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Water Finance and Nature-based solutions

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Question

What are some innovations for water finance that could be applied to mainstream and expand Nature-based Solutions in developing countries? What are some obstacles, opportunities and potential synergies?

Contents

1. Summary

Nature-based solutions (NbS) for water security can address a number of challenges simultaneously and deliver co-benefits. Broadly, NbS protect, sustainably manage, and restore natural and modified ecosystems to address societal challenges (Cohen-Shacham et al., 2016). NbS approaches for water security include source water protection, watershed management, sustainable drainage systems, and wetlands restoration and construction. By improving the timing, location, reliability and quality of water, NbS can improve water supply and quality, and contribute to disaster risk reduction. Co-benefits include improvements to human health, livelihoods and biodiversity and increasing climate change adaptation and resilience.

NbS generally are growing in prominence on the policy agenda. For example, the Global Commission on Adaptation recommends scaling up implementation to support climate change adaptation (see for example, Kapos et al., 2019). **NbS can also support greening the recovery following Covid-19**. The potential for investing to receive multiple benefits rather than traditional single-purpose investment is likely to be important in the context of reduced overseas development aid (ODA) budgets and potential capital flight northwards. There is also potential to link NbS with job creation and sustaining livelihoods as part of recovery efforts. For example, funding for coastal habitat protection in the USA in 2009 stimulated job creation following the 2008 financial crisis (Edwards et al., 2013).

Integrating green and grey infrastructure solutions can effectively address water security and a blended approach may be appropriate in a number of circumstances (Browder et al., 2019; Altamirano, 2019)[1]. Blended or hybrid solutions could potentially increase the attractiveness of NbS to investors and help to mobilise finance. Green infrastructure can complement grey by reducing the costs of engineered solutions and improving overall system performance (Browder et al., 2019; Kapos et al., 2019; Matthews et al., 2019; Abell et al., 2017). Unlike grey infrastructure, which is designed as a solution for one particular problem, NbS can be designed to address a number of water security challenges simultaneously (e.g. wetlands that promote water quality, erosion control, disaster risk management, and sustainable fisheries), support climate change adaptation, and have lower recovery costs after an event than grey infrastructure (ICEM, 2019; Kapos et al., 2019; Vogl et al., 2017).

However, limited access to finance is a key barrier for scaling up implementation of NbS for water security (Kapos et al., 2019; Tremolet et al., 2019)**.** Whilst investment in NbS for water security is growing, it is still dwarfed by the amounts invested in grey infrastructure[2]. NbS attract approximately 1-5% of investment in water security globally (WWAP/UN-Water, 2018; McCartney, 2020), and NbS generally, not just for water security, only attract a small share of

[1] Green infrastructure "intentionally and strategically preserves, enhances, or restores elements of a natural system, such as forests, agricultural land, floodplains, riparian areas, coastal forests (such as mangroves), among others, and combines them with gray infrastructure to produce more resilient and lower-cost services" (Browder et al., 2019: 14).

[2] For example, investment by governments, utilities and companies to support clean, reliable water supplies for cities has increased from USD 8.2 million in 2011 to USD 24.6 billion in 2015 (Bennet & Ruef, 2016; Bennett & Caroll, 2014). However, global private finance invested USD 3 billion in grey infrastructure between 2013 and 2015 (//www.edie.net/news/4/GWI---449bn-must-be-invested-in-water-annually-to-meet-SDGs/)

climate finance[3]. The characteristics of NbS, including the long-time scale for realising benefits and the diffuse nature of benefits and co-benefits, pose challenges for both public and private investment.

Obstacles and opportunities

Public and private investment processes, including economic appraisal tools and decision-making tools, are geared towards grey infrastructure and do not the fit the characteristics of NbS (OECD, 2020; Altamirano, 2019; Tremolet, 2019). There are two potential courses of action to increase the amount of finance invested in NbS:

- One, increase the number of bankable projects by supporting the development and preparation of projects that can be accommodated by existing investment processes, and de-risking projects to make them more attractive to investors.
- Two, supporting systems change and changes in the enabling environment. This could include regulatory and legislation changes to incentivise investment, or the development of tools and guidance that align NbS as an option, placing them on a level playing field with grey infrastructure, which has been more traditionally used to address water security challenges.

Increasing the number of bankable projects

Increasing investment in NbS will involve tackling the challenges they pose in terms of revenue streams and risks, which affect investor confidence. Investors can include private companies, private finance (e.g. commercial banks), and institutional investors (e.g. pension funds). Institutional investors include both domestic and international, with some international institutional investors having guidelines or rules around green investments. Finance from investors has to be repaid, which means investors need confidence in project revenue streams and acceptable risk. NbS have a number of problems with their risk-return profile as the nature of their benefits and co-benefits can be hard to translate into revenue streams.

NbS for water security can result in substantial avoided costs and a wide range of benefits. This could translate into a strong investment case for certain actors. For example, investing in watershed restoration and conservation could save water utilities across the world's largest cities an estimated USD 890 million annually (Kapos et al., 2019).

Clustering projects can help to increase investment: institutional investors are often looking to invest at scale. NbS can be too small-scale in terms of budget to attract sufficient investor capital. Clustering or aggregating projects can make them more attractive to investors, reduce risk and also support investment in multi-sectoral plans.

There are a number of potential opportunities in the planning and project development cycle to increase the number of bankable NbS projects. These include:

- Inclusion or consideration of NbS in multilateral development banks' (MDBs) and development partners' country-level strategy plans: similar to how many MDBs and aid

[3] For more information see https://d306pr3pise04h.cloudfront.net/docs/publications%2FNature-Based-Solutions-for-Climate-Manifesto.pdf

agencies require country partners to have Nationally Determined Contributions and National Adaptation Plans in place as a pre-requisite for funding;

- Capacity building for project development officers: Project developers often lack skillsets and methodologies to incorporate NbS into project development, and face difficulties defining the business case as a means to secure NbS financing;
- Pre-feasibility: technical assistance could support business case development or technical analysis for potential NbS projects.

Innovative finance vehicles for water supply and water and sanitation service delivery projects offer insights for increasing finance for NbS. Water is facing a financing gap: future funding needs for water infrastructure and for water and sanitation provision and delivery are significantly higher than current financing flows (OECD, 2018). The strong economic case for water-related investment has failed to translate into a compelling case for investment at scale globally (OECD, 2018). A number of new financing vehicles, instruments and tools are being developed to support increased financing.

