Financing water
Investing in sustainable growth
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Water flows as a prerequisite through every one of the Sustainable Development Goals (SDGs), especially those on food security, healthy lives, energy, sustainable cities, sustainable consumption and production, and marine and terrestrial ecosystems. SDG 6 specifically reflects the critical importance of water in its own right, ensuring availability and sustainable management of water and sanitation for all. There is also growing recognition of the crucial contribution of water-related investments to climate resilience and to delivering on the Paris Agreement. Beyond environmental concerns, sustainable and collaborative management of shared water resources also strengthens international peace and security.

Yet, according to the WHO and UNICEF, as recently as 2015, 2.1 billion people still lacked access to safely managed drinking water services and 4.5 billion lacked access to sanitation compatible with the objectives laid out in SDG 61. The Human Right to Water and Sanitation has been recognised by the United Nations General Assembly, but has yet to become a reality for a substantial share of the global population.

Achieving the SDGs, delivering on the Paris Agreement and making the Human Right to Water and Sanitation a reality will require a historic scaling up of investment into the development and management of water resources and water services. While there is a strong economic case for investment in water security, this does not always translate into a compelling financial case. Better reflecting the value of water can act as a driver for improved water management and stimulate further investment. Converting the benefits of investments into revenue streams can increase the risk-return profile of investments to attract financiers. Channelling available finance to projects that benefit people and the environment is a must. We need new courses of action that deliver on the ground.

“Financing Water: Investing in Sustainable Growth” sets out essential facts about the economic case for water-related investment and the financing gap. It charts a series of actions to better value water and ultimately facilitate investment at a scale commensurate with the commitments of the global community.
This Policy Paper helps support vital and global initiatives that are leading the way. The High Level Panel on Water (HLPW) - convened by the UN Secretary General and the President of the World Bank and comprising of 11 sitting Heads of State and Government – is charting a course to achieve SDG 6, including by scaling up financing. The perspective of the HLPW is global, acknowledging the investment gap and related market, policy and governance failures that occur in all parts of the world. Further emphasis should not only be on the mobilisation of additional financing, but also on ensuring that finance flows to investments which maximise benefits at least cost for society, today and in the future. The task goes beyond the water community alone: the efforts of urban planners, farmers, energy suppliers, and financiers will founder if they ignore water, as a resource, a potential hazard and an investment opportunity.

The Roundtable on Financing Water, established jointly in 2017 by the OECD, the World Water Council and the Netherlands, also provides an important forum to catalyse engagement with the water and finance communities with the aim of scaling up financing for water security and sustainable growth and to deepen and broaden awareness of the underpinning evidence base. We call on the Roundtable, as a platform open to a range of partners and stakeholders, to advance this agenda further and facilitate transition towards more and better targeted investments that contribute to water security and sustainable growth.

The Eighth World Water Forum in Brazil in March 2018 is one of the key milestones to deliver these powerful messages and engage with governments, international financing institutions, business and civil society organisations. Together, we must ensure that water is properly valued, and that financing supports investments in line with the global development agenda.

There is a compelling economic case for investment in water. The benefits from strategic investment in water security could exceed hundreds of billions of dollars annually. Recent analysis provides a partial estimate of the scale of global economic losses related to water insecurity: USD 260 billion per year from inadequate water supply and sanitation, USD 120 billion per year from urban property flood damages, and USD 94 billion per year of water insecurity to existing irrigators (Sadoff et al, 2015). Further, water-related losses in agriculture, health, income and property could result in a decline by as much as 6% of GDP by 2050 and lead to sustained negative growth in some regions of the world (World Bank, 2016a).

As of 2015, 2.1 billion people lacked access to safely managed drinking water services and 4.5 billion lacked access to sanitation compatible with the SDG6 objectives (WHO-UNICEF, 2017). Poor sanitation, water, and hygiene lead to about 675 000 premature deaths annually and estimated annual economic losses of up to 7% of GDP in some countries (World Bank, 2016b). Benefit-cost ratios for investments in water and sanitation services have been reported to be as high as 7 to 1 in developing countries (OECD, 2011).

The current economic climate, with low real interest rates in most countries, and abundance of capital globally provide a window of opportunity to scale up infrastructure investment. In many advanced economies, interest rates have been at or near historic lows, increasing the fiscal space available to governments (OECD, 2017a).
Investment needs largely outstrip current flows

To date, this strong economic case for water-related investment has failed to translate into a compelling financial case for investment at scale globally. Future investment needs are estimated to be significantly higher than current financing flows. For example, the present value of the additional investments needed until 2030 to achieve the Sustainable Development Goal of achieving universal and equitable access to safe and affordable drinking water for all is approximately 1.7 trillion USD (Hutton and Varughese, 2016). This is about three times the current investment levels. Moreover, this estimate represents only a fraction of the water agenda: projections of global financing needs for water infrastructure range from USD 6.7 trillion by 2030 to USD 22.6 trillion by 2050. These figures do not cover the development of water resources for irrigation or energy.

