Financing for Water

Financially-Sustainable Interventions in Water Resource Management

ICED
Infrastructure & Cities for Economic Development

This summary paper looks at financially sustainable interventions in water resource management. It forms the final part of a four-part series of summary papers based on research, commissioned through ICED, on innovative financing approaches to mobilise public and private financing for freshwater management.

To move beyond donor funding for water resource management, investment opportunities need to convincingly demonstrate the likelihood of repayment, on the terms and conditions proposed by project sponsors to financial entities interested in the investment. The following section looks at ways in which financing has been successfully mobilised for water resource management, drawing from examples that show the mobilisation of hundreds of millions of dollars (in 2015, for example, cities, companies and water utilities collectively invested USD 657 million in watershed restoration and protection),[1] before also addressing the more universal concepts of project preparation and creditworthy institutions. More important, the following section looks more deeply at water suppliers, from water sources through to water users, and identifies clear opportunities for the financial sector, which is driven by different goals than more charitable sources of funds, to meaningfully contribute.

Accordingly, the following pages examine potential financing flows from upstream sources. This includes the concept of the greening of grey infrastructure and thinking more holistically about how waste products can become financially-meaningful inputs in a circular economy, to encouraging bulk users (agricultural and industrial) to become more water-efficient. Further, there is often a marked disconnect between downstream utilities and upstream users, but these cannot be viewed as independent factors; utilities that are wasteful in their practices can be an unintentional tremendous draw on upstream water sources, and a failure to properly invest in these critical intermediaries can lead to dramatic negative consequences. As this is, for many sources of capital, the initial exposure to the water sector is through these utilities, a deliberate focus on enhancing their financial livelihood can prove beneficial in the future.

Water Sources

Greening Grey Infrastructure

Financial flows for traditional (grey) water infrastructure is often dependent on one bottom-line metric: the terms and conditions of repayment from the project sponsor to the project financiers. Through more creatively incorporating nature-based solutions into large capital-intensive investments with a long-term horizon for repayment, water resource management projects (like dams, and reservoirs) are harnessing the power of nature to deliver more sustainable outcomes. Additionally, the use of green solutions can reduce operating expenditures associated with a project over the entire investment's lifetime, demonstrating an additional benefit of the symbiotic relationship between natural and man-made solutions.[2]

An economic analysis of the São Paulo Watershed Conservation Plan[3] revealed that green infrastructure, in the form of watershed restoration, was a worthwhile investment. Two scenarios were considered: the first was restoring the watershed; and the second, continuing "business as usual" (BAU), dredging the water supply reservoir and incurring high water treatment costs. A comprehensive cost-effectiveness analysis reveals that watershed restoration is USD 4.5 million cheaper than the BAU case over a 30-year period using a 9 percent discount rate.

[1] Browder, et. al. (2019) Integrating Green and Gray : Creating Next Generation Infrastructure. Washington, DC: World Bank and World Resources Institute.
[2] Ibid.
[3] Ozment, et al. (2018) Natural infrastructure in Sao Paulo's Water System. Washington, DC: World Resources Institute.

DC Water, the public water utility in Washington, DC, issued a municipal environmental impact bond in 2016. It was structured to share performance risks associated with green infrastructure, rewarding investors if the green project's performance exceeds expectations, and limiting financial risk to DC Water if it underperforms. The 30-year, USD 25 million tax-exempt bond was placed with two private investors, and its proceeds are providing all the up-front capital needed for construction of three green infrastructure installations to improve the incidence and volume of combined sewer overflows by better managing stormwater in Washington, DC. The bond has an initial 3.43% interest coupon payable semi-annually for the first five years. At the five-year mark, a one-time USD 3.3 million contingent payment may be made to investors or DC Water, based on performance evaluation and U.S. Environmental Protection Agency determination of the success of the installations, as follows:

- if the installations reduce stormwater runoff more than expected, DC Water makes an outcome payment to investors;
- if the installations reduce stormwater runoff less than expected, investors make a risk-share payment to DC Water;
- if the installations reduce stormwater runoff as expected, just the basic principal and interest is due from DC Water to investors.

