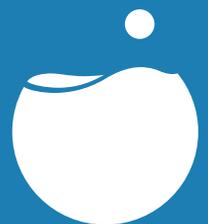


# WATER INFRASTRUCTURE AND INVESTMENT

A FRAMING NOTE FOR THE HIGH LEVEL PANEL ON WATER

Prepared by the World Water Council



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The World Water Council is an international multi-stakeholder platform organization, the founder and co-organizer of the World Water Forum. The World Water Council's mission is to mobilize action on critical water issues at all levels, including the highest decision-making level, by engaging people in debate and challenging conventional thinking. The World Water Council, headquartered in Marseille, France, was created in 1996. It brings together over 300 member organizations from more than 50 different countries.

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**Disclaimer**

This framing paper was prepared as an input to the High Level Panel on Water. The views and opinions expressed in this paper do not necessarily reflect the views of the High Level Panel or any of its members.

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## The challenge and its link to the SDGs

The infrastructure necessary to manage water resources and provide water services is of vital importance. Its benefits to humanity and to the natural aquatic environment that is our life support can be clearly demonstrated<sup>1</sup>.

Most of the SDGs will be imperilled without sound water management and adequate water supplies. **SDG 2** (zero hunger) will require substantial investment in the rehabilitation of surface irrigation systems, especially in Asia. **SDG 3** on good health and wellbeing relies heavily on universal access to clean water and the safe disposal of household wastes.

**SDGs 4** (quality education) **and 5** (gender equality) depend on access to safe, segregated toilets in schools, colleges, and working spaces that is an aim of **SDG 6**. **SDGs 7** (affordable and clean energy) and **8** (decent work and economic growth) imply sufficient water for hydropower generation and water for industrial processes and cooling thermal and nuclear power stations. **SDG 11** (sustainable cities and communities) rests on installing sustainable water supply, sanitation and wastewater services, without which the world's rapidly growing cities would become uninhabitable.

Despite its self-evident importance, investment in water infrastructure - in countries at all stages of development - is insufficient. In particular, large and multipurpose infrastructure for the most needy populations would not only secure water for multiple uses, it would bring jobs and provide a platform for social economic well-being. Not enough is being done to maintain and replace existing systems and structures, nor to prepare for the infrastructure for growing future requirements, in an era of growing climatic uncertainty.

<sup>1</sup> E.g. in Securing water, sustaining growth, the Report of the GWP/OECD Task Force on Water Security and Sustainable Growth. 2015

## Why has this situation arisen?

A number of interrelated factors are involved, including:

- Water is a neglected and marginalised sector of infrastructure, compared with others. Water does not enjoy great political support and has fewer “champions” than other sectors.
- Water infrastructure is capital-intensive and its development involves a lengthy planning and implementation cycle.
- Water charges are typically too low to cover on-going costs, hence operators rely on state budget subsidies. This makes water unattractive to commercial sources of finance and discourages private operators.
- Water infrastructure is costly, and its heavy funding needs are hard to meet from national financial sources.

However, financing opportunities are opening up. Long term finance for infrastructure has been more difficult to raise since 2008, and many countries continue to struggle with macroeconomic and fiscal pressures which constrain investment. At the same time, now is an excellent time to raise funding for infrastructure since borrowing costs are at historic lows. A growing chorus of influential voices are arguing in favour of government borrowing for infrastructure development: a globally coordinated effort of infrastructure investment would be a major boost to global growth<sup>2</sup>.

2 *Long term finance*. The World Bank's Global Financial Development Report 2015/2016.

## What will it cost?

SDG 6, specifically concerned with water, sanitation and hygiene, is likely to require a level of capital investment roughly three times the current level<sup>3</sup>. Once the new structures (pipes, pumps, wells, etc) are in place they will incur a higher level of recurrent operating and maintenance costs, posing a different kind of financing challenge. As 2030 approaches, the costs of operating the new infrastructure built will exceed the annual capital cost requirements to meet those remaining unserved.

