



The IWA Principles *for* Water Wise Cities

For Urban Stakeholders to Develop a Shared
Vision and Act towards Sustainable Urban Water
in Resilient and Liveable Cities

The IWA Principles for Water-Wise Cities assist leaders to develop and implement their vision for sustainable urban water, beyond equitable universal access to safe drinking water and sanitation. The Principles underlie resilient planning and design in cities. The ultimate goal of these Principles is to encourage collaborative action, underpinned by a shared vision, so that local governments, urban professionals, and individuals actively engage in addressing and finding solutions for managing all waters of the city, driven by three paradigm shifts:

1. RESOURCES ARE LIMITED: WE NEED TO DO MORE WITH LESS

With increasing numbers of people living in metropolitan areas, water, energy and materials need to be used carefully, reused and renewed.

2. CITY DENSIFICATION IS BOTH AN OPPORTUNITY FOR ECONOMIC GROWTH AND A THREAT TO LIVEABILITY

By 2030, over 6 billion people are expected to live in cities. More populated, denser cities will be required to provide more efficient services. Water is essential for the well-being of citizens, their safety and social inclusion in cities.

3. AN UNCERTAIN FUTURE UNDERLIES THE PLANNING OF OUR CITIES

Historical development pathways are often not appropriate to plan future water systems. Climate change and population growth are uncertainties. Planning these systems with increased modularity and reduced dependencies enable a better reactivity to unforeseen trends and events.

THIS IS A HUGE TASK. As water professionals, we are determined to inspire a new shared vision and implement the recently approved Sustainable Development Goals (SDG), and in particular SDG6¹ and SDG11², which are a bold call for the promotion of sustainable urban water management for safer, more inclusive and resilient cities. To achieve this we need to harness the power of collaboration with adapted governance, engagement of stakeholders and active citizen involvement.

The following Principles establish a framework for transitioning cities to address these paradigm shifts. Where existing and aging assets are in place, the Principles are to be applied at the pace of asset renewal, as dictated by wise asset management strategies. Where assets are to be built, applying the Principles opens opportunities for innovative systems which best address these paradigm shifts.

The Principles are structured along four increasing levels of action (each enabled by the next level), accompanied by five building blocks through which **the urban stakeholders can deliver sustainable urban water, becoming a water-wise community**, see Figure 1.





4 Levels of Action

1 Regenerative Water Services

- Replenish Waterbodies and their Ecosystems
- Reduce the Amount of Water and Energy Used
- Reuse, Recover, Recycle
- Use a Systemic Approach Integrated with Other Services
- Increase the Modularity of Systems and Ensure Multiple Options

2 Water Sensitive Urban Design

- Enable Regenerative Water Services
- Design Urban Spaces to Reduce Flood Risks
- Enhance Liveability with Visible Water
- Modify and Adapt Urban Materials to Minimise Environmental Impact

3 Basin Connected Cities

- Plan to Secure Water Resources and Mitigate Drought
- Protect the Quality of Water Resources
- Prepare for Extreme Events

4 Water-Wise Communities

- Empowered Citizens
- Professionals Aware of Water Co-benefits
- Transdisciplinary Planning Teams
- Policy Makers Enabling Water-Wise Action
- Leaders that Engage and Engender Trust

5 Building Blocks



Figure 1: The "Principles for Water-Wise Cities" Framework: four Levels of Action and five Building Blocks for urban stakeholders to deliver "Sustainable Urban Water" in their cities

Sustainable urban water is defined in this document as "all urban waters used and managed by water-wise communities in cities connected to their basins, built in a way that is sensitive to water issues so that short-term risks are minimised, resources are preserved, and liveability is increased through Water Sensitive Urban Design and Regenerative Water Services for all".

The Five Building Blocks to Deliver Sustainable Urban Water

VISION

- A shared vision moves stakeholders from defending solutions for their own specialties, to defining a set of common drivers for the greater benefit of the urban community.
- A shared vision is an essential prerequisite for ensuring the implementation of new policies and strategies.
- A **resilient city vision including water** enables people to work together at different scales and across disciplines. It supports the political will needed to invest in long-term measures. It provides consistency beyond political cycles.

GOVERNANCE

- Governance and institutions provide the framework for urban stakeholders to work together, breaking silos to integrate water in all urban services at the building, neighbourhood, metropolitan and catchment scales.
- Policies provide incentives for urban stakeholders to unlock the synergies across sectors, maximising the benefits of water to cities.

KNOWLEDGE AND CAPACITIES

- Implementing the sustainable urban water vision starts with the existing capacities and competencies of the different urban stakeholders.
- To fully realize the vision, increased capacities and competencies are needed, through sharing success stories from other cities, learning to work differently with new tools, pooling resources, and opening to other sectors' approaches and methods.