This model encourages investors to do due diligence, as they have a financial stake in the performance of the project; investors funding sustainable, innovative water management solutions such as this may also gain reputational benefits.

These types of interventions, explored in detail in a recent report from the World Bank and the World Resources Institute, help to mainstream green elements introduced in tandem with traditional grey infrastructure.

Forest Bonds: Improving Water Quality through Indirect Investments

Aligning market incentives for financial sustainability with environmental concerns, Forest Resilience Bonds (FRB) help to restore key watersheds before natural disasters, particularly fires, strike. The FRB deploys private capital to fund proactive forest restoration. Beneficiaries, including private landowners and public agencies and utilities, repay investors (such as foundations and state pension funds) over time. Targeted benefits such as decreased fire severity, protected water quality, and increased water yield are monetized through contracts based on a pay-for-success model designed to share cost savings among beneficiaries while also providing competitive returns to investors. By bringing together multiple payers to share the cost of restoration and tying payments to realized economic benefits, the FRB creates a compelling economic case for landowners as well as investors.[4]

This intervention, successfully piloted in the United States, has successfully crowded in private investors like insurance companies, demonstrating that water resource management efforts can be couched in a broader context to incentivise the flow of funds from financiers whose motivations may not initially be line with environmental concerns.

Alien Invasive Species: A Place in the Circular Economy

The removal of alien invasive species as proposed by the Nature Conservancy through its water funds addresses the problem from a technical perspective, but fails to meaningfully consider financial sustainability. An alternative approach incorporates looking at these species, upon their removal, as a productive input to a saleable good rather than a waste by-product for disposal. This has been demonstrated to be successful in Lima, Peru, where alien invasive species were used as the binding for concrete bricks manufactured for incremental upgrades for in-situ slum housing. It is currently being experimentally tested in South Africa, where the bricks have also been demonstrated to be flame-retardant at a higher threshold than traditional building materials.[5]

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[4] Blue Forest Conservation (2017) Fighting Fire with Finance: Forest Resilience Bonds

[5] Proceedings of Merensky Young Scientist Seminar: Valuation and Evaluation of Forest Resources (2018). 'Finding Value in Waste: An economic feasibility assessment for the manufacture of wood polymer composites using invasive alien plant'

This intervention, under consideration in South Africa, can lead to financial sustainability of a natural solution that leads to better efficiency in water resources management.

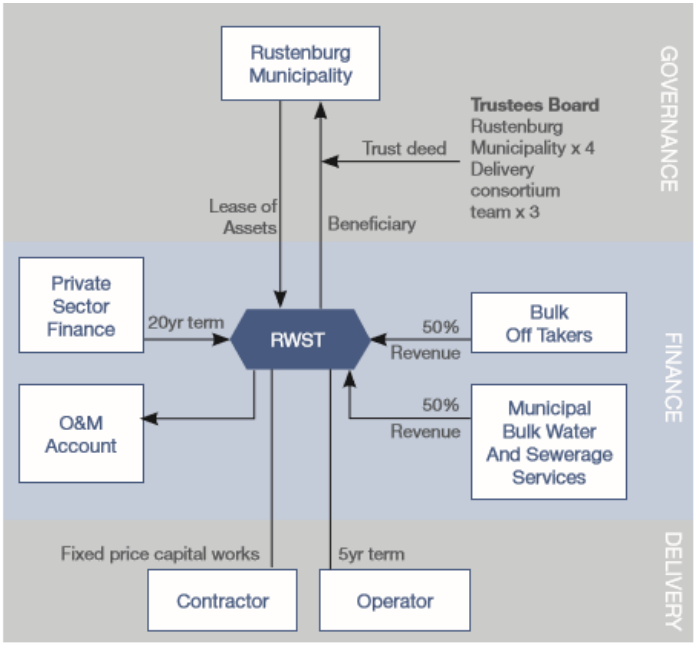
Industrial and Agricultural Users

The Role of Multi-National Corporations in Financing Scarce Water Resources

Multi-national corporations that are intensive water users can play a large part in helping to alleviate demands on the system through two key types of interventions: 1) a reallocation from using potable water for non-potable industrial uses and 2) upstream investments in water treatment facilities. In sub-Saharan Africa, both of these have had tremendous impacts on water use and resource management.

