OECD Studies on Water

Financing Water Security

Models and Approaches for Investments that Last



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MODELS AND APPROACHES FOR INVESTMENTS THAT LAST

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Preface

Water is fundamental to economic prosperity, social well-being, and environmental resilience. Yet it can no longer be taken for granted. Growing pressures from population growth, urbanisation, environmental degradation, and more frequent extreme weather events are placing unprecedented stress on water resources worldwide. In this context, the way we finance and structure water-related investments will be decisive in shaping development trajectories for decades to come.

This report comes at a critical moment. According to the Global Commission on the Economics of Water, underinvestment in water security is already projected to generate significant macroeconomic losses, equivalent to around 8% of global GDP by 2050. At the same time, water and sanitation investments yield substantial returns, generating on average around USD 4 in benefits for every dollar invested through improved health, education, food security, and environmental outcomes, according to UN estimates. Bridging this gap between costs and benefits requires not only mobilising more finance but also ensuring that such funds are deployed more effectively.

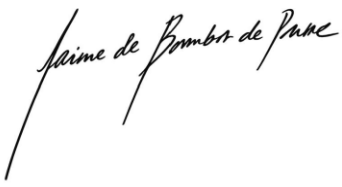
Too often water-related investments are constrained by limited access to funding. This is compounded by inefficiencies in resource allocation and utilisation, particularly in relation to operations, maintenance, and results delivery. Tariffs and revenue structures often remain insufficient to ensure financial viability, while investment decisions continue to prioritise short-term bankability over long-term resilience and impact. As a result, critical infrastructure may underperform or deteriorate prematurely, undermining both service delivery and broader development outcomes.

Against this backdrop, the report's core message is that how finance is structured matters as much as how much is mobilised. Improving water security requires rethinking not only how much we invest, but also how we invest. This includes better aligning incentives with long-term outcomes, strengthening accountability for results, and mobilising underused sources of capital seeking impactful opportunities.

The report highlights four complementary financing approaches with strong potential to improve the durability and effectiveness of water-related investments: bond finance, mobilising finance at scale over the medium to long term; Islamic finance, as a rapidly growing and impact-oriented source of capital; results-based financing, which links disbursements to verified outcomes; and public–private partnership models, which require careful structuring to ensure balanced risk-sharing and long-term value creation.

By examining these approaches, the report supports policymakers, financial institutions, and investors in designing financing strategies that not only close funding gaps, but also strengthen resilience, equity, and long-term water security. More robust water finance is not simply a sectoral priority, it is fundamental to achieving broader development goals in an increasingly water-stressed world.

Jaime de Bourbon de Parme
Environment Director
OECD



Foreword

This report contributes to a broader body of OECD work on water, biodiversity and climate, with a particular focus on financing models that generate lasting outcomes.

The report was developed in the context of the Roundtable on Financing Water, a joint initiative of the OECD, the World Water Council, the Netherlands and the World Bank. The Roundtable draws upon political leadership and technical expertise, with the ambition of facilitating increased financing of investments that contribute to water security and long-term growth. More specifically, the research work conducted in preparation for the *12th meeting of the Roundtable on Financing Water* led to this publication. This Roundtable meeting took place at the Islamic Development Bank's headquarters in Jeddah, Saudi Arabia, in April 2025, and gathered 400 leaders and experts on finance and water.

Water-related investments are instrumental in advancing development, not only by enhancing water security but also by supporting other economic sectors, including agriculture, industry, energy, health and education. Yet, the long-term viability of some water-related investments remains an area of concern across both OECD and non-OECD countries.

The report aims to explore funding and financing models that can strengthen the long-term viability of water-related investments or mobilise capital at scale for durable investments in water. It focuses on bond finance, public–private partnerships, results-based finance, and Islamic finance instruments - each offering the potential either to mobilise under-used pools of capital seeking impact-driven investment opportunities or to support the design of financial instruments aligned with lasting outcomes.

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Aude Farnault of the OECD Environment Directorate (ENV) is the main author of this report and led the work to develop this publication. Furkan Kavuncu (ENV) co-authored the chapters on bond finance and Islamic finance and other sections of the report. Goufrane Mansour (Ecopsis) co-authored the chapters on public-private partnerships and results-based financing. Sophie Trémolet (ENV) provided overall direction and quality control on the report. The report was prepared under the overall guidance of Walid Oueslati, Head of the Climate, Biodiversity and Water Division (ENV). The author team is grateful to Jennifer Timmins (ENV) and Den Bastunali (ENV) for managing the report layout.

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This report is based on analytical work conducted in preparation for the *12th meeting of the Roundtable on Financing Water*, held at the IsDB Headquarters in Jeddah in April 2025, and on the outcomes of the meeting. The Roundtable on Financing Water is a joint initiative of the OECD, the Government of the Netherlands, the World Water Council and the World Bank.

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Executive summary

Water-related investments are instrumental in advancing long-term development, not only by enhancing water security but also by supporting other economic sectors, including agriculture, industry, energy, health and education. Underinvestment in water security is expected to result in economic losses equivalent to an average of 8% of global GDP by 2050, according to the Global Commission on the Economics of Water. In low-income countries, losses could reach 10% to 15% of GDP. Each dollar invested in water and sanitation can generate approximately USD 4 in benefits through improved health, education, food security and environmental outcomes, as estimated by the United Nations.

Assessing the durability and effectiveness of water-related investments is challenging, as methodologies and appropriate metrics vary across water sub-sectors and many associated benefits cannot be readily quantified. Relevant indicators differ by investment type, ranging from operational efficiency metrics for piped water systems, to flood exposure and inundation reduction measures for flood protection projects, and hydrological performance metrics for nature-based solutions, among others.

The long-term viability of water-related investments remains an area of concern across both OECD and non-OECD countries. A persistent undervaluation of water-related benefits by public and private actors constrains the sector's revenue base. Combined with the tendency to maintain tariffs artificially low, this often prevents water operators to fully cover operational and maintenance costs and lead to operational inefficiencies. Where the renewal rates of water assets are known, they often reflect a significant backlog of investment in operation and maintenance for existing assets.

Furthermore, financial and institutional incentives frequently prioritise project size and bankability rather than long-term impact, resulting in investments that may be technically viable but are not always well adapted to future water stress or local needs. Investment decisions are commonly based on narrow economic indicators, with limited attention to distributional effects and long-term vulnerabilities.

Debates on mobilising finance for water-related investments have generally focused on the volume of capital needed to close the financing gap. Yet, the quality, structure, and purpose of the financing deployed is as critical as the volume of resources mobilised. This underscores the need for an examination of water financing models and their potential to facilitate long-term, impactful investment outcomes.

This report aims to help policymakers, financial institutions, and investors understand how the structure and design of financing models impact the durability of investments, and how underutilised financing sources, characterised by growing demand for impact-driven assets, can be mobilised more effectively.

Without purporting to be exhaustive, the authors have selected four models or approaches that can meaningfully **advance the research agenda on mobilising finance for water and enhancing the viability of financing and investment practices in the sector**, specifically through:

- Mobilisation of underutilised funding and financing pools that are increasingly seeking impact-driven investment opportunities, with particular emphasis on bond finance instruments (Chapter 2) and Islamic finance mechanisms and modalities (Chapter 3).
- Allocation and structuring of financial resources to ensure the delivery of long-term impactful outcomes, with a focus on results-based financing mechanisms (Chapter 4) and public–private partnership models (Chapter 5)

Bond finance offers significant potential to support water-related investments. Green, social and sustainability (GSS) bonds have gained momentum, but their application to freshwater investments remains limited, requiring targeted efforts to increase visibility and impact. Blue bonds, while growing, are primarily directed towards ocean-related projects, underscoring the need to deploy such instruments for freshwater investments. While bonds labelled blue or water have seen notable growth, they still represent less than 1% of the global GSS bond market, according to data from the Climate Bonds Initiative. Chapter 2 explores how to harness this untapped potential and leverage impactful investment for water at scale.

Islamic finance (IF) offers considerable yet underutilised opportunities for financing water investments. IF has undergone substantial and sustained growth over the past two decades, with an average annual growth often surpassing 10%, emerging as a resilient and expanding component of the global financial system. Despite this steady growth, water investments remain a marginal share of IF. Building on recent evidence, and acknowledging challenges and practical limits, Chapter 3 highlights IF's strong potential for water investment, driven by growing impact-oriented capital and the fact that its underlying principles, particularly risk- and profit-sharing and asset-backed finance, are particularly well-suited to the specific characteristics of water projects, making it a valuable model for structuring investments, including public-private partnership and innovative financing models.

Results-based finance is gaining traction as a promising approach to help improve the quality of water investments, by linking finance more directly to outcomes and performance. Unlike traditional models that focus on inputs or upfront disbursements, RBF links disbursements to independently verified outcomes, promoting accountability and aligning funding with measurable improvements in service delivery, performance or policy. RBF has been deployed for results across the water sector, from rural sanitation to stormwater management, with successful outcomes but limited scale. Whilst initial RBF models focused on rewarding output-level results, such as the number of new water supply connections, there has been a gradual integration of outcome-level results relating to long-term viability of services in the definition of results. Chapter 4 examines the use of RBF contracts in the sector and their potential to improve the lasting impact of water investments.

Finally, **there is significant potential to enhance the durability and effectiveness of investments structured through public-private partnership (PPP) models**. Failure to adequately structure PPP contracts can lead to widespread environmental and social damage and financial loss for the public sector. Chapter 5 examines models, innovative instruments, and policy incentives designed to mitigate potential adverse outcomes in PPPs, ensure balanced allocation of risks and benefits between public and private actors, and support the achievement of policy outcomes, including long-term network resilience, environmental outcomes, as well as equitable and affordable access.

1. Context: Challenges to effective investment in water

Water-related investments are fundamental to advancing development, not only to enhance water security but also to support other economics sectors that are heavily dependent on water (including energy and agriculture). Yet, the long-term viability of water-related investments remains an area of concern across both OECD and non-OECD countries. Indeed, some existing investment patterns remain constrained by limited cost recovery, inadequate maintenance funding, and weak integration of economic, environmental and social considerations. This chapter outlines the challenges associated with the design of durable financing models for water.

1.1. Definitions and scope of the report

"**Water-related investments**" refer to a broad range of investments that contribute to water security through the delivery of water and sanitation services, the management of water resources and water-related risks ("too much", "too little" and "too polluted") (OECD, 2022[1]). While the term investment refers to the total value of the expenditure incurred for building a given tangible fixed asset or purchasing an equipment, the term **financing** refers to the underlying finance sources and instruments that make such an investment possible (Jachnik, Mirabile and Dobrinevski, 2019[2]).

In the current research and debates on financing water-related investments, there is increasing recognition that the structure of financing for water is as critical as the volume mobilised (GCEW, 2024[3]). This has prompted a detailed examination of water financing models and approaches to analyse if and how they can lead to long-term, impactful investments.

The objective of this report is not to provide an exhaustive review of all existing financing models and approaches in the water sector, but rather to analyse a selected set of instruments that demonstrate particularly strong potential to enhance the lasting impact of investments or to leverage capital at scale for impact-driven investments. Thus, the report covers the following areas:

- **Chapter 2** looks at the use of capital market instruments for water, such as GSS bonds as well as blue bonds.
- Chapter 3 focuses on the deployment of Islamic finance instruments, which aim to achieve a balanced risk sharing between providers and recipients of finance and rely on asset-backed financing models.
- Chapter 4 studies the scaling up of results-based financing mechanisms that tie disbursements to verified performance outcomes, thereby enhancing accountability and incentivising long-term, effective service delivery.
- Chapter 5 analyses the redesign of public-private partnership models to ensure that risk-sharing arrangements are more closely aligned with public interest outcomes.
- Chapter 6 summarises the key findings and recommendations from the report.

1.2. Do water-related investments and financing models deliver lasting value?

1.2.1. Water-related investments, a key driver of water security and economic development

Strategic investment in water security can yield substantial benefits at global level (OECD, 2022[1])**.** While estimates suggest that every dollar invested in water and sanitation can generate approximately USD 4 in returns (UN, 2025[4]; UNICEF, 2021[5]), this figure may reach up to USD 7 per dollar invested in some regions, such as Africa (AfDB, 2025[6]). Conversely, underinvestment in water security is projected to generate substantial macroeconomic losses by 2050: according to the Global Commission on the Economics of Water (GCEW, 2024[7]), these losses could amount to around 8% of global GDP in the long term[1] and reach 10-15% of GDP in low-income countries.[2] By 2050, the combined economic impact of floods and droughts could result in cumulative global losses of USD 5.6 trillion (World Bank, 2023[8]). These estimates do not take into account the full economic value of water across the economy (WWF, 2021[9]). The total use value of freshwater from direct and indirect uses in 2021 is estimated at approximately USD 58 trillion, equivalent to 60% of global GDP (WWF, 2021[9]). This includes major ecosystem functions such as protection against extreme events, regulatory services and biodiversity preservation, as well as its value in supporting agricultural production and industrial activity. In addition, in 2020, water-related risks represented a combined threat of USD 301 billion to business value (CDP, 2020[10]). In 2022, companies

reported that investing in water-related opportunities, for instance related to water efficiency or resilience to water impacts, could bring over USD 250 million additional gain per company (CDP, 2023[11]).

Investment in water also have the potential to generate significant benefits across multiple sectors. The energy sector relies heavily on water, with hydropower accounting for approximately 18% of global electricity production and 50% of electricity production in 28 developing countries (IEA, 2021[12]). Industrial processes consumed nearly 15% of total freshwater withdrawals worldwide as of 2021 (Aquastat, 2021[13]). In agriculture, efficient irrigation systems can increase crop yields significantly, contributing to food security and rural livelihoods. For instance, research shows that irrigation increases maize yields by 55% in dryland regions of China (Zi et al., 2025[14]). Furthermore, improving access to clean water and sanitation has a direct impact on public health outcomes, with a potential reduction in incidence of diarrhoeal disease by up to 69% and acute respiratory infections by 14% in some regions (WHO, 2023[15]). These figures underscore the critical role that water investments play in driving development and economic growth across diverse fields.

1.2.2. Challenges to effective long-term investment in water

Challenges to assessing the long-term viability of water investments

Yet, measuring the long-term viability of water-related investments remains challenging, as **methodologies and suitable metrics differ across water sub-sectors, and many of the benefits involved are difficult to quantify**. For piped water-supply projects, this entails tracking operational performance indicators such as service continuity, levels of non-revenue water and energy efficiency across the distribution system. For flood protection investments, it requires quantifying outcomes such as the reduction in flood exposure areas and changes in the frequency or severity of inundation events. In the case of nature-based solutions, relevant indicators include the volume of stormwater runoff diverted from grey infrastructure and other hydrological performance metrics that support a robust assessment of their effectiveness and comparative value. **Developing consistent and credible methodologies to measure the long-term viability of such complex infrastructure therefore remains a significant challenge.**

The investment backlog undermining asset maintenance and serviceability

Many of the public and private benefits from water-related investments cannot be monetised, which makes it difficult to generate lasting revenue flows. Indeed, traditional economic or financial appraisal tools, such as cost benefit analysis (CBA), struggle to capture the value or full range of benefits and co-benefits from water-related investments. This lack of revenue streams partly explains the historic reliance on public budgets and concessional finance (OECD, 2022[1]). Additionally, affordability concerns (perceived or real) often lead decision makers to **keep tariffs artificially low** (OECD, 2019[16]), further weakening the financial viability and lifecycle of water investments.

Therefore, **water operators sometimes fail to cover operational and maintenance costs, with various rates of cost recovery and persistent operational inefficiencies**. On average, for the European Union (EU) as a whole, revenues from water tariffs cover around 70% of the financial cost of providing water services, with public financing covering the remaining 30%. In 24 EU Member States, more than 95% of the population could pay more for water services without facing affordability constraints on 2011-2015 average (OECD, 2020[17]). Furthermore, according to the UN-Water Global Analysis and Assessment of Sanitation and Drinking Water (GLAAS) report, over half of countries surveyed[3] stated that, even among higher-performing countries, water tariffs are at a level which allows the recovery of only 80% of operating costs, to say nothing of capital costs. Among UN Member States identified as needing accelerated progress to meet their WASH targets, this coverage drops to 19% (UN-Water, 2022[18]).

Where data on the renewal rates of water assets are available, they frequently indicate a substantial backlog in operation and maintenance investment for existing infrastructure. In the water supply and sanitation sector in EU countries, renewal rates are typically below levels that would be commensurate with assets' life expectancy (Farnault and Leflaive, 2024[19]). Other parts of the water sector such as agricultural water face similar challenges with ageing and deteriorating assets. Failure to monitor assets, resolve problems or implement upgrades in a timely way can lead to excessive water losses, which undermines the efficiency and effectiveness of water services and raises costs. High rates of non-revenue water are often a sign of operational inefficiency and can provide a partial insight into the extent of backlogs of investment in operation and maintenance. An OECD study found that there is significant potential to reduce non-revenue water in EU countries including in Bulgaria, Poland, Cyprus and Romania, including through targeted maintenance of assets to improve leakage control and drive asset renewal and modernisation (OECD, 2020[20]). This in turn might affect water resources themselves (due to pollution or excess abstraction), which will lead to higher costs later on, thus weakening the economic model for water utilities, making recovery even more uncertain in the future. It also triggers an equity issue, as failure to recover costs today results in transferring costs to future generations (Farnault and Leflaive, 2024[19]).

Irrigation systems, for example, **are typically capital-intensive and designed for long-term use, yet their durability is often undermined by suboptimal investment decisions, insufficient funding for maintenance and weak institutional oversight.** Many systems deteriorate prematurely due to fragmented planning and inadequate provisions for ongoing upkeep, which reduces service reliability and the value of public spending (Dankova et al., 2022[21]; FAO, 2018[22]). In the EU, cost recovery levels for irrigation are significantly lower than for water supply and sanitation, with significant differences reported within countries both for irrigation water tariffs and for cost recovery levels. These differences reflect factors such as the type of irrigation system, the basis used for charging, the age and condition of infrastructure and whether irrigation water is supplied through collective schemes or self-abstraction (Farnault and Leflaive, 2024[19]). As developed in Chapter 5 on PPPs, well-structured PPPs can help address these challenges by incorporating long-term operational commitments and performance-based incentives (IFC, 2022[23]). In Morocco, a 30-year PPP contract for irrigation modernisation integrated maintenance obligations and service standards, leading to improved water efficiency and reduced losses. In Andhra Pradesh, India, consolidating small-scale irrigation schemes under a single PPP model generated economies of scale and enhanced project viability (IFC, 2022[23]). Durable irrigation systems depend not only on initial infrastructure investments but also on consistent support for environmental stewardship, institutional capacity and system maintenance to ensure long-term functionality and impact.

Another example is **handpumps, a critical infrastructure for rural water supply in many developing countries, which are often failing due to weak maintenance systems and limited performance monitoring**. In Rwanda, a study of 181 handpumps found that nearly half failed at some point over seven months, with repair times ranging from 20 to over 140 days depending on the management model (UNC Water Institute, 2018[24]). Functionality rates reached 91% under professional systems but fell to 68% when those handpumps are managed through community-led approaches according to the study. These failures not only disrupt services but also diminish the return on investment. Sustained water access requires ongoing maintenance, real-time monitoring and institutional arrangements that support long-term service delivery.

A misallocation of financing resources undermining lasting value of investments

Embedding outcomes related to environmental protection (such as freshwater ecosystems conservation and restoration) and social responsibility (including equity in water access and exposure to water risks), **in investments and underlying financing instruments is a challenge for many governments and development funders**.

Several critical investments, including flood protection, nature-based solutions, small-scale infrastructure, and rural water supply and sanitation, remain largely underserved by prevailing financing sources and by private finance, which tend to favour large-scale grey infrastructure with well-established funding arrangements (such as desalination plants, wastewater treatment facilities and large reservoirs). Current financing models in these underfunded areas are insufficiently scalable, limiting the mobilisation of resources needed to meet growing infrastructure and resilience demands. Distinctive bottlenecks include disproportionate transaction costs, lack of standardised financing modes and instruments, and the absence of sound regulatory frameworks. Addressing these gaps will require innovative financing mechanisms and targeted public interventions to share investment risks and attract impact-driven capital (GCEW, 2024[7]; OECD, 2022[1]).

When it comes to social aspects, evidence suggests that a significant amount of **funding and financing for water investments may be poorly targeted, failing to reach the projects that can deliver the greatest benefits and countries most in need** (Leflaive and Hjort, 2020[25]). Indeed, over 50% of public water subsidies are estimated to be captured by the top income quintile in some countries, while people who need public subsidies are not receiving them (Andres et al., 2019[26]). Furthermore, data suggests that water-related ODA is sometimes concentrated in a limited number of countries, while not reaching some of the poorest countries[4] (Leckie, Smythe and Leflaive, 2021[27]). While financial innovation abounds for water-related investments, with multiple arrangements to blend public and private finance, they often fail to be deployed in low-income countries at scale (OECD, 2019[28]).

1.3. Can financing models and approaches help strengthen the viability and effectiveness of water investments?

Enhancing the quality of financing for water entails supporting long-term, patient capital that generates not only financial returns but also broad-based economic and social value (GCEW, 2024[7])**.** Public actors, particularly governments and public development banks, are uniquely positioned to deliver such strategic funding. Concurrently, there remains significant untapped potential to scale private sector investment, provided returns are aligned with inclusive and long-term development objectives. Realising this potential requires moving beyond traditional de-risking approaches. Instead, it calls for a reconfiguration of how risks and rewards are equitably distributed between public and private stakeholders, ensuring transparency, fairness and mutual accountability (GCEW, 2024[7]).

For instance, **financing can be strategically allocated to prioritise asset maintenance and serviceability rather than being mainly focused on infrastructure development**. By structuring financing to support continuous service delivery and the achievement of essential public policy objectives, resources are directed toward sustaining long-term functionality. This approach not only enhances the viability of service provision and water resources but also optimises the use of limited financial resources. Moreover, it facilitates access to new or underutilised funding sources that often demand stronger assurances regarding viability, thereby unlocking additional financial potential while reinforcing environmental and social outcomes.

This report analyses how the structure or design of financing models and approaches can have an impact on the long-term viability and effectiveness of investments. This includes financing models that share some or all of the following characteristics:

- Take a balanced approach to risk-sharing between providers and recipients of capital.
- Adopt a strong focus on asset maintenance, including through ensuring that sufficient flows of working capital are funded so that asset maintenance can be implemented where and when it is needed to support lasting assets.

- Incentivise delivery of results in line with customer needs and desirable outcomes, measured not only in financial terms but based on other dimensions of performance, including social and environmental indicators.

The report focuses specifically on the following approaches, as they represent a potential to mobilise impact-driven investment in the water sector, either by tapping underutilised asset pools seeking investment opportunities or by enabling the design of instruments that can be aligned with long-term outcomes:

- The use of capital market instruments, such as GSS bonds as well as blue bonds.
- The deployment of Islamic finance instruments, including sukuk (Islamic bonds), PPPs and blended finance, which can support more balanced risk sharing arrangements between providers and recipients of finance and rely on asset-backed financing models.
- The scaling up of results-based financing mechanisms that tie disbursements to verified performance outcomes, thereby enhancing accountability and incentivising long-term, reliable service delivery.
- The redesign of public-private partnership models to ensure that risk-sharing arrangements are more closely aligned with public interest outcomes.

The main categories of instruments reviewed in this report are summarised in the table below. These instruments can be deployed to support a range of water-related investments, which in turn generate diverse benefits across economic, environmental and social dimensions – such as the conservation and restoration of freshwater ecosystems, the mitigation of flood and drought risks, and the expansion of access to safe water supply and sanitation services. As mentioned earlier in this chapter, this report focuses on identifying options to enhance the long-term impact and effectiveness of these financing models and associated investments. It does not aim to quantify or compare their resulting economic, environmental or social benefits. The scope of instruments considered extends beyond traditional loan products to include grants, guarantees and equity-based mechanisms.