In addition to the abovementioned costs of SDG 6 in upgrading and extending service coverage, some investment will be entailed in bulk water supply and treatment, and in overcoming the huge and growing deficit in wastewater collection and treatment. The latter, in particular, will be very costly<sup>4</sup>.

The costs of “water infrastructure” need to be assessed across the full water cycle, and for all its major uses. In addition to water supply, sanitation and wastewater services, there are sizeable investments to be made in management of water resources to ensure the continuing flow of bulk water for human use and essential ecosystems, for flood management, irrigation, hydropower, navigation, etc.

Some of these items are included in the widely quoted estimates by McKinsey & Co of the global investment cost of water infrastructure 2013-2030 which give a total of US\$11.7 trillion, or an annual average of US\$650 billion. This is of a similar size to estimates for power, smaller than for roads, and larger than for telecommunications<sup>5</sup>.

3 \$114 billion annually (Hutton & Varughese (2016) *The costs of meeting the 2030 Sustainable Development Goal Targets on drinking water, sanitation, and hygiene*. WSP & World Bank

4 Estimates by Lloyd Owen, cited in World Water Council/OECD (2015), are that the global annual cost of investment in sewerage and wastewater treatment will rise by \$40-52 billion in 2029, on top of the current level of c. \$83.5 billion.

5 Further details in World Water Council/OECD *Water: fit to finance?* (2015)

## Breaking down the challenge

Five major tasks can be identified:

- convincing national leaders that investment in water infrastructure is important, beneficial and timely;
- supporting governments in mobilising resources - planning, technical and financial - to implement such infrastructure;
- getting the right type of infrastructure in place (efficient, resilient, green, etc.)
- improving the financial viability of water infrastructure and services
- actively promoting new sources of funding

The above tasks will fall to different development partners, as appropriate for the challenge in question.

## Key interlinkages with other challenges that provide the greatest opportunities for impact

Policy-makers and practitioners in water are being urged increasingly to “think Out of the Box” and make linkages between water and other domains. Developing such linkages are essential in order to avoid conflicts over the use of an increasingly scarce resource. Trade-offs need to be managed, and synergies maximised.

More water infrastructure will have to be multi-purpose, and planned alongside other sectors (agriculture, power, industry, urban development etc) to achieve the best outcomes.

### Water quality, sanitation and health

The portion of the global population currently lacking access to clean water and safe sanitation largely overlaps with the poorest and most deprived members of society. Their lack of these services is a mark of their poverty and holds back their progress on other SDGs too. Success in providing universal clean water supply, safe sanitation and associated domestic hygiene to the standards set out in the SDGs would make a big impression on the economic opportunities, health and well-being of deprived populations, with disproportionate gains to the health and educational status of women and girls.

Targeting the poorest amongst the unserved population in the provision of water services and sanitation, and in campaigns to end open defecation, would have a direct and immediate impact on poverty alleviation. The safe collection, treatment and disposal of household wastes would eliminate health risks in large settlements. Actions to tackle water pollution from households, industrial effluent and untreated sewage would have major benefits to public health and the quality of urban life.

In the context of increasing competition and water conflict, water infrastructure should also aim to provide for smarter water use - appropriate water quality for appropriate uses should complement traditional water supply approaches.

## Resilient economies

A resilient economy is robust in the face of likely climate change and volatility, and able to cope with other shocks domestically or from abroad<sup>6</sup>. Water is the medium likely to be most affected by climate change; conversely, the present infrastructure of water is likely to contribute to climate change through its impact on greenhouse gas emissions, and in any case it is not well adapted to future climatic challenges.