In the South African intermediary city of Rustenburg, local mines teamed with the city to create a Special Purpose Vehicle (SPV) with a 25-year concession to finance, upgrade and operate water infrastructure. The key to the success of the SPV was the signing of a long-term offtake agreement with the mines for the provision of non-potable treated wastewater, which forms 50% of the SPV's revenue. The capital costs of the investments of the trust, approximately USD 59 million, were able to be structured as long-term financing due to the presence of the industrial bulk off-takers with strong creditworthiness and the ability to demonstrate sound financial management coupled with long-term future revenue – see Figure 1.

Figure 1: Structure of Rustenburg water infrastructure SPV[6]



This intervention represents an opportunity to increase the flow of funding into the water sector through the use of creditworthy borrowers with strong balance sheets, which ultimately yields higher levels of efficiency of water usage.

The Use of Non-Potable Water by Extractive Industries

As mentioned in the above example of the city of Rustenburg, as the mine is not dependent on potable water for its daily business, it was able to achieve the same level of productivity with water that was not treated to the same extent. More specifically, the mines had previously relied on freshwater that was imported from neighbouring catchments. The move to the use of non-potable has

biomass and recycled thermoplastic waste in South Africa' and 'The Feasibility of Wood Plastic Composite Materials as building materials for RDP houses.'

[6] Water Scarcity Solutions (2016) Innovative financing arrangements and waste water re-use: Rustenburg, South Africa

enabled the re-allocation of the imported freshwater to the municipality thus increasing the overall freshwater resource that is available in the catchment.

This intervention, currently implemented in Rustenburg and other places where extractive industries represent the majority of the employment opportunities, can lead to a significant decrease in demand on water resources, releasing upstream demand.

Water Risk for Agricultural Producers

In the Middle East, Israel has demonstrated how to reduce water-dependence; in the past fifteen years, its agricultural production has continuously grown, making it a net exporter, with 80% of its agricultural products shipped overseas and with the highest ratio globally of crop-yield per cubic metre of water.[7] Investors in Israeli agricultural enterprises strongly consider the level of water dependency before originating a loan.[8]

This intervention, applied in Israel and conceptually being piloted by CDP globally, may lead to a virtuous cycle where financiers and agricultural producers both see benefit in investments in upstream technologies that lead to a decrease in farm-loan defaults.

Utilities

Non-Revenue Water: City of Pretoria

The City of Pretoria loses hundreds of thousands of dollars every year due to non-revenue water, with the largest losses being concentrated in physical loss/leakage, theft from the system, and inefficiencies in billing and collection. Cities across South Africa, including Pretoria, lack the finances to meaningfully address these challenges within their existing budgets, and their management typically prioritize other elements above these cost-saving measures as they can be expensive and may not be in line with what the electorate deems as important. With help from the Development Bank of Southern Africa, the city has been able to design and begin implementation of the Water Conservation and Water Demand Management Programme, with the overall objective being an increase in city revenue and service delivery accompanied by a decrease in water demand in a water-scarce country.[9]

This intervention, currently being piloted in Pretoria, can lead to a significant decrease in demand on water resources, releasing upstream demand.

Direct Potable Reuse: Windhoek, Namibia

Since 1968, Namibia's capital city of Windhoek has used direct potable reuse as part of its strategy to deliver water to its residents. Globally, water reuse has been recognised for decades as a key component of sustainable water management in water-scarce environments. Water reuse has not been widely implemented in much of the global south due largely to negative public perception. For example, water reuse has previously been proposed for South African municipalities – the eThekwini (Durban) Municipality and the City of Cape Town – but was rejected due to public concerns in favor of seawater desalinisation. Treating wastewater for potable water reuse using reverse osmosis, however, requires about one-third the energy requirement of ocean desalination and costs approximately 30% less.[10] Because of these cost savings and, more important, a persistent drought across southern Africa, Windhoek increased its reliance on reused water from 16% to 29% - see Figures 2 and 3 below.