Table 1.1. Main types of instruments reviewed and recommendations for enhancing long-term impact (selected)

	Definitions	Main types of instruments reviewed	Recommendations for enhancing long-term impact (selected)	Current limits (selected)
Bond finance	Debt instruments that enable issuers, such as governments, municipalities or corporations, to raise capital from investors over a specified period	GSS bonds Blue bonds SLBs	• Develop standards and frameworks dedicated to water bonds, to structure and scale the market • Structure instruments that meet investors' demands (backing issuers to enhance their credit ratings, supporting the aggregation of diversified portfolios…) • Mandate robust impact reporting, independent verification and promote methodological consistency • Support the development of municipal and local currency bonds, as subnational governments are often responsible for service delivery but face obstacles in accessing capital market • Leverage performance-linked or outcome-based bond instruments to drive water investments by aligning financing with measurable social and environmental outcomes	Still mostly focused on oceans (to the detriment of freshwater investments) Large benchmark size issuances; difficult to access for small-scale projects Specific to SLBs: concerns over weak ambition, limited transparency and small coupon step-ups

	Definitions	Main types of instruments reviewed	Recommendations for enhancing long-term impact (selected)	Current limits (selected)
Islamic finance (IF)	Financial practices and instruments that comply with Shariah (Islamic law) and are based on ethical, asset-backed and risk-sharing principles	Islamic banking, Sukuk, Islamic social finance (zakat, waqf, qard hasan), PPPs, parallel financing, blended finance	• Guide the development of IF for water investments through targeted legal, regulatory and economic policy measures • Support enhanced data collection, reporting and monitoring to track IF flows into water investments • Advocate for international standard-setters to establish harmonised IF product standards that integrate water investment criteria, among other objectives • Create a framework and/or a technical assistance facility aimed at developing and implementing innovative Islamic finance instruments for water investments • Commission studies on how asset-backed and asset-based financing features can enhance the long-term viability of financing mechanisms, particularly in terms of transparency, accountability, financial resilience and risk sharing	From principles to actual investments: still marginally benefiting water Most sectors benefiting from IF are household consumption, real estate, manufacturing, construction and trade
Result-based finance	Variety of instruments linking disbursements to the achievement of pre-agreed outcomes	Result-based grant Impact-linked loan Development impact bond	• Develop credible methodologies to measure operational viability for complex infrastructure and integrate outcome-level results relating to services' durability (in addition to output-level results) in RBF models • Strengthen the results verification processes, as the credibility of RBF approaches is fundamentally determined by the rigor of these processes • Set up dedicated financing facilities with established, standardised procedures to manage RBF payments on behalf of funders (notably to reduce transaction costs) • Address risks of perverse incentives in results-based grants, for instance incentivising financial performance • Commission studies on the cost-effectiveness of RBF models and promote transparency on the costs of designing and implementing RBF • Develop guidance to funders on where, when and how to apply RBF and for what policy outcomes to facilitate the adoption of the instrument • Provide technical assistance to implementers where needed, to mitigate their exposure to higher performance and financial risks	Concerns over cost effectiveness of RBF models and ability to reach scale Higher performance and financial risks on implementers Risk of perverse incentives (dependency on external funding)
Public-private partnerships	Long-term agreements between a government and a private partner. In some PPPs, the private partner delivers and provides upfront financing for building a capital asset base, sharing the associated risks	Build-Operate-Transfer Concessions	• Structure PPPs to incentivise results' achievements, embedding performance indicators (including ambitious long-term impact targets) and adequate remuneration structures in PPP contracts • Develop detailed PPP projects feasibility assessments to identify all potential risks, mitigation measures and trade-offs • Build capacity of public sector institutions for designing and managing balanced PPPs • Implement regulatory reforms to enable balanced PPPs • Engage with the private sector (including potential private operators and investors) to create trust and build awareness of water-related investment opportunities • Engage with local financial institutions (including local commercial banks and public development banks) to enable the deployment of local currency lending and blended finance • Address political risks through citizens' engagement in national and local fora on forthcoming and ongoing PPP projects	Issues with social acceptability (when PPPs are perceived to be a transfer of responsibilities to the private sector) Failure to adequately structure PPP contracts can lead to widespread environmental and social damage and a financial loss for the public sector

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Notes

[1] Driven by reduced agricultural productivity, disruptions to food and energy systems, and increased impacts from extreme weather events such as floods and droughts.

[2] Where economies are more dependent on agriculture and other water-sensitive sectors and have lower adaptive capacity (related to infrastructure, financial resilience and social safety nets).

[3] This includes 121 countries, including 17 high income countries, 38 upper middle-income countries, 42 lower middle-income countries and 24 low-income countries.

[4] For instance, In Asia-Pacific, India and Indonesia received a very high amount of ODA per annum compared to other countries, while other countries received no ODA, such as Laos, Bangladesh, Myanmar, Afghanistan and Papua New Guinea.

2. Leveraging bond finance for water investments

This chapter explores the state of play in the use of bond finance for water and analyses options for scaling it up. The first section provides definitions of the different types of bonds relevant to water financing, outlines the analytical methodology used and presents the rationale for leveraging bond finance for water. The second section provides an overview of recent trends in bond finance for water, at the global level but also by region, country, issuer type and level of issuance. The third section explores opportunities to expand bond issuance to finance long-term, impactful water investments, focusing on international frameworks and standards, as well as investor demand from key investor groups.

Key findings

- **Bond finance holds significant potential for mobilising capital to support water-related investments**. The mobilisation of capital from a broad investor base, combined with medium- to long-term repayment terms, makes it in principle well-aligned with the specificities of water-related investments. Additionally, bond finance is gaining prominence globally, which represents a timely opportunity for water investments.
- **Investments in water through bonds is rising but it still represents a marginal share of GSSS bonds**, which itself represent a marginal share of the global bond market. Water- and blue-labelled GSSS bond issuance rose from USD 1 billion in 2022 to USD 6.4 billion in 2023, before reaching USD 4.7 billion in 2024. Despite this recent increase, water and blue-labelled bonds account for less than 1% of total GSSS bond issuance, which reached USD 1.1 trillion in 2024. In parallel, bonds with at least one mention to "water" or "blue" in their use of proceeds reached USD 290 billion in 2024, which means that a large proportion of water-related investments financed through bonds do not carry a "water" or "blue" label.
- **The expansion of bond finance for water is being driven by various enabling factors**, such as growing investor demand, increasingly stringent Environment, Social, Governance (ESG) criteria, the growth of the GSSS bond market and supportive policies. Similarly, several types of bonds (including corporate, sovereign and municipal bonds) are gaining traction and are likely to continue to grow in the coming years.
- **However, several challenges persist**, such as difficulties in clearly tracking the allocation of proceeds in multi-labelled bonds, consequent limited visibility into investments supporting water and related sub-sectors, investor concerns about revenue stability, complex regulatory environments and underdeveloped local capital markets in many developing countries.
- **Unlocking greater investment in water security and freshwater through bonds** can be supported by the development of guidelines and standards for the issuance such bonds, the development of water finance taxonomies and the strengthening of impact reporting. Improving risk-return profiles through credit enhancement mechanisms, innovative financing mechanisms (such as revolving funds) or economic incentives (such as tax exemptions in the US) can also help to attract investors.

2.1. What is bond financing for water?

This section provides definitions of the different types of bonds that finance water-related investments, explains the methodology used for the analysis and makes the case for leveraging bond finance for long-term, impactful water-related investments.

Box 2.1. Methodology for the data analysis

- **The three datasets used for this analysis include data from the *Green Bond Database*, the *Social and Sustainability Bond Database* and the *Sustainability-Linked Bond Database* of the Climate Bonds Initiative (CBI)**, which provide detailed information about bonds, including the issuer, type of issuing institution, issuance amount, date, country, use of proceeds (i.e. how funds raised through the bond are used to finance different types of investments allocation of funds raised by the bond). More information on the datasets can be found in Annex A of this chapter.
- **The datasets contain three key variables that allow mapping bond issuance for water: the original bond label, the use of proceeds (UoP) and the key performance indicators**. The original label assigned by the issuer categorises the bond based on its primary financing objective, which offers insight into the intended purpose of the proceeds. The UoP outlines the specific sectors, subsectors or projects that will be financed through the funds raised by the issuance. **This chapter relies primarily on original label data, as UoP data is less comprehensive** in the datasets and KPIs are used only for "sustainability-linked bonds" (which amounts in general and for water are marginal compared to other types of bonds). The analysis tracks labelled issuance volumes, not actual disbursed investments.
- **Bonds often contain several original labels, which can make it difficult to break down the proportion of financing allocated to each category**. The methodology applied in this chapter is to consider the total volume of capital raised through bonds that contain at least one label qualified as water or blue by their issuers, referred as water- or blue-labelled bonds. Bonds that contain at least one water or blue label in the database have on average only 1.27 original labels, which minimises the margin of error (and suggests that around 80% of revenues probably supported water investments).

2.1.1. Definitions

Bonds are debt instruments that enable issuers, such as a governments, municipalities, or corporations, to raise capital from investors over a specified period (SNA, 2025[1]; CBI, nd[2])**.** Investors receive periodic interest payments (coupons) and are repaid the principal amount at maturity. Along with other capital market instruments, bonds are crucial sources of long-term financing to mobilise capital, including to close the financing gap for priority development objectives (Dembele, Schwarz and Horrocks, 2021[3]).

"Green" bonds are debt instruments whose proceeds are used to finance or refinance projects that generate a clear environmental impact. These bonds must align with the four core components of the Green Bond Principles (GBP) of the International Capital Market Association (ICMA): i) Proceeds from green bonds must be allocated to projects with clearly defined environmental benefits; ii) Issuers are expected to disclose the criteria and procedures used for project selection, including alignment with environmental objectives and risk management practices; iii) Proceeds should be tracked and managed transparently, ideally with third-party verification; iv) Annual reporting on fund allocation and expected environmental impacts is required to ensure accountability and maintain investor confidence (ICMA, 2021[4]; ICMA, 2023[5]). Eligible green project categories include renewable energy, energy efficiency, water security and wastewater management, pollution prevention and control, eco-efficient or circular economy-aligned products, green buildings, terrestrial and aquatic biodiversity conservation, and clean transportation.

"Social" bonds are issued to finance projects that directly address or mitigate specific social challenges and aim to achieve positive social outcomes for vulnerable populations. Eligible social project categories include affordable basic infrastructure (including clean drinking water, sewers, sanitation), access to essential services, affordable housing, employment generation, food security and socioeconomic advancement or empowerment (ICMA, 2023[6]).

"Sustainability" bonds combine elements of both green and social bonds, with proceeds directed to a mix of green and social projects. These bonds must align with the four core components of both the GBP and the Social Bond Principles (SBP) (ICMA, 2021[7]). The SBP are similar to the GBP (mentioned above) yet tailored to social benefits and objectives (ICMA, 2023[5]).

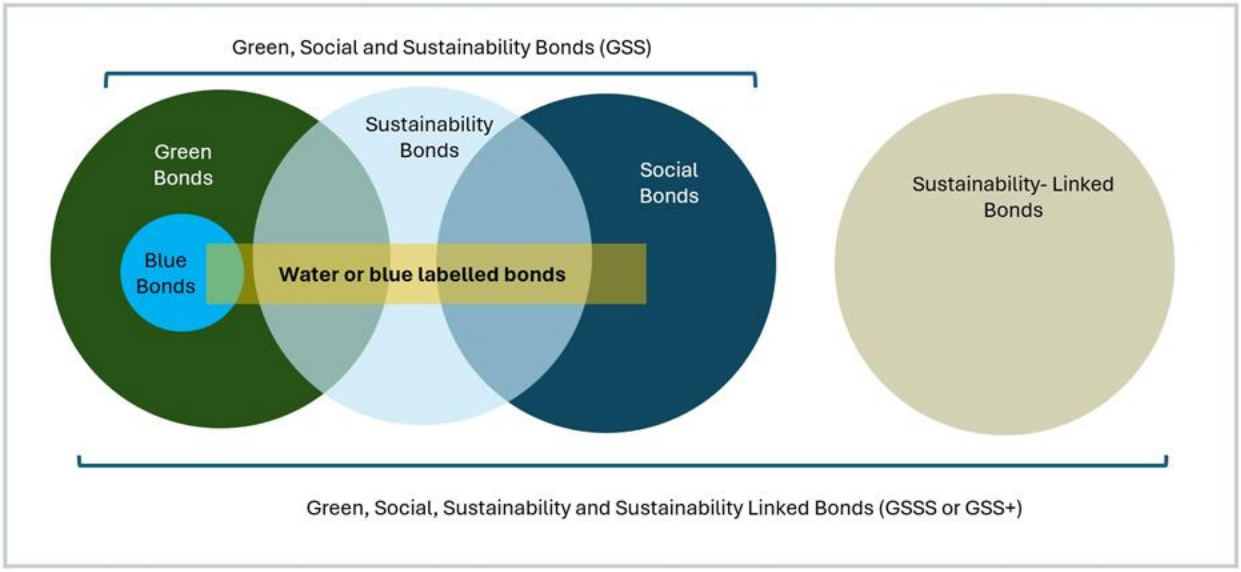
Many "green, social and sustainability" (GSS) bonds allocate proceeds to water-related projects, even if they do not explicitly carry a water or blue label (CBI, 2024[8])**.** These bonds often finance infrastructure for wastewater treatment, flood resilience, irrigation and water supply systems under broader themes, such as resilience, smart cities or biodiversity. For example, green bonds issued for environmental resilience may include water resource management projects, while social bonds targeting essential services often support access to safe drinking water and sanitation in underserved communities (CBI, 2024[8]).The absence of water labelling for these bonds makes it difficult to track and assess the volume of bond financing directed specifically toward water investments.

Unlike GSS bonds, which allocate proceeds to specific projects, **"sustainability-linked" bonds (SLBs)** are general-purpose bonds, whose financial terms are tied to the achievement of environmental and social performance targets (OECD, 2024[9]). In other words, the use of proceeds of SLBs are not assigned to specific sectors, subsectors or projects. The capital raised can be allocated across various areas, provided it aligns with the predefined Environmental, Social and Governance (ESG) objectives. These ESG objectives of SLBs are assessed through KPIs specified in the bond documentation such as water use intensity, proportion of recycled water or water supply levels, ensuring transparency and accountability over a defined period (ICMA, 2024[10]). As a forward-looking instrument, SLBs go beyond project-based models, offering greater flexibility for corporate and sovereign issuers integrating environmental and social commitments into their financial strategies. By linking financial incentives to measurable outcomes, SLBs encourage issuers to enhance performance in areas such as water efficiency, emissions reduction and biodiversity conservation (CBI, 2024[11]).

"Blue" bonds are a relatively new addition to the impact-focused debt market, designed to finance both ocean and water-related projects. ICMA defines blue bonds as a debt instrument structured in accordance with the Green Bond Principles, where the funds raised are solely allocated to supporting projects that enhance ocean conservation and improve water resource management, either through new investments or refinancing existing initiatives (IFC, 2022[12]). Thus, blue bonds are not leveraged to improve water security only but also aquatic life and biodiversity. Some guidelines, such as those developed by ICMA and the Asian Development Bank (ADB) primarily focus on ocean-related projects (IFC, 2022[12]). Others, such as the IFC Blue Finance Guidelines, place greater emphasis on freshwater-related themes, covering both SDG 6 and SDG 14. According to the ICMA, blue bonds are classified under green bonds, as depicted in Figure 2.1.

As illustrated in Figure 2.1 and mentioned the Annex *Methodology for the Analysis*, **a bond does not need to be explicitly classified as a blue bond to support investments related to water security or oceans**.

Figure 2.1. Water within the classification of GSSS bonds



Note: Water- or blue-labelled bonds refer to bonds bearing water or blue mark assigned by their issuer. The classification relies on issuers' categorisation. SLBs can include water-related KPIs; nevertheless, there is no SLB carrying a water or blue label by the issuer in the dataset.
Source: Authors based on (ICMA, 2023[5]).

2.1.2. The case for scaling up bond finance for water

Bonds are, in principle, an appropriate instrument for financing water-related investments, owing to their capacity to mobilise capital over the medium to long term. Water-related investments, such as water supply systems and wastewater treatment, often require significant upfront investment with long repayment periods. Bonds, particularly those with medium- to long-term maturities, tend to provide stable, predictable repayment schedules that can in principle align with the lifespans of such investments. The average time to maturity of water- or blue-labelled bonds issued between 2014 and 2025 is nine years, based on CBI data (see Annex A). This average is of ten years for green bonds, eight years for "social and sustainability bonds" and six years for SLBs. This time frame aligns well with the medium to long payback periods and capital needs of water investments. To incentivise profit-maximising investors to allocate capital to water-related instruments when they may offer lower risk-adjusted returns than alternative investment opportunities, the asset-liability matching case is a promising avenue, particularly for institutional investors with long-dated liabilities. Water infrastructure assets typically have operational lifecycles of 50 to 100 years, generating stable and predictable cash flows over extended periods while also providing a potential hedge against nature-related financial risks, an increasingly important consideration for pension funds, insurers and other long-term investors.

Bonds also represent strong potential for water-related investments for their ability attract capital from a variety of investors and tap in a broad investor pool. Unlike commercial loans, which are typically issued by a single bank or a consortium of banks, bonds allow multiple investors – including institutional investors such as pension funds and insurance companies – to participate in financing water investments. This characteristic is particularly appealing for investors seeking relatively low-risk, long-term and stable returns (OECD, 2024[13]). Corporate bonds, for instance, provide a reliable channel for long-term capital, supporting stronger balance sheets and enabling sustained investment. Unlike bank credit, which is often pro-cyclical, corporate bond markets offer a more stable source of finance across economic cycles (OECD, 2024[14]).

Bonds are increasingly prominent in global capital markets, presenting a significant opportunity to expand bond-based financing for long-term water investments. This is particularly relevant given that water-related investments currently constitute only a marginal proportion of the global bond market. Global annual bond issuance reached nearly USD 25 trillion in 2024 (OECD, 2025[15]), with a consistent upward trend since 2020. GSSS bonds have also been rising significantly for the past years, reaching USD 1.1 trillion in 2024, as well as bonds bearing water or blue labels, although the share of GSSS bonds compared to the overall bond market remain marginal and the share of bonds bearing a water or blue label remain marginal compared to the overall GSSS bond market. These trends are analysed in-depth in the second section.

While bonds bearing "water" or "blue" labels encourage issuers to earmark part of their investments to water and allow to track these investments, flexibility in the labelling can also allow access to wider sources of capital. Water or blue labels offer issuers a strategic signal of their environmental commitment, enhancing their reputation and potentially broadening their appeal to impact-conscious investors (IFC, 2022[12]). For investors, these labels support the alignment of portfolios with long-term goals, notably related to clean water and sanitation and life below water. Labelling also encourages issuers to earmark water-related spending, addressing the challenge of tracking water investments in multi-labelled bonds (CBI, 2024[8]). Over time, this could lead to more accurate data, promote standardisation and attract additional private capital to the sector. At the same time, use of screening criteria rather than strict labels, can limit the fragmentation of the market and allow to access broader pools of capital, including not initially dedicated to water.

2.2. Recent trends in bond finance for water

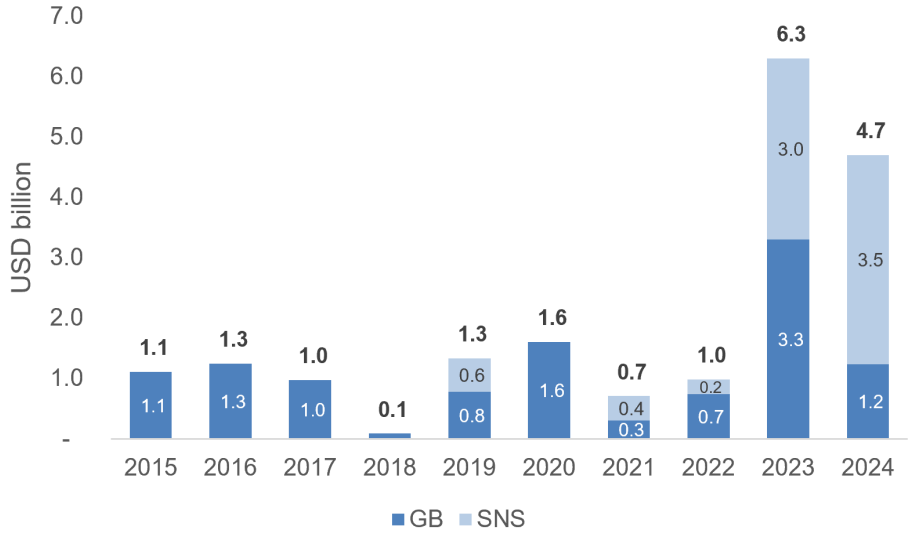
This section provides an overview of recent trends in bond finance for water, at the global level but also by region, country, issuer type and level of issuance.

2.2.1. Global trends

The global GSSS bond market saw a significant rise in bond issuance with water or blue labels in 2023 and 2024 in absolute terms. These two years accounted for 58% of the past decade's total volume of water or blue labelled bonds, highlighting growing interest in financing water-related investments through bonds. Figure 2.2 shows that water- or blue-labelled bond issuances reached USD 11.4 billion in 2023 and 2024, surpassing the USD 8.1 billion recorded over the period running from 2015 and 2022. However, issuance declined by 23% in 2024 (from USD 6.4 billion in 2023 to USD 4.7 billion), largely due to a drop in green bond issuance with a water label, from USD 3.4 billion to USD 1.5 billion. Despite this decrease, bond financing with water or blue labels maintains an overall upward trend. The total issuance of GSSS bonds bearing water or blue marks in their original labels[1] in the period 2015-2024 is recorded at USD 19 billion, averaging USD 1.9 billion per year.

Bonds associated with water at any degree – based on their UoP, original labels or KPIs – are primarily GSS bonds, with minimal representation from SLBs. Of the total USD 1.6 trillion in bond issuance over the period of 2015-2024, 99% of the total issuance are classified as either green bonds (65%) or "social and sustainability bonds" (34%). While the water- or blue-labelled bond market was dominated by green bonds until 2022, social and sustainable bonds with such labels markedly surged in 2023 and 2024, surpassing green bonds in this market for the first time in 2024 (see Figure 2.2). SLBs account for the remaining 1%, reflecting their marginal role with respect to water-related financing. It is important to note that a water-related KPI in SLBs can include water withdrawal levels or water use intensity in other sectors and do not necessarily indicate an investment in water. Thus, assessing the contribution of SLBs in water financing is challenging (OECD, 2024[9]).

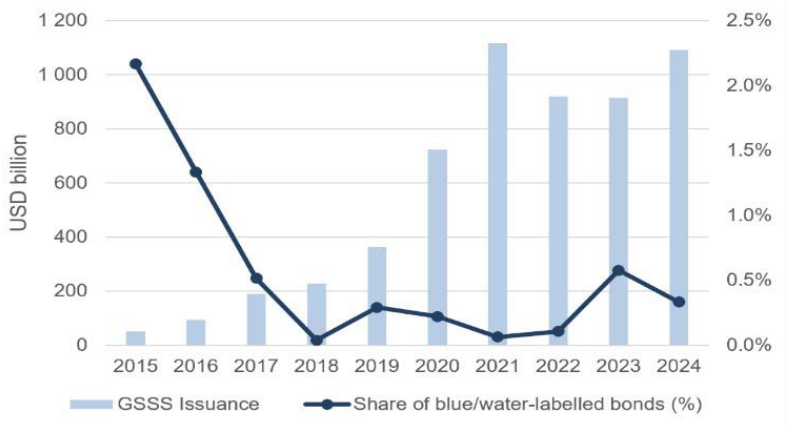
Figure 2.2. Blue/Water labelled total bond issuance by year [Original Label]



Note: GB: Green Bonds, SNS: Sustainability and Social Bonds.
"Blue/Water labelled" refers to bonds labelled with water or blue tags by their issuers.
Source: Authors based on CBI dataset.

Despite the recent increase in 2023 and 2024, water- or blue-labelled bonds continue to represent only a small fraction of the global GSSS bond market, accounting for less than 1% of total bond issuance globally. According to CBI datasets, the total GSSS bond market was valued at USD 51.3 billion in 2015 and expanded nearly 21-fold, reaching USD 1.1 trillion in 2024. The expansion of water-labelled bonds has therefore not been as fast as the growth of the overall GSSS bond market, as shown in Figure 2.3. In 2015, water and blue-labelled bonds represented 2% of that market, whereas they only accounted for 0.4% of the market in 2024. An exception to this trend has been observed between 2022 and 2023, when their share has increased from 0.1% to 0.7%.

Figure 2.3. Total GSSS bond issuance and the share of blue/water-labelled bond issuance, 2015-2024



Note: "Blue/Water labelled" refers to bonds labelled with water or blue tags by their issuers.
Source: Authors based on CBI dataset.

