

# Integrated Urban Water Management (IUWM): Toward Diversification and Sustainability



## Key messages

- The world's towns and cities are growing rapidly. Sustainable urban development means focusing on the relationships between water, energy, and land use, and diversifying sources of water to assure reliable supply.
- Integrated Urban Water Management (IUWM) provides a framework for planning, designing, and managing urban water systems. It is a flexible process that responds to change and enables stakeholders to predict the impacts of interventions.
- IUWM includes environmental, economic, social, technical, and political aspects of water management. It brings together fresh water, wastewater, storm water, and solid waste, and enables better management of water quantity and quality.
- IUWM calls for aligning urban development with basin management to ensure sustainable economic, social, and environmental relations along the urban–rural continuum.
- Developing, policies and strategies supported by financing strategies, technological developments, and tools for decision-making, in cooperation with both public and private sector partners, can facilitate putting IUWM into practice at all levels.
- Urban water planners will shift from being resource users to resource managers, change their consumption patterns, waste management, and planning to better balance resource flows to and from cities.
- IUWM projects require significant funding, but public agencies in many countries have limited ability to invest in infrastructure.
- Improving economic service efficiency and minimising water losses involves redesigning systems and changing consumer behaviour. This will need increased cooperation with the private sector.
- Developing 'eco-cities' will enable waste products to be used to meet energy and material needs.

## Moving to Integrated Urban Water Management

"Urban water management is now on the verge of a revolution in response to rapidly escalating urban demands for water, as well as the need to make urban water systems more resilient to climate change. Growing competition, conflicts, shortages, waste and degradation of water resources make it imperative to rethink conventional concepts – to shift from an approach that attempts to manage different aspects of the urban water cycle in isolation to an integrated approach supported by all stakeholders."

Dr Mohamed Ait Kadi, Chair, GWP Technical Committee

### ▷ Why we need IUWM

The world's population has reached 7 billion and more people now live in cities than in rural areas. Rapid urbanisation, inadequate public services, and out-of-date urban planning models have marginalised vast numbers of new arrivals crowded into informal settlements or slums, exacerbating inequality and urban poverty and compromising efforts to increase water security.

Today, major cities face many daunting challenges, but water management is one of the most serious. Potable water is scarce, many sources of water must be treated at high cost and volumes of wastewater are growing.

In many parts of the world, city dwellers lack safe drinking water and fall ill with waterborne diseases. As cities seek new sources of water upstream and discharge their effluent downstream, surrounding communities suffer and the hydrological cycle and aquatic systems, including vital ecosystem services, are disrupted. This situation is set to worsen as cities grow.

### ▷ The climate challenge

Urban development is only now becoming part of the international discussion on climate change policy. Cities are beginning to devise adaptation and mitigation strategies. They are recognising that fresh water will be among the systems most affected by climate change and they are beginning to devise strategies to improve the resilience of their water sectors.

Climate change will mean warmer temperatures, more frequent heatwaves, and increasing areas affected by droughts and floods. Some regions will see intense tropical cyclones and coastal areas will face rising sea levels. Low-lying coastal zones only account for 2 percent of the world's total land area, yet they are home to over 13 percent of the world's urban population.

Climate change will impact water supply and sanitation. It will increase flood damage and water treatment requirements, and it will reduce water availability and operational capacity.

To prepare for climate change planners must view urban water management alongside the built-up environment, pollution control policies, and solid waste and storm-water management.

### ▷ What is IUWM?

Integrated Urban Water Management (IUWM) calls for the alignment of urban development and basin management to achieve sustainable economic, social, and environmental goals. It brings together water supply, sanitation, storm- and wastewater management and integrates these with land use planning and economic development.

An IUWM approach integrates planning for the water sector with other urban sectors, such as land, housing, energy, and transport to avoid fragmentation and duplication in policy- and decision-making. Cross-sector relationships are strengthened through a common working culture, collective goals and benefits are better articulated, and differences in power and resources can be negotiated. It includes the urban informal sector and marginalised communities.

IUWM principles:

- Encompass alternative water sources;
- Match water quality with water use;
- Integrate water storage, distribution, treatment, recycling, and disposal;
- Protect, conserve and exploit water resources at their source;
- Account for non-urban users;
- Recognise and seek to align formal and informal institutions and practices;
- Recognise relationships among water, land use, and energy;



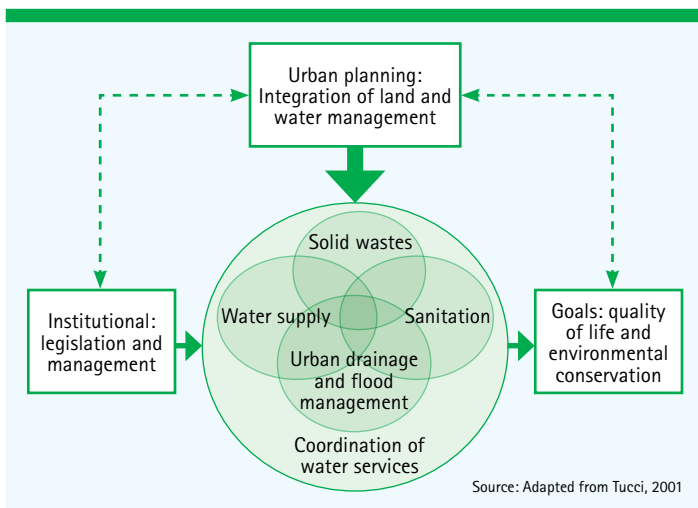
- Pursue efficiency, equity and sustainability;
- Encourage participation by all stakeholders.