Both new and existing infrastructure have to be designed or modified to be climate-resilient. The water-energy Nexus is important here - water is one of the largest use sectors of energy, while energy is a major user of water. To name just one specific area, water managers and service providers need to address their profligate and inefficient use of energy -

Water is an essential element of the Green Economy – the aspiration for a more sustainable system of production and consumption making less demands on finite resources and vulnerable habitats. For instance, the wider development of hydropower (e.g. in Africa, currently under-provisioned in this sector) will lessen dependence on fossil fuels for energy generation. Energy-efficiency, recycling treated wastewater and the reuse of nutrients and heat from wastewater are all potentially important contributions of water to the Green Economy. In this context there is great scope for innovation & the use of smart technology in seeking water solutions<sup>7</sup>.

Food security is a key aspect of the resilient economy. Whilst there is good potential for increasing productivity in rain-fed agriculture<sup>8</sup>, the major role for water infrastructure will be in upgraded surface irrigation systems. In Asia particularly, this will be critical for meeting the SDG Hunger Goal. The challenge is to produce more “crop per drop” since new irrigable land is scarce, and water for irrigation increasingly competes with the needs of urban areas and industry in water-scarce regions. Irrigation infrastructure will also need to be climate resilient, and capable of serving multiple purposes (apart from food production, fisheries, transport, flood management, etc.).

Certain types of industry are heavy users of water, for processing, cleaning, and in the content of their output. Water shortages interrupt output and prolonged drought can cause serious stoppages. Droughts also cause damage indirectly through their impact on hydropower and (through the supply of essential cooling water) thermal power generation. At the other climatic extreme, severe flooding causes havoc to industrial production, the repercussions of which are felt throughout international supply chains (e.g. from the Thailand floods in 2011).

Corporate businesses and their financial partners are taking an increasingly close interest in the various kinds of water risk they are exposed to, and have great potential influence on the water situation in areas where they operate.

6 Endogenous or exogenous shocks )

7 2030 Water Resources Group (2013): *Managing water use in scarce environments: a Catalogue of Case Studies*.

8 IWMI *Water for food, water for life* (2007)

## Human settlements

Urban living is a fact of life for over 60% of the world's population. The uncontrolled growth of major cities and the failure to keep up with clean water supply, sanitation and wastewater management is linked with serious depletion and pollution of water sources, posing problems for health & environment.

Future water development will increasingly have an “urban” complexion and urbanisation offers opportunities for water planners – economies of scale in water, sewerage and wastewater services, the possibility of recycling, scope for involving private businesses, potential for cross-subsidy from other urban services, synergies with other utilities, tapping into growing property values, etc.<sup>9</sup>

## Environmental services

Sound water resources management is a “win-win” for both the water sector and the natural environment. The proper protection and enhancement of catchments and wetlands, preservation of river flows, and the control of pollution benefits all water users and protects aquatic ecosystems vital to life-support.

There is growing interest in the protection and enhancement of “natural (green) infrastructure” as a complement to the development of “hard” structures in meeting the water needs of growing cities. It has been shown that various types of watershed conservation can have major beneficial impacts on sedimentation and nutrient pollution affecting 700 million people in 100 of the world's largest cities. Such conservation strategies can provide a positive return on investment for the city utilities concerned<sup>10</sup>.

In the same context, schemes of Payments for Ecosystem Services (and the Water Funds in several Latin American countries) enable financial transfers to be made from the downstream beneficiaries of upstream watershed conservation to farmers and other landholders engaged in conservation practices.

9 The UK Water Partnership (2015): *Future visions for water and cities: a Thought Piece*. Also, OECD (2015) *Water and cities: ensuring sustainable futures*.

10 The Nature Conservancy (TNC) *Urban water blueprint: mapping conservation solutions to the global water challenge*. 2014. The deal between New York City and landholders in the Catskill catchment area is one of the best known cases.

## Brief overview of current landscape in relation to the challenge – key actors & activities currently underway

A large number of organisations are actually, or potentially, involved in advancing the agenda sketched in this Note. Table 1 lists a small selection of them.