Project preparation facilities and finance facilities can play an important role in increasing the number of bankable projects by de-risking projects, offering long-tenor finance and guarantees, and mobilising local currency markets. For example, the Private Infrastructure Development Group has supported the project preparation and financing of an innovative public private partnership, the Kigali Bulk Water project in Rwanda, which will supply up to one-third of the capital's water.

Early stage capital and expertise during project development can support the development of investment ready projects that are attractive to investors (NWP, 2020). The Dutch seed-funded Water Finance Facility aims to mobilise large-scale private investment from domestic institutional investors to support water and sanitation service delivery. The first country facility, the Kenya Pooled Water Fund launched in 2018. It issues long tenor bonds in local currency to domestic investors, with the proceeds on-lent to water service providers. Pooling loans, and reviewing the credit worthiness of water service providers reduces the risks for investors.

System and enabling environment changes

Policy and regulatory environments can influence the attractiveness and feasibility of using NbS at scale (Kapos et al., 2019). Unlike grey infrastructure, NbS have not been mainstreamed into the set of solutions and options considered by governments, local authorities or the private sector (OECD, 2020). They are also not considered on an equal footing with grey infrastructure by the multilateral development banks (MDBs), developing country governments or public and private investors. Requiring NbS to be included in project origination, project design, procurement, financing conditions and industry standards could raise awareness of their use and effectiveness and promote uptake. For example, in Peru a 2016 change to the Sanitation Sector Law requires utilities to use 1% of tariffs collected to support NbS for water quality. This has resulted in increased levels of available funding for NbS.

Formal decision-making tools are needed that can compare the cost-benefits of green and grey infrastructure. Traditional economic, financial, and engineering cost-performance systems favour single-purpose grey infrastructure over NbS investment. Tools such as cost-benefit analysis (CBA) assume projects are narrowly defined, have a single purpose and can be evaluated in a high-confidence quantitative framework: these tend to disfavour NbS. Potential

ways to overcome this include development of a method that can evaluate and mainstream CBA for multi-purpose infrastructure; change discount rates; and, evaluating operations over operational lifetime.

MDBs including the World Bank and the Asian Development Bank (ADB) are working to generate both client demand from countries, and to mainstream NbS within their work. For example, the ADB is piloting a number of NbS for disaster risk reduction in cities in Vietnam as proof of concept projects. It is also developing a series of internal guidance as part of a larger, more systematic and operational commitment to NbS. Internal guidance will align NbS as an additional set of options within the disaster risk and climate adaptation programmes for water, cities, and transport sector investments

Examples of innovative finance mechanisms

There are a number of emerging funding models and financial mechanisms for water projects that could increase the uptake of NbS. This report highlights a small number, including:

- **Blended finance approaches:** for example, the Philippines Revolving Water Fund is a blended finance mechanism that use ODA, domestic public sector funds and commercial financing to lower borrowing rates and market water and sanitation projects to finance institutions. Lessons learned, including the importance of capacity building for lenders so they could invest in the water sector, could provide insights for increasing investment in NbS.
- **Green bonds and climate bonds:** The green and climate bonds market is growing, and whilst bonds are largely issued by high and middle income countries, there are some signs the market is diversifying as Kenya issued its first green bond in 2019. However, only a small proportion of green bonds are used to support water projects. In 2019, the CBI certified 17% of the green bonds issued: only 9% of certified use of proceeds bonds were in the water sector (CBI, 2020).
- **Water Funds:** institutional platforms which use philanthropic funds to leverage investment in a collective investment fund to support upstream NbS commonly through payment for ecosystem services (PES) to farmers. There are 41 funds in operation, with two in Africa and more in the pipeline.
- **Climate finance:** the MDBs and other development partners can work with governments to combine climate finance with large conventional loans to create opportunities for effective demonstration of NbS. For example, to support piloting bioengineering in Vietnam, ADB bundled a Global Environment Facility (GEF) project grant with a large infrastructure loan. However, it can be difficult for water projects to secure climate finance due to concerns about 'additionality'. Integrating NbS into climate finance vehicles such as the GEF and the Green Climate Fund via top down policy frameworks such as UNFCCC could motivate uptake amongst governments (ICEM, 2019).

Evidence base

This rapid literature review draws on grey and practitioner literature. It draws on work from forums such as the Organisation for Economic Cooperation and Development's (OECD) Roundtable on Water Finance, the Global Water Practice and the World Bank, and organisations working on water finance. The review focuses on water finance instruments that have been used

for infrastructure and water, sanitation and hygiene provision. It does not include consideration of the insurance industry due to time constraints. But, there are potential areas where the insurance industry could incentivise investment in NbS, for example using different premium rates to exert economic pressure (Kapos et al., 2019). These warrant attention.

1. Financing water security

Water security is facing a financing gap as it poses several barriers for investment, including (OECD, 2018):

- **Problems with cost recovery related to both pricing and timeframes**: water services are often under-priced, whilst water infrastructure projects are often capital intensive with high sunk costs and long pay-back periods.
- **Problems with monetising benefits**: water security investments generate a mix of public and private benefits and reduce water-related risks. It is hard to monetise these and translate them into revenue flows, especially for avoided costs such as climate impacts.
- **Problems for investors in assessing water-related investments:** a lack of appropriate analytical tools and data, including track record of these types of investments, can deter investors who do not understand water issues.
- **Scale:** water projects are often small-scale and context specific, leading to raised transaction costs and challenges for scaling up emerging innovative financing models.

Water security projects compete with other sectors such as road and telecommunications for finance. An attractive risk-return profile is important for securing investment. For water projects the risk-return profile depends on three factors: a stable revenue stream; how the range of risks are shared between public and private actors; and, investors' ability to assess investment and operation risk (OECD, 2017; Smith et al., 2019).

Investors have traditionally shown discomfort for 'new' or unfamiliar (or non-traditional) risks that are hard to place into context. These include climate impacts or the uncertainties around the performance of NbS relative to grey investments. However, investors themselves differ in their appetite and interest in (and avoidance of) different types of risk. For instance, project finance seeks direct revenue flows from investments commensurate with a certain level of risk (i.e., higher incomes are associated with higher levels of risk), while institutional investors (e.g., public employee pension funds), seek investments that satisfy fiduciary requirements while allowing them to invest capital at scale (OECD, 2017).

Barriers for financing NbS

Scaling-up the implementation of NbS faces a number of challenges: a lack of clear financing instruments and standardised finance models; a lack of policy and financial frameworks; barriers in the enabling environment that stop NbS being considered on an equal footing with grey infrastructure; and, traditional economic, financial, and engineering cost-performance systems that favour single-purpose grey infrastructure over NbS investments (OECD, 2020; Smith et al., 2019). Whilst the number of projects is increasing, many are pilots, small-scale, or applied on an ad hoc basis (Tremolet et al., 2019; Kapos et al., 2019).