The gap between current financing and future needs results from a number of barriers:

- Water is generally an under-valued resource, not properly accounted for by investors that depend upon or affect its availability, such as land use planners, urban developers, farmers, or energy suppliers.
- Water services are often under-priced, resulting in a poor record of cost recovery for water investments.
- Water infrastructure is typically capital intensive, long-lived with high sunk costs. It calls for a high initial investment followed by a very long pay-back period.
- Water management generates a mix of public and private benefits in terms of valued goods and services as well as reduced water-related risks. Many of these benefits cannot be easily monetised, undermining potential revenue flows.
- Lack of appropriate analytical tools and data to assess complex water-related investments, and track record of such investments can deter financiers.
- Water projects are often too small and too context-specific. This raises transaction costs and makes emerging innovative financing models difficult to scale up.
- Financial flows may benefit projects which are bankable, but may not maximise benefits for communities and the environment. This raises the question of how to ensure that the most beneficial investments from a social welfare perspective attract finance at scale?
- Prevalent business models sometimes fail to support operation and maintenance efficiency, a condition to sustain service at least cost over time.

2. Notably, investment needs may be considerable higher in light of the new indicators of safely managed drinking water and sanitation services defined by the WHO/UNICEF JMP 2017 report on Progress on Drinking Water, Sanitation and Hygiene: 2017 update and SDG baselines.

3. For a compilation of estimates of investment needs, see: Winpenny J. (2015), Water: Fit to Finance?, World Water Council, OECD.

Valuing water and water security is particularly challenging. Water resources provide diverse benefits – from the economic value derived from productive uses for drinking water supply, industry and irrigation, to the ecological value for biodiversity to the option value of storing groundwater against future water shortages. The marginal value of water per unit across different uses and regions spans a very wide range. Water can have very different values depending on the type (e.g. surface, groundwater, reclaimed or desalinated water), quality, reliability and proximity to its use. Changes in policy and regulation can affect these values considerably. The Bellagio Principles on Valuing Water, developed under the aegis of the High Level Panel on Water, are a positive step towards better reflecting the value that water provides to the economy, society and the environment.

Valuing water means recognising and considering all the diverse benefits derived from improvements in water management in terms of valued goods and services, as well as reduced water-related risks.

It promotes efficiency and better practices by exposing the short and long-term costs of pollution, waste and misallocation. It creates opportunities for converting the benefits from investments in water management into revenue streams, potentially improving the financial case for investment.

A range of policy instruments are available to recover the costs of investment from those who benefit and provide a revenue stream for investors (e.g. tariffs for water supply and sanitation, abstraction charges, pollution taxes, value capture mechanisms, payments for ecosystem services). Improving willingness to pay for water management and water services requires clear explanation about how revenues collected will be used for stated goals that benefit users. Robust allocation arrangements can help to shift water towards higher value uses and provide flexibility to adjust to changing conditions.
Seizing opportunities from water-related innovation. Improved recognition of the value of water and use of related policy instruments can help to stimulate innovation. This in turn can lower the costs of minimising water risks and enhancing water-related services and can generate investment opportunities. Water-related innovation, as measured by patenting activity, has more than doubled since 1990 (Figure 1) (OECD, 2018a forthcoming).

The top ten countries which account for the largest share of global water-related technologies patents are indicated in Figure 2. The figure also illustrates the relative specialisation of each of these countries in patents related to water security (demand-side, supply-side and pollution abatement technologies). This is measured by Relative Technological Advantage, calculated as the ratio between a country’s share of water security patents and its share of total patents.

Figure 1. Growth in water-related patented inventions by category

![Growth in water-related patented inventions by category](image1)

Note: The annual number of patented inventions filed for each category has been normalised to 1 in 1990.


Figure 2. Top water-related inventor countries, 1990-2013

![Top water-related inventor countries, 1990-2013](image2)

Note: Size of data points is representative of 2016 nominal GDP based on OECD data, with the exception of Chinese Taipei GDP data, which comes from the World Bank database.