[7] OECD Observer (2015) Innovations overcoming water scarcity: Israel
[8] Interview with Yehudit Singer, Bank Hapoalim.
[9] Presentation for the OECD-GIZ Conference on 'The Role of Finance: Closing the Financing Gap for Water.' Interviews with DBSA.
[10] Water Research Commission (2015) Best Practices on Cost and Operation of Desalination and Water Reuse Plants

Figure 2: Windhoek Water Supply Before 2015/2016 Drought[11]

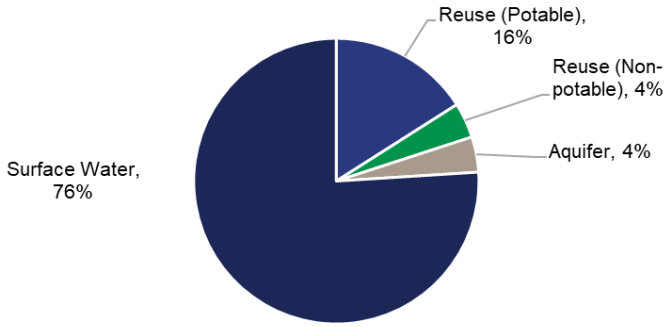
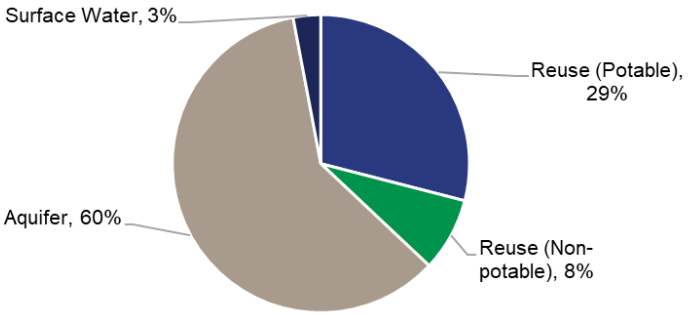


Figure 3: Windhoek Water Supply Drought Mitigation[12]



Technically, treating reused water up to potable standards is straightforward. The technologies and systems required to reliably treat water, even water from domestic and industrial sources, are well established and readily available. The most significant impediment to more widespread adoption of water reuse is public perception. In an effort to change this perception, Windhoek uses stringent monitoring of water quality and a robust public education campaign.

The operating costs of direct potable reuse are far less expensive than other options. The total operating costs amount to GBP 0.61/m^3 (capital costs GBP 0.10/m^3, operational costs GBP 0.51/m^3), which is far cheaper than the other options for importing water to Windhoek (e.g. transport from the Okavango River or desalination at the coast). Capital costs for the design and construction of the facilities, amounting to EUR 12.5 million, were financed through long-term loans from the European Investment Bank and Germany's KfW.[13]

This intervention, currently operational in Windhoek and under consideration in other cities around the world, can yield an alternative source of potable drinking water, particularly since the water (in coastal and riparian cities) is traditionally treated to high standards before release into the ocean.

Community Engagement: Lusaka, Zambia

The Lusaka Water and Sewerage Corporation sources its water supply from boreholes directly underneath well-landscaped roundabouts. Community members will often use these spots as destinations for photos, and the locations themselves are viewed as important in the fabric of each ward. Although not a direct financial intervention, community engagement and awareness about the water that beautifies their gathering-spots and, more important, is piped into their homes can be incorporated as an important part of the overall downstream maintenance of water resources in an urban environment.