Quantifying and valuing the benefits and co-benefits of NbS and translating them into revenue streams is difficult. Common economic appraisal tools and decision-making tools, such as CBA, do not necessarily capture the value or full range of benefits and co-benefits from NbS projects (OECD, 2020, Raymond et al., 2017). Where methods do exist for valuing co-benefits these are often not sufficiently developed to support investment decision-making (Tremolet et al., 2019). The benefits from NbS may also change over time and the value and/or performance of the investment may appreciate over time compared to traditional engineered solutions (Smith et al., 2019).

Converting benefits from investment in water into revenue streams can improve the financial case for investment (OECD, 2018). However, the diffuse nature of benefits that can be derived from NbS are not easily translated into revenue streams. For example, many of the co-benefits may not be traded in the market, presenting challenges for private investment (OECD, 2020).

NbS benefits are often translated into substantial avoided costs. Some funding models, such as Water Funds (see section 4) have been developed that can recover the costs of investment as avoided costs or through tariffs (OECD, 2018). NbS that use payments for ecosystem services (PES), such as Water Funds, need a strong regulatory regime due to the long timeframe for realising benefits (OECD, 2018).

The longer timeframe for realising benefits from NbS relative to grey infrastructure can lead to investors and policy-makers defaulting to grey infrastructure. Benefits from NBS are experienced over different timescales and the benefits may change over time, when comparing short, medium (1-10 years) and long-term (decades) timeframes (ICEM, 2019). Investors often evaluate projects over the lifetime of the financing vehicle as opposed to the operational lifetime of the project (OECD, 2020). The lack of short-term benefits may be a barrier for some investors who operate over short return periods. At the project planning and prioritisation stages, the long timescales for realising benefits can result in benefit-cost ratios that vary over time (OECD, 2020) and appear unfavourable compared to grey infrastructure. The longer timescale also complicates direct comparison of NbS and grey infrastructure (ICEM, 2019).

Dynamic uncertainty can lead to concerns over the performance reliability of NbS (OECD, 2020). Natural systems are dynamic and complex and there can be a high degree of variation in how ecosystems impact hydrology (Matthews et al., 2019; WWAP/UN-Water, 2018). This dynamism complicates assessing the technical performance of NbS projects, how they might interact with grey infrastructure if it is part of a hybrid project, and developing solid predictions about the level of service provided (OECD, 2020). A lack of robust performance data can reinforce investors' preference for grey infrastructure solutions and perceptions that NbS are high risk (OECD, 2020). Natural systems vary which means similar NbS projects in different geographic areas may function differently: this lack of predictability can affect investor confidence (OECD, 2020). There can also be challenges in evaluating how ecosystems will respond to climate change and how this will affect NbS. However, this is similar to the challenges in evaluating how grey infrastructure will respond to climate change, although it may be more difficult (Matthews et al., 2019).

Technical and practical aspects can also act as barriers for increasing investment in NbS. Project developers often lack the skillsets and methodologies to incorporate NbS into project development, and face difficulties defining the business case as a means to secure NbS financing (Watkins et al., 2019). Technical capacity to implement NbS can be low in developing countries, which are unfamiliar with them (ICEM, 2019). NbS projects often require continuous

low-level maintenance over long timeframes, which is not necessarily accommodated in existing funding models (OECD, 2020).

2. The enabling environment

The dominant policy and financial decision-making processes, regulations, legislation and technical standards create a bias towards grey infrastructure solutions for water security (OECD, 2020). This bias can be found in both project origination and planning processes, and in investment processes and decision-making. Governments can support changes in the enabling environment, including in national and subnational planning processes, regulations and legislation, and institutions which facilitate the uptake of NbS (OECD, 2020). For example, stable policies and financial incentives can help to reduce trade-offs between short-term investments and long-term benefits (ICEM, 2019). Government action can also lower the sometimes prohibitively high transaction costs faced by the private sector when investing in water security (Altamirano, 2019). Technical standards and decision-making tools as well as the role of actors such as the MDBs can also influence the enabling environment.

Planning processes

NbS, including their different temporal and spatial scales, need to be integrated into national and subnational government planning processes. For example, the management of nature and ecosystems services typically resides in the Ministry of Environment, while decisions concerning infrastructure tend to be made in Ministries of Planning and Finance (Watkins et al., 2019). Similarly, environment, climate change, and water departments within individual MDBs may also have differing (and conflicting) views about NbS and have little coordination and cooperation on NbS support. In both cases, this can mean that NbS are not always considered as a potential option in early stage planning and procurement processes for infrastructure (Watkins et al., 2019).

Planning processes have a strong emphasis on single-purpose / single-sector problem identification. Project development and assessment processes are often designed to narrow problems. Both tend to favour single-purpose grey infrastructure. In contrast, identifying potential synergies between sectors and ministries and administrative levels through gathering disparate problems together (water supply, flood risk, drought prevention) can generate more opportunities for NbS, which tend to be inherently more flexible and make use of the multiple benefits and co-benefits seen with natural landscapes (Smith et al., 2019; Matthews et al., 2019). In practice, creating administrative and leadership opportunities to seek out and reinforce connections across and between silos, boundaries, and administrative barriers can help lead to more NbS opportunities.

New policy frameworks, technical standards and decision-making tools

Decision-making processes around planning, implementing, operating and financing infrastructure may need to be adapted if NbS are to be applied consistently and considered on an equal footing with grey infrastructure (OECD, 2020). As grey infrastructure is the traditional standard for infrastructure development, NbS are typically not represented in most policy frameworks (Watkins et al., 2019). Emerging technical and professional standards, will help to increase the acceptability of NbS within financial institutions (Kapos et al., 2019).

Work in this area includes the International Union for Conservation of Nature's (IUCN) Global Standard for NbS launched in July 2020.

Tools are needed to allow comparison of green and grey infrastructure options. Analytical tools (such as IUCN's WISE-UP to Climate) are needed to identify the trade-offs between green and built infrastructure on the basis of clear performance metrics as well as standards to compare options and understand the revenue streams (OECD, 2017).

New policy and technical frameworks can situate NbS and grey infrastructure on a level playing field by ensuring they are considered as an option. For example, the Organisation for Economic Cooperation and Development (OECD) has developed a new policy evaluation framework which aims to address two key areas: one, how can NbS, given their characteristics, "fit" into existing planning and investment decision-making processes, and, two, identify where and how these processes need to be adjusted to remove distortions so NbS can be considered on an equal playing field to other options (OECD, 2020). A new technical framework developed by the International Centre for Environmental Management (ICEM) classifies NbS in the agricultural sector as a first step towards integrating NbS in agriculture in Asia (ICEM, 2019).