The *Global Debt Report 2024* analysis **estimates the share of water and wastewater management bonds in GSS bond issuance, excluding SLBs, at between 4% and 6%, depending on issuer type, for the period 2014 to 2023** (OECD, 2024[13]) (see Table 2.1). These estimates differ from those derived from the empirical analysis in this chapter, indicating a share of less than 1% for the period 2015-2024 (see Figure 2.3). As the timeframes differ by only two years (2014 and 2024), the discrepancy primarily arises from two key methodological differences between the analyses. A key distinction lies in the source of the data. While the *Global Debt Report 2024* analysis employs OECD *Corporate Sustainability dataset* and the London Stock Exchange Group (LSEG) dataset, the analysis used in this chapter utilises dataset provided by the CBI. Another key distinction is the primary variable used for sectoral allocation: while the analysis in Table 2.1 relies on UoP descriptions, this chapter uses primarily original labels due to gaps in UoP data. The flat allocation method applied in the *Global Debt Report 2024* assumes equal distribution of proceeds across all listed sectors in the UoP description. For example, a bond of USD 1 000 with water and energy UoP would allocate USD 500 to each sector, regardless of actual fund distribution (OECD, 2024[13]).

Table 2.1. GSS bonds' use of proceeds, 2014-2023

	Corporate Sector		Official Sector		
Sector	**Non-financials**	**Financials**	**Agencies and Local Governments**	**Central Governments**	**Multilateral Institutions**
Agriculture	0%	0%	0%	1%	1%
Biodiversity Conservation	3%	4%	3%	19%	5%
Clean Transport	10%	11%	11%	11%	5%
Adaptation	6%	6%	4%	10%	8%
Energy Efficiency	18%	15%	10%	11%	8%
Green Construction/Buildings	10%	17%	5%	7%	5%
Infrastructure	8%	4%	14%	3%	10%
Renewable Energy Projects	21%	15%	8%	7%	7%
Social Expenditures	3%	9%	28%	12%	25%
Sustainable Development Projects	1%	1%	2%	1%	7%
Waste Management	1%	2%	1%	4%	1%
Water or Wastewater management	**4%**	**6%**	**4%**	**6%**	**4%**

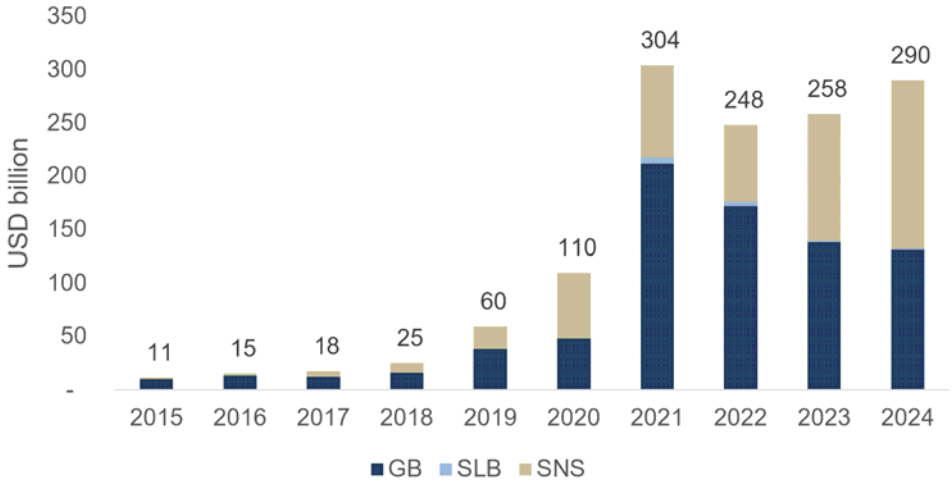
Note: This table is retrieved from OECD's report titled "Global Debt Market 2024" which analyses datasets provided by OECD *Corporate Sustainability* and London Stock Exchange Group (LSEG).
Source: (OECD, 2024[13]).

To date, blue bonds have largely been issued to finance investments in marine ecosystems rather than freshwater resources. The first sovereign blue bond, issued by Seychelles in 2018, raised USD 15 million for fisheries, marine protection and the blue economy (CBI, 2024[8]). Subsequent issuances by multilateral institutions, including the Nordic Investment Bank and ADB, focused on marine biodiversity, coastal resilience and pollution reduction. While these bonds have advanced ocean-related targets, they have contributed little to freshwater investments, such as water supply, sanitation and watershed management.

An analysis based on use of proceeds and KPIs, not original labels (mostly used in this chapter for reasons of data completeness as indicated in the methodology section) **gives a different perspective**. **The relatively high volume of GSSS bonds with water- or blue-related UoP or KPIs suggests that significant capital is being raised for water-related investments, even in the absence of a corresponding original label.** Indeed, in 2024, bonds with at least one mention to "water" or "blue" in their UoPs reached **USD 290 billion in 2024** (see Figure 2.4). However, this does not give a precise vision

of the volume of finance which went to water from these bonds, since most of the UoP contained mentions to other sectors.

Figure 2.4. Total issuance of GSSS bonds with water- or blue-related use of proceeds or KPIs, 2015-2024 [Use of proceeds]



Note: GB: Green Bonds, SLB: Sustainability-Linked Bonds, SNS: Sustainability and Social Bonds.
The volumes correspond to bonds with at least one mention related to "water" or "blue" in their UoP, which often contain mentions to other sectors. Therefore, it does not give the exact amount of proceeds related to water.
Source: Authors based on CBI dataset.

2.2.2. Breakdown of bond issuance by region and issuer type

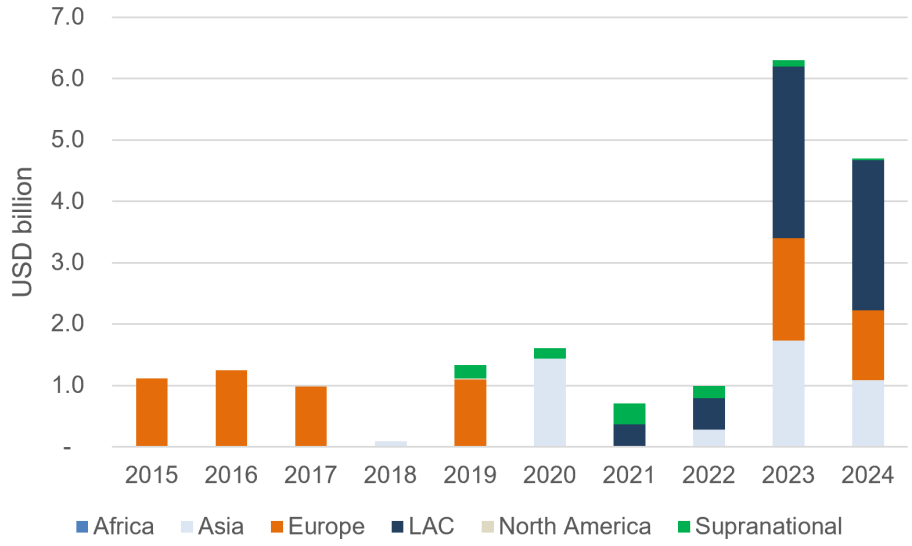
Between 2015 and 2021, the issuance of blue and water-labelled bonds remained relatively stable, with Europe leading the market. In 2020, Asian issuers entered the market, contributing a significant share. The **sharp increase in 2023** was **largely driven by issuers from Latin America and the Caribbean (LAC)**, as shown in the following figure. According to the data, issuers in **North America** are less likely to label their bonds as "water" or "blue"; however, this does not imply that such bonds do not support water-related investments. North American issuers actively issued GSSS bonds with water- or blue-related UoPs or impact-linked KPIs between 2015 and 2024. In parallel, the volume of water- or blue-labelled bond issuance in **Africa** is very limited, with only one recorded issuance from Cabo Verde's International Investment Bank, which issued a USD 3.4 million bond in 2023. More broadly, Africa accounts for less than 1% of total GSSS bond issuance globally, based on data from CBI.

This trend continued in 2024, though with a slight decline in both Asian, European and LAC issuances. The expansion in 2023 and 2024 highlights the growing recognition of bond financing as a viable tool for water-related investments, with increasing participation from regions beyond Europe, although their share is marginal compared to GSSS bond issuance.

The limited issuance of water- or blue-labelled bonds as well as other GSSS bonds in other regions such as Africa and the Middle East reflects structural challenges. In Africa, elevated interest rates, complex issuance procedures and the absence of dedicated regulatory frameworks for such instruments constrain market development (Menon, 2024[16]). In both regions, gaps in technical capacity, weak institutional frameworks and limited investor confidence in impact finance further impede progress. While impact-driven bond issuance is gradually expanding in the Middle East, particularly led by the UAE and Saudi Arabia, volumes remain relatively low compared to Latin America and Europe. This is partly due to

economic volatility, nascent impact reporting practices and uneven policy implementation (UNDP and GWP-Med, 2016[17]). These conditions help explain the slower uptake of bond instruments relative to global frontrunners.

Figure 2.5. Blue/Water labelled total bond issuance by year and by region [Original labels]

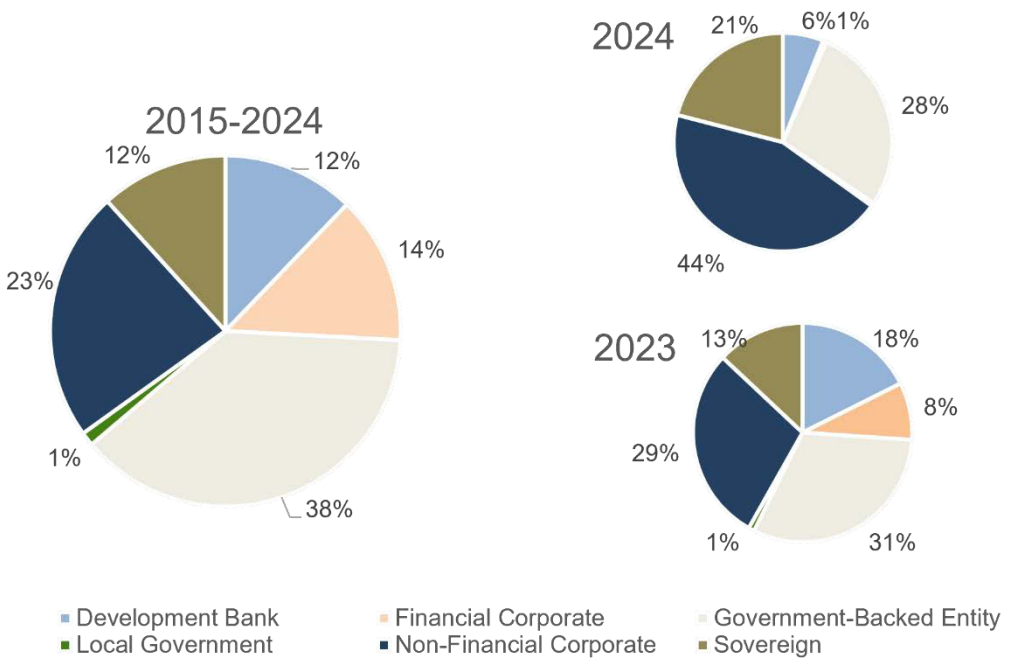


Notes: "Blue/Water labelled" refers to bonds labelled with water or blue tags by their issuers. LAC: Latin America and the Caribbean. Middle Eastern countries are classified under the Asia region in the CBI data.
Source: Authors based on CBI dataset.

Blue and water-labelled bonds are issued by different types of organisations. Between 2015 and 2024, on average, **government-backed entities**, including national banks and state-owned water utilities, accounted for the largest share of total issuances (38%), followed by **non-financial corporates**[2] (23%), **financial corporates** (14%) and **sovereign issuers** (12%) and **development banks** (12%), while local government issued only a marginal share of such bonds (1%).

The most recent data indicates a changing landscape. In 2023, government-backed entities remained dominant (although their share had reduced to 31%), while non-financial corporates and development banks increased their share, respectively to 29% and 18%. In 2024, government-backed entities continued to hold a significant share at 28%, while the share of development banks decreased to 6% and financial corporate issuances dropped to 1%. The share of sovereign issuers increased to 21%. **Non-financial corporates**[2] **dominated the market in 2024**, with a 44% share, signalling a shift towards greater corporate participation in the blue and water-labelled bond market. This trend stems mostly from the increasing interest of certain water companies (private and mixed with both public and private shareholders) to issue bonds to finance their water investments. As mentioned above, corporate bonds offer a stable source of long-term financing, enhancing corporate balance sheets and facilitating sustained investment. They serve as a counter-cyclical alternative to bank credit, which tends to fluctuate with economic cycles (OECD, 2024[14]).

Figure 2.6. Types of issuers of blue/water labelled bonds [Original labels]



Note: Blue/Water labelled refers to bonds labelled with water or blue tags by their issuers.
Source: Authors' calculations on CBI dataset.

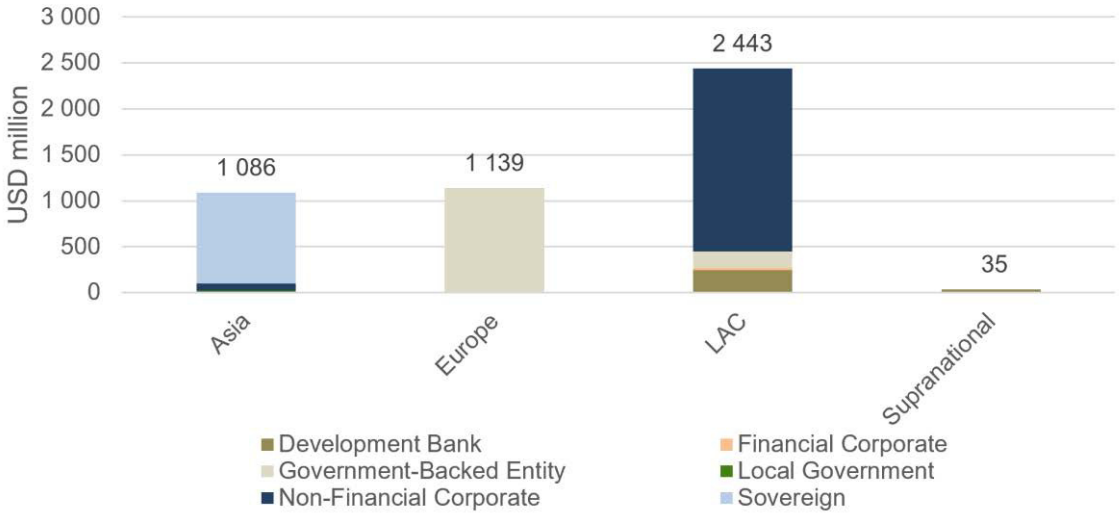
A **cross-analysis of issuer types and regions** shows that **in 2024**, **LAC** saw the largest increase in blue and water-labelled bonds, reaching USD 2.4 billion, driven mainly by non-financial corporates, including private and mixed water companies. **Europe** followed with USD 1.1 billion, where government-backed entities played a key role. In **Asia**, issuances totalled USD 1.1 billion, primarily from sovereign bonds, with smaller contributions from non-financial public and private corporates (USD 77 million) and local governments (USD 22 million).

At the global level, **supranational issuers**,[3] such as for instance the Central American Bank for Economic Integration (CABEI) and the Asian Development Bank (ADB), had a limited presence, with only USD 35 million of issuances in 2024, representing only 0.7% of the total water- or blue-labelled bond issuance (USD 4.7 billion).

The dominance of LAC, Europe and Asia in water-related bond issuance in 2023 and 2024 reflects a growing commitment to water-related investments through bond financing in these regions, with a diverse range of issuers. This distribution highlights the expanding recognition of blue and water-labelled bonds as effective financial instruments for addressing water security challenges across different countries with various economic and institutional settings. Possible drivers for such increase in issuance in 2023 and 2024 include the development of standards, taxonomies and the leadership of pioneering financial institutions. For example, in Europe, the European Green Bond (EUGB) Standard, which was developed upon the EU Taxonomy, aims to establish a unified legal framework for the issuance and verification of green bonds within the EU (OECD, 2025[18]). In Brazil, the Ministry of Finance launched a public consultation in late 2023 to develop a national taxonomy for sustainable activities, integrating both environmental and social objectives, including water access. Similarly, Colombia has established a sustainable finance framework through the adoption of the Green Taxonomy, incorporated via External Circular 005 of 2022 issued by the Financial Superintendency of Colombia (SFC), which provides guidance

for classifying environmentally sustainable economic activities, including those related to water resources. Since 2016, the Inter-American Development Bank (IADB) has played a key role in advancing the green capital markets in LAC, supporting over 30% of issuances by volume, particularly first-time issuances in local markets (OECD, 2024[13]).

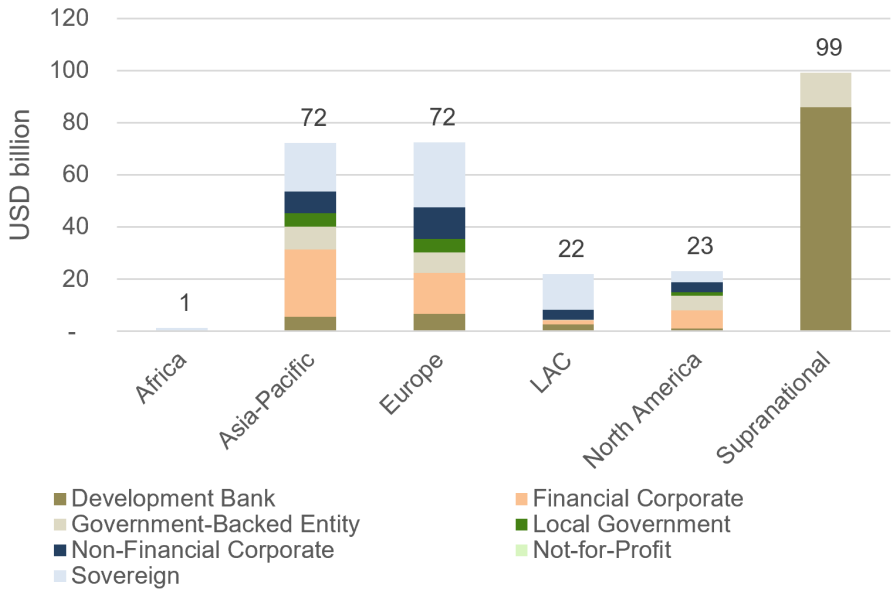
Figure 2.7. Blue/Water labelled total bond issuance by region and issuer institution type, 2024 [Original labels]



Note: Blue/Water labelled refers to bonds labelled with water or blue tags by their issuers. LAC: Latin America and the Caribbean.
Source: Authors based on CBI dataset.

An analysis of bond issuances based on UoPs or KPIs[4] shows a slightly different perspective of the breakdown by region and issuer type. In 2024, supranational institutions (mostly multilateral and regional development banks) issued USD 99 billion of bonds including water-related KPIs or UoPs. Asia-Pacific and Europe each recorded around USD 72 billion in issuances, mainly driven by sovereign and financial corporate issuers. LAC and North America reported similar volumes (USD 22-23 billion), with balanced issuer profiles. Bonds issuances in the similar category in Africa totalled around USD 1 billion in 2024. Weak local capital markets, characterised by limited depth, low investor confidence and weak regulatory frameworks, particularly in low- and middle-income countries such as those in Sub-Saharan Africa, restrict GSSS bond issuance and access to long-term capital for water infrastructure (CBI, 2024[8]).

Figure 2.8. Total issuance of GSSS bonds with water- or blue-related use of proceeds or KPIs, by region and issuer type, 2024 [Use of proceeds]



Note: LAC: Latin America and the Caribbean.
The volumes correspond to bonds with at least one mention related to "water" or "blue" in their UoP, which often contain mentions to other sectors. Therefore, it does not give the exact amount of proceeds related to water.
Source: Authors based on CBI data.

2.2.3. Breakdown of issuance by country and main issuers

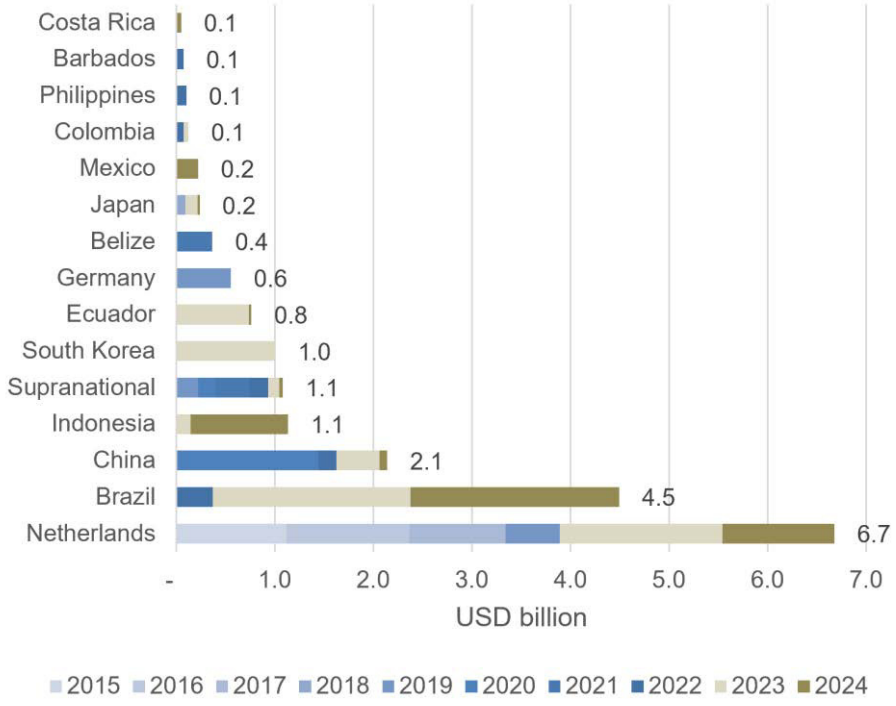
The Netherlands and Brazil have emerged as the largest issuers of blue and water-labelled bond, with total issuances reaching USD 6.7 billion (34% of total globally) and USD 4.5 billion (23% of total), respectively in the period 2015-2024. While the Netherlands have a relatively stable yearly issuance across the period (with a few exceptions), Brazil experienced a significant increase in the years 2023 and 2024 (see Figure 2.9).

NWB Bank, the Netherlands' sole issuer of water-labelled bonds, has been the most consistent global issuer over the past decade, with cumulative issuances of USD 6.7 billion (2015-2024).

Brazilian issuers collectively raised USD 4.4 billion across 2023 and 2024, marking the highest concentration of water-related bonds in LAC. This issuance was **primarily driven by non-financial corporates** such as Aegea (USD 1.8 billion), SABESP (USD 1 billion), and other regional water and sanitation utilities, including Rio+ Saneamento, CORSAN and Prolagos, as depicted in Table 2.2. **Águas do Rio**, a subsidiary of **Aegea**, the largest private sanitation company in Brazil (second largest at the global level), issued in total USD 1.2 billion in 2023 and USD 0.7 billion in 2024. These bonds, categorised as a GSS bond, carry water and other labels as designated by Águas do Rio. Its UoP includes energy, water, waste, land and biodiversity, which makes the exact allocation of funds to water difficult to track. A similar UoP structure is observed in the 2023 GSS bond issuance by the **Basic Sanitation Company of the State of São Paulo** (Companhia de Saneamento Básico do Estado de São Paulo - **SABESP**), valued at USD 1 billion, although this bond does not include biodiversity as a targeted investment area. Alongside **Companhia Riograndense de Saneamento (CORSAN)**, which was privatised in 2022, **Rio+ Saneamento**, a private water and sanitation provider serving 18 municipalities in Rio de Janeiro, issued bonds totalling USD 514 million to finance water infrastructure investments in the city. The prominence of private sector issuers reflects Brazil's well-established water utilities market, where companies play a

leading role in financing water infrastructure and services. **Government-backed entities in Brazil also contributed, albeit at a lower scale.** Sanepar and CASAN, which are water companies with public and private capital, with the local governments as the majority shareholders, raised a combined USD 381 million, demonstrating subnational public sector involvement in water financing. However, there was no sovereign issuance from Brazil, indicating that water investments remain **primarily driven by corporates and local governments rather than by the national government due to the governance structure of the Brazilian water sector**.

Figure 2.9. Main countries issuing water- or blue labelled bonds in the period 2015-2024 [Original labels]



Note: "Blue/Water labelled" refers to bonds labelled with water or blue tags by their issuers. The countries with total issuance volume below USD 100 million are not included in this graph.
Source: Authors based on CBI dataset.

At country level, all issuers combined, China appears as the third global issuer in the period 2015-2024, with a total issuance of USD 2.1 billion. China's involvement in water-labelled bond issuance is led by corporate and government-backed entities rather than sovereign issuers. China Merchants Bank issued bonds for USD 400 million in 2023, marking one of the largest bond issuances related to water from a financial corporate in the region. Meanwhile, Qingdao Water Group, a government-backed entity, issued multiple bonds reaching the total amount of USD 118 million in 2023-2024.