[11] USAID (2018) Water Reuse Gets a New Take in South Africa
[12] Ibid.
[13] Water Research Commission (2015); City of Windhoek (2018) Potable Water Reuse as a Component of Windhoek's Water Supply; Australian Water Recycling Centre of Excellence (2014) Global Potable Reuse Case Study

Traditional Ways of Financing Bulk Water Infrastructure: Keur Momar Sarr 3, Senegal

The Senegalese government has successfully solicited funding from a range of development finance institutions for the installation of a significant water treatment facility, to improve access to water for some of Senegal's most vulnerable populations as well as to support the agricultural sector. The main expected outputs of the full project are:

1. The construction of a third water treatment and pumping plant in Keur Momar Sarr (KMS3) with a production capacity of 100,000 m^3/day;
2. The laying of a 216-kilometre water-supply pipeline between the treatment plant and Thies and between Thies and Dakar;
3. The construction of two water storage reservoirs, each with a capacity of 10,000 cubic metres in Thies, and three distribution reservoirs in Thies, the Blaise Diagne International Airport (AIBD) and Diamniadio Urban Centre;
4. The installation of structured supply and distribution systems;
5. A 792-kilometre extension of the network and installation of 85,000 social connections;
6. The construction of support infrastructure for the production and marketing of agricultural and market-garden products and;
7. The development of an information, education and communication (IEC) programme to sensitise and assist the population before, during and after project implementation.

The project, upon full execution, will improve drinking water supply for 3 million people living in the project area and create or preserve over 100,000 new job opportunities in the agricultural sector, with an estimate that approximately 48% of the beneficiaries are women.[14] The project is estimated to be completed by 2020, and has been financed by the following DFIs:

Source	Amount (EUR million)
African Development Bank	65
European Investment Bank	100
French Development Agency (AFD)	92
Government of Senegal	27.36
Islamic Development Bank	133.48
World Bank	6
Total	**423.84**

This intervention is the standard case for investment in water infrastructure across much of the developing world, where DFIs bear the burden of covering the capital costs for new projects. The presence of DFIs, who can act as a catalyst for more profit-oriented investors/lenders, can lead to a system-wide change where investment banks and institutional investors feel comfortable with infrastructure investments.

Financing Bulk Infrastructure through PPPs: Kigali, Rwanda

Kigali has a population of 1 million and rising fast placing a strain on infrastructure services in the city. Although water coverage rates are good by African standards at over 80%, the majority of customers are served by communal stand posts and supply is intermittent because of limited water production capacity.

The large-scale water treatment plant, due for completion in 2020, will produce 40 megalitres of clean water per day, equivalent to one-third of Kigali's total supply. Water will be drawn from the Nyabarongo River to be treated before distributing a clean supply to up to 500,000 domestic, commercial, and industrial customers.

[14] African Development Bank (2016) Project Appraisal Report – Reinforcement of Multiple-Use Water Supply Along the Louga – Thies – Dakar Road from the Keur Momar Sarr Treatment Plant

Three Private Infrastructure Development Group (PIDG) companies helped finance the project at different stages of its development - Emerging Africa Infrastructure Fund (EAIF), the Technical Assistance Facility (TAF), and DevCo.[15] Kigali Water benefited from a well-coordinated package of blended finance. EAIF led the arrangement of financing for the USD 60.8 million plant, providing a USD 40.6 million, 18-year-long term loan jointly with the African Development Bank and securing investment from other PIDG companies. The balance was provided as equity finance by Metito, who developed the project.

DevCo—the specialist PPP advisory facility operating through PIDG and implemented by IFC—provided funding to help structure the transaction and its competitive tender. TAF granted US$6.25 million in crucial viability gap funding to reduce up-front costs and allow the government to expand the number of people connected to a reliable water supply without raising tariffs. 150,000 customers are expected to benefit in the first phase. This combined support gave developer Metito and the Rwandan Government the necessary assurance and security to proceed with an innovative plan that was affordable for all parties and end users.

The original scope of the project included both the water treatment plant and distribution network. During the development of the project it was concluded that it would be more efficient for the municipal utility to deliver the distribution network infrastructure. An agreement was reached between Metito and the government to split the construction of the project. The distribution network infrastructure is delivered by Rwanda's water utility WASAC, supported by a separate financing package from the Government of Rwanda and the African Development Bank.[16]

This intervention, successfully tested in Rwanda and under consideration in Malawi, represents a mechanism considered to be pioneering in the developing-markets context as it pairs the financial resources and motivations of the private sector for profit with the expectations of the public sector as far as provision of service.