**Table 1. Key actors in shaping the global agenda for water infrastructure & investment**

<p><b>HIGH-LEVEL ADVOCACY &amp; CHAMPIONING OF WATER INVESTMENT</b></p> <p>Advocacy, research &amp; policy advice; stakeholder consultation &amp; engagement</p>	<p>World Water Council Global Water Partnership UN-Water OECD World Bank Global Water Practice World Economic Forum WBCSD Oxford University School of Geography &amp; Environment &amp; Environmental Change institute The Financial Times Leading multinational businesses</p>
<p><b>MOBILISING RESOURCES: GENERAL SUPPORT FOR PLANNING, FINANCING &amp; IMPLEMENTATION OF INVESTMENT IN WATER INFRASTRUCTURE</b></p> <p>Policy-oriented research &amp; evidence; capacity building; technical services; project implementation</p>	<p>International Finance Institutions (World Bank, AfDB, AsDB, IADB, CDB, AIIB, etc.) Leading private consultancies 2030 Water Resources Group International Water Resources Association FAO ICID UN-Habitat International Energy Agency US Army Corps of Engineers</p>
<p><b>WATER INFRASTRUCTURE IN RELATION TO WATER QUALITY, SANITATION AND HEALTH</b></p> <p>Design &amp; implementation of programmes &amp; policies to connect with target groups</p>	<p>World Bank Global Water Practice WHO &amp; UNICEF JMP Donor agencies (AFD, DFID, etc) Leading water NGOs (e.g. WaterAid, MSF, water.org., etc UN Habitat Major water companies Aquafed</p>

**WATER INFRASTRUCTURE IN  
RELATION TO RESILIENT ECONOMIES**

Applied research; technological development;  
policy advice

UNEP Green Economy programme  
OECD Cities Programme  
Korean Global Green Growth Institute  
WBCSD  
2030 Water Resources Group  
Grantham Research Institute of London  
School of Economics

**WATER INFRASTRUCTURE IN  
RELATION TO HUMAN SETTLEMENTS**

Policy development; applied research; advisory  
services; stakeholder engagement

UN Habitat  
World Water Council & Mayors

**WATER INFRASTRUCTURE &  
ENVIRONMENTAL SERVICES**

Research & evidence-gathering; sponsorship of  
projects

The Nature Conservancy  
IUCN  
Forest Trends

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# Most useful actions that need to be taken globally in the short, medium and long term; which stakeholders need to be engaged?

## Advocacy & policy messages

### Needs

More vigorous & convincing advocacy of investment in water infrastructure is required, plus identification of effective champions. This involves better & more active deployment of evidence of the social and economic benefits of water infrastructure and the risks from its neglect – leading to greater acknowledgement by national leaders that water is a key infrastructure category that deserves priority in planning, investment and financing.

Investors and businesses need to be involved to convince them of the risks posed by water insecurity to their operations, and what they can do about this – for their own benefit and for the sake of the communities they operate in. The refinement of tools and metrics to calibrate water risk is part of this task.

A convincing case needs to be made for investment in water infrastructure, not only for its own benefits but as a key part of macroeconomic strategy in a world of depressed demand and historically low interest rates for savers and borrowers.

### Short/medium term actions

Press for serious consideration (inc. discussion in G7, WEF, IMF Board, etc) of a coordinated global effort of investment in urgent water infrastructure projects, to implement and follow on from the adoption of the SDGs.

### Stakeholders

National Finance Ministers/Ministries: G7 & G20 leaders; IMF, WEF, World Water Council, GWP, WBCSD, Multinational companies, quality business and financial newspapers and periodicals, World Bank, Korean GGGI, OECD, academic research institutes.

## Mobilising resources for planning, financing & implementation

### Needs

Infrastructure planning needs to evolve to fit new requirements forced by climate change, greater planning constraints, scarcity and conflict over resources and other factors. A fuller understanding is needed that major water projects are typically of a multi-purpose nature that will need to be climate-resilient. This implies a more inclusive and eclectic approach to the planning of such projects

Large and multi-purpose projects typically need complex financing structures, calling for specialist teams. These are now rarely found in private banks, and international financing institutions have an important niche role to play here (e.g. World Bank's Singapore-based financial advisory group).