The IUWM approach begins with clear national policies on integrated water resources management, backed by effective legislation to guide local authorities. A successful approach requires engaging local communities to solve the problems of water management. Collaborative approaches should involve all stakeholders in setting priorities, taking action, and assuming responsibility.

IUWM assesses both water quantity and quality, estimates future demand, anticipates the impacts of climate change, and recognises the importance of efficiency, without which water operations cannot be sustainable. It also recognises that different water sources can be used for different purposes – fresh water and desalinated water for domestic use; and treated wastewater for agriculture, industry, and the environment. With new desalination technologies, saltwater may become an accessible water source.

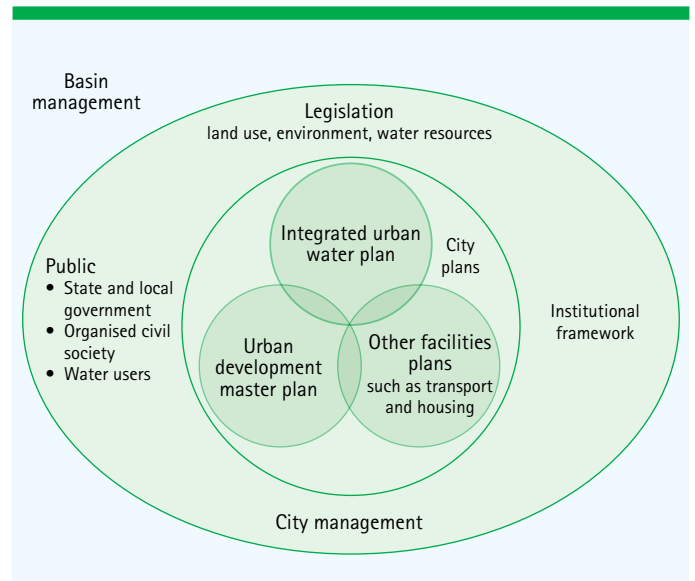
IUWM requires the development of planning and management for all components of urban water services. Figure 1 illustrates the coordinating structure that will ensure communication between departments, levels of government, local communities, and stakeholders.

Figure 1



Urban planners can help governments overcome fragmented public policy and decision-making by linking planning with other policy sectors like infrastructure, and adopting collaborative approaches that involve all stakeholders in determining priorities, actions, and responsibilities – see Figure 2.

Figure 2



This may involve new ways of coordinating different agencies and controlling water use, such as new regulators to enforce standards and procedures. Integrated urban water policies based on participatory governance can secure sustainable development, but changes will be necessary to stimulate innovation, efficiency, and sustainability.

One constraint in adopting IUWM will be transforming entrenched institutional practice in large cities. Thus the greatest opportunities to achieve results may lie with small and medium-size cities of fewer than 500,000 inhabitants. Instilling a different approach to resource management in the governance of these cities is possible.

### ▶ The economics of IUWM

Under IUWM, water prices and allocations reflect the costs of developing and delivering water supplies and maintaining the system. Price signals the true value of water. Accurate pricing will encourage all users to manage water wisely, consistent with an integrated urban water management strategy.

Differential tariffs that account for water quality can incentivise all users to reduce surface water or groundwater consumption in favour of reclaimed water for example.

Tariffs, taxes, and subsidies can be used to distribute benefits fairly without diminishing the productivity of water resources. But if tariffs are set too low so they favour poor users and then cannot support effective operations and maintenance, the system may inadvertently contribute to greater inequality.



Pricing instruments can be designed so users pay more for higher levels of consumption or quality. Financial incentives like rebates, subsidised retrofits, water audits, and seasonal and zone pricing can also be used. Schemes under the 'polluter pays' principle, in which charges relate to the effluent that users generate, can improve the cost-effectiveness of treatment and reuse. They can even fund the construction of new infrastructure.

But IUWM projects require significant levels of funding for both capital and operation and maintenance costs. For countries with limited ability to invest in water infrastructure, appropriate policies and well-functioning institutions are needed for fund-raising.

### ► Policy recommendations

Adopting IUWM and its iterative processes will help cities to significantly reduce the number of people without access to water and sanitation by providing water services of appropriate quantity and quality, and improving the health and productivity of urban residents. Governments should:

- Ensure their policies and strategies facilitate putting IUWM into practice at local and national levels,
- supported by financing strategies, technological developments, and tools for decision-making;
- Take on a more central role in cities and towns so as to lead development initiatives and ensure basic needs are met;
- Incorporate climate change predictions in planning urban water supply and sanitation and install and maintain, with the participation of a wide range of stakeholders, infrastructure and services that are 'climate-proof';
- Pay special attention to supporting the informal urban sector, vital for a sustainable urban economy;
- Overcome governance fragmentation in public policy and decision-making by linking planning with the activities of other sectors;
- Build staff and institutional capacity to engage in IUWM to ensure they deliver at an optimal level;
- Engineer tariffs, taxes, and subsidies to transfer benefits to vulnerable groups, and ensure pricing policy reflects true costs;
- Consider employing the 'polluter pays' principle to improve the cost-effectiveness of treatment and reuse.

The Global Water Partnership is an intergovernmental organisation of 13 Regional Water Partnerships, 84 Country Water Partnerships and more than 2,800 Partner Organisations in 169 countries. Our vision is a water secure world. Our mission is to support the sustainable development and management of water resources at all levels through Integrated Water Resources Management (IWRM). IWRM is a process that 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 and the environment.

Global Water Partnership  
Global Secretariat  
Drottninggatan 33  
SE-111 51 Stockholm  
Sweden  
[www.gwp.org](http://www.gwp.org), [www.gwptoolbox.org](http://www.gwptoolbox.org)

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