-resources-management-resultsprofile

Interlinkages of challenges and potential solutions. Water and wastewater utilities are the second- third largest energy consumers in cities, though wastewater could be an economically reasonable source for bringing urban water and wastewater management close to an energy neutral status.

Deadlock of traditional solutions. In sprawling mega cities the traditional model of centralized waste water management is no longer feasible. The infrastructure and investment needs of the traditional centralized systems may go beyond affordable limits.

Principles for approaching the problem

Effective models of integrated urban water management might take different forms, depending on the size of cities / settlements, stage of development, economic activities within, location, environment, traditions, etc.

Sustainable water management of settlements is considered an inseparable part of water resource management of the broader suburban areas, aquifers and river basins.

Integrated urban water management aims to help cities progress towards a circular economy, thus closing the loop of water resource circulation, and helps limit the discharge of liquid waste and the constantly growing need for additional water resources.

All interventions into the urban water management system must have the net effect of higher water efficiency with lower energy demand and a concomitantly decreased carbon budget.

Lack of reliable urban water infrastructure results in higher costs of water, lower quality control, and negative impact on public health.

Contributions of the Panel

To keep up with the rapidly growing urban demand and balancing the falling per capita availability, the HLPW has engaged the scientific and practitioner communities to further develop the most important principles for integrated urban water management. It has also taken note of the recommendations of the UN New Urban Agenda.

Findings and conclusions

Implement an integrated approach to urban water management in line with the Habitat III New Urban Agenda, aiming at more adaptable and resilient infrastructure.

- Access to safe water and sanitation by disadvantaged groups in urban communities should be secured. This should be part of maintaining technological and financial solvency at the level of the system. This recommendation can only be achieved if the value of water with all its aspects is embraced by the cities.
- **Involvement of all stakeholders.** The Panel recommends the establishment practice of involving of all major users and dischargers into the coordination mechanisms of water supply and waste water management.
- Integrated water sensitive urban design is recommended to be applied for designing and building infrastructure to boost capability to mitigate the impacts of climate change.
- The Panel recommends considering the combination of efficient treatment of urban waste water, recycling and re-use of water, with energy generation and use of by-products for urban agriculture.
- The Panel recommends improving the upgradability of basic urban water infrastructure, and improve its **capa-bility to adapt** to changes of population and expansion of city structures, as well as embracing new technologies.
- In the case of new or upgraded settlements, establishing **decentralised systems** using frugal solutions adjustable to the local demands is essential.
- Efficient maintenance: The efficient models allow for city managements to change certain elements and modules of a system, thus helping to keep the maintenance costs under control.
- Comprehensive environmental sustainability. The Panel supports the New Urban Agenda's push to give "particular consideration to urban deltas, coastal areas and other environmentally sensitive areas", and "to integrating appropriate measures into sustainable urban and territorial planning and development".
- The Panel stresses that resilient and integrated urban water management is a part of the relevant basin-wide coordination of using water resources. A proper combination of grey and green infrastructure at the basin level can significantly reduce costs of water infrastructure investment within the cities.
- The water-energy-carbon nexus is pivotal, as all interventions must have the net effect of higher water efficiency with lower energy demand and a concomitantly decreased carbon budget.