### Short/medium term actions

Regional high-level representative bodies (e.g. Africa's AMCOW, the Asia-Pacific Water Forum), supported by regional UN and IFI offices, make assessments of priorities for water infrastructure in their regions, and of the planning, technical and financial resources necessary to implement these. IFIs, donor agencies and other relevant funding bodies (e.g. Green Climate Fund) to respond to these assessments with their own plans.

### Stakeholders

National planning and economic Ministries; IFIs, promoting & anchoring large & MPI projects using skills & products; national infrastructure finance banks & agencies; the Green Climate Fund and other climate finance agencies

## Designing infrastructure Fit for Purpose

### Needs

This is a large agenda. It includes designing new infrastructure, and adapting existing assets, to make them climate-resilient. Water service providers need to be open to new business models, and accept state-of-the-art contracting and budgeting methods, and be responsive to evolving (including "smart") technologies. This will be particularly relevant to the spread of services to populations currently outside the scope of formal services. Water infrastructure needs to be more efficient, less wasteful, and more suited to the tasks in hand.

There is an important and promising agenda in tackling the constraints & opportunities of water in the context of rapid urbanisation. Promoting the synergies between water services and other services from urban infrastructure, such as housing, energy, transport, flood management, air quality, etc. with the aim of facilitating climate-resilient infrastructure development and tapping into the economic benefits from urban development. Existing regulatory and governance frameworks for water should be reviewed to encourage new service models, standards and technologies more appropriate to future challenges:

### Short/medium term actions

Organisation of regional Round Tables involving mayors and other urban planners, relevant professionals, and urban financing agencies and sources, to consider – with the aim of adopting – policies and modalities for dealing with the water needs of growing cities.

### Stakeholders

Mayors & local authorities involved in urban development; World Water Council, private water companies & progressive public utilities (especially those with innovative business models); water and energy regulators, OECD, UN Habitat

## Improving financial viability of water infrastructure

### Needs

An important reason why water infrastructure is under-funded is that it rarely satisfies criteria of financial viability required by commercial funding sources. Its cash flows typically do not enable it to service private equity or commercial debt. Solutions lie in measures to make water more efficient, less wasteful, more businesslike and ultimately more profitable. The aim would be to enable water services and projects to meet more of their financial needs from internal sources, and to facilitate access to commercial finance, including in some cases private equity. Success stories and examples of good practice should be widely publicised in the appropriate circles.

### Short/medium term actions

- Donor agencies and NGOs should sponsor challenge funds (similar to the DFID-backed Dreampipe project) for the promotion of greater efficiency in water services.
- Peer-to-peer missions should be organised and funded whereby practitioners from successful water companies and utilities offer advice and guidance to counterpart bodies. Funding would be available for programmes of implementation.

### Stakeholders

Aquafed, private water companies, companies and utilities from emerging market countries, IWRA, World Water Council, etc.

## Promoting newer sources of funding

### Needs

While more could be done to make effective use of existing “traditional” sources of infrastructure finance, there is both a need and an opportunity to attract newer sources, such as climate funding, Green Bonds, tapping urban land values, and, above all, institutional investors (pension and insurance funds) and Sovereign Wealth Funds.

### Short/medium term actions

Conversations need to be organised (by water/financial publications, World Water Council, IFC, Institute of International Finance or others) between representatives of leading institutional investment (II) funds and Sovereign Wealth Funds (SWFs), on the one hand, and national governments and practitioners from the water sector, on the other – with IFIs, OECD and other involved agencies also present. Their purpose would be to understand the policies and attitudes of institutional investors and SWFs and the obstacles they perceive in placing more funds into infrastructure such as water.

The aim of these conversations would be to increase the, currently tiny, proportion of II and SWF funds going to finance long term water infrastructure. The following (box 1) initiative has been developed to attract these and other types of investor into water infrastructure, and deserves further consideration and support.