PLANNING TOOLS

- Asset management, master plans or decision support systems are the means for urban stakeholders to initiate action.
- These tools, developed and used by cross-sectoral teams, allow for assessing risks, identifying benefits and co-benefits of projects, defining levels of service, and ensuring ownership by stakeholders.

IMPLEMENTATION TOOLS

- Regulations³ create incentives. Based on quality assurance, equity, transparency, accountability and sound financing, they provide a solid frame for stakeholders to invest in sustainable urban water.
- Financial tools, linked to rigorous asset management plans, enable long lasting improved service levels with a well-maintained infrastructure.
- Financing tools, which value the ability of solutions to adapt to changes or recover from disasters, allow cities to adopt more efficient solutions and transition towards systems requiring smaller and more frequent investments.
- Integrated services, combined with shorter investment cycles and the valuing of co-benefits, bring new funding opportunities, providing options to overcome the lack of financial capacity for cities.
- Augmenting traditional financing and contracting models with innovative instruments involving private and public financing, including circular economy mechanisms, opens new funding opportunities which promote regenerative water services.

The Four Levels of Action:

The four levels of actions build on the **base principle** that all city-dwellers have access to safe drinking water and sanitation services, which requires planning, prioritization, monitoring and reporting of the human rights to water and sanitation⁴.

LEVEL 1 - REGENERATIVE WATER SERVICES FOR ALL

The main goal is to ensure public health and satisfy all current needs while protecting the quality and quantity of water resources for future generations by efficient production and use of water, energy and materials. Regenerative water services are underpinned by five principles. Embedding these principles in water and wastewater systems rehabilitation, extension or new development will ensure the resource is protected and not overused. It will create value from energy and resource recovery not only from water but also from other services, and will facilitate financing by generating new revenue whilst delivering broader economic, social and environmental benefits to the city:

1.1 REPLENISH waterbodies and their ecosystems within the basin by taking from or discharging to them only what can be given or absorbed by the natural environment. Reduce water intakes to match quantities that the natural environment is able to renew, and protect the quality of water sources from wastewater and urban run-off so that it is fit for ecosystems and for use with minimal treatment requirements.

1.2 REDUCE the amount of water and energy used. Minimise the amount of water used in accordance with storage capacities. Minimise the energy used in moving and treating urban waters, including rainwater.

1.3 REUSE and use diverse sources of water with treatment that matches the use, applying the "fit for purpose" water quality approach and Integrated Water Resources Management (IWRM⁵); **RECOVER** energy from water whether through heat, organic energy or hydraulic energy; **RECYCLE** and recognise the value of "upcycled" materials, such as nutrients or organic matter;

1.4 Use a **SYSTEMIC APPROACH** integrated with other urban services. Consider the different parts of a water system and other services such as waste or energy as a whole, to enable solutions that reduce and reuse while improving services costs efficiently.

1.5 INCREASE THE MODULARITY and ensure there are multiple resource, treatment, storage and conveyance options available throughout the system for ensuring service levels and resilience of urban water systems in the face of either gradual or sudden changes.

By applying the principles for regenerative services when adapting to population growth, or to the impacts of climate change, water services contribute to reducing the carbon footprint of cities and to rehabilitating their basins⁶.

LEVEL 2 - WATER SENSITIVE URBAN DESIGN

seeks the integration of urban planning with the management, protection and conservation of the total urban water cycle to produce urban environments that are 'sensitive' to water sustainability, resilience and liveability co-benefits. This second level of action includes four principles:

2.1 PLAN AND IMPLEMENT URBAN DESIGN ENABLING REGENERATIVE WATER SERVICES.

Design domestic and industrial precincts and buildings in ways that enables regenerative water services. This reduces the water, energy and carbon footprint of housing, contributing to its affordability through lower monthly bills. It also leads to cleaner waterways, benefiting ecosystems and people, while also improving social and urban amenities. It includes building green infrastructure to capture and treat stormwater for a range of co-benefits.

2.2 DESIGN URBAN SPACES TO REDUCE FLOOD RISKS.

Increase resilience to flood risks by developing urban drainage solutions, integrated with urban infrastructure design so that safe flooding spaces are provided and the city acts as a “sponge”, limiting surges and releasing rainwater as a resource. Plan vital infrastructure to enable quick disaster recovery.

2.3 ENHANCE LIVEABILITY WITH VISIBLE WATER from roadside green infrastructure to major blue-green corridors as opportunities for recreation, inclusive public space, economic development and transportation, creating multi-purpose spaces and infrastructure. Urban water services are essential for ensuring sustainable irrigation of parks and gardens, providing shade and mitigation of heat islands.

2.4 MODIFY AND ADAPT URBAN MATERIALS TO MINIMISE THEIR IMPACT ON WATER POLLUTION:

The urban materials of roofs, walls, surfaces, roads, and urban furniture ought to be carefully selected to prevent the release of pollutants when exposed to sun and rain.