Capital Markets Investments into WASH providers: Kenya Pooled Water Fund (KPWF)

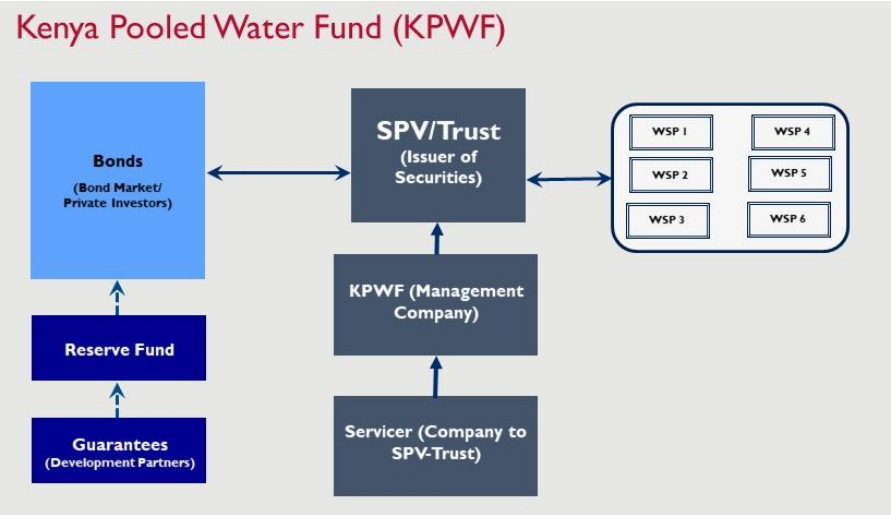
Since the devolution of power to counties in 2011, Kenya's water service providers (WSPs) have been increasingly looking for competitively-priced, long-term funding for their investments in distribution networks. DFIs, and later domestic commercial banks, have provided financing to the most creditworthy of the WSPs, but this represents only 60%, or 60 billion KES, of the total financing need in Kenya. One of the major obstacles to the achievement of full financing, as articulated in the Kenya Water Vision and SDG 6, is the inadequacy of conventional sources of funding to realise the required infrastructure investments and the lack of a mechanism to access private sector financing.

In response, development aid agencies have designed the Kenya Pooled Water Fund (KPWF), a financing mechanism intended to provide water utilities with access to capital market financing. The KPWF will help bridge part of the gap by tapping local, and possibly global, institutional investors via the issue of tax-exempt "infrastructure" bonds. A key benefit of KPWF bond financing is that longer-tenor financing lowers the annual cost of financing (as compared with short-term commercial bank lending), allowing for lower tariff increases to service the debt.

The inaugural bond issuance of the KPWF, planned for mid-2019, is anticipated to raise approximately KES 3 billion, or GBP 22.5 million. After demonstrating the success of this issuance, the KPWF plans to issue on an annual basis for the foreseeable future at sizes dictated by Kenya's creditworthy WSPs and their financing needs. The KPWF will be replicated in countries across sub-Saharan Africa and south/southeast Asia.[17] See Figure 4 below for detail on the structure.

[15] PIDG (2019) Annual Review 2018: https://www.pidg.org/wp-content/uploads/2019/06/PIDG_2018_Annual_Review_MAY2019_Final_Digital-4.pdf
[16] Cattaneo (2018) Kigali Water: Lessons from one of sub-Saharan Africa's first water PPPs
[17] Kenya Pooled Water Fund

Figure 4: Structure of Kenya Pooled Water Fund[18]



This intervention, underway in Kenya with expectations of replication across sub-Saharan Africa and south/southeast Asia, is important for both the lessons learned from project and entity preparation on each of the WSPs and the demonstration of investor appetite for a capital-markets instrument that allows for investment into the water sector.