### **Box 1. Regional water infrastructure financing model - the case of lower Jordan river master plan**

SIWI has developed a model aimed at financing an investment package totaling USD 4,6 bn to restore the Lower Jordan River (LJR). This has a potential to help the basin economy grow from USD 4 bn p. a. to USD 73 bn in 2050. The LJR Master Plan has been ratified by the three riparian governments, but political reasons, lack of government ability to fund and a region shunned by institutional investors present challenges to produce funds to finance the investment plan.

The proposed financing model is a Special Purpose Vehicle in the form of a private-equity style fund. The fund is operated by a professional fund manager, with the appearance of a conglomerate utility. The fund owns the assets, which makes for collateral, options for secondary markets and the best pricing of credit. The fund is divided into bundles or “compartments” that allow different financiers to partake in the fund.

The regional perspective used in the model attempts to turn the disadvantage of riparian nations disagreeing over rights to land, resources and security; since the investments are regional and the benefits generated cater to all states, the price of withdrawal becomes steep. Investment banks have indicated an interest to participate in the financing of the model. The model is conceivable in any transboundary basin, especially well suited where there are power imbalances among the riparians, since the perspective creates interdependencies with strong barriers to withdraw or exit.

*Source: SIWI*

### **Stakeholders**

Institutional investors, Sovereign Wealth Funds & other “patient investors”, IMF, World Bank & IFC, World Water Council, OECD, national Finance Ministers, national financial regulators, IIF, specialist publications (*Financial Times, Global Water Intelligence, Wall St Journal, Investors’ Chronical, etc.*)

A fuller description and justification of many of these proposals can be found in the Report of the High Level Panel on Financing Infrastructure for a Water-Secure World – “Water: fit to finance?” presented to the 7<sup>th</sup> World Water Forum, Korea, April 2015. This report also contains a full list of proposals addressed to each of the main groups of stakeholders.

## Definition of success – how the world would be different if the issues were properly addressed

The overwhelming majority of the world's population would have accessible clean water and safe disposal of household wastes.

Sustainable investment in large infrastructure for poor nations will create jobs, food security, energy security, protection from natural hazards, increase resilience and thus assure a key pillar for socio-economic growth.

Public rivers, canals & lakes would not be polluted by untreated sewage or industrial effluent

Water-related diseases and epidemics would be greatly reduced

Water would be part of the Green Economy through reduced leakage, greater energy efficiency, more exploitation of hydropower, recycling of wastewater, exploitation & reuse of heat & nutrients from wastewater, etc.

Greater food security from investment in rehabilitated and more efficient irrigation systems (more crop per drop)

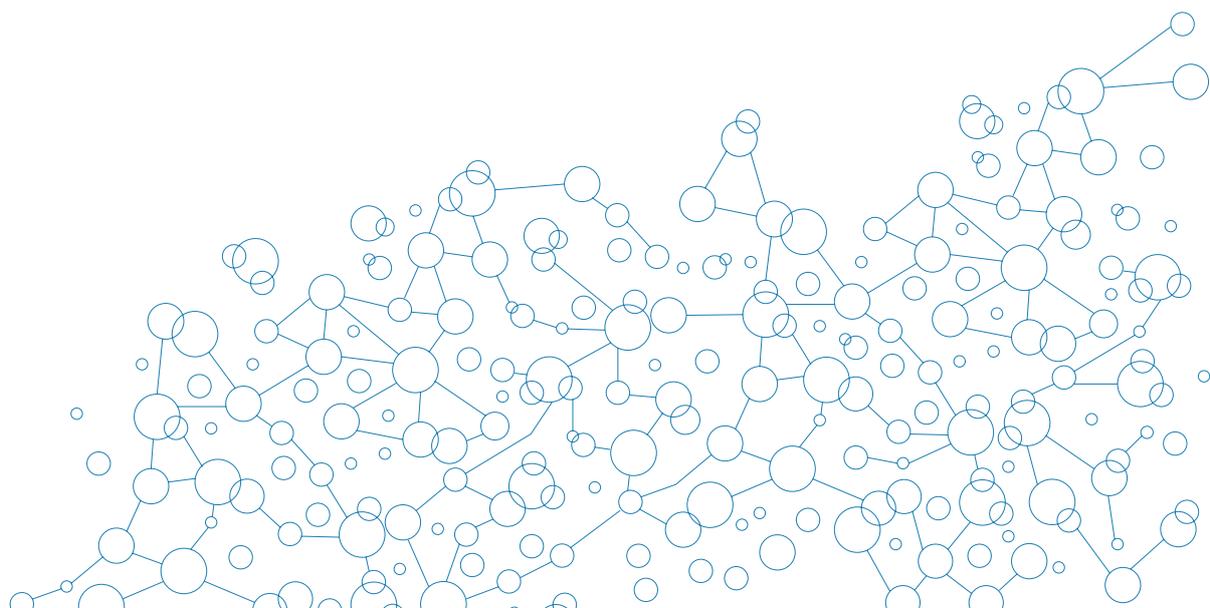
Better protection & resilience in face of climatic fluctuations & extreme events (flooding & drought). Less economic damage caused by latter.

