



Integrated Urban Water Management Plans

Integrated urban water management plans (IUWMP) are designed to pursue efficiency, equity, and sustainability in the management of urban water resources. IUWMP are an example of a mechanism implemented under an Integrated Urban Water Management (IUWM) approach that encompass all aspects of water management: environmental, economic, social, technical, and political. This Tool addresses what are the key principles and steps towards developing and implementing successful IUWMPs.

Why we need Integrated Urban Water Management (IUWM)?

Within urban areas, water is a crucial resource. Urbanisation has intensified the competition over water resources due to the increasing the number of commercial, residential, and industrial users. As a result, many cities worldwide suffer from the issue of water scarcity, with many lacking safe, potable water. Increased upstream resource extraction and downstream pollution not only have an adverse impact on the surrounding communities, but disrupt hydrological cycles, and degrade aquatic ecosystems. Vast amounts of food and consumer goods are imported into cities from non-urban regions, with large amounts of energy often produced elsewhere. The increasing water demand fueled by urbanisation therefore extends far beyond city-borders. As cities do not exist in isolation, there is a need for coordination in water resource management (e.g., basin, coastal, regional, national, etc.). Climate change is also expected to drastically impact future water availability through altering natural water cycles (e.g., variable rainfall patterns, increased floods, droughts, and storm surges, and sea-level-rise), placing additional strain on urban water infrastructures through increased flood damages and water treatment requirements, and reduced water availabilities and operational capacities.

Conventional, fragmented approaches to urban water management are therefore no longer adequate as they have failed (or are likely to fail) from the perspective of cost effectiveness, technical performance, social equity, and environmental sustainability. A system-wide paradigm shift is thus required, from the application of a traditional set of technologies towards the formation of a synergic urban-water relationship. Integrated Urban Water Management (IUWM) provides a framework for interventions over the entire water cycle which simultaneously advance the security of water resources, enhance the quality of life, optimise economic growth, maintain ecological balance, and improve the resilience of water systems (to climate change).

What is Integrated Urban Water Management (IUWM)?

The IUWM approach strives to achieve the sustainable and efficient management of urban water resources by aligning urban development and basin management in a manner which supports sustainable economic, social, and environmental goals. To do so, IUWM focuses on equally increasing water supply and restricting water demand. IUWM combines the management of water supply, storm water, sanitation, wastewater, and drinking water systems, thereby avoiding fragmentation and duplication in policy- and decision-making. IUWM approaches strengthen cross-sector relationships by balancing competing demands, identifying collective goals/benefits, and negotiating differences in power and resources, among water users (e.g., agriculture, energy, industry, household, and ecosystems). By applying IUWM, urban water planners can shift from being resource users to resource managers, and influence consumption patterns, waste management and planning as to better balance the resource flows to and from cities.

Main Principles of IUWM

Many governments are now recognising the importance of IUWM approaches in addressing key water challenges within cities. There has since been a growing consensus on the main principles of IUWM plans:

- Involving key stakeholders – at the planning, decision-making, implementation, monitoring, and evaluation stages is critical to the success of the IUWM plan. Encouraging participation of stakeholders is key to gaining their support, however this process should be structured clearly by outlining their roles and responsibilities within a legal framework.
- Closing the “water loop” – so that all links between water sources, supply, wastewater, and storm water are clearly understood and accurately translated into action. By incorporating upstream and downstream relationships into the water cycle, a more holistic vision of urban water systems can be achieved.
- Assessing all water sources – as to investigate water sources that are traditionally less visible or known. For example, ground water, rainwater, storm water, black water (i.e., wastewater), and grey water (i.e., wastewater that is not sewage, such as sink water and dishwasher discharge). It is important to identify all demand and supply sources of water within urban systems ([Tool C3.01](#); [Tool C3.02](#)).
- Identifying wastewater as a resource – can maximise benefits through employing innovative technologies to actively reclaim energy, biogas, and nutrients from wastewater. Recycling and reuse of water resources are central to improving water efficiency within urban areas.
- Designing adaptive mechanisms – can enhance resilience against uncertainty and changing conditions that are imposed by environmental disasters and global warming. Special attention should be given to integrated drought and flood management in IUWM plans ([Tool A3.06](#); [Tool A3.07](#)).
- Urban water partnerships – can be established by involving academic institutions, media, and advocacy groups as well as industrialists and commercial actors. IUWM plans require research and development for new water technologies, investments for water infrastructure, as well as the involvement of institutional actors to integrate principles of supply and demand efficiency in daily water usage. Changing consumer behaviour and redesigning systems will require increased cooperation with both public and private sector water services ([Tool B2.01](#); [Tool B2.02](#)).

- Low cost, high impact solutions – are needed to pursue efficiency and effectiveness of water resource solutions, especially within cities in developing countries. For example, the implementation of urban WASH programmes in India, Kenya, and Uganda demonstrates a means to provide affordable water supply and sanitation services.
- Community awareness campaigns – can help the adoption process through increasing the knowledge and awareness of the wider public on “good water practices” ([Tool C4.01](#); [Tool C4.02](#)). Engagement of the public and local communities in water-resource activities is key to educating its value and encouraging fund-raising for its protection.

Implementation Steps

Designing a structured IUWM plan process can more likely lead to positive economic, social, and environmental outcomes. When implementing IUWM plans, it is therefore advised to follow a 5-step process (adapted from [DHI, 2021](#)):

- Identify challenges. Potential barriers to implementation can be found in the areas of legislation and regulations; economics and finance; planning and collaboration; culture and capacity; and citizen engagement.
- Evaluate and communicate possible solutions. Explore all possible actions to determine the most efficient, cost-effective, sustainable strategy. Advocate the benefits to stakeholders, communicating the links between policy planning across sectors. This will entail asking stakeholders to define their priorities, actions, and accountabilities ([Tool C1.03](#)).
- Define appropriate tools. Various technical tools can be utilised to help manage all water systems in one place and prevent data gaps. For example, water data portals, rainfall tracking dashboards, or integrating water modelling platforms can serve in data dissemination ([Tool B4.01](#)).
- Implement strategy. Once the situation has been evaluated and the plan accepted and designed, it can now be implemented. It is important to identify who will be responsible for each stage of the implementation, and who, and how often its operation will be monitored.
- Assess and adapt. A set of sustainable indicators should be developed to evaluate and monitor the performance of the IUWM plan (i.e., compliance with standards, including water quality and economic performance) ([Tool B1.03](#); [Tool C1.03](#)). Indicators can be qualitative or quantitative in nature. Based on these findings, the IUWM plan can be adapted and improved.



Figure 1. Five-stage implementation model for IUWM. Source [DHI \(2021\)](#).

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