The need to improve the evidence base for NbS is commonly cited in the literature. However, it is important to note that a strong economic case for NbS does not necessarily translate into a strong investment case. As outlined above the attractiveness of NbS for investors is likely to relate to their risk-return profile. A number of commentators argue that generating evidence on the economic and long-term benefits of NbS can help to convince policy-makers and decision-makers to increase the uptake of NbS (see for example, Kapos et al., 2019). Indirect evidence (e.g., Matthews et al., in press) suggests that evidence may be a misleading objection and that more subjective preferences for grey infrastructure, administrative obstacles, and resistance to institutional change may be as or more important.

Regulatory and legislative incentives

Regulatory and legislative requirements can increase the uptake of NbS. Countries including the UK, Norway and Canada, as well as the EU have introduced financial or regulatory incentives to encourage the use of NbS (OECD, 2020). A 2019 OECD survey found that 23 out of 27 respondents were using NbS to address water quality, quantity, and flood risk management issues (OECD, 2020). Incorporating NbS into policy, legislative, and regulatory requirements is likely to be important in areas where private sector investment and development is increasingly meeting infrastructure development needs, for example Latin America and the Caribbean (see for example, Watkins et al., 2019). A relatively easy change could be requiring a section in environmental impact assessments asking whether or not NbS have been considered as a complement or alternative.

In Peru, the national 2016 Sanitation Sector Reform Law requires utilities to use a certain proportion of revenue from water tariffs for watershed conservation and climate change adaptation (Browder et al., 2019). Between 2016 and 2018, this policy change has generated USD 30 million for green infrastructure projects via PES, and an additional USD 86 million for climate change mitigation and disaster risk management (Browder et al., 2019). In Lima, Sedapal, the state-owned utility has used resources raised to establish a Fund of almost USD 22 million to fund green infrastructure projects including lagoons, water harvesting, reforestation, terracing and non-conventional water solution initiatives to reach communities that have no access to water and sanitation (Altamirano, 2019; Bleeker & Vos, 2019). A public-private

dialogue platform, WRG2030, has been established to discuss guidelines and best practices for this process (Altamirano, 2019).

Multilateral Development Banks (MDBs)

Sharing pilot projects and data as 'proof of concept' can boost government confidence (ABD, 2019). The Asian Development Bank is currently piloting a number of green infrastructure/NbS projects in Southeast Asia to address flooding, climate-change and environmental degradation. For example, the Water Sensitive Urban Design (WSUD) project integrates water cycle management and green infrastructure in four cities in Vietnam (ADB, 2019). The Asian Development Bank (2019) argues that clear and constant dialogue is needed to build understanding, capacity and drive uptake of NbS by addressing government and private sector perceptions around expense, difficulty and time frames. The World Bank in partnership with the Global Facility for Disaster Reduction and Recovery, and Deltares have developed a Natural Hazards-Nature-based Solutions platform to facilitate exchange of knowledge and lessons learned, provide guidance on planning and implementation, and to champion NbS in the policy-making and investment arenas[4].

Technical assistance (TA) from the MDBs could help governments and their planning and procurement teams to increase capacity and uptake of NbS (Watkins et al., 2019). For example, TA could support governments to draft clauses related to NbS; and increase capacity to evaluate tender documents and monitor contract performance (Watkins et al., 2019). The Inter-American Development Bank plans to develop a Technical Guidance document for Ministries of Finance to use to integrate NbS into policy and procurement processes (Watkins et al., 2019).

Generating client demand will also be important. Governments normally approach MDBs with a problem to be addressed through a partnership. Early on in this process the MDBs could introduce NbS or hybrid approaches at an option. To support this, MDBs will need to better integrate NbS into their processes including analysis, policy advice and financial decision-making tools to incorporate NbS into their lending decisions.

The MDBs can support a positive enabling environment for NbS by (Kapos et al., 2019; Watkins et al., 2019):

- Encouraging supported governments to include requirements for review of NbS options in project-related procurement policies, including standalone NbS and hybrid solutions;
- Developing and deploying innovative finance mechanisms. This could include supporting the development of result-based financing schemes (e.g. social and development impact bonds); promoting the expansion of the resilience bonds market; promoting the proliferation and expansion of aggregating credit facilities such as habitat banks and water funds; developing blended finance mechanisms; and, providing credit guarantees;
- Partnering with local financial institutions interested in expanding their green portfolios to help them develop and publicise NbS-related pilots, case studies, and products.

[4] For more information see: https://www.naturebasedsolutions.org/about

The MDBs and the climate funds can also support mainstreaming hybrid infrastructure. Possible actions include promoting cross-sectoral infrastructure delivery; supporting countries to develop the climate and disaster risk reduction rationale of hybrid infrastructure strategies for water security; and developing the blueprints of implementation and financing arrangements (Altimarino, 2019).

3. Selected examples from High and Middle income countries

USA: State Revolving Funds

The Clean Water State Revolving Fund (CWSRF), launched in 1987, is a financial assistance programme for a wide range of water infrastructure, including green infrastructure, focusing on water quality[5]. The federal government provides a grant to all 50 states plus Puerto Rico. The 51 CWSRF programmes function like environmental infrastructure banks, providing low interest loans for water infrastructure projects. Loan repayments and interest earned are then 'revolved' (used) to finance new projects. In addition to loans, other financing options include: purchase of debt or refinance, guarantees and insurance; guarantee SRF revenue debt; loan guarantees and additional subsidisation[6]. To date over USD 138 billion has been made available through the 51 funds.

The Water Infrastructure Finance and Innovation Act (WIFIA), passed in 2014, established a new federal loan and guarantee programme (WIFIA, 2020). WIFIA aims to accelerate investment in water and wastewater infrastructure, including both grey and green infrastructure, and source water protection by complementing other sources of funding such as the CWSRFs and the bond market (WIFIA, 2020). Loan rates are tied to the US Treasury rates for the same maturity and WIFIA also offers long tenor loans (OECD, 2017).

USA: municipal use of fees and credits for managing stormwater

New financing tools are being developed in the USA to help cities accelerate their use of green infrastructure to manage stormwater run-off. In Philadelphia, the Water Department has introduced a new stormwater fee and credit structure to encourage private, non-residential parcel owners to invest in stormwater retrofits (Valderrama et al., 2013). Monthly stormwater fees are discounted for owners who 'green' their parcel by reducing and managing run-off, and project payback is in future avoided stormwater fees (Valderrama et al., 2013). However, many parcel owners need to access finance to fund stormwater retrofits. Green infrastructure retrofits present barriers for investors including the discounted payback period stretches beyond 10 years and the limited repayment track record for stormwater retrofits in Philadelphia (Valderrama et al., 2013).