Table 2.2. Global Blue/Water labelled bond issuance by issuer, 2023 and 2024 [Original labels]

Country	Issuer Type	Issuer	2023 USD million	2024 USD million	Total USD million
Netherlands	Government-Backed Entity	National Water Board (NWB) Bank	1 650	1 139	2 788
Brazil	Non-Financial Corporate	Aegea (Águas do Rio)	1 155	685	1 840
Indonesia	Sovereign	Republic of Indonesia	144	987	1 131
Brazil	Non-Financial Corporate	Companhia de Saneamento Básico do Estado de São Paulo (SABESP)	-	1 042	1 042
South Korea	Export Credit Agency	Export-Import Bank of Korea	1 000	-	1 000
Ecuador	Sovereign	GPS Blue Financing Designated Activity Company (Ecuador Blue Bond)	656	-	656
Brazil	Non-Financial Corporate	Rio+ Saneamento	514	-	514
China	Financial Corporate	China Merchants Bank Co., Ltd.	400	-	400
Brazil	Government-backed Entity	Cia de Saneamento do Parana - Sanepar	200	123	323
Brazil	Non-Financial Corporate	Companhia Riograndense de Saneamento (CORSAN)	-	270	270
Mexico	Development Bank	FIRA Fideicomisos Instituidos en Relación con la Agricultura - FEFA Fondo Especial para Financiamientos Agropecuarios	-	221	221
China	Government-Backed Entity	Qingdao Water Group	41	77	118
Ecuador	Financial Corporate	Banco Bolivariano	80	-	80
Brazil	Non-Financial Corporate	Prologos SA (Aegea)	79	-	79
Supranational	Development Bank	Central American Bank for Economic Integration (CABEI)	75	-	75
Supranational	Development Bank	Asian Development Bank (ADB)	35	35	70
Japan	Non-Financial Corporate	Metawater Co. Ltd.	68	-	68
Brazil	Government-Backed Entity	Companhia Catarinense de Águas e Saneamento S.A. (CASAN)	58	-	58
Costa Rica	Government-Backed Entity	Banco Nacional de Costa Rica	-	50	50
Colombia	Financial Corporate	BBVA Colombia	50	-	50
Japan	Local Government	City of Chiba	21	22	43
Japan	Local Government	City of Kumamoto	34	-	34
Peru	Development Bank	Cofide Corporacion Financiera De Desarrollo S.A.	-	26	26

Country	Issuer Type	Issuer	2023 USD million	2024 USD million	Total USD million
Ecuador	Financial Corporate	Fideicomiso de Bonos Azules BDA	-	25	25
France	Government-Backed Entity	SYCTOM (Agence Metropolitaine des Dechets Menagers)	22	-	22
Fiji	Sovereign	Government of Fiji	20	-	20
Cape Verde	Financial Corporate	International Investment Bank - (IIB) (Cabo Verde)	3	-	3
		Total	**6 305**	**4 703**	**11 008**

Note: Blue/Water labelled refers to bonds labelled with water or blue tags by their issuers.
Source: Authors' calculations based on CBI dataset.

At the issuer level, the Republic of Indonesia was the third-largest global issuer in 2023 and 2024, with total sovereign issuances reaching USD 1.1 billion. The issuance volume surged from USD 144 million in 2023 to USD 987 million in 2024 (see Table 2.2). Although the bonds are officially labelled as blue, their UoP spans multiple sectors, including energy, waste, water and land. These sovereign issuances align with Indonesia's policy focus on infrastructure resilience and adaptation, particularly in water and sanitation (SWA, 2022[19]).

The Export-Import Bank of South Korea also ranked among the top issuers in 2023-2024, due to a single issuance of USD 1 billion in 2023. Funds raised were dedicated to water management, particularly projects promoting marine ecosystem-friendly practices, and investments in marine electricity generation facilities and water transport infrastructure (DNV, 2024[20]).

Japan's participation in the market has been primarily driven by **sub-national and non-financial corporate issuers**. The **cities of Chiba and Kumamoto** issued USD 77 million in water-related bond in total over the period of 2023-2024, signalling some engagement by local governments, albeit at a much smaller scale compared to other issuers. Among non-financial corporates, Metawater, a Japanese company specialising in water and environmental engineering, issued a bond totalling USD 68 million, demonstrating the role of private firms in water-related infrastructure and services.

Beyond Brazil's large issuance in LAC, Ecuador recorded notable sovereign issuance of USD 656 million in 2023, as well as issuances from **financial corporates**. Although the funds from the sovereign bond were mostly dedicated to marine conservation activities (IADB, 2023[21]), the stated UoP includes water and land use components. **Costa Rica's** largest public commercial bank, Banco Nacional de Costa Rica (BNCR), raised USD 50 million in government-backed issuance in 2024. The blue bond adheres to the Social and Green Bond Principles, as well as Blue Bond Guidelines established by ICMA and the UoP include buildings, water, waste and land. **Mexico's** Trust Funds for Agriculture (FIRA), a development bank, issued a USD 221 million bond, while a **Peruvian** national public development bank, the Development Finance Corporation (Corporacion Financiera De Desarrollo S.A. - COFIDE) raised USD 26 million in 2024 through water-labelled bond issuances. This **highlights the role of development banks in LAC, alongside non-financial corporates such as water companies** in scaling up water- or blue-labelled bond issuance to finance water investment.

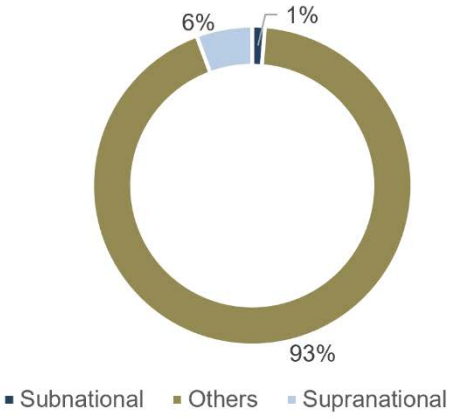
2.2.4. By level of issuance (supranational, national, subnational)

Between 2015 and 2024, supranational issuers raised USD 1 billion through water- or blue-labelled bonds, accounting for 6% of global GSSS issuances (see Figure 2.10). The largest supranational issuers were ADB and Nordic Investment Bank, with USD 420 million and USD 392 million of issuances,

respectively (see Table 2.2). Other two supranational issuers included Inter-American Investment Corporation (IDB Invest) and Central American Bank for Economic Integration (CABEI).

In contrast, **sub-national issuances remained limited, accounting for 1.3% of the global GSSS issuance**, totalling USD 243 billion in the period 2015-2024. The largest municipal water-related bond, amounting to USD 152 million, was issued by the Municipality of **Shenzhen**, a major city in southeastern China that serves as a gateway between Hong Kong and mainland China. The UoP is exclusively allocated to water treatment and supply projects within the city.

Figure 2.10. Supranational and subnational issuances of water- or blue-labelled bonds, 2015-2024 [Original labels]



Note: Every bond that are not classified as subnational and supranational in the CBI database. Blue/Water labelled refers to bonds labelled with water or blue tags by their issuers.
Source: Authors based on CBI dataset.

As mentioned above, two Japanese cities, **Chiba** and **Kumamoto**, issued USD 77 million in water-related municipal bonds in 2023 and 2024 (see Table 2.2). These issuances were denominated in local currency, with proceeds directed towards water infrastructure, sanitation and land use projects linked to biodiversity. Despite its modest size (USD 14 million), the **Atlanta** Water and Wastewater bond in the US, issued in 2019, is another example of municipal financing for water-related investments.

Municipal and sub-national bonds offer a viable pathway to scale up water investments by enabling local governments to finance infrastructure aligned with regional water needs. As water supply, sanitation and environmental resilience are primarily managed locally, these debt instruments can mobilise long-term capital for critical projects. Of the USD 127 billion of **bonds with water-related UoP issued in North America in the period 2015-2024, 14 %** (USD 18 million) **originated from municipal issuers.** Countries with established municipal bond markets, such as the US and India, have successfully leveraged these instruments, with programs like the U.S. Environmental Protection Agency's Water Infrastructure Finance and Innovation Act providing credit enhancements to reduce borrowing costs (OECD, 2023[22]). Over the last decade, **municipal water and wastewater utilities** issued important volumes of bonds (even though not always labelled with water or blue marks), with an increase from USD 31 billion in 2014 to USD 44 billion in 2024 (GWI, 2025[23]). Some innovative mechanisms such as the Clean Water State Revolving Fund and tax-exempt status, allowed to reduce borrowing costs and ensure steady returns for investors (EPA, 2017[24]). Municipal bond issuers from North America and the United States rarely apply water or blue original labels to their issuances, even when a substantial share of proceeds is allocated to water-related investments (visible in the UoPs).

By issuing **sub-national or municipal bonds**, local government debt becomes tradeable on secondary markets, allowing multiple investors to purchase portions of that debt and allowing securitisation (OECD, 2022[25]). However, **adoption remains limited in emerging markets** due to credit risks, weak capital markets and the absence of standardised issuance frameworks. Strengthening regulatory frameworks, improving credit ratings and leveraging blended finance with DFIs can enhance investor confidence and expand municipal bond financing for water projects (CBI, 2024[26]).

2.3. Opportunities to scale up bond finance for impactful water investments

This section explores opportunities to expand bond issuance to finance long-term and impactful water investments, examining enabling tools such as taxonomies, standards, and reporting frameworks to boost transparency and investor trust, as well as demand from key investor groups.

2.3.1. Guidance, frameworks and standards for water/blue bonds

Clear guidance and standardised frameworks are key to scale up water investments through bonds. Investment taxonomies and verification mechanisms can be deployed to ensure transparency, accountability and alignment with environmental goals, boosting investor confidence. However, current frameworks often lack the specificity needed for freshwater investments and global water security. Enhancing these standards will improve market integrity, comparability and capital mobilisation for impactful water investments.

Standards supporting water-related bond issuance

Guidance from multilateral and bilateral institutions on (water-related) bonds can help scale up bond financing for water by attracting investors, enhancing market credibility and ensuring alignment with long-term objectives. Various international associations (including CBI and the International Capital Market Association - ICMA), multilateral development banks (including ADB) and development finance institutions (such as the International Finance Corporation - IFC), have developed voluntary guidelines, which include criteria and best practices, to support the standardisation of the issuance of water and blue bonds. These frameworks can play a role in aligning the UoPs with water-related investments, supporting transparency in the use of proceeds and mobilising both public and private capital at scale (CBI, 2018[27]; IFC, 2022[28]; ICMA, 2023[5]). Such guidance can help address key challenges including fragmented market practices, lack of standardisation and limited investor awareness. Furthermore, the predominance of ocean-focused projects among blue bonds underscores the need for clearer differentiation in blue finance frameworks to expand funding for water-related infrastructure. Strengthening guidance on freshwater investments within blue finance taxonomies can help address water security challenges more effectively.

For example, CBI developed a set of standards used to certify green bonds and loans that finance water-related projects: the Water Infrastructure Criteria. These criteria ensure that water-related bonds and loans contribute positively to environmental management and long-term resilience. These criteria distinguish water-focused green bonds from conventional water bonds by ensuring that proceeds are used for environmentally aligned projects, such as watershed restoration, industrial water efficiency and large-scale water supply infrastructure (CBI, 2018[27]). By 2020, projects with a total valuation of around USD 7 billion had obtained certification under the Water Infrastructure Criteria across various regions, including the United States, Nigeria, South Africa, China and Australia (Cooper and Matthews, 2020[29]). This certification indicates alignment with environmental standards, reinforcing transparency and investor confidence in water-related investment and helping to direct financing toward long-term water investments. **By applying screening criteria, in addition to issuer labelling, frameworks such as CBI's Water Infrastructure Criteria provide an encompassing approach to scale up water investments through**

bonds which are not necessarily labelled "water" or "blue". This mitigates the risk of fragmentation by recognising a broader set of eligible projects, including those not explicitly labelled as "blue" or "water", but which contribute to water security. These criteria can align issuer and investor expectations around environmental outcomes, facilitate access to green capital and promote wider adoption of good practices across the water sector (CBI, 2022[30]).

As outlined at the beginning of the chapter, the ***Green Bond Principles*** **(GBP) developed by ICMA serve as a key benchmark for green bond issuance**. Similarly, the *Social Bond Principles* (SBP), *Sustainability-Linked Bond Principles* (SLBP) and *Sustainability Bond Guidelines* (SBG)[5] provide guidance for issuers, influencing the development of more detailed frameworks by financial institutions (ICMA, 2021[4]; ICMA, 2023[5]). For example, **IFC's Blue Finance Guidelines** build upon these principles to address water and marine-related investments. These pillars ensure transparency, accountability and alignment with responsible objectives, reinforcing investor confidence in thematic bond markets. Similarly, **ICMA's guidance on financing the blue economy** is based on GBP and promotes standardisation across issuers, underwriters and investors, helping scale the market for blue-labelled debt instruments, including bonds and loans (ICMA, 2023[5]). It also strengthens transparency by encouraging disclosure requirements that enable investors to evaluate environmental impacts of bonds.

Role of governments and MDBs in strengthening market architecture for water-related bonds

Establishing national guidelines for water and blue bonds can also support the scaling up of bond finance for water and attract domestic institutional investors. National green finance frameworks in countries such as Indonesia and Malaysia are setting clearer eligibility criteria for water-related investments, providing guidance for bond issuers through rigorous classification of activities and sectors related to water (OECD, 2022[31]). In particular, the Green Bond and Green Sukuk (Islamic bonds) Framework, which was issued by the Indonesian Ministry of Finance in 2018, contributed to the large amount of water-labelled sovereign green bond issuance by the Indonesian government (USD 1.3 billion). Similarly, the Guidelines on Issuance of Corporate Bonds and Sukuk (Islamic bonds) to Retail Investor, developed by the Securities Commission Malaysia was another positive initiative in the region. However, the guidelines lack depth on water-related items.

MDBs are increasingly playing a role in developing frameworks and setting standards for investments in water through bonds. The **IFC** developed a **Green Bond Framework**, a set of guidelines that govern the issuance of green bonds, aiming to ensure that funds raised through IFC's green bonds are allocated to environmentally aligned projects. This framework is aligned with the GBP of the ICMA (mentioned above). Furthermore, IFC introduced **guidelines for blue finance**,[6] mapping water-related investments under the GBP and Green Loan Principles (GLP). The document provides a list of eligible use of proceeds to support private investments aligned with the GBP and GLP, and contributing to SDG 6 and 14, aiming to support the increase of water-related investments through loans and bonds. These guidelines define eligible blue finance projects for green bonds and loans, including water supply, sanitation, marine ecosystem restoration and water-friendly industrial processes (IFC, 2022[28]). Similarly, the IsDB, along with ICMA and LSEG, is exploring the integration of Shariah-compliant sukuk with green bond principles to broaden the investor base for impact-driven water finance. In their guidance on GSS sukuk, similarly to blue bonds, blue sukuk is considered under green sukuk (ICMA, IsDB and LSEG, 2024[32]).

Enhancing water-related taxonomies and impact reporting frameworks

The limited visibility of water-related activities within existing GSSS financing frameworks may reflect market inefficiencies driven by classification and disclosure gaps. The absence of clear identification of water-related investments limits the ability to track financial flows, assess needs, and price risks and opportunities, contributing to their underrepresentation in financing markets and potentially hindering

capital allocation toward water security objectives. Addressing these gaps strengthens the case for a dedicated water taxonomy or more specific classification criteria and highlights the need to further develop criteria and methodologies for investments in the sustainable management of water resources.

At the national and regional levels, taxonomies have enabled more consistent classification of environmentally relevant activities, improved transparency in capital allocation and supported the development of coherent green finance frameworks across sectors. For instance, **at the European level**, the EU Taxonomy has played a pivotal role in shaping the European Green Bond (EUGB) Standard, providing a structured framework for water-related and broader green bond issuances across the region. By defining clear eligibility criteria for environmentally aligned activities, the taxonomy enhances market transparency, mitigates greenwashing risks and strengthens investor confidence. For water-related investments, the EU Taxonomy outlines technical screening criteria, covering areas such as water supply efficiency, wastewater treatment and flood risk management, ensuring that green bond proceeds support tangible environmental improvements (OECD, 2025[18]). The EUGB Standard, aligned with the taxonomy, mandates issuers to disclose project alignment with these criteria, reinforcing accountability and facilitating the mobilisation of capital for water infrastructure (OECD, 2025[18]). **At national level**, established frameworks such as the U.S. Water Infrastructure Finance and Innovation Act, the Clean Water State Revolving Fund or the Colombian Green Taxonomy, among others, have demonstrated effectiveness in mobilising long-term financing for water investments, including investments in wastewater treatment, drinking water systems and related environmental infrastructure.

Enhanced and comprehensive guidance on freshwater-related bond standards is required, underpinned by the development of more sophisticated and harmonised taxonomies. Despite progress, existing frameworks used for issuing water-related bonds remain fragmented and lack depth to provide comprehensive guidance. Most blue bond standards are centred on marine conservation, offering limited applicability for freshwater-related investments such as drinking water supply, sanitation services or watershed restoration (S&P, 2024[33]). Technical criteria are insufficiently defined, with limited clarity on project eligibility and weak assurance of environmental benefits related to freshwater-related investments.

Enhanced taxonomies are essential to enable more precise classification of freshwater-related activities and to guide the development of bond standards. For instance, SLBs lack water-specific KPIs and the broad flexibility in target-setting weaken their relevance for freshwater outcomes. These limitations restrict the scalability and impact potential of water-related bonds. Addressing them will require the development of harmonised and inclusive taxonomies that better reflect the full scope of water investments and offer clearer guidance to regulators, issuers and investors.

Water-related investments across bond categories

The limited uptake of water and blue bonds is partly explained by the lack of standardisation, reporting, tracking and impact measurement compared to other types of bonds, in particular green bonds. Green bonds currently dominate the GSSS bond market, benefiting from well-established frameworks, clearer eligibility criteria and stronger recognition among investors (CBI, 2018[27]). **Water is often included under green bonds due to clearer standards and stronger investor confidence, and blue bonds are still often associated with ocean and marine-related investments.** For instance, some sukuk contributing to finance water investments have been labelled as SRI[7] sukuk, with no reference to water in the label. Furthermore, the presence of multiple labels for bonds can lead to difficulties in accurately tracking the volume of investments going to water in general and to water sub-sectors (including freshwater), thereby reducing transparency, investor interest and potentially the actual amount of investments reaching the sectors. Issuers and investors face additional hurdles related to revenue stability, regulatory fragmentation and underdeveloped local capital markets in some jurisdictions.

The choice of the bond category is context-specific and critical in securing investor interest. In certain regions, these instruments are more commonly classified as green rather than blue, primarily due

to higher levels of standardisation; however, in other contexts, categorising them as blue may appeal to thematic investors. **The emergence of blue bonds presents an opportunity to direct capital more explicitly towards water-related outcomes.** However, some voices support that the promotion of blue bonds as a distinct category without consistent standards for freshwater investments could lead to regulatory fragmentation, inefficiencies and increased transaction costs (IFC, 2022[12]). It is important to recall that green bonds initially faced similar concerns before evolving into a widely trusted instrument. With the development of coherent standards, robust taxonomies and institutional support, blue bonds could similarly gain traction as an effective tool to scale water finance. **Rather than prioritising one label over another, an integrated approach may be more appropriate**, one that enhances the visibility, credibility and impact of water-related investments across all relevant finance instruments.

The lack of impact measurement and reporting for water-related bonds poses a challenge for investors and issuers (Bosmans and De Mariz, 2023[34])**.** Bond managers are increasingly calling for more precise impact reporting to strengthen transparency and accountability (Environmental Finance, 2023[35]). Subsequently, leading international financial institutions, including the EIB, developed a harmonised impact reporting framework to enhance data comparability and ensure consistent assessment of financed projects. **Mandating impact reporting for all water-related bonds, drawing on best practices from disclosure regulations and CBI certification standards, could improve market transparency** (CBI, 2024[8])**.** Furthermore, harmonisation of methodologies is required for effectively assessing the size of water-related bond markets. While labelled issuance remains limited, broader estimates that include any mention of water suggest much larger volumes, creating confusion about actual market size. Aligning methodologies and improving disclosure are essential to ensure reliable data, support informed decision-making and avoid misleading signals on capital flows. **Labelling aside, enhancing transparency and credibility in water-related bond financing requires consistent post-issuance reporting on the allocation of proceeds.** Many bonds support water-related investments without a dedicated water or blue label, limiting the ability to trace financial flows. At the same time, when bonds carry multiple thematic labels, the proportion of proceeds allocated to water-related activities is often not clearly identified. Strengthening post-issuance disclosure requirements would help address these gaps, facilitate the tracking of environmental and social impacts, and support the development of more targeted and accountable financing strategies.

2.3.2. Growing investor demand for green and water-related bonds

Investors in water-related bonds, including blue bonds and green bonds with water-focused use of proceeds, represent a diverse landscape, driven by a combination of financial returns and impact-driven investment objectives. This market includes institutional investors, impact investors, development finance institutions (DFIs) and corporate entities, each with distinct investment strategies, risk appetites and priorities. While the market for blue and water-related bonds is expanding, it remains a niche within the broader impact finance landscape, presenting substantial opportunities for further growth (CBI, 2024[8]). In the green bond market, funds often support cross-sectoral investments that include water projects. This can contribute to offset water investments' perceived high-risk profile and contribute to attract investments (CBI, 2022[30]).

2.3.3. Type of investors

Institutional investors, including pension funds, insurance companies and asset managers, are increasingly active in green bond markets, including water-related bonds (Rabobank, 2024[36])**.** Their interest is shaped by a dual mandate to generate stable long-term returns while aligning investments with environmental and social criteria. Water risks are gaining prominence in these assessments, ranking as a critical concern among institutional investors, following cybersecurity and anti-corruption risks (Rabobank, 2024[36]). Despite this growing interest, challenges such as limited secondary market liquidity, inconsistent

impact reporting and a lack of standardised metrics hinder broader institutional participation. However, regulatory frameworks such as the *EU Sustainable Finance Disclosure Regulation* are incentivising asset managers to increase allocations to impact-linked investments, including water security (OECD, 2022[31]). Expanding the issuance of water-related bonds and improving impact measurement frameworks could further strengthen institutional investor engagement.

Impact investors prioritise investments that generate measurable environmental and social benefits alongside financial returns. Blue and water-labelled bonds align well with these objectives, directly financing projects related to marine conservation, fisheries, water infrastructure and environmental resilience. The Seychelles' 2018 blue bond issuance demonstrates how these instruments attract impact-driven investors by funding initiatives that enhance marine ecosystems while delivering economic benefits (Euromoney, 2025[37]). However, despite growing participation, impact investors face challenges related to the lack of standardised methodologies for measuring the environmental and social impact of water-related investments. Unlike green bonds, which benefit from more structured reporting practices, water finance lacks widely accepted frameworks for assessing metrics such as water quality improvements, biodiversity conservation or reduced water stress (Bosmans and De Mariz, 2023[34]). Addressing this gap through harmonised impact reporting frameworks could facilitate greater impact investor participation in the water finance market.

Corporate entities are playing an increasing role in the water-related bond market as both issuers and investors, using bond instruments to finance viable water infrastructure and manage water-related risks. As mentioned previously in the chapter, non-financial corporate entities such as utilities, water service providers and industries with high water dependencies are aligning capital expenditures with impact-oriented investment commitments through bond issuance (CBI, 2024[8]). Additionally, financial corporates such as private and state-owned commercial banks, investments banks and trust funds issued water-related bonds in the same period to finance their investments in water.

Risk management and investor confidence

MDBs and DFIs, including the WB, IFC and the ADB, play a crucial role in de-risking water investments and mobilising private capital through investing in bonds, guarantees, co-investment mechanisms and concessional financing. These institutions are issuing blue- and water-labelled bonds to channel capital towards projects delivering environmental and economic benefits in marine and freshwater ecosystems. Additionally, they support the water- or blue-labelled bond market by providing credit enhancements that lower investment risk, acting as anchor investors to establish credibility and assisting governments in designing regulatory and policy frameworks that enable bond issuance for water-related investments (CBI, 2024[26]). However, their engagement in water-focused bonds remains relatively limited compared to other sectors such as energy and infrastructure (CBI, 2024[26]). Strengthening their role through dedicated blue/water bond facilities and blended finance approaches could unlock additional capital for water-related investments. In 2021, ADB issued a dual-tranche blue bond raising USD 310 million for marine and freshwater conservation in Asia and the Pacific, supporting water management and environmental resilience. The bond's use of proceeds includes freshwater-related investments, including ecosystem restoration, natural resource management and solid waste management to prevent freshwater contamination. ADB's investment in a green bond issued by Georgia Global Utilities JSC (GGU) for resilient water supply, demonstrates how MDBs can provide de-risking mechanisms through investing in bonds to attract other types of investors (ADB, 2024[38]). Similarly, the Inter-American Development Bank's (IDB) 2022 green bond issuance of USD 1 billion financed resilient water and sanitation projects in Latin America, attracting institutional investors through alignment with green finance standards (CBI, 2024[26]).