LEVEL 3 - BASIN CONNECTED CITIES

The city is intrinsically connected and dependent on the basin it is part of, and which interacts with neighbouring basins. By proactively taking part in basin management, the city secures water, food and energy resources, reduces flood risk and enhances activities contributing to its economic health. This third level of action includes three principles:

3.1 SECURE THE WATER RESOURCE and plan for drought mitigation strategies by sharing the water resource with other users in the basin, namely agriculture, industry and energy sectors, and other cities who all contribute to the basin's and city's economy.

3.2 PROTECT THE QUALITY of the water resource together with the other basin stakeholders, to ensure high quality drinking water achieved with minimal treatment and energy requirements, and ecosystems services (e.g. forest catchment areas, wetlands).

3.3 PREPARE FOR EXTREME EVENTS, such as storms and heavy rains, by managing flow regimes in rivers, by maintaining adequate vegetation in the basin to minimise flash floods. Invest in coastal storm risks mitigation and flood warning systems.

LEVEL 4 - WATER-WISE COMMUNITIES

The implementation of the previous three sets of Principles requires a holistic approach and strong partnerships. This fourth level of action is about people building on their existing capacities to govern and plan; professionals becoming more “water-wise” in their area of expertise, so that they can integrate water across sectors, highlighting the co-benefits of integrated solutions to unlock investments. It is also about

people becoming “water-wise” in their behaviours as citizens. This level of action is where the transition starts; it is where each stakeholder realises the role they have to play to make a difference. It's about inspired people instigating five key actors of change into this “water-wise” transition:

4.1. CITIZENS involved in the sustainable urban water vision. Water-wise citizens can drive urban planning and design with their understanding of the risks (flooding, scarcity) and opportunities (resource recovery, reducing dependency on uncertain future resources, increased well-being). Water-wise citizens will also adapt their behaviour. They will develop their acceptance to solutions, enabling regenerative water services, and their willingness to pay for such services while mandating their officials to ensure affordability.

4.2. PROFESSIONALS WITH VARIOUS EXPERTISE (FINANCE, TECHNICAL, SOCIAL) who understand the co-benefits across urban sectors so that they may plan and implement the best solutions for urban dwellers and businesses. Synergies and dependencies exist between water and urban planning, architecture, landscaping, and energy, waste and transport services: water services require energy but conversely urban water can be used to produce energy locally; green urban space requires water that can be provided by collecting rainwater or reusing water from treated effluent to recycle nutrients in vegetated areas. Professionals, realising the market and non-market value of the co-benefits associated to an integrated urban agenda, will enable innovative sustainable solutions.

4.3. TRANSDISCIPLINARY PLANNING AND OPERATION TEAMS integrating water in city planning. All waters (freshwater supply, rain, rivers, seas and wastewater) are interconnected with each other and other urban systems (parks, roads, energy and waste) so that efficiencies and synergies arise from a coordinated approach. A city planning organisation recognising these inter-relations and bridging over existing individual departments is needed to enable urban professionals to implement sustainable urban water.

4.4. POLICY MAKERS enable the implementation of the Principles for regenerative water services, water sensitive urban design, and basin-connected cities. Water-wise policy makers establish policies and financing mechanisms (tariffs, partnerships, that are responsive and adaptive to future changes) to drive and enable sustainable urban water through incentivising and rewarding innovative solutions. They phase out the existing subsidies and tax advantages that are environmentally harmful. They monitor, evaluate and adjust the policies based on future needs as they change over time.

4.5. LEADERS provide the progressive vision and a governance structure to coordinate work at 4 scales (catchment, metro, neighbourhood and building) and across disciplines. The people governing at the national and local levels can enable sustainable urban water through coordination and integration, leveraging “effective and efficient governance enhancing trust and engagement”⁷.

Water-wise communities will use the building blocks to put the Principles into action. The progressive implementation of the Principles at three levels: 1/ regenerative water services for all, 2/ water sensitive cities, and 3/ basin connected cities, will strengthen each of the 5 key actors of change of the city's water-wise communities.

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REFERENCES

- ¹ SDG6 "Ensure availability and sustainable management of water and sanitation for all" –
More details on <https://sustainabledevelopment.un.org/sdg6>
- ² SDG11 "Make cities and human settlements inclusive, safe, resilient and sustainable" –
More details on <https://sustainabledevelopment.un.org/sdg11>
- ³ Refer to the Lisbon Charter
- ⁴ Refer to "IWA's manual of the Human Rights to Safe Drinking Water and Sanitation for Practitioners".
<http://www.iwapublishing.com/>
- ⁵ Integrated water Resources Management is a process which promotes the coordinated development and management of water, land and related resources in order to maximise economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.
- ⁶ Refer to Basin of the Future Charter (in drafting)
- ⁷ OECD Principles on Water Governance, 2015



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