Aggregating projects can make them more attractive to private finance. In the case of Philadelphia, many stormwater retrofits are small-scale with relatively high fixed costs and

[5] For more information see: https://www.epa.gov/cwsrf/learn-about-clean-water-state-revolving-fund-cwsrf

[6] The Drinking Water State Revolving Water Fund works in a similar way but focuses on drinking water infrastructure needs. For more information see: https://www.epa.gov/dwsrf/how-drinking-water-state-revolving-fund-works#tab-1

transaction costs (Valderrama et al., 2013). Packaging a number of projects together could make them more attractive to private finance as it reduces project development costs, and helps investors manage risk by diversifying the quantity and character of projects in a stormwater investment portfolio (Valderrama et al., 2013).

In Washington DC, the utility has adopted a market-based approach to encourage land-owners to manage stormwater and retrofit their properties[7]. Landowners are charged a fee by the utility for cleaning stormwater run-off into nearby rivers. The fee is based on the property's amount of impervious square footage. A stormwater credits trading market allows property owners to earn credits based on the amount of stormwater their land can absorb, which are sold on city-supported market places. Developers of new properties are required to capture a certain amount of rainfall through green infrastructure: if they are unable to capture this amount they can buy credits from other property owners.

Indonesia: Advancing the business case and clustering projects

Translating water security strategies into a pipeline of investable projects or project clusters requires changes to project origination and preparation, and advancing the business case for hybrid green-grey solutions (Altamirano, 2019). The business case for hybrid solutions needs to go beyond the strategic and economic business case into the commercial, financial and management business case (Altamirano, 2019). The Financing Framework for Water Security approach brings together stakeholders involved in the water security planning process (e.g. private sector, investors, and water resources planners) to develop these business cases and design appropriate implementation and finance arrangements (Altamirano, 2019). This approach can support the translation of strategic plans, such as IWRM plans, into clearly phased hybrid infrastructure clusters and then a number of financially viable projects (Altamirano, 2019). If investors understand the synergies between clusters of projects, access to finance could be linked to timely implementation of other projects in a particular cluster (Altamirano, 2019).

Application of this approach in Semerang, Indonesia has identified five clusters of projects and blended finance will be important to deliver the overall strategy. Implementing the five clusters in a phased manner can address a number of water security challenges by increasing water storage and infiltration, increasing surface water availability and consumption, and decreasing groundwater extraction (Altamirano, 2019). Implementation of approximately one project per cluster will begin in 2020 to create evidence, generate stakeholder buy-in and create the capacity of public authorities to procure hybrid projects successfully and the private sector to deliver hybrid projects (Altamarino, 2019).

4. Water Funds

Water Funds are institutional platforms bringing together different water users to collectively invest in upstream habitat protection and land management, and mobilise finance (Abell et al., 2017). Pioneered in Quito, Ecuador in 2000, there are now 41 funds across Latin and North America, Africa and Asia. The Inter-American Development Bank (IADB) and the

[7] For more information see: https://www.nature.org/en-us/magazine/magazine-articles/planning-for-a-rainy-day/

GEF are supporting scaling-up Water Funds in Latin America. Water Funds operate as trust funds and are blended collective investment vehicles, which pool funding from donors, companies and utilities to invest in a jointly agreed plan. A governance board selects projects, distributes funds and monitors impacts (Abell et al., 2017). Payments for ecosystem services are used to support farmers to adopt water and soil conservation measures to improve water quality and supply downstream.

The business case for Water Funds often includes avoided costs and benefits that can derived from improved water quality. Water Funds offer no direct returns to investors. Any returns that are generated are re-invested in watershed management and conservation activities. Avoided costs for utilities and companies include reduced water treatment costs, whilst other benefits often include improved water quality for hydropower and other uses, which can increase output.

Launched in 2015, the Upper Tana-Nairobi Water Fund was the first in Africa, with impacts to date including 27 million more litres of water flowing in Nairobi daily and increased yields for farmers[8]. The Fund largely targets upstream soil erosion which affects both hydropower production downstream and Nairobi's drinking water (TNC, 2015). The Fund's business case predicts that a USD 10 million investment will result in a return of USD 21.5 million in economic benefits over a 30 year timeframe (TNC, 2015). This includes savings from water and wastewater treatment, increased power generation and increased yields for both smallholder farmers and larger producers.

The 2018 'Day Zero' crisis in Cape Town was one of the triggers for establishing the Greater Cape Town Water Fund. It is focusing on invasive alien species removal in seven catchments. The Fund's Business Case estimates that within five years these activities will generate expected annual water gains of 50 billion litres, and that targeted investment could save 2 months of water a year at one-tenth of the cost of the next available option (building a desalination plant) (TNC, 2018).

5. Climate Finance

Climate finance refers to formal channels through which aid is directed for climate change action (Smith et al., 2019). This includes multilateral institutions such as the Adaptation Fund and the Green Climate Fund (GCF) as well as funding channels through the MDBs, aid agencies and some private sector sources (Smith et al., 2019).

There are a number of challenges for accessing climate finance for NbS (Kapos et al., 2019). These are similar to the challenges for accessing finance generally for NbS and include: a lack of understanding of the links between ecosystems and adaption amongst financial institution staff; lack of recognised performance metrics; and, most existing funding models do not match well to the need for continuous low-level investment over the long timeframes that characterise NbS (Kapos et al., 2019).

Development partners can play a key role in promoting NbS in the context of climate finance. For example, they can work with governments to combine climate finance with large

[8] For more information see: https://panorama.solutions/en/solution/upper-tana-nairobi-water-fund-engaging-business-investment-nature-based-solutions-water

conventional loans: this can create opportunities for effective demonstration of innovative solutions for scaling up and replication (GEF, 2020). For example, to support piloting bioengineering in Vietnam, ABD followed a blended finance approach and bundled a Global Environment Fund (GEF) project grant with a large infrastructure loan (GEF, 2020).

Water security projects can pose challenges for securing climate adaptation finance as it can be difficult to determine their 'additionality'. For example, the GEF typically funds the adaptation part of a project, and requires co-financing for the part of the project that would have been needed regardless of climate change (GEF, 2011). The rationale is that GEF funds can be used to catalyse adaptation in the context of larger development interventions (GEF, 2011). Co-financing can be from development assistance, government budget lines, and NGO and community groups contributions, as well as in cash/grant, loan, soft-loan or in-kind form (GEF, 2011).