National governments can also contribute to de-risking water-related bond issuances by providing guarantees that enhance creditworthiness and attract investors (Laubenstein and Leflaive, 2024[39])**.**

Sovereign and partial credit guarantees lower default risk, making long-term water investments more viable, particularly in emerging markets. Expanding guarantee schemes for subnational governments and municipal utilities, alongside integrating risk-sharing mechanisms within blended finance structures, can further strengthen private sector participation in water investments (Laubenstein and Leflaive, 2024[39]).

Issuers with strong credit ratings are generally more attractive to investors, as such ratings indicate lower default risk and enable access to capital on more favourable terms. In the case of water-related bonds, higher credit ratings allow issuers to reach a broader investor base and reduce borrowing costs, thereby enhancing the financial viability of water investments. For example, the Dutch NWB Bank has maintained a AAA credit rating since 1996, with a credit risk similar to the Dutch government, supporting its ability to issue large volumes of GSSS bonds, including those related to water, with strong investor demand (see Box 2.2). In contrast, weaker credit ratings can increase capital costs or restrict market access, limiting the capacity of issuers to raise long-term financing for water investments through capital markets.

Scale is a determining factor for investor interest and bond market viability. Having the ability to secure a sufficiently large volume of eligible and bankable water investments is not straightforward for all issuers. Notable examples of large water bonds, including bonds from NWB Bank, but also the Viveracqua Hydrobond in Italy and Saur's blue bond in France, highlight the effectiveness of aggregating a diversified portfolio of water-related projects to achieve the critical mass required for benchmark-sized issuance. These cases underscore the **importance of project consolidation and pipeline development in meeting institutional investor expectations and facilitating access to capital markets**. This is a particularly acute challenge in the water sector as water infrastructure is often small-scale and locally managed, especially in rural or decentralised contexts. Beyond the financing of large transactions, the question of **adapting these instruments to small-scale water projects arises**. Strengthening the capacity of issuers, particularly public utilities and municipalities and developing platforms to aggregate smaller investments are clear options to support small-scale investments through capital markets.

Box 2.2. Meeting investors' demands: lessons from the National Water Board (NWB) Bank

NWB Bank is a national bank, which is majority-owned by the Dutch water authorities (81%), with minority stakes held by the Dutch State (17%) and provinces (2%). The bank provides financing to local and regional authorities responsible for water management, as well as to the health care, education and public housing sectors.

NWB Bank maintains a **AAA credit rating**, with a credit risk similar to the Dutch government, supporting its ability to attract investors and issue large volumes of water-related bonds. As of 2025, NWB Bank's total balance sheet stands at EUR 79 billion, including EUR 25 billion in impact-oriented funding.

NWB Bank was the world's first issuer of water and blue-labelled bonds in volume in 2023 and 2024, issuing a total of USD 2.9 billion, significantly surpassing the volume issued by any other bond issuer during the same period, according to data from CBI.

The proceeds are channelled to Dutch water authorities, the governmental bodies responsible for flood protection, water management and water quality. These funds support projects related to energy recovery from wastewater, flood protection and other flood defences, sanitation and dredging of waterbeds, transport and cleaning of wastewater and disposal of sewage sludge.

The NWB Bank experience highlights that scaling water investments through bond finance requires:

- Structuring instruments that meet institutional investors' demands, namely, benchmark-sized issuances with long maturities and strong credit ratings (AAA).
- A clear, dedicated water bond framework aligned with recognised taxonomies (e.g. EU Green Bond Standard) and supported by independent second-party opinions (e.g. Shades of green by CICERO and now Standards & Poor).
- Positioning water bonds within the context of adaptation, resilience and biodiversity to strengthens their appeal to investors.
- Robust impact reporting (e.g. detailed annual reporting on environmental impacts such as reduced flood risks or improved water quality) and independent verification with quantitative metrics to build investor confidence and facilitates comparability across issuances.

Source: (NWB Bank, 2025[40]).

2.3.4. Innovative bonds instruments

The design of bond instruments and the structure of financing mechanisms are also critical in securing investor interest, with a view to scale up bond finance for water. The ability of water-related bonds to attract investors relies as much on the quality of the underlying projects, the structure of financing mechanisms and the robustness of associated reporting systems as on the bond labels themselves.

The analysis reveals limited freshwater investment via bonds, primarily due to lack of standardised reporting, blue bonds being biased towards ocean-related investments and the scale requirements of bond issuance while many water investments are local. This section does not exhaustively examine all innovative bond instruments but highlights key potentials:

- **Performance-linked or outcome-based bond instruments** (such as impact bonds, resilience bonds and SLBs), combined with credit enhancement mechanisms, can catalyse freshwater investments by shifting financing toward measurable social and environmental outcomes as market standards evolve.
- **Municipal and local currency bonds** offer a scalable financing avenue by enabling subnational governments with sufficient creditworthiness and governance transparency to mobilise capital tailored to community water needs.
- **Perpetual bonds** present a potential solution to credit rating constraints and market access challenges, particularly for low-income countries.

Performance-linked bond instruments

Impact bonds represent an innovative, results-based financing mechanism that attracts private capital to pre-finance water investments through performance-based contracts, where investor returns are contingent on independently verified social or environmental outcomes rather than fixed interest payments (ICMA, 2021[41]; Trotta, 2024[42]). This pay-for-performance model shifts financial risk away from public entities, enhances accountability and incentivises innovation to tackle complex water security challenges. The model is particularly relevant to water security investments, including freshwater investments, due to the sector's clear, measurable impact metrics and the substantial upfront capital requirements. A survey by the Global Impact Investing Network (GIIN) shows that **one in five investors is considering the use of social impact bonds to finance their WASH investments in emerging markets and developing economies** (Trotta, 2024[42]). Environmental impact bonds (EIB), a subset of impact bonds, have demonstrated their potential by financing green infrastructure to improve water quality and flood resilience, exemplified by successful issuances like the District of Columbia Water and Sewer Authority (DC Water)

(World Bank, 2021[43]) and Atlanta Flood bond[8] (Atlanta Watershed Management, 2019[44]). **Scaling impact bonds requires strong public-sector capacity to design and contract outcome-based schemes** (Brand et al., 2021[45]), as explained in the chapter on result-based finance mechanisms.

Despite their current limited share (1%) in the water- or blue-labelled GSSS bond market (as evidenced in the previous sections), **SLBs** can support water-related investments by tying financial terms to predefined impact performance targets, while allowing issuers full discretion over the use of proceeds. They therefore **hold significant potential for areas such as water security,** biodiversity, resilience and social development – which have strong financing needs but typically lack pipelines of sizeable and bankable assets necessary to use GSS bonds. Because SLBs are **backed by the full financial strength of the issuer, rather than by a set of specific green or social projects,** they allow issuers to **issue bigger and longer-term bonds** than traditional GSS bonds. They can also be linked to existing nationally defined, sector-specific performance benchmarks and thus increase their credibility and issuers' accountability (OECD, 2024[9]). However, **concerns over weak SLBs ambition, limited transparency and small coupon step-ups** have affected their credibility (Ul Haq and Doumbia, 2022[46]). To address SLB bottlenecks, an OECD report recommends supporting technical assistance, developing local guidelines, selecting ambitious KPIs and targets, strengthening data capacities, improving bond design and scaling market transactions in developing countries (OECD, 2024[9]). Additionally, other studies show that combining such bonds with credit enhancements, like guarantees, has the potential to reduce the cost of capital and crowd in investors (David et al., 2025[47]).

Resilience bonds offer a promising way to mobilise funding for water-related investments that support adaptation and disaster preparedness (Laubenstein and Leflaive, 2024[39]). By linking bond repayments to the financial savings from avoided losses, such as reduced insurance payouts or emergency response costs, they create incentives to invest in infrastructure that mitigates flood risks, protects watersheds and improves water system reliability. In urban settings, for instance, they can fund nature-based solutions like wetland restoration or permeable surfaces, while in coastal areas, they support projects that demonstrate measurable reductions in flood risk, helping municipalities lower insurance costs and attract investment. Notable examples include the Forest Resilience Bond in California, which raised USD 4 million to restore forestland and reduce wildfire risk (US EPA, 2021[48]) and the EBRD's resilience bonds, which have mobilised USD 1.4 billion since 2019 (EBRD, 2019[49]). However, **the broader application of resilience bonds requires clear methodologies for calculating avoided losses and strong institutional frameworks to manage and allocate the resulting financial benefits.**

Subnational bond markets: municipal bonds and local currency bonds

Municipal bonds can play a critical role in financing water investments at the subnational levels. Their effectiveness has been demonstrated since the early twentieth century, particularly in the United States, where between 90% and 95% of financing for drinking water infrastructure is sourced through municipal bond markets (Agrawal and Kim, 2022[50]). These instruments provide subnational governments with access to long-term capital, allowing for infrastructure investment while spreading repayments over time.

Municipal bond markets outside the US, particularly in the Global South, remain limited but are showing early signs of growth, especially in Southeast Asia and parts of Africa. Examples include a green municipal bond issued by Ba Ria Vung Tau province in Viet Nam for water-related projects (ADB, CBI and ASGF, 2024[51]), a EUR 18 million ten-year green bond by Tanga UWASA in Tanzania to expand water infrastructure for over 26 000 people (UNCDF, 2024[52]) and USD 77 million in water-related bonds issued by the cities of Chiba and Kumamoto in Japan between 2023 and 2024. Supportive frameworks have also emerged, such as the Local Government Unit Guarantee Corporation in the Philippines (OECD, 2010[53]) and new municipal bond regulations introduced in Indonesia by the Financial Services Authority in 2024. **These developments highlight emerging momentum, though further growth will require**

targeted technical assistance, regulatory support and risk mitigation to help mobilise capital for local water infrastructure. Municipal bonds present a strategic opportunity to expand financing for water investments by leveraging the fiscal authority of local governments and their capacity to secure debt through tax revenues. Unlike sovereign bonds, they are typically issued to finance specific infrastructure projects, enabling more targeted and transparent resource allocation. Sovereign bonds generally offer greater liquidity than municipal bonds, owing to their larger market size, higher trading volumes, broader institutional investor participation and more transparent pricing mechanisms, which facilitate efficient secondary market transactions. However, municipal bonds can also attract long-term, impact-oriented investors and, in some cases, offer tax incentives or lower risk due to ring-fenced revenue streams. While liquidity in municipal bond markets, especially in developing countries, is more limited than for sovereign bonds (Schwert, 2017[54]), their strategic value in mobilising subnational finance justifies policy efforts to improve market depth, transparency and investor confidence. Under certain conditions and in specific cases, cities and water utilities may demonstrate stronger creditworthiness than sovereigns, owing to stable revenue streams, sound financial management and limited exposure to macroeconomic volatility, particularly when supported by robust institutional frameworks or credit enhancements.

Governments can play a crucial role in supporting municipal bonds by establishing clear legal and regulatory frameworks that enable local authorities to issue debt efficiently and transparently. In particular, scaling municipal bonds for water investment can be supported through **tax incentives that enhance investor appeal**. In the United States, for example, interest income from municipal bonds is often exempt from federal, and in some cases, state and local taxes (Agrawal and Kim, 2022[50]). This increases the tax-equivalent yield, making municipal bonds more attractive despite lower nominal returns. In high-tax settings, such incentives lower borrowing costs for municipalities and broaden the investor base. Indonesia has progressively reformed its municipal bond regulatory framework, led by the Financial Services Authority (OJK), to streamline issuance procedures, enhance transparency and promote impact-oriented finance through updated regulations, including frameworks supporting GSSS bond issuance.

Mobilising domestic capital through local bond markets provides a strategic approach to scale up financing for water infrastructure while strengthening financial resilience and viability. Issuing bonds in local currency enables municipalities and utilities to tap into domestic investor bases, such as pension funds and insurance companies, which are well suited to provide long-term capital aligned with infrastructure requirements (UNCDF, 2024[52]). Local currency financing also reduces exposure to exchange rate risk by matching debt service obligations with project revenues, thereby enhancing the financial stability and bankability of water investments (OECD, 2022[31]), improving predictability for both issuers and investors. They also facilitate access to capital for smaller-scale service providers, particularly when combined with pooling mechanisms or credit guarantees that enhance creditworthiness. In doing so, local currency bonds can contribute to the development of domestic capital markets and support the long-term growth and stability of water-related investments. Successful domestic issuances, particularly those labelled as green or blue bonds can build market confidence, attract international investment and encourage replication. For instance, Georgia Global Utilities JSC issued a USD 300 million, five-year certified green bond partially denominated in local currency to upgrade Tbilisi's water supply network, with ADB investing USD 40 million to improve access to potable water for 1.4 million people and strengthen resilience, while mitigating currency risk and adhering to international green bond principles (ADB, 2024[38]).

Perpetual bonds

Water infrastructure assets, such as dams and pipelines, often have lifespans exceeding 50 to 100 years (Laubenstein and Leflaive, 2024[39])**; perpetual bonds can provide a suitable financing instrument by offering indefinite funding that aligns with the longevity of these assets and eliminates refinancing risk.** Perpetual bonds are bonds with no set maturity date. Rather than repaying the principal, the issuer undertakes to provide ongoing interest payments for an indefinite period (Igan,

Kim and Levy, 2021[55]). Most perpetual bonds are issued by governments or financial institutions, with water-specific examples remaining uncommon. A notable historical exception is the bond issued in 1648 by the Water Board of Lekdijk Bovendams in the Netherlands. Remarkably, the holder was still receiving interest payments as of 2025, underscoring the long-term nature and durability of such instruments (CFI, n.d.[56]). Perpetual bonds, by aligning the financial horizon of investors with the operational lifespan of infrastructure, can attract long-term capital while reducing refinancing risk and exposure to interest rate volatility. This structure is particularly suited to public entities or utilities with stable revenue streams, enabling the financing of capital-intensive investments without immediate repayment obligations. However, perpetual bonds carry risks such as interest rate sensitivity, potential coupon deferrals, reinvestment uncertainty due to call options, lower repayment priority and limited liquidity in secondary markets.

Perpetual bonds may also enable countries with lower credit ratings to access capital markets without rigid repayment schedules, helping to preserve national fiscal autonomy. By shifting investor focus from full principal repayment to ongoing interest servicing, these instruments create opportunities for broader and more equitable participation in financing. As the risk assessment focuses on the issuer's ability to meet annual interest payments rather than repay principal, this model can improve access to capital markets for low- and middle-income countries seeking to finance water-related investments. The liquidity and income profile of perpetual bonds may also appeal to investors seeking long-duration assets backed by essential public services, such as water provision.

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Notes

[1] As explained in the methodology section, this chapter uses primarily original labels due to gaps in UoP data.

[2] A non-financial corporate refers to a privately or publicly owned company operating in sectors outside financial services, including water utilities, infrastructure and sanitation services. A government-backed entity is a public or semi-public organisation that operates independently but receives financial or strategic support from a national or regional government. A financial corporate is a privately owned or publicly traded financial institution engaged in banking, investment or fiduciary services. Sovereign issuers are national governments.

[3] Supranational issuers refer to international organisations or entities formed by multiple governments. Bonds issued by supranational issuers e.g., World Bank, Asian Development Bank, International Finance Corporation, differ from sovereign bonds issued by a single government.

[4] Bonds with at least one mention related to water in their UoPs or KPIs.

[5] As mentioned earlier in the chapter, these guidelines build on four key principles: i) Proceeds must be allocated to projects with clearly defined environmental or social benefits; ii) Issuers are expected to disclose the criteria and procedures used for project selection, including alignment with environmental or social objectives and risk management practices; iii) Proceeds should be tracked and managed transparently, ideally with third-party verification; iv) Annual reporting on fund allocation and expected environmental or social impacts is required to ensure accountability and maintain investor confidence.

[6] According to the IFC, “blue finance is an emerging area in green finance with increased interest from investors, financial institutions and issuers globally. It offers tremendous opportunities to help safeguard

our access to clean water, protect underwater environments and invest in the water economy. Blue Bonds and Blue Loans are financing instruments that raise and earmark funds for investments such as water and wastewater management, reducing ocean plastic pollution, marine ecosystem restoration, responsible shipping, eco-friendly tourism or offshore renewable energy."

[7] socially responsible investment

[8] The USD 14 million Atlanta Flood Environmental Impact Bond, developed by Quantified Ventures for the Proctor Creek Watershed, funds green infrastructure to reduce stormwater runoff, improve water quality, and lower flood risk. It is the first EIB open to public investors, enabling greater public capital mobilization (Atlanta Watershed Management, 2019[44]).

3. Mobilising Islamic finance for water investments

This chapter examines the contribution that Islamic Finance (IF) could play to finance lasting water-related investments globally. Building on recent evidence, it explores the untapped potential of IF financing sources and instruments for water, identifying promising applications for water investments and options to scale them up to contribute to improve water security. The chapter also analyses the extent to which IF could potentially contribute to improving the viability and quality of financing for water-related investments. It looks at the challenges that may constrain this potential and at practical limits in the application of IF values and principles when financing water.

Key messages

- **The Islamic Finance (IF) market has grown substantially over the years**. The IF industry was valued at USD 3.4 trillion as of 2023 (IFSB, 2024[1]), while it was representing USD 200 billion in 2000. This growth has been observed in both Muslim-majority countries, such as Saudi Arabia, Malaysia and the UAE, and other jurisdictions including the UK, Luxembourg and Hong Kong.
- **Despite this steady growth, water investments still represent a marginal share of IF**. For instance, water represents 0.2% of Islamic Banking investments according to the Prudential and Structural Islamic Financial Indicators (PSIFI) dataset of the Islamic Financial Services Board (IFSB). Similarly, the share of water in Islamic development finance is around 2.3%, including hydro-electric powerplants and agricultural water resources (classified under the energy and agriculture sectors, respectively) according to the Total Official Support for Sustainable Development (TOSSD) dataset.
- **This is due to some obstacles to the expansion of IF in the water sector**, which include relatively limited market size, depth and liquidity in some countries, regulatory fragmentation across jurisdictions, limited awareness and understanding of IF mechanisms and lack of reporting and data for its application to water investments.
- **Opportunities to leverage IF for water investments** include strengthening policy frameworks, international coordination and standardisation, leveraging promising Islamic finance instruments, mobilising private investment, and strengthening data systems and reporting.
- Harnessing the potential of Islamic finance for water is promising, not only due to the substantial volume of capital available, but also because of the underlying principles and specificities of financing models which **can – to some extent – be source of inspiration of durable water financing models**, including PPPs and innovative financing structures, most specifically with regards to asset-backed finance, risk sharing, financial resilience, transparency and accountability.

Expected benefits for OECD countries and partners

OECD member countries and partners would benefit from harnessing Islamic finance for investment in water for various reasons:

- Islamic finance represents a rapidly growing pool of investable assets (growing by around 10% per year), representing an increasing share of the global financial system. Their deployment extends beyond Muslim-majority countries. This growth creates opportunities to mobilise capital for water infrastructure and water security projects, especially in countries with pressing water challenges.
- Its underlying principles align closely with responsible finance, as Islamic finance prohibits investments in harmful sectors and promotes ethical, socially responsible practices, which can be applied to financing water conservation, wastewater treatment and equitable access to water resources.
- It offers innovative financial structures, including asset-backed instruments, profit-and-loss sharing mechanisms and risk-resilient financing, that can be adapted to support water infrastructure projects, water utilities and resilient water management.
- It constitutes a novel source of financing and alternative financing tools well suited to the structural characteristics of water-related investments, which are typically long-term and capital intensive.

3.1. Latest trends in Islamic finance for water

Islamic Finance (IF), which refers to financial practices, institutions and instruments that comply with Shariah[1] principles, has been growing steadily across multiple sectors and geographies for the past two decades, with further growth potential and increasing demand for this type of financial services in both Muslim and non-Muslim countries. There is significant potential for mobilising IF for impact-driven investment, although the water sector has yet to fully benefit from this type of financing.

The values underlying IF include improving societal welfare, shifting the emphasis away from an exclusive focus on the creditworthiness of the borrower to one that examines the value creation associated with investments and resulting economic and societal benefits, as well as providing a safety net for the poor and most vulnerable. Furthermore, IF's partnership-based and equity-focused approach and its links to real economic activities make it also consistent with impact-driven investment approaches.

3.1.1. Islamic finance by regions, types of assets and sectors

IF has undergone substantial and sustained growth over the past two decades, emerging as a resilient and expanding component of the global financial system. Between 2000 and 2023, total Islamic financial assets increased from approximately USD 200 billion to more than USD 3.4 trillion (IFSB, 2024[1]), with average annual growth often surpassing 10% (FiCS, 2025[2]). This growth has been observed in both Muslim-majority countries, such as Saudi Arabia, Malaysia and the UAE, and in non-Muslim jurisdictions including the UK, Luxembourg and Hong Kong, where regulatory frameworks have been adapted to attract Shariah-compliant investment (FiCS, 2025[2]). The robust growth of the Islamic finance industry is driven by increasing demand for Shariah-compliant financial products and services, expanding Islamic banking services and supportive government regulations.

The global IF industry is composed of four main branches: Islamic banking, Islamic capital market instruments (also referred to as sukuk), Islamic funds and insurance. Islamic banking, providing Shariah-compliant banking and asset management services, constitutes the largest segment. Islamic capital markets, also referred to as **sukuk**,[2] is the second largest. Islamic banking (70%) and sukuk (25%) together account for nearly 96% of the industry, according to IFSB data. **Islamic funds**[3] and **Islamic insurance**, including takaful[4] account for the remaining 4% and less than 1%, respectively, as shown in Table 3.1 based on IFSB (Islamic Financial Services Board) data.

Regionally, IF institutions in the **Gulf Cooperation Council (GCC) countries** account for 53% of global IF assets, with most of these assets concentrated in Islamic banking. They are followed by institutions in **East Asia and the Pacific** countries, which hold 22%, driven mainly by operations in Southeast Asia, particularly in Indonesia and Malaysia. The remaining Shariah-compliant assets in the world are distributed across IF institutions in the **Middle East and North Africa** (MENA) **region** (13%, excluding GCC countries), **Europe and Central Asia** (13%, spanning from the UK to Kazakhstan), **South Asia** (3%, driven by Bangladesh and Pakistan) and **Sub-Saharan Africa** which holds less than 1%.

The uneven distribution of Islamic finance across regions conceals significant regional disparities among IF branches. In particular, the MENA region (excluding GCC countries) has a significantly underdeveloped sukuk market despite having the second largest Islamic banking market in the world. In contrast, Europe and Central Asian countries have been directing more investments in sukuk rather than Islamic banking.

Table 3.1. Breakdown of the global Islamic finance industry by region and type of assets, USD billion, 2023

Region	Islamic Banking Assets	Sukuk Outstanding	Islamic Funds Assets	Takaful and other Islamic insurance	Total	Share (%)
Gulf Cooperation Council (GCC)	1 464	293	28	15	1 847	52%
East Asia and the Pacific	314	411	38	6	769	22%
Middle East and North Africa [MENA (except GCC)]	418	6	-	3	428	13%
Europe and Central Asia	80	102	46	1	229	8%
South Asia	84	20	5	-	109	3%
Sub-Saharan Africa	-	15	11	-	26	1%
Others	8	3	-	-	19	1%
Total	**2 372**	**850**	**132**	**24**	**3 379**	**100%**
Share %	70%	25%	4%	1%	100%	

Note: East Asia and the Pacific countries include Australia, Brunei Darussalam, China, Indonesia, Japan, Malaysia, Philippines, Republic of Korea, Singapore and Thailand.
Europe and Central Asia countries include France, Kazakhstan, Kyrgyzstan, Russian Federation, Serbia, Tajikistan, Türkiye, Uzbekistan, Germany, Ireland, Luxembourg and United Kingdom.
Gulf Cooperation Council (GCC) countries include Bahrain, Kuwait, Saudi Arabia and the United Arab Emirates.
Middle East and North Africa (MENA [except GCC]) countries include Algeria, Egypt, Iran (Islamic Republic of), Iraq, Jordan, Lebanon, Libya, Morocco, State of Palestine, Syrian Arab Republic, Tunisia and Yemen.
South Asia countries include Afghanistan, Bangladesh, Sri Lanka, Maldives, Pakistan and India.
Data are mostly taken from primary sources (regulatory authorities' statistical databases, annual reports and financial stability reports, official press releases and speeches, etc.) and from the IFSB's Prudential and Structural Islamic Financial Indicators (PSIFIs) database. In the absence of primary data, third party data providers have been consulted.
Source: (IFSB, 2024[1]).