Investments in water security comprise a very heterogeneous range of activities. For example, investing in a wastewater treatment plant is very different from financing a floodplain to protect a city from flood risks. Similarly, financing the construction and start-up of a new desalination plant raises different challenges and opportunities than financing the refurbishment of one in operation. At the same time, the range of financiers is also very diverse: with different mandates, investment objectives, risk appetites and liquidity needs. As part of the on-going work of the Roundtable on Financing Water, a typology of water security investments and a typology of financiers will be developed to help match specific investments needs with the most appropriate financing available. Potential classifiers for water investments include scale (from watershed to household); function (water supply, wastewater management, flood protection, etc.); and operating environment (ownership, governance and regulation) (Money, 2017).

A taxonomy of instruments and vehicles for infrastructure financing developed by the OECD illustrates the wide range of financing channels for infrastructure investment (both direct and market-based). Each instrument has its own characteristics and implications for lending or investment portfolios (Table 1).

Table 1. Taxonomy of instruments and vehicles for infrastructure financing

<table>
<thead>
<tr>
<th>Modes</th>
<th>Infrastructure Finance Instruments</th>
<th>Market Vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asset Category</td>
<td>Instrument</td>
<td>Infrastructure Project</td>
</tr>
<tr>
<td>Fixed Income</td>
<td>Bonds</td>
<td>Project Bonds</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Municipal, Sub-sovereign bonds</td>
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<tr>
<td></td>
<td></td>
<td>Green Bonds, Sukuk</td>
</tr>
<tr>
<td></td>
<td>Loans</td>
<td>Direct/Co-Investment lending to infrastructure project, Syndicated Project Loans</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mixed</td>
<td>Hybrid</td>
<td>Subordinated Loans/Bonds, Mezzanine Finance</td>
</tr>
<tr>
<td>Equity</td>
<td>Listed</td>
<td>YieldCos</td>
</tr>
<tr>
<td></td>
<td>Unlisted</td>
<td>Direct/Co-Investment in infrastructure project equity, PPP</td>
</tr>
</tbody>
</table>

Analytical work on financing water is impeded by a lack of data and patchy information. Projections of financing needs are diverse and can vary by several orders of magnitude. Mapping the flow of finance to water security investments can identify the ultimate sources of capital; the level of investment and who are the different players at different stages as well as the different channels and vehicles to access investment in water security (e.g. green bonds).

To advance work on mapping financing flows, the OECD is working with the European Commission to project financing needs for water supply and sanitation and flood protection in 28 EU member states by 2050. The study will also identify the sources of available finance in each country, to develop an assessment of financing capacity. This work could be extended to a broader range of countries.

**INFRASTRUCTURE AS AN ASSET CLASS**

Lack of data pertaining to infrastructure investment is not only an issue in the domain of water. It is a well-recognised barrier to scaling up private sector investment across infrastructure sectors. The "Infrastructure Data Initiative" was recently launched to address this need and support efforts to establish infrastructure as an asset class. This is a joint initiative by the OECD, the European Investment Bank, Global Infrastructure Hub, Long-term Infrastructure Investors Association and the Club of Long-Term Investors, which aims to create a centralised repository on historical long-term data on infrastructure (including water) at an asset level (OECD, 2017b).
Water infrastructure is typically very long-lived and capital-intensive. For instance, dams and conveyance infrastructure can last for 80-100 years or longer. It is especially challenging to ensure that investments can cope with considerable uncertainty due to climate change, economic and demographic trends as well as technological advances. Further, investments outside of the water sector - such as urban design or the construction of physical assets in flood plains - influence the exposure and vulnerability of people and assets to water risks.

Addressing this requires long-term strategic planning of investment pathways that reduce water risks at least cost and that can be adapted over time in response to developments. This requires investments not only in infrastructure, but also in institutions and information, such as data collection and analysis. Well-designed infrastructures only deliver expected benefits when they are backed by appropriate institutions (for project design, financing, management, accountability), and when they build on the best available knowledge and information. It also requires undertaking cost-benefit analysis on sequences (or portfolios) of projects and carefully considering how pursuing a specific project may foreclose future options or inadvertently increase vulnerability to water risks. For example, investment in irrigation systems usually reduce the adverse effects of rainfall variability on agriculture, but may also amplify the impacts of drought by encouraging cultivation of water-intensive crops, which cannot be sustained under extreme conditions (World Bank, 2017).