The requirement for additionality suggests it is easy to distinguish between adaptation and non-adaptation projects, or the specific aspects of a larger project that are designed to address specific climate impacts, e.g. increased flood risk or greater storage capacity to address water scarcity (Smith et al., 2019). Additionality can create tension between different types of projects, e.g. disaster relief versus WASH for the urban poor (Smith et al., 2019). It is also difficult to determine in individual water projects: due to the uncertainties of the global water cycle it is sometimes impossible to calculate the difference between the investment in a world without climate change and the investment in a world with climate change (Smith et al., 2019). Several institutions such as the GCF have recognized these concerns, and have highly modified or eliminated the requirement to document additionality very strictly. The major development banks have, in contrast, created an additionality reporting framework so that their reports follow similar reporting criteria and standards in how they track and document additionality (Smith et al., 2019).

GEF

The Global Environment Facility (GEF) has supported NbS for water security through its Special Climate Change Fund and its Least Developed Countries Fund. Examples include:

- **Coastal resilience in Timor Leste:** funded through the Least Developed Countries Fund, this programme is working nationally and in seven municipalities to conserve coastal ecosystems, build climate resilience and develop supportive policies and institutional capacity[9]. It addresses both upstream and downstream water security challenges and is being implemented by UNDP, following a project preparation grant.
- **Erosion control in Vietnam:** co-financed by the ADB and UNDP, and executed by Vietnam's Agriculture Projects Management Board, and the Ministry of Agriculture and Rural Development, this project piloted riverbank and roadside bioengineering for erosion control to build community resilience to climate change and flooding (GEF, 2020). It aimed to demonstrate the effectiveness of NbS as well as increase the capacity and technical skills of government personnel and produce technical guidelines for selected bioengineering and associated engineering options (GEF, 2020). Project results include:

[9] For more information see: https://www.thegef.org/news/mangrove-mountain-building-coastal-resilience-timor-leste

the ADB has extended its application of bioengineering to other countries in the region including Lao PDR and Timor Leste (GEF, 2020).

However, climate financed NbS projects confront the same challenges as NbS projects generally. For example, in the case of controlling erosion in Vietnam, bioengineering techniques are not formally included in national design standards and specifications; and, institutional barriers include existing engineering codes, and contracting processes that provide little incentive for cost savings (GEF, 2020).

6. Green and Climate Bonds

The green and climate bond market is growing: it approached USD 200 billion in 2017 (Smith et al., 2019). The global bond market loosely represents privately sourced funding for many infrastructure projects (Smith et al., 2019). The green and climate bonds market was launched in 2007 by the European Investment Bank (EIB) and the World Bank to demonstrate to private investors that funds were being applied to green projects (environmentally friendly 'use of proceeds'), mostly climate change mitigation and adaptation projects (Smith et al., 2019; CBI, 2018).

Green bonds enable investors to direct funding towards environmentally-friendly activities with a comparable risk-return profile to traditional bonds and an additional element of transparency to provide assurance to investors (SBN, 2018). Investors are often large institutional investors such as pension funds, interested in steady returns, long term lengths and credible green credentials (Smith et al., 2017).Green bonds can help meet investors fiduciary requirements (OECD, 2017). For issuers, green bonds attract a diverse range of investors, enhance reputation, and support stronger ESG risk management (SBN, 2018). In 2019, 65% of green bonds were listed on various stock exchanges, with Luxembourg Stock Exchange and the German Stock Exchange being the most popular places to list (CBI, 2020).

Climate and green bonds are largely issued by, and the market for them is largely in high and middle income countries. Europe and North America were the most significant issuers in the market until 2016, when China launched its own domestic green and climate bonds market (Smith et al., 2018). In 2019, Kenya issued its first green bond suggesting the market is diversifying, although the USA, China and France continued to be the top three issuers (44% of global issuance in 2019) (CBI, 2020).

Green bond markets in emerging economies are growing at a slower pace than developed ones, due to factors including relatively small and early stage capital markets, limited investor demand for green offerings and lack of awareness and knowledge (SBN, 2018). However, the green bond market is expected to grow as more emerging economies begin to issue their own certified climate bonds (Smith et al., 2019).

The Water Infrastructure Criteria of the Climate Bonds Standard is an example of best practice in sustainable investments in water infrastructure and green-grey hybrid systems (Frank et al., 2018). It can help to overcome the barriers NbS projects have faced in assessing bond financing from cities, companies and utilities (Frank et al., 2018). The Climate Bonds

Initiative (CBI)[10] has created a set of principles, verification standards and sectoral criteria to ensure investors could have confidence in the climate claims made by issuers and that the projects being financed had accounted for climate risk (Smith et al., 2019). The Water Infrastructure criteria were launched in 2017 and additional resilience criteria for NbS were added in 2018 (Smith et al., 2019).

A 2019 Government of the Netherlands EUR 5.98 billion climate bond was the first to receive certification for NbS for water security and illustrates investors' interest in certified climate bonds (Smith et al., 2019). The bond was issued by the Dutch State Treasury Agency and certified by the Water Infrastructure Criteria of the CBI's Climate Bonds Standard. It raised capital for water and flood defence projects, related to the 'room for the river' approach, as well as renewable energy facilities, and low-carbon transportation systems (Smith et al., 2019). The bond was oversubscribed three times within 90 minutes of being issued (Smith et al., 2019).

At least USD 7 billion in assets for projects have been certified by the Water Infrastructure Criteria for projects in the USA, Nigeria, South Africa, China and Australia (Smith et al., 2019). Examples include:

- **San Francisco Public Utilities Commission (SFPUC)**[11]: Wastewater revenue green municipal bonds of approximately USD 402 million. Proceeds used to fund selected projects as part of the SFPUC Sewer System Improvement Project including stormwater, flood resilience, sewage treatment, wastewater, and associated control system infrastructure upgrades and is intended to address ageing infrastructure, seismic reliability, combined sewer discharges, rising sea levels and localized flooding. Underwriters include JP Morgan and Goldman Sachs amongst others. SFPUC is one of the largest municipal green issuers in the US, issuing USD 1.44 billion. The Wastewater Revenue green bonds are the first to be marketed to offshore investors.
- **Access Bank, Nigeria**: issued in 2019 this is the first Certified Climate Bond from an African corporate. About 80% of proceeds will finance projects related to coastal flood defences to protect against sea level rise in Eko Atlantic City, near Lagos, and the remained allocated to solar energy generation. This is the second certified Climate Bond from Nigeria following a sovereign issuance in 2017 (CBI, 2019).