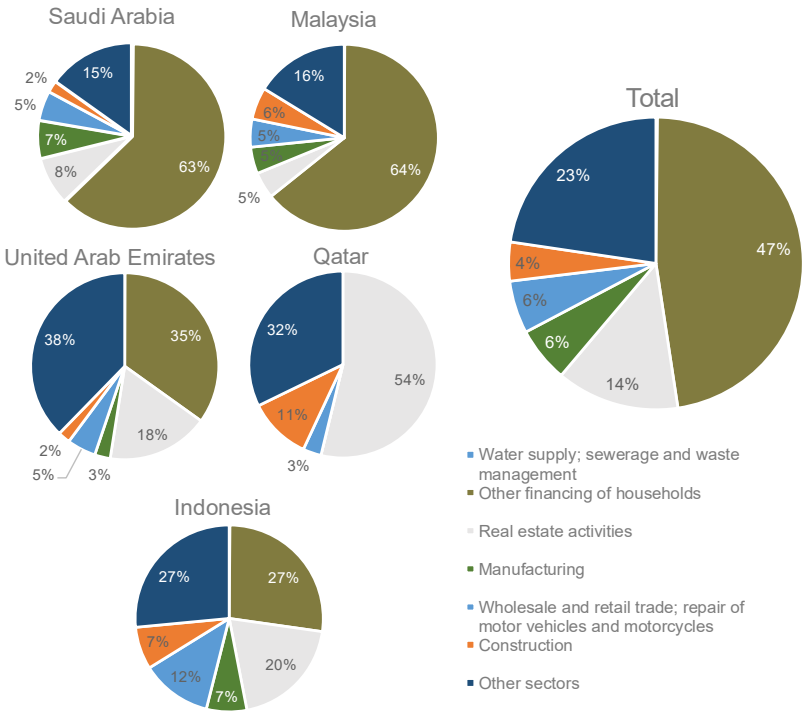
Household consumption, real estate, manufacturing, construction, and trade have been the main drivers of growth in the IF industry in recent years. In 2021, household consumption accounted for 47% of the financing provided by Islamic banks globally, according to data from the IFSB. Figure 3.1 illustrates that "other financing of households" is the leading sector in all major markets for Islamic banking, such as Saudi Arabia, UAE, Malaysia and Indonesia, except Qatar. **Real estate** is the second-largest sector benefitting from Islamic banking services, accounting for up to 18% of the total, followed by **manufacturing and trade**, each with a 6% share.

Accessibility of underlying tangible assets in these sectors facilitates the use of IF mechanisms. Indeed, a core characteristic of IF is its connection to the real economy through the incorporation of real assets in financial transactions. IF contracts often involve transfer of ownership of underlying assets, which are more readily available in sectors like household consumption, real estate, trade and manufacturing.

The share of water investments within Islamic banking remains marginal, namely 0.2% of the total, according to IFSB's Prudential and Structural Islamic Financial Indicators (PSIFI) dataset on Islamic banks. As a result, the share of water does not appear on the figure below, as it is basically insignificant compared

to other sectors. Further analysis of the nexus between Islamic banking and water financing appears later in the chapter.

Figure 3.1. Sectoral distribution of financing from Islamic banks in selected countries with a significant Islamic banking sector, percentage share in total, 2021



Note: This graph depicts the sectoral distribution of each sector within the total financing of Islamic banks. Data is reported quarterly in the IFSB's PSIFI database as submitted by the regulatory and supervisory authority of each respective jurisdiction in national currency. It includes data on financing from Islamic banks. Due to data limitations, some countries, including Iran, Türkiye and Egypt are excluded from the analysis of the total. It is noteworthy that Iran is a significant player in Islamic finance, accounting for 38% of global Islamic finance assets in 2022 (ICD, 2023[3]).

Definitions: "Islamic bank": Full-fledged Islamic bank that is fully Shariah-compliant. "Other financing of households": Personal/consumer finance and credit cards. For some jurisdictions this category includes real estate too. "Other sectors": Sectors of other service activities (export); electricity, gas, steam and air-conditioning supply; public administration and defence with compulsory social security; agriculture, forestry, hunting, fishing, mining and quarrying; accommodation and food service activities; administrative and support service activities; activities of households as employers; human health and social work activities; professional, scientific and technical activities; education; information and communication; arts, entertainment, and recreation; other or public sector activities; and activities of extraterritorial organisations and bodies combined.

Source: Authors' calculations based on the Islamic Financial Services Board's (IFSB) Prudential and Structural Islamic Financial Indicators dataset on Islamic banks (PSIFIs, 2023[4]).

3.1.2. Islamic finance and its potential for impact-driven investment

IF holds strong potential, in principle, for contributing to develop impact-driven investment due to its foundational principles. Key principles of IF include risk- and reward-sharing, the prohibition of speculative investments and a requirement for asset-backing (see Table 3.2). The prohibition of interest (riba) and speculation fosters transparency in financial contracts by using clearly defined mark-up payments rather than fluctuating interest rates as well as promoting fairness between parties. IF also

redefines relationships between financial actors, encouraging partnerships rather than conventional borrower-lender dynamics to establish more equitable risk- and reward-sharing arrangements (OECD, 2020[5]). This partnership is generally provided through the transfer of ownership of underlying assets used to structure the financial agreement. Shariah principles also prohibit investments in sectors such as alcohol, gambling and weapons, aligning closely with the practices of ethical finance and Socially Responsible Investment (SRI) portfolios, which also ban these sectors.

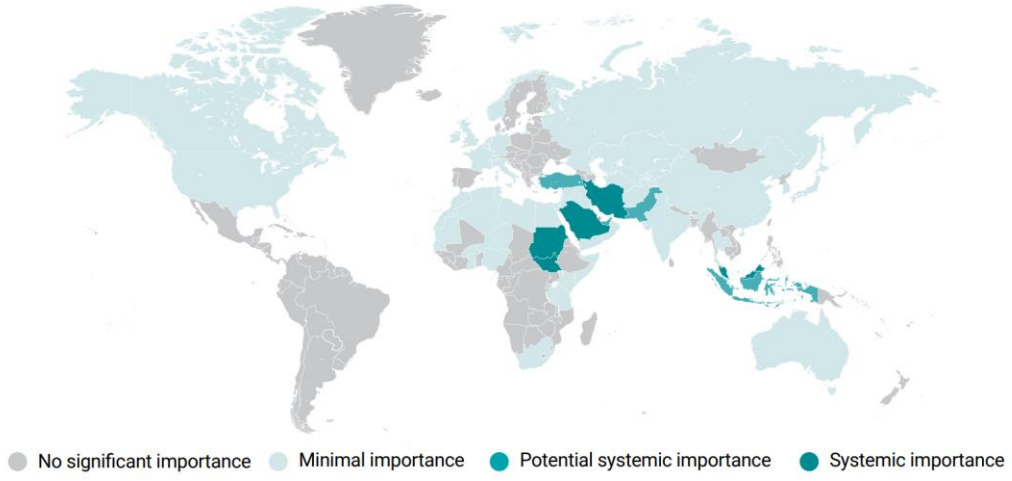
Table 3.2. Principles and key attributes of Islamic finance

Key Attributes	Principles
Prohibition of Interest (riba)	Earnings must derive from real economic activity; profit is based on risk and value creation.
Risk and Profit-Loss Sharing	Encourages equitable risk-sharing between parties; applied through various Shariah-compliant contracts.
Ethical Investment	Investments must align with ethical standards, excluding haram (forbidden by Shariah) sectors and promoting social benefit.
Avoidance of Excessive Uncertainty (gharar)	Forbids contracts with excessive ambiguity or speculation; terms must be clear and transparent.
Asset-Backed Transactions	All financial activities must be linked to tangible assets or services; includes ijarah and sukuk.
Fairness and Prevention of Unjust Enrichment	Promotes equity and mutual consent in transactions; ensures fairness and social justice.
Social Responsibility and Charity	Supports wealth redistribution through mechanisms like zakat* and sadaqah**; aids vulnerable groups.

Note: *Zakat, one of Islam's five pillars, requires Muslims with sufficient means to redistribute 2.5% of their wealth to those in need annually.
**Sadaqah is voluntary charitable donations aimed at supporting vulnerable populations.
Source: (IsDB Institute, 2024[6]).

IF instruments are globally relevant as they are applied in various jurisdictions in the world and can be combined with conventional financing mechanisms, making them well-suited for impact-driven investments (ADB, 2022[7])**.** As evidenced by the data on geographical allocation in Figure 3.2, IF is not limited to countries with a predominantly Muslim population and is applied in a diversity of regions globally. It can also operate alongside conventional financial mechanisms, provided that specific Shariah-related requirements are met.

Figure 3.2. Importance of Islamic finance in the world



Source: (FiCS, 2025[2]; UNDP, 2016[8]).

In practice, however, the contribution of IF to investment in long-term socio-economic and environmental outcomes remains limited. The global IF industry commits very marginal resources to impactful investments (OECD, 2020[5]). As of 2021, Shariah-compliant investments in green finance were estimated at approximately USD 20 billion (ADB, 2022[7]), representing only 0.7% of the global IF market value, which stood at USD 3.1 trillion for the same year (IFSB, 2022[9]). Similarly, **the share of IF in development finance remains modest** despite significant efforts from the IsDB to leverage its potential. For example, in 2021, IF accounted for 2% of total flows in Official Development Assistance (ODA) and other officially-supported flows, according to the *Total Official Support for Sustainable Development* (TOSSD) dataset[5] (OECD, 2020[5]). Further analysis on Islamic development finance[6] directed towards water investments is provided later in the chapter.

Furthermore, the relatively early stage of development of the IF industry poses challenges to its ability to effectively address environmental and social issues. Since its emergence in the 1970s, IF has experienced steady growth. However, its relatively limited maturity constrains its ability to scale financing for impact-driven investments. Indeed, the sector faces relatively lower market depth and liquidity compared to conventional finance, limiting its capacity to attract substantial investment. This also hampers the adoption of international standards, as varying legislative approaches across jurisdictions create barriers to growth. These regulatory inconsistencies indirectly hinder the convergence of IF with social and environmental investment standards (Ahmed, 2017[10]) such as the Principles for Responsible Investment (PRI) and standards of the TCFD. However, developments are promising for the future and some of these issues should be resolved gradually, as the industry develops and matures.

Despite this, some Islamic finance instruments are increasingly used to support long-term socio-economic and environmental priorities. The total amount of development finance provided by the IsDB for these purposes increased from USD 7.7 billion in 2019 to USD 8.3 billion in 2023 according to TOSSD data (or to USD 12 billion in 2023 according to IsDB (IsDB, 2024[11])). In the past years, green sukuk have effectively financed projects across sectors, from renewable energy in Malaysia to green infrastructure in Indonesia, aligning with environmental standards and Shariah principles. In 2019, the IsDB completed its first-ever Green Sukuk issuance, raising EUR 1 billion with a five-year term. Proceeds were earmarked for a broad range of green projects across IsDB's 57 member countries. Islamic social finance instruments, such as zakat and waqf, support targeted social investments that address poverty and inequality. Furthermore, Islamic microfinance and takaful offer targeted support to underserved populations, focusing on health and economic resilience. For instance, Islamic microfinance has been applied to expand access to water services for vulnerable populations, as demonstrated in the Indonesia Urban Water, Sanitation and Hygiene (IUWASH) project in Kudus, Indonesia (see section below on public-private partnerships) and through models integrating Islamic social finance instruments with microfinance schemes (see section on Islamic social finance). In addition, a joint initiative by the IsDB and UNDP, the Global Islamic Finance and Impact Investing Platform (GIFIIP) acts as a collaborative platform to mobilise private sector capital and support market-based financing solutions for socio-economic and environmental priorities (see section on Islamic blended finance). Launched in 2016, GIFIIP is producing research on the contribution of IF to impact-driven investments and disseminate this research through workshops (including on developing national green sukuk programmes for countries such as Pakistan and Uzbekistan under its Green Sukuk Initiative) (UNDP, 2024[12]).

Countries like Malaysia and Indonesia have pioneered the development of green sukuk, Islamic funds and supportive regulatory frameworks and policies (ADB, 2022[7])**.** After the launch of the *Sustainable and Responsible Investment (SRI) Sukuk Framework* by the Securities Commission Malaysia in 2014, Malaysia issued the first green sukuk in 2017 for the energy sector, followed by Indonesia's sovereign green sukuk in 2018, a five-year issuance raising USD 1.25 billion. Alongside these capital market activities, Malaysia's Central Bank introduced the Value-based Intermediation (VBI) framework[7] in 2017 to align Islamic banking with responsible and value-driven practices. VBI has since expanded to the takaful sector within Malaysia's advanced IF ecosystem (LSEG and RFI, 2023[13]).

In the GCC, the adoption of impact-driven investment frameworks in IF has been slower compared to Southeast Asia but is steadily accelerating, even though some corporations are renegading on their commitments. This progress is driven by national commitments to achieve net-zero emissions by 2050 and increasing client demand for responsible investment solution (S&P Ratings, 2024[14]; CFA Institute, 2019[15]; ICD and LSEG, 2023[16]). Following the first corporate green sukuk issuance by Majid Al Futtaim in 2019, Al-Rajhi Bank, the largest Islamic commercial bank, introduced a syndicated Shariah-compliant *sustainability financing facility* in 2022, while Qatar Financial Centre (QFC) launched the region's first *Sustainable and Sukuk Bond Framework* the same year (LSEG and RFI, 2023[13]). Oman's Capital Market Authority also recently issued draft regulations for SRI instruments, covering social, green and blue sukuk (LSEG, 2023[17]).

Finally, the potential of IF in contributing to tackle environmental challenges is increasingly acknowledged, including in international fora. At the 2022 G20 Summit in Indonesia, a high-level panel explored the role of sukuk in green finance, with IF highlighted as an essential tool to diversify financing mechanisms and increase resources for impact-driven investment. Another prominent high-level discussion during the summit focused on IF and digitalisation (IsDB, 2022[18]). Similarly, COP28 in Dubai featured discussions on leveraging IF to support long-term environmental and socio-economic objectives. (GEFI, 2024[19]). In 2024, following announcements at COP28, the International Capital Market Association (ICMA), the IsDB and the London Stock Exchange Group (LSEG) released a guide for green sukuk issuance (ICMA, IsDB and LSEG, 2024[20]).

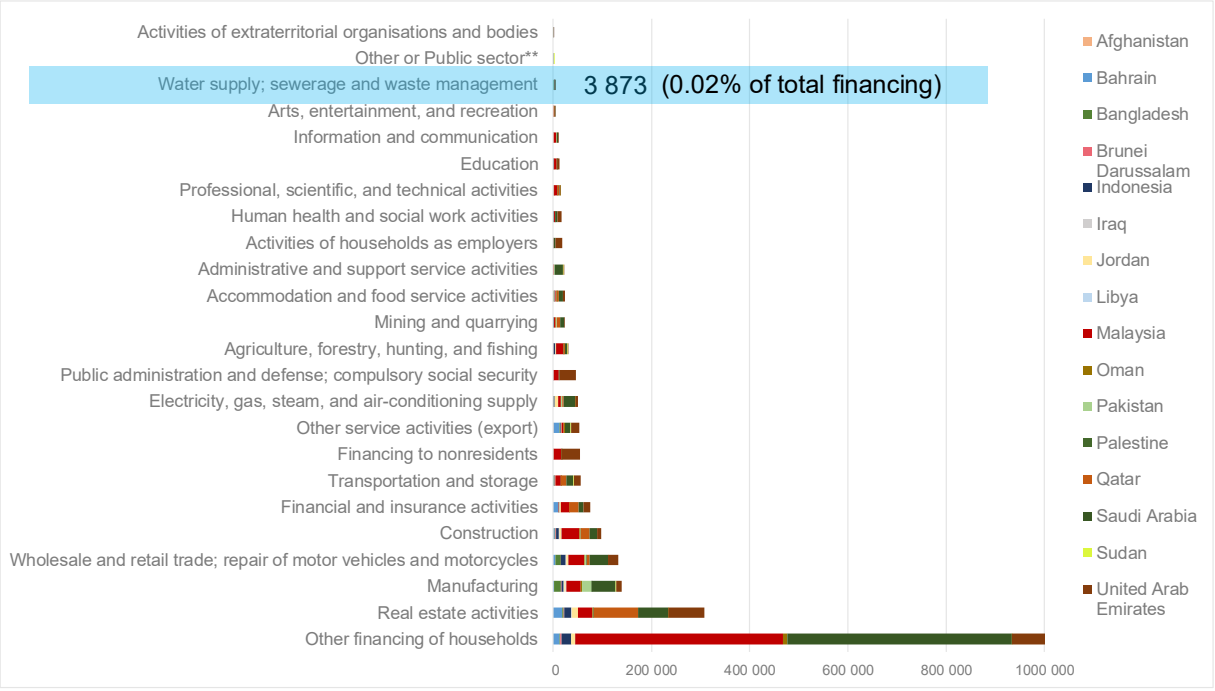
3.1.3. Islamic finance for water: state of play

The share of the water sector in Shariah-compliant investments is currently very low when compared to other sectors. According to recent data, Islamic banking, the largest segment of the IF industry, commits only very marginal resources to water-related investments. Likewise, Islamic development finance,[8] including private IF mobilised through public interventions, is underutilised for water. This section assesses the current allocation of IF to the water sector and evidences its largely untapped potential.

Islamic banking

Islamic banking, the dominant segment of the IF industry, allocates very marginal resources to water-related investments. In 2021, financing from Islamic banks to the water supply, sewage and waste management sector represented only 0.2% of total financing, as shown in Figure 3.3. In Malaysia, for example, only 1.5% of the net-zero and green financing by Islamic banks was allocated to water security and wastewater management in 2022, according to the Association of Islamic Banking and Financial Institutions Malaysia (AIBIM) (AIBIM, 2022[21]). However, it is worth noting that some water-related investments may be classified under other sectors, such as hydropower being counted under energy or agricultural water supply and irrigation under agriculture.

Figure 3.3. Sectoral distribution of financing from Islamic banks by country, 2021



Note: This graph depicts the sectoral distribution of each sector within the total financing (millions in USD, 2024 prices) of Islamic banks.
Data are reported quarterly in the IFSB's PSIFI database as submitted by the regulatory and supervisory authority of each respective jurisdiction in national currency. It includes data on financing from Islamic banks.
"Islamic bank": Full-fledged Islamic bank that is fully Shariah-compliant.
"Other financing of households": Personal/consumer finance and credit cards.
"Other or public sector**": Only Sudan and Palestine include one additional category among sectors. For Sudan, this category is labelled as "other" without further explanation. For Palestine, it is marked as "public sector," which refers the finance granted to the Palestinian National Authority, local authorities and other non-financial public sector entities.
Due to data limitations, some countries, including Iran, Türkiye and Egypt are excluded from the analysis. It is noteworthy that Iran is a significant player in Islamic finance, accounting for 38% of global Islamic finance assets in 2022 (ICD, 2023[3]).
Source: Authors based on the Islamic Financial Services Board's (IFSB) Prudential and Structural Islamic Financial Indicators dataset on Islamic banks (PSIFIs, 2023[4]).

Water is not prioritised by investors and banks within Islamic banking due to several factors. These include the perceived low profitability of water-related investments, the complexity of IF instruments, the nascent stage of the IF industry and limited regulatory frameworks**.** For many Islamic banks and Islamic windows of conventional banks, water investments are viewed as high-risk and low-return; such projects are typically small-scale, yield returns over the long term and require substantial upfront capital (OECD, 2022[22]). These challenges are further developed in the last section of this chapter. Besides, some of the sectors receiving the largest share of investment from Islamic banking (including, for instance, manufacturing, construction and transport) are water-intensive industries, which can affect both the quantity and quality of water through abstraction, pollution and land degradation.

The Islamic commercial finance sector has the opportunity to align with ethical and responsible objectives. Frameworks such as the Maqasid Matrix (LSEG, 2023[17]) and the Maqasid al-Shariah Index (Asutay Mehmet and Harningtyas, 2015[23]) embed ethical principles at the core of IF and hold promise in aligning their financing with responsible objectives, including potentially linked to water security. Maqasid al-Shariah, which encompasses the higher objectives of Shariah, including the protection of life, aims to ensure that IF products align with broader environmental and social impact goals. By embedding these

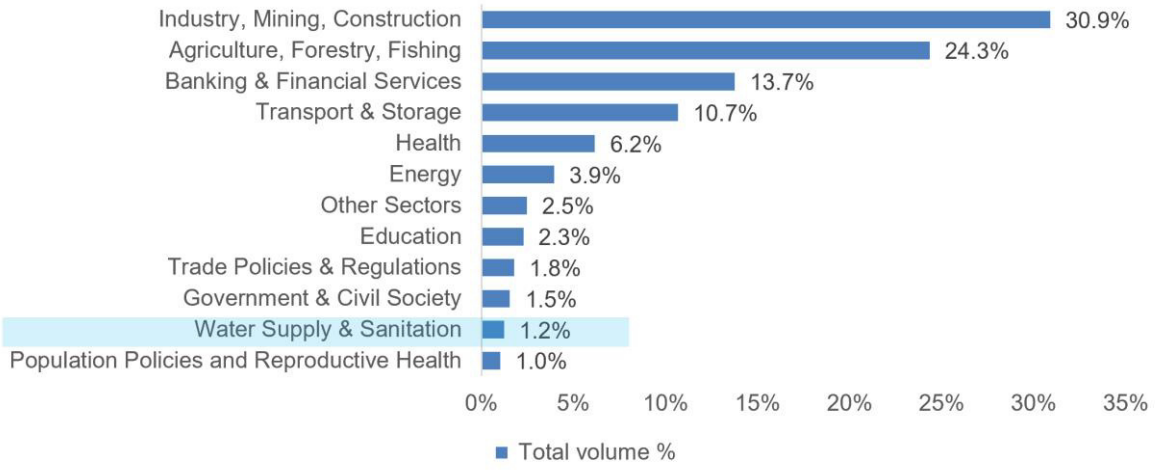
frameworks into institutional operations, IF providers can deliver equitable and impactful financing solutions for critical sectors such as water, health and education. This could be fostered by harmonised reporting standards, targeted capacity-building initiatives for financial institutions and policy incentives to encourage widespread adoption.

A survey[9] conducted for this chapter indicates that **commercial Islamic banks and banks with Islamic windows tend to favour murabaha[10] over other instruments for responsible investments.** For example, murabaha has been utilised to finance water-related investments in a water PPP in Indonesia (see section on PPPs later in the chapter) and has also been employed to structure sukuk for large-scale water infrastructure financing, as seen in Air Selangor's Sukuk Murabaha Programme (see section on Sukuk below).

Islamic Development Finance

Water also accounts for a very limited share of Islamic development finance which consist of Shariah-compliant official flows[11] and private finance mobilised by official interventions.[12] The bulk of Shariah-compliant official flows goes to the Industry, Mining and Construction sectors (almost 31%), the Agriculture, Forestry and Fishing sectors (almost 25%), the Banking and Financial services sectors (14%) and the Transport and Storage sectors (almost 10%) in the period of 2019-2023 (see Figure 3.4). As for Islamic banking, sukuk and other types of assets, the share of water in Islamic development finance is marginal, representing only 1.2% of the total (and 2.3% when including hydro-electric powerplants and agricultural water resources classified under the energy and agriculture sectors, respectively) according to the TOSSD dataset.[13] Yet, it is important to note that some additional investments in water could potentially be classified under other sectors, such as water for irrigation under the Agriculture, Forestry and Fishing sector.