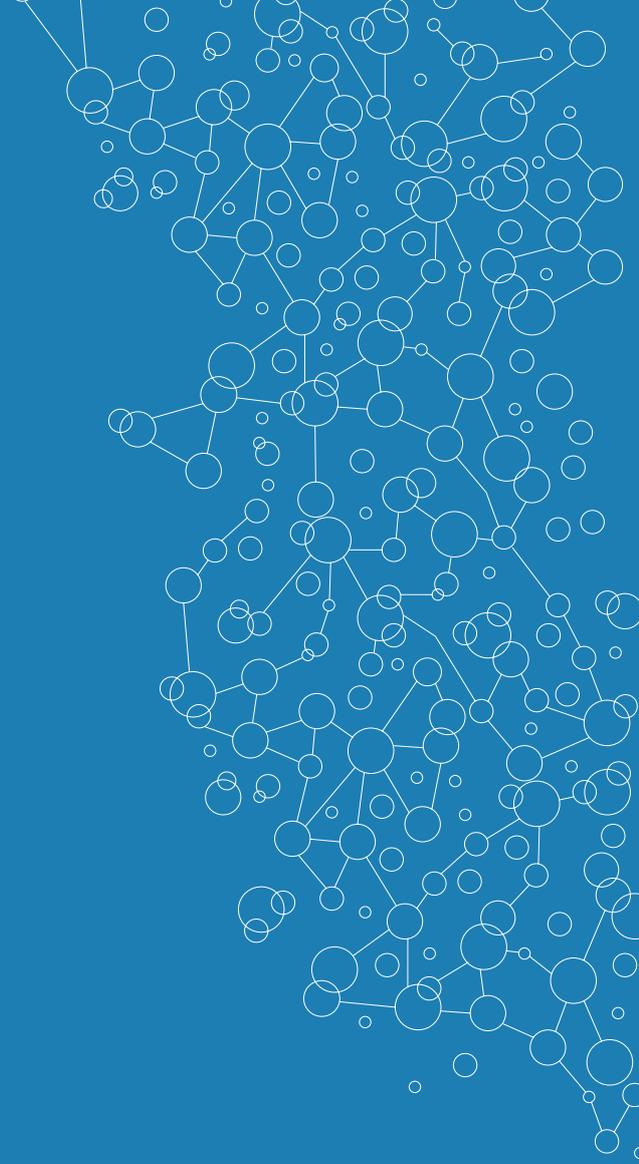
Wide acceptance of the value of water, in its different states and uses – informing behaviour of users, corporate practices, allocations of water between different use sectors. Would relieve local and regional tensions and conflicts over water

The supply of water services would become a more attractive business, able to recover its O&M costs from charges, and able to attract sufficient funding for new investment.

Water would become an interesting and attractive career choice for young and ambitious professionals; scientists and engineers would find water an interesting and profitable challenge in their work.







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