However, only a small proportion of green bonds are used to support water projects. In 2019, the CBI certified 17% of the green bonds issued: only 9% of certified use of proceeds bonds were in the water sector (CBI, 2020).

New bond tools are being developed including 'sustainability bonds', 'blue bonds' and 'social bonds', with potential to be applied to water security and NbS. In September 2019, the Philippines Rizal Commercial Banking Corporation issued a USD 300 million sustainability bond: the bank's Sustainability Finance Framework includes water and land use as two of its seven eligible green categories (CBI, 2020). The first SDG-linked bond was also issued in 2019 by Italian energy producer Enel (CBI, 2019). This new instrument requires Enel to measure its

[10] The CBI seeks to develop mechanisms to better align the interests of investors, industry, and government to catalyse investments at a speed and scale sufficient to avoid dangerous climate change (CBI, 2018).

[11] For more information see: https://www.climatebonds.net/2018/07/sfpuc-seeks-widen-investor-base-latest-wastewater-infrastructure-green-bonds

performance against several environmental and social key performance indicators and dependant on whether they are achieved, to pay up to 25 points more in the coupon to bondholders (CBI, 2020). Sustainability-focused investing is gaining traction across all asset classes, with an increasing range of strategies and products within equity and debt markets seeking positive environmental and social impact as well as financial returns (SBN, 2018).

7. Project preparation facilities

Private Infrastructure Development Group (PIDG)

PIDG is an infrastructure development and finance organisation delivering infrastructure in the poorest and most fragile counties[12]. It operates along the project life cycle and across the capital structure to help projects overcome financial, technical or environmental challenges, working to create investment-ready, bankable, infrastructure opportunities. It combines a number of different specialist companies that operate at different stages of the project life cycle:

- **TAF-DevCo:** upstream technical assistance provides support to project development and enabling transactions; Viability Gap Funding improves the affordability and or/impact of projects; and other services include transaction advisory services and piloting new programmatic initiatives.
- **InfraCo Africa and InfraCo Asia:** develop bankable projects that can attract debt and equity at financial close and are able to hold equity stakes during construction and operation. This includes project origination, early project development, providing management and capital to address early-stage risks.
- **The Emerging Africa Infrastructure Fund (EAIF) and GuarantCo:** EAIF provides long-term foreign currency loans in sub-Saharan Africa, whilst GuarantCo provides local currency contingent credit solutions, including guarantees to banks and bond investors to develop local capital markets.

In 2018, PIDG funded an innovative water public-private partnership (PPP) project in Rwanda (PIDG, 2019). Barriers to private sector investment in water infrastructure in Rwanda include (PIDG, 2019):

- Lack of long-tenor commercial loans;
- Untested regulatory framework for PPP;
- Uncertainties surrounding the sector's governance framework. The off-taker's financial performance and credit history were unknown, a risk for its counterparties in a long-term off-taker agreement, which forms the basis of a PPP;
- The need to ensure a financial structure that makes water affordable to low-income groups and provides a return to investors.

Through the Kigali Bulk Water project PIDG provided a package of blended finance to support the development of viable infrastructure solutions for Kigali's water problems (PIDG, 2019). PIDG provided government advisory services in the early stages and project structuring stages; facilitated a competitive tendering process; and debt investment and viability

[12] For more information see: https://www.pidg.org/about-us/

gap funding. The project's developer will build and operate the infrastructure, whilst a subsidiary company will sell the water to the government-owned Water and Sanitation Corporation of Rwanda for service delivery and distribution (PIDG, 2019). The Kigali Bulk Water scheme will provide around one-third of Kigali's water (PIDG, 2019).

8. Finance Facilities

Investment facilities set up by governments and international financial institutions can be expected to have a key role in pre-project preparation and in forging credible financing packages (World Water Council, 2015). Dedicated finance facilities, such as the EU Natural Capital Finance Facility, can be used to scale up investment in natural capital projects (OECD, 2017). Such a dedicated facility allows for patient investments with longer tenors than otherwise available (OECD, 2017).

Natural Capital Finance Facility

The European Investment Bank's Natural Capital Financing Facility (NCFF) is a financial instrument that supports NbS for climate change adaptation and biodiversity[13]. It supports projects across the EU and provides tailored loans and investments backed by an EU guarantee. Financed projects must generate revenues or demonstrate cost savings. The Facility is open for project proposals until the end of 2021.

The NCFF consists of a flexible finance facility and a technical assistance support facility (EIB, n.d). The former typically provides direct/intermediated debt or investing in equity funds, whilst the latter provides grants for project preparation, implementation, monitoring and evaluation (EIB, n.d.). Current projects supported by the NCFF include the Irish Sustainable Forest Fund and green infrastructure for urban resilience in Athens[14]

Water Finance Facility[15]

The Water Finance Facility (WFF) mobilises large-scale private investment from domestic institutional investors to support water and sanitation service delivery. Established with seed funding from the Netherlands' Ministry of International Trade and Development Cooperation, the WFF aims to develop local water financing facilities in a number of developing countries. These national facilities will catalyse domestic private institutional, large-scale and long-term capital market financing in the water sector through bond financing. The WFF provides early stage financial development support and expertise for the organisational set-up, financial and legal structuring of bonds and loans, and compliance with regulatory authorities. In countries with no history of, or low issuance of water-related infrastructure securities, institutional investors

[13] For more information see: https://www.eib.org/en/products/blending/ncff/index.htm#

[14] For more information see: https://www.eib.org/en/products/blending/ncff/project-examples/index.htm

[15] For more information see: https://waterfinancefacility.com/ & https://www.oecd.org/water/OECD-GIZ-Conference-Background-Document-Water-Finance-Facility.pdf

may require some type of credit enhancement such as guarantees to invest in the first bond launch.

The WFF aims to achieve financial self-sustainability. Its goal is to catalyse the issuance of an aggregate of circa EUR 1 billion in water bonds in 5-8 countries (providing approximately 20 million people with sustainable WASH access). This will allow operations to be maintained at scale via interest revenues (the margin between borrowing and lending rates) without the need for further donor support.

Kenya Pooled Water Fund

The Kenya Pooled Water Fund (KPWF), the first Fund established under through the Water finance Facility, is a non-profit established to provide water utilities [water service providers (WSPs)] with access to capital market financing for their water and infrastructure needs. The KPWF issues long tenor bonds in local currency to investors including domestic pension funds and other institutional investors. The bond proceeds are on-lent to WSPs to fund projects. WSPs pay back the loans over 15 years and bond repayments are made to investors. The KPWF lowers investment risk in a number of ways: one, reviewing the creditworthiness of WSPs; engaging public regulators to get an approved public security; pooling loans; and, providing guarantees, which act as a credit enhancement and make the bond more secure. A key benefit of KPWF bond financing is that longer-term financing lowers the annual cost of financing (by comparison with short-term commercial bank lending), allowing for lower tariff increases to service debt.