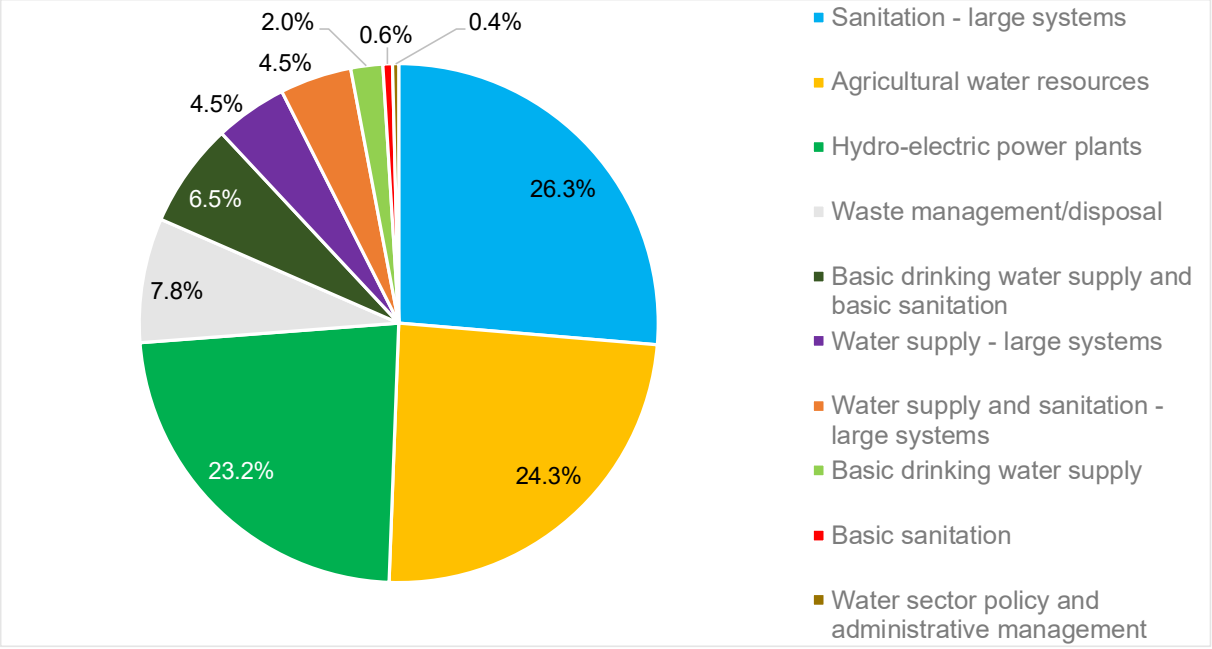
Figure 3.4. Sectoral distribution of official flows and mobilised private finance tagged "Islamic finance", 2019-2023



Note: TOSSD data encompasses Official Development Aids (ODAs) and Other Official Flows (OOF), combined with private finance mobilised through official intervention.
Total volume indicates the sum of transactions labelled as Islamic finance in the TOSSD data.
The Islamic Development Bank (IsDB) accounts for 98% of the total Islamic financial commitments in the dataset. The remaining 2% is provided by the Arab Bank for Economic Development in Africa.
"Other sectors": Sectors of tourism; general environment protection; commodity aid and general programme assistance; business and other services; other social infrastructure and services; humanitarian aid; other multisector activities; and communications combined.
Source: Author based on the TOSSD dataset (TOSSD, 2025[24]), 2025.

The main water sub-sectors financed by Islamic development finance (or officially-supported Shariah-compliant flows[14]) **include large sanitation systems, agricultural water and hydroelectric power plants**, showing different allocation compared to conventional ODA flows for water. Together, these sub-sectors represent about 74% of total water-related investments financed by official IF flows and mobilised private IF, highlighting a strong focus on large infrastructure projects. These main sub-sectors are followed by waste management and large water supply and sanitation systems. Figure 3.5 illustrates the entire sub-sectoral distribution, encompassing water supply and sanitation combined with hydroelectric power plants and agricultural water resources, which are generally categorised under energy and agriculture. This allocation differs significantly from that of conventional ODA flows for water. The analysis of ODA flows for water over the period 2002-2018 reveals a dominant share of large water supply and sanitation systems (21% of total), followed by basic drinking water supply and sanitation (10%) and agricultural water resources (6%) as the third-largest sub-sector (OECD, 2022[22]).

Figure 3.5. Sub-sectoral distribution of the committed water-related official flows and mobilised private finance tagged "Islamic finance", percentage share in total, 2019-2023



Note: TOSSD data encompasses Official Development Aids (ODAs) and Other Official Flows (OOF), combined with private finance mobilised through official intervention.
Total volume indicates the sum of transactions labelled as Islamic finance in the TOSSD data.
This figure encompasses all sub-sectors within the water and sanitation sector, as well as hydroelectric power plants from the energy sector and agricultural water resources from the agriculture sector, given their classification as water-related investments.
The Islamic Development Bank (IsDB) accounts for 98% of the total Islamic financial commitments in the dataset. The remaining 2% is provided by the Arab Bank for Economic Development in Africa.
Source: Authors' calculations based on the TOSSD dataset (TOSSD, 2025[24]), 2025.

Between 2019 and 2023, Pakistan received the largest share of Shariah-compliant development finance for water-related projects, amounting to USD 180 million (20% of the total) for the Mohmand Dam and Hydropower Project (TOSSD, 2025[24])**.** Lebanon and Uganda also featured prominently, each receiving USD 87 million (10% of the total). **In terms of regional distribution**, 56% of Islamic development financing for water-related investments during this period was allocated to **Sub-Saharan Africa**, benefiting

countries such as Uganda, Côte d'Ivoire, Senegal, Guinea, Benin and Mauritania. This was followed by **South and Central Asia (26% of total)**, driven primarily by Pakistan and the MENA region (11% of total), with Lebanon as a key recipient.

The IsDB is the principal provider of Islamic development finance, including flows channelled to water investments, according to the TOSSD data, committing over USD 879 million to 391 SDG-related development projects from 2019 to 2023 (98% of total financing), **followed by the Arab Bank for Economic Development in Africa** with USD 17 million for two projects (2% of total financing) from 2019 to 2023.

While IsDB stands out as the most active IF provider for environmentally and socially aligned investments, the share of financing channelled to water-related investments have been fluctuating over the years, depending on demands from member countries. Whilst the water, sanitation and urban services sector accounted for 12.5% of total funds approved by IsDB since its foundation in 1975, the sector represented only 1.9% and 1.3% of the total funds approved in 2022 and 2023, focusing on projects in three countries: Mauritania, Guinea and Djibouti (IsDB, 2024[11]). **Despite this trend, water financing is gaining prominence in the bank's strategic priorities.** The IsDB demonstrated its commitment to water security by supporting resilient water investments at COP28 and COP29 and by co-convening the 12th meeting of the Roundtable on Financing Water in 2025. For example, during COP29 in Baku, the Bank signed a landmark agreement committing USD 1.2 billion in financing to support Kazakhstan's water infrastructure and enhance its environmental resilience. Until 2024, this represented the largest water-focused investment in the history of the IsDB (IsDB, 2024[25]).

Most Islamic public development banks (PDBs) operate as national development banks, such as the Al-Amanah Islamic Investment Bank of the Philippines, which specialises in financing pilgrimages to Mecca (FiCS, 2025[2]). However, **several major MDBs and DFIs have progressively incorporated Islamic finance instruments** and established partnerships with Islamic PDBs to enhance their financing for Muslim-majority countries. In 2009, the IFC, as part of the World Bank Group, became the first non-Islamic institution to issue a sukuk, raising USD 100 million for term funding in the Middle East. In 2024, the IFC also committed a USD 240 million Islamic Equity Bridge Loan, structured as a murabaha[15] financing, to ACWA Power to support Uzbekistan's renewable energy sector (IFC, 2024[26]). Blended with ACWA Power's equity contributions, this initial murabaha financing helps attract additional private finance for the investment. Throughout the 2010s, major MDBs, including the Asian Development Bank (AsDB), the African Development Bank (AfDB) and EBRD, signed Memorandums of Understanding with IsDB to establish investment funds targeting Muslim-majority countries. For instance, EBRD launched a USD 120 million investment fund to support the development of SMEs in Egypt, Jordan, Morocco and Tunisia (FiCS, 2025[2]). In 2009, the AsDB and the IsDB jointly established the "Islamic Infrastructure Fund", a Shariah-compliant private equity vehicle, originally capitalised at USD 500 million. The Fund was conceived to mobilise public and private equity, including from Islamic finance investors to finance infrastructure projects in 12 common member countries across Asia. By 2020, the Fund had deployed USD 165 million in Shariah-compliant equity investments across sectors such as power, transport, water supply, waste treatment, telecommunications and social infrastructure (ADB, 2020[27]).

3.2. Promising financing instruments to scale up Islamic finance for water

Islamic finance offers a broad array of instruments with the potential to support investments with long-term environmental and socio-economic benefits, including water-related investments. The requirement for IF instruments to be linked to real assets presents both opportunities and challenges for water investments. For instance, Shariah-compliant public-private partnerships (PPPs) may differ structurally from conventional models, and PPPs that combine conventional and Islamic financing tranches require specific measures, such as common security pools to mitigate risks associated with asset ownership transfers to

IF providers and agreed-upon penalty fee structures to ensure alignment. Similarly, Islamic social finance instruments, while promising for water-related investments, come with specific implementation challenges, as each instrument serves a distinct purpose and requires tailored mechanisms for allocation and management. This section explores the potential of IF tools and instruments for mobilising financing for water investments, focusing on **green sukuk, public-private partnerships, Islamic social finance and blended IF.**

3.2.1. Green sukuk

Green sukuk: a market in expansion

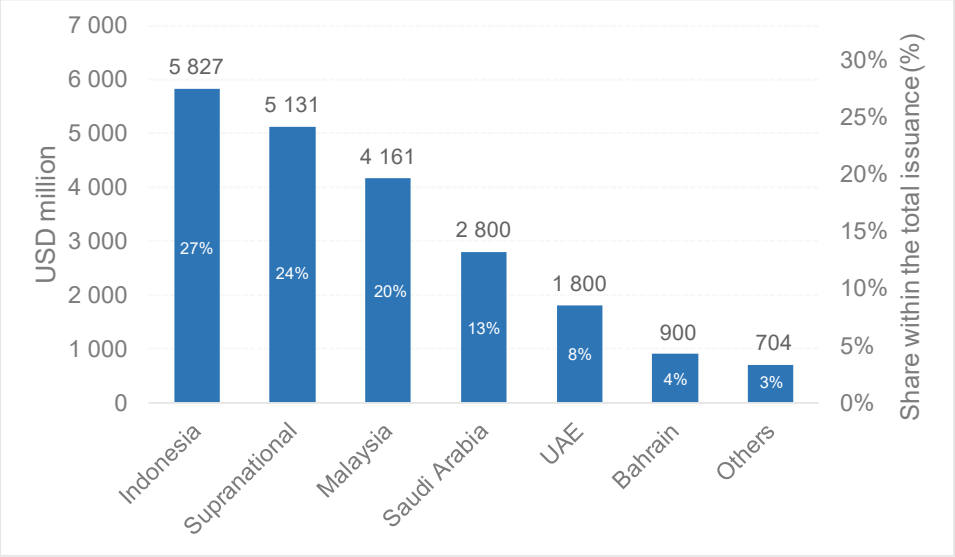
Often referred to as "Islamic bonds," sukuk are investment certificates that represent partial ownership of tangible assets, usufructs or services, distinguishing them from conventional bonds, which are debt instruments (Abdul Aziz and Gintzburge, 2009[28])**.** As mentioned earlier in the chapter, sukuk is a significant component of the IF industry, constituting 25% of the global market, second only to the Islamic banking sector (IFSB, 2024[1]).

Sukuk are classified into two primary categories, based on their commercial features: asset-backed and asset-based. In asset-backed sukuk, investors have direct ownership of the underlying assets, bear the associated risks and have limited recourse to the issuer. By contrast, under asset-based sukuk, investors do not own the assets but rely on the issuer's creditworthiness, with full recourse to the issuer in case of default. (Hidayat, 2013[29]). The majority of sukuk in the market today are asset-based rather than asset-backed, reflecting a predominant trend[16] (ICMA, IsDB and LSEG, 2024[20]). This distinction significantly influences the risk exposure and repayment conditions associated with sukuk.

The green sukuk market, as the Shariah-compliant counterpart of GSS bonds, have experienced strong growth, but the market remains concentrated in a few countries and institutions. International investor and ESG-focused investor demand has fuelled the growth of green sukuk, with 72% of issuances in 2021 taking place in global markets (e.g. the Eurobond market) (LSEG, 2023[17]). The primary drivers for green sukuk investments are alignment with environmental and social criteria (42% of the respondents to the Refinitiv Sukuk Survey 2022), followed by Shariah compliance (38%) (LSEG, 2023[17]).

After issuing the first SRI Sukuk in 2017, **Malaysia** accounted for 48% of global sukuk issuances in 2021-2022, confirming its position as a pioneer in the global sukuk market (IIFM, 2023[30]). **Indonesia** has taken the lead in terms of green sukuk issuance over the years, having issued 27% of the cumulative green sukuk over the period 2017-2022 (see Figure 3.6); this was driven primarily by sovereign issuance. **Supranational issuance of green sukuk came close second over that period**, with the IsDB alone issuing USD 5.1 billion (LSEG, 2023[17]). In the **GCC region**, green sukuk issuance has experienced a rapid increase lately, largely driven by client demand. By the second quarter of 2024, the GCC had reached USD 18.5 billion in issuance, accounting for 43% of the global green sukuk outstanding (USD 43 billion as of the first quarter of 2024) (Fitch Ratings, 2024[31]).

Figure 3.6. Cumulative green sukuk issuance by country, 2017 – 2022

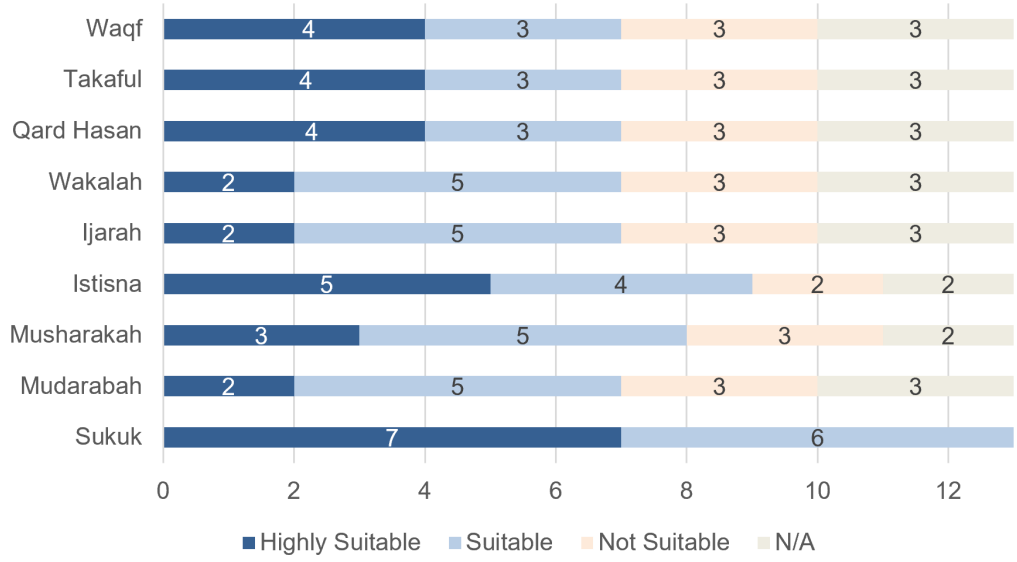


Note: "Others" include Bangladesh, Türkiye, Sudan and Nigeria. This figure is retrieved from LSEG Refinitiv's report titled "Green and sustainability sukuk report 2022".
Source: (LSEG, 2023[17]).

The current use of green sukuk for financing water

IF stakeholders recognise sukuk as a suitable instrument for financing water investments. A survey conducted for this research was shared among IF experts from various institutions, including commercial banks, multilateral development banks, government and regulatory bodies and research institutions.[17] Sukuk emerged as one of the most relevant instruments in terms of the suitability of different IF instruments for investments in the water sector. All the respondents considered sukuk as highly suitable or suitable for water investments. Respondents from financial institutions particularly highlighted sukuk's applicability for large-scale infrastructure projects, with some noting that sovereign sukuk could play a key role in leveraging finance for water investments at national level. As illustrated in Figure 3.7, sukuk is considered as a suitable instrument for financing water investments: indeed, 70% of the survey respondents consider it either highly suitable or suitable for financing water projects. This reflects the alignment of sukuk with water investments, given its focus on financing tangible assets, compatibility with long-term infrastructure needs and the convergence between ESG objectives and Shariah-compliant principles. In particular, green sukuk provide a structurally compatible instrument for financing water-related investments, combining long-term, asset-backed features with increasing investor interest and the eligibility of water infrastructure as a green use of proceeds. **Most green sukuk to date have focused on energy and transport, with only a small share allocated to water, indicating an underexplored opportunity rather than an established trend** (KFH and UNDP, 2024[32])**.**

Figure 3.7. Suitability of Islamic finance instruments for water investments



Note: The OECD and IsDB carried out a survey aiming to map existing Shariah-compliant financial allocations to the water sector and identify strategies to scale up Islamic finance for water investments.
Sukuk can be issued using different Shariah-compliant structures, such as wakalah, ijarah, istisna or mudarabah, depending on the nature of the underlying assets and the project being financed.
Source: Authors' own calculations based on the survey results, 2025.

The share of securities labelled "blue" or "water" remains low in both the sukuk and conventional bond markets, highlighting limited emphasis on the water sector, even among GSS bonds (as evidenced in Chapter 2). The IsDB, the second largest green sukuk issuer globally, allocated only 1% of its EUR 1 billion green sukuk issuance in 2019 to water projects, prioritising renewable energy instead (IsDB, 2020).

A substantial portion of IF for water-related investments currently flows through green sukuk, as opposed to "blue sukuk," which is still at development stage and predominantly fund marine-focused projects like sewage treatment, ocean conservation and pollution prevention. This trend parallels advancements in the broader bond market (see Chapter 2). For example, Air Selangor, Malaysia's largest government-owned water utility, issued as sukuk to fund water supply and management projects, as outlined in Box 3.1. Although not defined as blue sukuk, the funds are fully dedicated to water investments (Air Selangor, 2023[33]). As in the bond finance market, green sukuk often support cross-sectoral investments that include water projects. This can help offset the perceived high-risk profile of water investments and attract further capital. Another prominent example is the USD 1.6 billion green sukuk issued by Majid Al Futtaim Sukuk Company in the UAE, with proceeds directed to energy, water and real estate sectors.

The blue sukuk market remains an emerging subset within the green sukuk space, albeit in a nascent stage. Certain countries are beginning to pioneer blue sukuk, such as Indonesia, which leverages its experience in green sukuk issuance and its maritime position. Although innovative financing models like cash waqf-linked blue sukuk[18] are being considered to support ocean-related investment (Mutmainah et al., 2022[34]), they have not yet been implemented in Indonesia (Bappenas and ICCTF, 2022[35]).

Box 3.1. Air Selangor's issuance of Sukuk Kelestarian to finance water supply and water management projects in Malaysia

Pengurusan Air Selangor Sdn Bhd (Air Selangor) is Malaysia's largest water services provider, supplying treated water to Selangor, Kuala Lumpur and Putrajaya. As a government-owned entity, Air Selangor is responsible for ensuring reliable water services to over 2.6 million accounts, covering both domestic (i.e. households) and non-domestic (e.g. businesses and institutions) users. It focuses on both maintaining existing infrastructure and expanding infrastructure to meet demand.

To fund its long-term infrastructure projects, Air Selangor launched a USD 2.3 billion Sukuk Murabaha[19] Programme in 2020. Under the Programme, the total amount of capital raised by their Sukuk Kelestrian, an SRI sukuk, has reached USD 486 billion, as of September 2023. Although not formally labelled as a blue or green sukuk, the Sukuk Kelestarian illustrates the potential of IF to support large-scale investment in water infrastructure.

These proceeds have been mostly allocated to water supply (61%) and water management projects (17%). 50% of the total amount invested in water was allocated and utilised for CAPEX financing, while 28% was allocated and utilised for OPEX financing. Air Selangor plans to double the Sukuk Murabaha Programme to meet rising CAPEX needs, targeting an additional USD 2.3 billion.

This programme finances key projects, such as the Rasau Water Supply Scheme, which aims at significantly increasing water supply capacity in the Selangor region (constructing new water treatment plans) and supporting initiatives to reduce water losses (including installing smart water meters). Indeed, Stage 1 of the project expected to increase the plant's capacity to 700 million litres per day of treated water, benefiting over 460 000 accounts, including households, businesses and institutions in Klang and Kuala Langat by December 2025. Stage 2 aims at reaching capacity of 1 400 million litres per day to serve 934 thousand accounts by 2028.

This project illustrated asset-based Sukuk, meaning investor returns are not fully dependent on the performance of the underlying water-treatment assets. Although asset revenues may support payments, Air Selangor can draw on other funding sources, resulting in lower asset-related risk for investors.

Source : (Air Selangor, 2023[33]; GWI, 2024[36]).

Challenges and opportunities to scale sukuk for water

Green sukuk has the potential to bring additional financing to water due to its large demand base. The demand for impact-oriented debt instruments is likely to rise in the future, driven by the pressing need for resilient infrastructure and solutions to environmental and social challenges. Green sukuk appeals to a broad investor base because it complies with Shariah and additionally with ESG criteria (as green bonds), thereby attracting international investors beyond those specifically focused on Shariah compliance. Furthermore, green sukuk offers opportunities for exposure to emerging markets such as Indonesia, Malaysia, GCC countries and Türkiye. **The growing international interest in green sukuk, already supported by many non-Shariah-sensitive investors, could be amplified by advancing the standardisation of regulatory and legal frameworks.**

Sukuk require greater transparency than conventional green bonds due to Shariah compliance and trustee oversight (Chambers, 2017[37]), making them potentially well-suited for water-related investments. Indeed, their regulatory framework enhances disclosure, which conventional bonds could emulate for better fund accountability. Clear asset management guidelines and regular reporting can further strengthen investor confidence. Trustees play a role in ensuring proper asset management and compliance. Given

that the viability of water investment is linked to the proper use and maintenance of tangible assets, the transparency and governance embedded in sukuk frameworks can enhance accountability and safeguard long-term outcomes.

However, the requirement for underlying assets in green sukuk issuance can potentially be a challenge for water-related investments. Structuring such sukuk can be complex for both investors and issuers, as green sukuk must be backed by a minimum level of tangible assets to ensure tradability. In fact, depending on the water sub-sector, some types of water-related investments can sometimes be relatively less attractive to investors, compared to other sectors such as energy and real estate, regarding the portfolio of underlying assets, because water infrastructure assets are usually immovable and location-specific, therefore hardly tradable. The value of these underlying assets must meet or exceed the issue value (UNDP, 2021[38]). In addition, in the current GSS sukuk market, issuers need to identify assets that meet both impact-oriented and Shariah-compliant criteria, which can be challenging.

Harmonising and strengthening Islamic finance regulation and governance could help scale up green sukuk, including for water-related investments. Despite the positive trends in both supply and demand for green sukuk issuance, these standards require further alignment with global environmental standards to continue to attract more international investors (ADB, 2022[7]). Recent efforts, such as the 2024 guidance by IsDB, the International Capital Market Association (ICMA) and the London Stock Exchange Group (LSEG), aim to bridge ICMA Green Bond Principles with Shariah criteria, supporting the standardisation of green sukuk (ICMA, IsDB and LSEG, 2024[20]).

3.2.2. Public-Private Partnerships (PPPs) and parallel financing

Comparison between conventional and Islamic PPPs

Islamic PPPs differ from conventional PPPs through a number of contractual elements, particularly with regard to interest, asset ownership and risk sharing. As explained earlier, Islamic financial agreements are essentially asset-linked. To comply with Shariah law, Islamic PPPs use various types IF instruments structured around underlying assets. These financial instruments consist of sale transactions (e.g. istisna,[20] Murabaha,[21] sukuk), lease agreements (e.g. ijarah,[22] sukuk) and equity-based partnerships (e.g. mudharabah,[23] musharakah[24]). Although certain mark-ups and profit-sharing mechanisms apply, project finance associated with Islamic PPPs exclude interest. Instead of fixed interest rates, IF institutions usually define profit-sharing parameters, using variable benchmarks, like the Secured Overnight Financing Rate (SOFR), which are global benchmark reference rates used by major global banks for both short- and long-term financing in the global financial markets (World Bank, 2017[39]; Kannangara, 2024[40]). Alternatively, social discount rate (SDR) may be applied to capture the time value of social benefits, supporting equitable and long-term positive outcomes, in alignment with the ethical and developmental objectives of IF (Gassouma, Benhamed and El Montasser, 2023[41]). Furthermore, unlike conventional PPPs, Islamic financiers do not impose charges such as late payment or default fees, as Shariah forbids any fees or charges before completing a service or purchase (World Bank, 2017[39]).