While financiers are typically focussed on the availability of a pipeline of “bankable” projects, governments should also situate these pipelines within broader investment strategies that contribute to water security and sustainable development pathways over the long term. Further work is required to develop the appropriate methodologies and analytical tools to assess the economic, social and environmental costs and benefits of such pathways and their combination at different scales (from local level, to basin, national, transboundary and global). This methodology should also explore the potential benefits from synergies emerging from interrelated projects and their impact on water resources. It would inform project preparation and selection by governments, development finance institutions and other partners.
Financing approaches to scale up investment

Investments in water security compete with other sectors for financiers’ attention, driven primarily by the attractiveness of the risk-return profile. This depends on two factors: i) a stable revenue stream; and ii) how the range of risks related to water security investments are shared between public and private actors. Mobilising commercial finance, in particular domestic sources, need to be based on policy reforms of the water sector to promote efficiency gains, cost reduction and cost recovery, as well as improving the balance of tariffs and taxes as sources of finance.

Blended finance – defined as the strategic use of development finance for the mobilisation of additional finance towards sustainable development in developing countries – is a promising approach to scale-up financing flows for water (Figure 3) (OECD, 2018b). It can dramatically enhance the leverage effect of development finance - which is significant and rising but not at scale (Figure 4) - by mobilising other types of funds. Further, blended finance can significantly improve the risk-return profile of water-related investments for commercial financiers.

Figure 3. Blended finance approach

Since 2000, there has been a growing interest in the use of blended finance, as reflected by the increasing number of blended finance facilities (Figure 5). Between 2000 and 2016, a total of 167 facilities which engage in blending were launched, with a combined sized of USD 31 billion (in terms of commitments). Blended finance is not an asset class, rather it uses a range of instruments to calibrate the risk-return profile of projects and to address other barriers to private investment. A recent survey from the OECD on amounts mobilised from the private sector by official development finance interventions for a select number of instruments estimates that official development finance mobilised an additional USD 1.5 billion of private resources in 2012-15 for water and sanitation (USD 385 million on average per year). The survey also reveals that the main leveraging instruments in this sector were guarantees (USD 1 billion), followed by syndicated loans (USD 388 million) (Figure 6) (OECD, 2017c).

Challenges related to blending include the need for a good enabling investment environment, ensuring that development finance does not crowd out private finance and that the desired development outcomes are realised. Further analysis is needed to draw lessons from experience with blended finance and better understand the challenges of applying the approach to the specificities of water security. The OECD is undertaking work to apply the OECD DAC Principles for Blended Finance to the case of water, to develop more tailored and actionable recommendations.

Figure 4. Trends in aid to water and sanitation, total official flows from all donors, 2-year average commitments, USD billion, constant 2014 prices

Figure 5. Growing number of blended finance facilities established between 2000 and 2016


Figure 6. Private finance mobilised by official development finance interventions to the water and sanitation sector, USD million, 2012-15

The Roundtable on Financing Water is a joint initiative established by the OECD, the World Water Council and the Netherlands launched in 2017. It draws upon political leadership and technical expertise, with the ambition of facilitating increased financing of investments that contribute to water security and sustainable growth by:

- raising the profile of the issue on the international political agenda and within the finance community;
- improving the evidence-base with analytical work on how to overcome the barriers to investment;
- pushing the boundaries of traditional thinking about financing water-related investment; and
- promoting impactful ways of financing water-related investment.

The Roundtable provides a global public–private platform for knowledge exchange and effective engagement, collaboration, and action across governments and regulators in developed, emerging and developing economies, institutional investors, the private sector, international organisations, philanthropies, academia and civil society organisations. It develops rigorous, innovative and compelling analyses and practical recommendations, organises high-impact events, and engages effectively in the wider policy debates and arenas, helping to support the rapid scaling-up of water investment and financing flows on a scale commensurate with the challenge.

Whether you are a financier, a professional in urban development, agriculture or energy, you have a role to play. Please visit www.oecd.org/water/roundtable-on-financing-water.htm.
Roundtable on Financing Water

3 pillars for action

1. Mapping and estimating financing flows
   - Estimating investment needs
   - Estimating capacity to finance
   - Typology of investments in water security
   - Typology of financiers

2. Analysing policies that affect investment flows
   - Policies that help or hinder investment flows
   - Policies that spur innovation
   - The role of information in stimulating demand for investment

3. Promoting pathways and approaches that facilitate investment
   - Blended finance
   - Approaches to valuing the benefits of water investments
   - Long-term strategic planning to facilitate investment
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Financing water: Investing in sustainable growth

This Policy Perspectives summarises key messages about the economic case for water investment, the barriers to investment and the financing gap.

It charts a course for action to better value water and to facilitate water investment at scale. The Roundtable on Water Financing, a joint initiative of the OECD, the World Water Council and the Netherlands, will continue to deepen the evidence base and broaden engagement on these issues.

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