Kenya Innovative Finance Facility for Water (KIFFWA)[16]

KIFFWA is an impact investor that mobilises new forms of finance for the water sector. It provides early stage capital and expertise during the project development phase to structure initiatives in such a way that they become investment-ready and attractive for different types of financiers (NWP, 2020). It was established by the Netherlands Water Partnership with funding from the Embassy of the Kingdom of the Netherlands (NWP, 2020).

KIFFWA acts as a co-developer of an initiative and 'de-risks' the lead developer of that initiative during the development phase (typically the most risky phase of any initiative) (NWP, 2020). It funds a maximum of 50% of project development budget and at financial close of the project, the KIFFWA grant is converted into a one-off fee, an equity stake or a loan (NWP, 2020). At the end of September 2019, KIFFWA had a pipeline of 14 initiatives across a range of water areas (including drinking water, hydropower, IWRM, and sanitation) with an estimated total size of Eur 256.6 million: 9 of the 14 initiatives received approval from the Board of Directors to arrive at and execute a Joint Development Agreement (NWP, 2020). One of the first initiatives it invested in is the Kenya Pooled Water Fund. Next steps include exploring expanding to other countries in Africa, starting with Rwanda and establishing a Blended Finance Facility to act as a developer-investor (NWP, 2020).

[16] For more information see: https://kpwf.co.ke/

9. Private sector companies

Corporate investment in NbS is growing as more and more companies are exposed to water risks that could substantially disrupt their business (Frank et al., 2018). Risks include physical (too much or too little water, or poor quality water), reputational and regulatory: physical risks often lead to pressure to act (Frank et al., 2018). Evidence from 49 companies from three sectors (food, beverage, and metals & mining) that reported their risk responses through CDP in 2015, 2016 and 2017 illustrates that (Frank et al., 2018):

- Strategies to tackle risk are increasingly going beyond-the-fence (water resources beyond the direct control of the business) and include NbS, grey infrastructure, waste water reuse, access to WASH and agricultural efficiency.
- NbS are rising in popularity (increasing from 32% in 2015 to 40% in 2017) and rose to become the most popular solution. Meanwhile, the use of grey infrastructure (damming and rechannelling rivers) decreased from 36% to 23%.
- WASH solutions for nearby communities are popular, especially amongst mining companies. This is despite being less practiced compared to previous years (dropping from 43% to 39%).
- Wastewater reuse from other utilities or using discharge water for irrigation purposes (23% in 2017).
- Businesses operating in the food sector often engage with local farmers in the effort to improve agricultural practices, such as more efficient irrigation systems (26% in 2017).

Frank et al. (2018) argue that there is recognition amongst water conscious companies that if other water users mismanage their water use, they may run out of water despite improving their own water efficiency. Consequently, businesses seem to have realised that the key to sustainably tackling upstream water risks is to move beyond ‘symptoms’ in their own operations to root causes of water risks, such as poorly managed abstraction of groundwater or unsustainable land management, and are engaging with the watershed they operate in (Frank et al., 2018).

NbS can also have carbon benefits and there may be possibilities to link to carbon finance (Frank et al., 2018). For example, Danone is restoring mangroves in India and Senegal through their livelihoods fund to remove carbon and manage water (Frank et al., 2018). A large Swiss retailer has also invested, through carbon finance, in watershed reforestation together with its suppliers and smallholders in Kenya, to reduce sedimentation and improve local livelihoods (Frank et al., 2018). Linking NbS and carbon benefits could be attractive for companies who are looking to manage their water risks and lower carbon emissions within their own value chain, or certify products as ‘carbon balanced’.

New finance instruments are being developed that enable companies to finance NbS using public and private capital (Frank et al., 2018). This includes preferential interest rates on short and long term loans, undertaking investments in NbS to lower insurance rates, and using public funding to de-risk private investments. By working collectively within a watershed, and across supply chains, corporates are collectively financing interventions, thereby lowering costs for each stakeholder (Frank et al., 2018).

10. Blended finance

Blended finance can help to de-risk projects and reduce the high initial costs of projects, making them more attractive to private investors (OECD, 2017). It uses development finance to attract private finance, especially during project preparation and development and can significantly improve the risk-return profile of water-related investments for commercial financiers (OECD, 2017; OECD, 2018). Between 2012-15 official development finance interventions for a select number of instruments mobilized an estimated additional USD 1.5 billion of private resources (OECD, 2018). The main leveraging instruments in this sector were guarantees (USD 1 billion), followed by syndicated loans (USD 388 million) (OECD, 2018). 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 (OECD, 2020).

The Philippine Water Revolving Fund

Established in 2008 by the government of the Philippines, USAID and the Japan Bank for International Cooperation, this fund blends ODA and domestic public funds with commercial financing to lower borrowing rates and market water and sanitation projects to private finance institutions (World Bank, 2016). It provides loans to water service providers (local government units and water districts) to finance local water and wastewater projects, with loan repayments revolved to finance other projects (World Bank, 2016). Changes to financing policies for water service providers in 2004 led to them being categorised according to creditworthiness, with those qualifying as creditworthy expected to transition from government funding to market-based finance (World Bank, 2016). However, local commercial banks were not familiar with utilities and saw them as weak and inefficient (World Bank, 2016).

By blending ODA, the Fund was able to mobilise additional domestic commercial finance for water utilities (World Bank, 2016). The fund mechanism included two complementary financial market-enabling components: a credit rating system to help inform investors, and a water project appraisal training programme to build the capacity of lenders with little prior experience of investing in the water sector (World Bank, 2016). In addition to the financing mechanism, the programme included operational strengthening to help utilities improve internal operations and creditworthiness, thereby allowing them to develop bankable projects; and, regulatory reform to improve the enabling environment for commercial finance lending to water utilities (World Bank, 2016). Between inception and 2014, the fund channelled more than USD 234 million in loans for water and sanitation projects to finance 21 projects, with approximately 60% of finance coming from private banks, and benefitting an estimated 6 million people (World Bank, 2016). Lessons learned from the programme include (World Bank, 2016):

- Blending through the revolving fund has resulted in lower borrowing costs for water service providers and longer tenors;
- The different credit enhancements offered with PWRF lowered investment risk;
- Technical support and regulatory changes helped to improve the enabling environment and access to commercial finance, including helping both investors and utilities assess risk.

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