Financial Sustainability

A recurring theme throughout this paper has been the need for bankable and creditworthy institutions that sponsor investible projects at all points in the water cycle, whether in upstream catchment areas or further downstream from utilities and municipalities. To ensure that projects will ultimately attract the eye of interested investors/financiers, there are a series of necessary steps to be considered.

International best practices have identified a logical flow that is:

1. **Establishment of creditworthiness for the sponsoring entity**, achieved through capacity-building on financial management, corporate leadership, institutional relationships between the entity and other related stakeholders in both public and private sectors
2. **Completion of comprehensive project preparation** to ensure technical and financial sustainability of proposed investment opportunities, including a cost-benefit analysis for the introduction of pioneering or non-traditional investments
3. **Finalisation of an entity-wide capital investment plan** that matches the suite of projects with entity-wide growth for the project sponsor, holistically balancing proposed infrastructure investments with their financial needs and confirming an anticipation of project timing
4. **Prioritisation of projects** (identified in step 2) in harmony with capital investment plan (completed in step 3) on the basis of financial and technical merit
5. **Identification of appropriate financial tools and mechanisms** to deliver prioritised projects in capital investment plan, particularly when looking at tenor, investment appetites of funders, and other key considerations
6. **Introduction of projects**, preferably with associated credit enhancements to investors/lenders likely to be interested based on alignment of investment objectives, pricing, repayment period, and other conditions.

While there are few instances of this being successful in water resource management, there are examples of transactions, either successfully closed or otherwise in progress, across the larger water sector. Some organisations are actively pursuing limited-scope interventions along the above

[18] Designed by author.

chain (for example, the World Wildlife Fund is facilitating relationships between project sponsors and project financiers), but there is significant room for scaling these up.

Common Threads from Investors and Facilitators

Investigation into potential innovations in financing is incomplete without interviews of both sources of finance and those entities that help to facilitate the flow of capital. During interviews, respondents shared the same concerns:

- **Traditional methods of water resource management/conservation are hard to fund and miss market finance completely.**
- **Despite years of discussion on the topic, there is no universally-approved definition for green projects, which is challenging both at the time of origination of transactions and during later reviews of compliance.** This is particularly worrisome for investors with portfolios where they are mandated to invest a certain percentage into 'green projects' and where they may be in violation of the expectations of the portfolio guidelines if projects lose their green accreditation. This is a challenge for both DFIs as well as for domestic investors from lending institutions around the world.
- **The public sector, which has been broadly defined to include development finance institutions (DFIs), can sometimes 'crowd out', rather than 'crowd in' private sector investors.** As DFIs offer financing at concessionary rates with accompanying technical assistance, it is difficult for the private sector to be competitive with their market rate offerings. Additionally, Chinese financiers are approaching the same limited pool of creditworthy institutions sponsoring bankable projects at rates that are comparable to those from the DFIs, and with a faster speed to close than DFIs or the private sector.
- **At many conferences, people talk about the lack of 'bankable projects' when the challenge is a combination of a lack of 'bankable projects' and 'creditworthy institutions' with good corporate governance, strong financial management, and a sense of how the overall entity thesis is financially sustainable.** The lack of a common language or definition for financial vocabulary or appropriate sequencing among key stakeholders – financiers, sponsors, and facilitators – is increasingly problematic as entities or projects are being proposed for consideration for transactions without sufficient readiness. Financiers, who often look at infrastructure investment opportunities without a holistic background in the sector, may ultimately choose to reject considerations of the sector if entities and projects do not conform to traditional expectations of bankability.

Concluding notes on section

Unsurprisingly, there is a strong correlation between the comments of the investors and the findings from the case studies. The sources of finance that led to the observations outlined above unanimously pointed to a lack of entity creditworthiness (regardless of the placement along the financing spectrum) as well as a lack of project bankability when viewed in terms of pure numbers. The regularity of negative sentiment about the water sector's financial sustainability, even in the face of successful demonstrations, highlights the need for a targeted set of interventions from development aid agencies, who can act as facilitators.