Despite these differences, Islamic and conventional PPPs share significant structural and commercial similarities. IF financiers frequently structure products to resemble conventional debt and equity arrangements, enabling participation in projects with conventional financing and easing integration within existing frameworks. In infrastructure PPPs, including those related to water, which typically involve multiple financiers, this approach allows IF and conventional finance to operate within the same project (World Bank, 2017[39]). This coexistence of conventional finance and IF in the same project is called "parallel financing" (see sub-section on *Parallel financing*). Although separate documentations are required for Islamic and conventional tranches of a PPP arrangement, the legal framework around parallel financing seems to have developed enough to avoid excessive complexities. Additionally, even without an Islamic

tranche, PPPs inherently demand elevated levels of transparency and risk management due to their partnership structure (Gundogdu, 2019[42]).

The use of Islamic finance in water-related PPPs

The use of IF instruments in water-related PPPs remains limited, despite some synergies between IF mechanisms and infrastructure PPP models. Indeed, the growing trend of using IF sources in PPPs has not been widely reflected in the water sector, with most green IF investments focused on the renewable energy sector (Kasri et al., 2024[43]).

Nonetheless, **existing examples demonstrate the applicability of IF instruments in water-related PPPs**, for both large- and small-scale projects. For large-scale water infrastructure projects, the Patrind Hydropower Project in Pakistan and the ACWA Power's Red Sea Utilities in Saudi Arabia are illustrative examples. The Patrind Hydropower Project in Pakistan illustrates how the concessional component of a PPP can be effectively financed using Shariah-compliant assets and instruments (see Box 3.2 below) (IsDB, 2020[44]). The ACWA Power's Red Sea Utilities project shows how cross-sector infrastructure PPPs can mobilise private capital for water-related investment, with USD 1.6 million raised through Islamic banks such as Al Rajhi Bank and Riyadh Bank, alongside the Saudi Sovereign Fund and Public Investment Bank. Although primarily focused on renewable energy, the project also includes the construction of water production and wastewater treatment plants (see Box 3.2).

For small-scale microfinance projects, the Indonesia Urban Water, Sanitation and Hygiene (IUWASH) project in Kudus, Indonesia demonstrates the effectiveness of Islamic microfinance in delivering essential water services to low-income communities through PPPs. Implemented between 2012 and 2013 as part of a wider five-year initiative, the project used a PPP model involving the local government, Bank Syariah Mandiri and USAID (Nughoro, 2014[45]). An Islamic microfinance product financed 3 750 new water connections for low-income communities. Overall, the project improved water and sanitation access for more than 400 000 people across multiple regions (USAID, 2016[46]).

Box 3.2. PPP projects with an Islamic tranche in the water and related sectors

Patrind Hydropower Project in Pakistan with IsDB's USD 142 million Shariah-compliant contribution

Patrind Hydropower Project in Pakistan is an example of PPP project involving IF instruments in water-related sectors (hydropower). With a generation capacity of 147 MW, the project has been supplying electricity since 2014 to an estimated 1.6 million people, helping to meet Pakistan's growing energy demand. It was supported by K-Water & Daewoo E&C with lending from the ADB, International Finance Corporation (IFC), IsDB and Export-Import Bank of Korea (KEXIM). The total cost of the project was USD 632 million, with the IsDB contributing USD 142 million through Shariah-compliant financing.

ACWA Power closed USD 1.59 billion for Red Sea Utilities Project

The Red Sea Project in Saudi Arabia, encompassing the design, construction and operation of utilities infrastructure, is one of the most significant Islamic PPP. The project, which focuses on renewable energy for power generation, water production, wastewater treatment and district cooling, is a collaborative effort involving ACWA Power (Saudi Arabia), SPIC Huanghe Hydropower Development Company (China) and Saudi Tabreed Cooling Company. This consortium secured financing from a group of Saudi and international banks, including Al Rajhi Bank, APICORP, Bank Saudi Fransi, Riyadh Bank, Saudi British Bank, Saudi National Bank and Standard Chartered Bank. The project was procured as an independent PPP, with Saudi Arabia's sovereign wealth fund, the Public Investment Fund (PIF), providing a guarantee for the 25-year offtake agreement through its ownership of the Red Sea Development Company (TRSDC).

Source: (PPIB, 2017[47]); (Red Sea Global, 2020[48]).

Parallel financing

Parallel financing (or co-financing) **refers to the use of both Shariah-compliant and non-Shariah-compliant financing resources for a specific purpose.** This approach has been tested in various countries, sectors (such as transportation and energy) and contexts, including infrastructure PPP projects, showcasing the effective coexistence of conventional finance and IF (World Bank, 2017[39]).

In many projects, including PPPs, Islamic and conventional financing mechanisms coexist, but the extent to which parallel financing is used in the water sector remains unclear. There are notable examples, albeit limited. One such example is Saudi Arabia's Shuqaiq Independent Water and Power Plant PPP, which secured a total of USD 1.9 billion in financing, including an Islamic tranche led by Riyadh Bank, a commercial bank based in Saudi Arabia. Developed by a consortium of multiple companies, the project was designed to provide electricity and water to the Abha and Jazan regions (IJGlobal, 2007[49]), allowing to increase daily water production to 430 000 cubic meters in 2019 (Shuqaiq 3). The project received the Distinction Award at the Global Water Awards 2020 from Global Water Intelligence (GWI) for its scale, the blend of international and local investors, and its highly competitive tariff (GWI, 2020[50]).

Similarly, in Qatar, commercial Islamic banks and windows have played a significant role in financing desalination projects for over a decade. For instance, multiple desalination plants in Doha's Ras Abu Fontas industrial area have benefitted from both Islamic and conventional financing arrangements, as outlined in Box 3.3. **These examples illustrate the viability of parallel financing for large-scale water projects yet underline the need for better documentation and analysis of its application in the water sector.**

It is important to note that **parallel financing is applicable only under certain conditions** related to alignment with Shariah such as asset ownership and prohibition of default fees. **The asset ownership requirement in IF presents a complex but essential consideration when structuring parallel financing, as ownership entails both risks and advantages, such as enhanced financial security.** Islamic financiers typically hold respective shares of ownership (legal or beneficiary) in underlying assets, which conventional financiers might view as a risk factor. In the event of a default in a parallel financing project, providers of Islamic facility may find themselves in a relatively advantageous position compared to their conventional counterparts, due to their ownership rights over certain assets. **This challenge can be mitigated through a common security pool**, ensuring equitable treatment among all financiers (both Islamic and conventional). For instance, in an ijarah[25] (leasing) arrangement for a dam construction, Islamic financiers typically hold ownership of the underlying asset (e.g. water reservoir, power generation equipment, land rights). Should the project default, these financiers agree to transfer their assets into the common security pool, allowing for their liquidation alongside other assets to ensure equitable treatment among all parties involved.

In accordance with Shariah, which requires that fees or charges are applied only when an actual service has been delivered, **some Islamic financing institutions refrain from imposing certain fees commonly found in infrastructure finance transactions, such as commitment fees, late payment fees and default fees** (World Bank, 2017[39]). This creates a difference in financing structures, where conventional lenders impose these fees, but Islamic financiers do not. However, to prevent moral hazard in joint financing projects, some Islamic finance providers collect these fees but donate them to charity (World Bank, 2017[39]). In cases like water desalination projects, these charitable funds can support water and sanitation projects, including in underserved areas, thus enhancing the impact of the investment.

Box 3.3. Parallel financing for Qatar's desalination projects in Ras Abu Fontas

Domestic Islamic banks and conventional banks with Islamic windows in Qatar have played a pivotal role in financing desalination projects. Since the establishment of the first desalination plants at Ras Abu Fontas in 1981, the Qatari government has continually expanded the units to increase water production capacity. In 2008, the Ras Abu Fontas A1 desalination plant, designed to produce approximately 205 000 cubic meters per day, was financed through a combination of a commercial term loan and an Islamic tranche.

In 2013, the Qatar Electricity and Water Company (QEWC) secured a USD 450 million financing package to support the USD 500 million Ras Abu Fontas A2 desalination plant, with a capacity of roughly 165 000 cubic meters per day. The financing included a conventional debt tranche provided by Qatar National Bank (QNB) Group and an Islamic financing tranche arranged by Barwa Bank, Masraf Al Rayan and Qatar Islamic Bank.

The Islamic tranche also featured hedging facilities, with Qatar Islamic Bank acting as the Islamic Facility Agent and Islamic Security Trustee. This project exemplifies a parallel financing through conventional and Islamic tranches for large-scale water infrastructure development.

Source: (QIB, 2013[51]; The Peninsula Qatar, 2013[52]).

3.2.3. Islamic social finance and philanthropy

Islamic social finance has the potential to enhance equitable access to water and sanitation, particularly in areas where commercial capital is either unwilling or unable to engage. Grounded in principles of social justice and redistribution, instruments such as zakat, waqf and sadaqah can be used to finance basic

services for underserved populations. These mechanisms are particularly relevant in low-income and fragile contexts, where demand for concessional resources is high and repayment capacity is limited. While their application to the water sector remains limited in scale and largely fragmented, these instruments offer a pathway to mobilise domestic resources and strengthen community-level service delivery.

Islamic social finance: definition and state of play

Islamic social finance, also referred to as redistributive IF, includes mechanisms aimed at supporting poverty alleviation, wealth redistribution and intergenerational solidarity (ADB, 2022[7])**.** It encompasses traditional Islamic institutions that also serve as powerful financing mechanisms, including zakat (mandatory almsgiving), waqf (endowments), sadaqah[26] (voluntary charitable giving) and qard hasan[27] (benevolent zero-interest loans), which primarily provide funding to unbanked populations (Kuanova, Sagiyeva and Shirazi, 2021[53]). It also includes contemporary Islamic not-for-profit microfinance institutions (IRTI, 2019[54]).

Zakat, one of Islam's five pillars, requires Muslims with sufficient means to redistribute 2.5% of their wealth to those in need annually. Zakat is typically a direct wealth transfer between individuals, raising discussions regarding its potential use for public goods, such as infrastructure or educational and healthcare facilities. **Waqf**, traditionally the endowment of immovable assets for social benefit, has evolved to include forms such as equity and cash waqf,[28] broadening its scope to encompass movable assets. **Sadaqah** involves voluntary charitable donations aimed at supporting vulnerable populations, while **qard hasan**, provided by Islamic financial institutions, offers zero-interest loans to individuals in need.[29]

Interest in Islamic social finance is growing. Reported funds for qard hasan and zakat grew from USD 0.5 billion in 2012 to USD 1.5 billion in 2022 (ICD and LSEG, 2023[16])**. Islamic social finance offers significant yet underutilised potential for advancing SDG 6.** These instruments can make meaningful contributions to water-related investments that, while less commercially attractive for some water sub-sectors, yield substantial social impact. Available analyses and estimates provide insights into this financial potential at national and global levels. For instance, annual global zakat contributions are estimated between USD 200 billion and USD 1 trillion[30] (BAZNAS and UNDP, 2017[55]). Cash waqf, a waqf subcategory, is expected to reach USD 13 billion per year in Indonesia alone (World Bank, INCEIF and ISRA, 2019[56]). Case studies demonstrate the compatibility of most of Islamic social finance instruments with water-related investments. However, the impact of these financing resources on water is currently far from having reached its full potential.

Zakat's potential for water investments

Zakat holds significant potential as a catalyst for supporting long-term socio-economic and environmental objectives, including related to water, if effectively mobilised to meet the needs of the most vulnerable. As one of the five pillars of Islam, zakat is mandatory, akin to a tax – this has sparked debate about whether its collection and allocation should be managed by the state for optimal poverty alleviation (Iqbal, 2000[57]). Traditionally used to address poverty, zakat has increasingly demonstrated its potential to contribute to various social and environmental outcomes. For example, the National Board of Zakat for the Republic of Indonesia (BAZNAS), in collaboration with UNDP and UNICEF, has shown how zakat can meet Shariah requirements while supporting investment in water (see Box 3.4). Indonesia, home to the world's largest Muslim population, is among the countries with the highest estimated potential for zakat, estimated at 3.8% of GDP (World Bank and ISDBG, 2016[58]), which is equivalent to USD 32 billion per year (BAZNAS and UNDP, 2017[55]).

Zakat can also be pooled with other Islamic social finance tools to address water-related needs. For instance, in Indonesia, Zakat, Infaq and Sadaqah (ZIS) funds[31] are increasingly mobilised to help bridge the financing gap in WASH services for the low-income and vulnerable households with support from multi-stakeholders WASH working groups, formed by Bappenas (Indonesia National Planning

Agency), facilitating the collaboration between the central and regional governments, the National Board of Zakat (BAZNAS), UNICEF and various zakat institutions (see Box 3.4). However, the use of zakat remains fragmented and lacks transparency, limiting its full potential globally.

Effective zakat governance is essential for ensuring that zakat funds are allocated transparently, efficiently and in line with Islamic principles, thereby enhancing their impact. Strong governance frameworks are needed to direct zakat resources towards water projects that serve the most vulnerable populations, particularly in regions affected by water scarcity (Muhammad et al., 2024[59]). Sound administration includes clear project selection criteria, independent audits and transparent reporting, all of which help build donor confidence and mobilise further contributions. In Indonesia, for instance, zakat institutions place emphasis on standardised financial reporting and transparent disclosure of zakat distribution. This includes the publication of clear financial statements and the provision of accessible information on project funding and outcomes (Firmansyah and Devi, 2017[60]). In addition to addressing immediate needs, this approach supports long-term objectives such as community ownership and capacity development.

Waqf's and cash waqf's potential for financing water

Waqf has the potential to be expanded for water-related investments, even though data on its contribution to such investments is limited. Waqf can serve various societal causes and can take many forms, providing greater flexibility than zakat[32] in terms of structure and purpose (OECD, 2020[5]). Historically, waqf has supported various societal needs, including public drinking water, as seen in the first water-focused waqf asset in early Islam and the widespread waqf-funded fountains during the Ottoman Empire (Abid and Miakhil, 2024[61]). Public fountains were financed through waqf arrangements, ensuring access to drinking water in urban areas.

Modern waqf structures have evolved, often governed by boards of trustees and funded through diverse resources, including cash and equity, known as **cash waqf**, with returns reinvested to support waqf initiatives (World Bank, INCEIF and ISRA, 2019[56]). Thus, cash waqf enhances the flexibility of traditional waqf instruments which generally rely on real estate assets.

As a result, **assessing its current global financial potential is challenging**. The International Waqf Fund (IWF) allocated around 24% of its yearly returns to water and sanitation projects in Sri Lanka, South Sudan and Iraq, which benefited approximately 7 000 people through the construction of wells and water purification plants (IWF, 2024[62]). Similarly, in 2021, 17% of the IWF resources funded water and sanitation projects in China, Indonesia and Pakistan (IWF, 2022[63]). The Humanitarian Relief Foundation, a waqf-based organisation founded in Türkiye, has constructed close to 15 000 water wells in 44 countries over the past 22 years (IHH, 2024[64]). The IsDB has not yet allocated its Awqaf Properties Investment Fund specifically for water-related projects but has supported smaller-scale initiatives that integrate waqf resources for water. In 2015, the IsDB allocated USD 3.5 million to the Towfiq Welfare Society Waqf to advance educational and health activities in Somalia. This waqf has implemented Water Development Programs in the region, providing potable water for both human and livestock needs through artesian boreholes and hand-dug wells (IsDB and APIF, 2019[65]).

Due to its small ticket size, cash waqf can be combined with other Shariah-compliant financial instruments, contributing to its growing use in recent decades. In Indonesia alone, voluntary cash waqf contributions are estimated to reach USD 13 billion annually (World Bank, INCEIF and ISRA, 2019[56]). The Waqf Agency of Indonesia has proposed cash waqf linked sukuk (CWLS) structures to support impact-driven investments, particularly ocean-related, which is gaining recognition in the country (Mutmainah et al., 2022[34]) and could be expanded to investments in water. In Malaysia, experts and academics have explored waqf-based takaful (insurance) models using public donations to address flood risks (Che Mohd Salleh et al., 2020[66]; Ishak and Zaini, 2024[67]).

Box 3.4. BAZNAS: Institutionalising zakat to finance WASH services in Indonesia

BAZNAS and local authorities collaborate on water and sanitation in Kendel Village, Indonesia

In 2018, BAZNAS partnered with local authorities to construct toilets for 40 households in Kendel village, Boyali, Indonesia, a community of around 7 000 people. Prior to BAZNAS's involvement, the local government had constructed a water tank to pump water from a nearby river. This collaboration between BAZNAS and the local government led to a decline in diarrhoea incidents and a reduction in open defecation practices, significantly improving the well-being of the targeted households. The project highlights the effectiveness of zakat, not only to address poverty and hunger but also to improve access to clean water and sanitation.

Mobilising alms fund for financing WASH services in Indonesia: Zakat, Infaq and Sadaqah (ZIS)

Since 2016, Islamic alms, including Zakat, Infaq and Sadaqah (ZIS) Funds, have emerged as a key financing mechanism for WASH services for the poor in Indonesia. Annual Zakat funding in Indonesia is estimated at approximately USD 27.8 billion, with Amil Zakat Institutions channelling these funds towards WASH financing. Key stakeholders include BAZNAS (National Board of Zakat), Badan Wakaf Indonesia (Indonesia Waqf Board), other Zakat Amil institutions (LAZ), Bappenas (Indonesia National Planning Agency), UNICEF and the WASH working group.

The project has resulted in the construction of over 10 000 latrines and supported more than 500 households in building toilets. Additionally, an *Index for Sustainability of Clean Water and Sanitation* and *Technical Guidelines for ZIS utilisation in safe WASH* were developed. The initiative underscores the significant potential of Zakat funds in financing WASH, with support from the national Islamic scholar council (MUI) for the broader use of ZIS in WASH and the involvement of multiple stakeholders.

Source: (Hudaefi et al., 2020[68]); (Bappenas and UNICEF, 2022[69]).

Qard hasan's potential for water investments

Qard hasan, an interest-free or benevolent loan, can potentially be deployed to finance small-scale water investments and promote equitable access to financing. This type of loan requires no monetary return. Indeed, the borrowers are only required to repay the principal amount, depending on their financial capacity (Iqbal and Shafiq, 2015[70]). As such, it enhances financial inclusion by providing financing to low-income individuals.

The use of qard hasan is limited within the Islamic banking sector, with only a small number of banks offering this instrument, partly due to its zero-return nature (Leins, Seele and Vogel, 2016[71])**.** Beyond Islamic commercial banks, institutions like IsDB provide qard hasan loans, particularly to finance working capital for low-income groups (IsDB, 2021[72]). NGOs (e.g. Islamic Relief Worldwide, LAZ Daarut Tauhiid), non-profits and microfinance institutions (e.g. Bait at Tamwil Muhammadiyah, Amanah Ikhtiar Malaysia) also utilise qard hasan to support small-scale entrepreneurs and low-income households.

Qard hasan is well-suited for small-scale or household-level water investments, supporting financial inclusion through its non-profit structure. However, it is not appropriate for large-scale infrastructure due to limited cost recovery (benevolent nature). **As a complementary tool, it can help fill affordability gaps, while sukuk or blended waqf models offer more scalable financing options.** For example, under its Rural Development Scheme, Islami Bank Bangladesh Limited, a commercial bank focused on poverty alleviation, provides qard hasan micro loans of up to USD 130 to support improvements in water, sanitation and rehabilitation services for rural communities in Bangladesh (Farooqi, Qamar and

Chachı, 2017[73]). Qard hasan, which are generally used by microfinance institutions, can be pooled at national level to fund water-related investments, supporting the poorest households lacking access to clean water (Iqbal and Shafiq, 2015[70])

3.2.4. Islamic blended finance

Blended finance approaches that combine Islamic commercial and social finance present opportunities to scale up investment in water. Although still at an early stage, these models have the potential to improve credit profiles and attract private capital to complex or underfunded projects.

Definition of Islamic blended finance and distinction with conventional blended finance

Similarly to conventional blended finance,[33] which catalyses private capital through public finance, Islamic blended finance seeks to mobilise commercial IF through Islamic social finance. Islamic blended finance is defined as "an optimal mixture of Islamic social funds like zakat, waqf, sadaqah, qard hasan and grants, alongside philanthropic funds and commercial Islamic financial instruments to generate financing for SDGs" (Khan and Badjie, 2022[74]). While conventional blended finance relies on instruments such as grants, repayable grants and guarantees to catalyse private capital, Islamic blended finance can use Shariah-compliant alternatives, including waqf, sadaqah, zakat, qard hasan or kafalah (Khan and Badjie, 2022[74]). Islamic blended finance can thus offer a pathway to ensure alignment with both financial viability and social impact objectives, making it potentially a viable mechanism for financing impact-driven (including water-related) investments.

State of play in the use of Islamic blended finance

Despite its potential, Islamic blended finance remains an emerging field with limited empirical literature and data availability (Badjie, 2019[75])**.** Since the mid-2010s, the IsDB has increasingly used Islamic social finance as a mechanism to de-risk impact-driven investments (Ascarya, Suharto and Husman, 2022[76]). This has spurred further exploration of blended finance approaches that combine philanthropic and commercial IF instruments to support long-term socio-economic and environmental objectives. Academic interest in the intersection of Islamic social and commercial finance has grown in recent years, particularly since 2020 (Maulina, Dhewanto and Faturohman, 2023[77]).

Due to the lack of comprehensive data, the analysis of Islamic blended finance remains largely case specific. One notable example is the establishment of an Islamic blended finance facility in 2021 by the IsDB in collaboration with donor institutions.[34] Indeed, the IsDB provided USD 200 million in murabaha[35] financing, blended with philanthropic contributions from the Gates Foundation, to cover the financing costs of polio vaccines for Pakistan (Khan and Badjie, 2022[74]). Another example is the IsDB's USD 5 million blended murabaha line of credit[36] which combine concessional resources with commercial, Shariah-compliant financing to make SME lending more affordable. The example demonstrates how blended Islamic instruments can help mobilise additional financing for essential services (Khan and Badjie, 2022[74]).

Islamic blended finance for water

Given the limited use of conventional blended finance for water investments and the marginal allocation of IF to water, the application of Islamic blended finance in the water sector is likely to be very marginal. No comprehensive empirical study is assessing its scale and impact. However, existing examples highlight its potential. One such case is the collaboration between the National Board of Zakat (BAZNAS) in Indonesia, a local bank and the UNDP, where zakat and Corporate Social Responsibility (CSR) funds were combined to finance micro-hydro power plant projects. These funds were further supplemented by contributions from the Global Environment Facility (GEF). This initiative not only

enabled renewable energy generation but also improved water access and energy security for over 5 000 people across 900 households (Kasri et al., 2024[43]). The structured integration of concessional and commercial funds in this case illustrates how Islamic blended finance can be leveraged to close financing gaps in water-related investments. Furthermore, the **Global Islamic Finance Programme (GIFP)**, led by WWF, aims to mobilise over USD 1.6 billion in Islamic blended finance for nature-based solutions, including water-related investments (see Box 3.5). The pilot phase in 2025 will test the Programme in five countries, providing further insight into the viability and scalability of Islamic blended finance in environmental and water projects.

Box 3.5. The Global Islamic Finance Programme (GIFP)

In the context of the Global Islamic Finance Programme (GIFP), WWF, in collaboration with Islamic windows of major international commercial banks, including HSBC Amanah and Standard Chartered Saadiq, as well as the Securities Commission Malaysia, seeks to mobilise over USD 1.6 billion to scale up capital investments in nature-based solutions. The programme operates under two distinct financing strategies.

Under the Return First Strategy, GIFP aims to mobilise USD 1.5 billion in Islamic commercial capital, based on an initial "anchor" investment of approximately USD 150 million. This blended base is meant to catalyse further financing via concessional seed capital, upstream capital, securities, guarantees, market-based equity and debt participation. The leveraged funds are intended to target bankable projects with attractive market returns, for instance wastewater treatment.

Under the Impact First Strategy, GIFP will deploy USD 50 million in grant funding to leverage USD 150 million in Islamic social finance, supporting projects with lower commercial viability. It utilises a range of Islamic social finance instruments such as cash waqf, non-cash waqf, philanthropic donations, social impact sukuk and outcome-driven qard hasan.

GIFP states that the impact metrics that will be linked to investment financing with metrics related to water security. The potential share of water-related investments within GIFP could be assessed as the programme progresses. The results from its pilot phase in 2025 across Tunisia, Türkiye, Pakistan, Malaysia and Indonesia will help draw lessons for expanding the application of blended IF for environmental investments, including water.

Source: (WWF, 2024[78]).

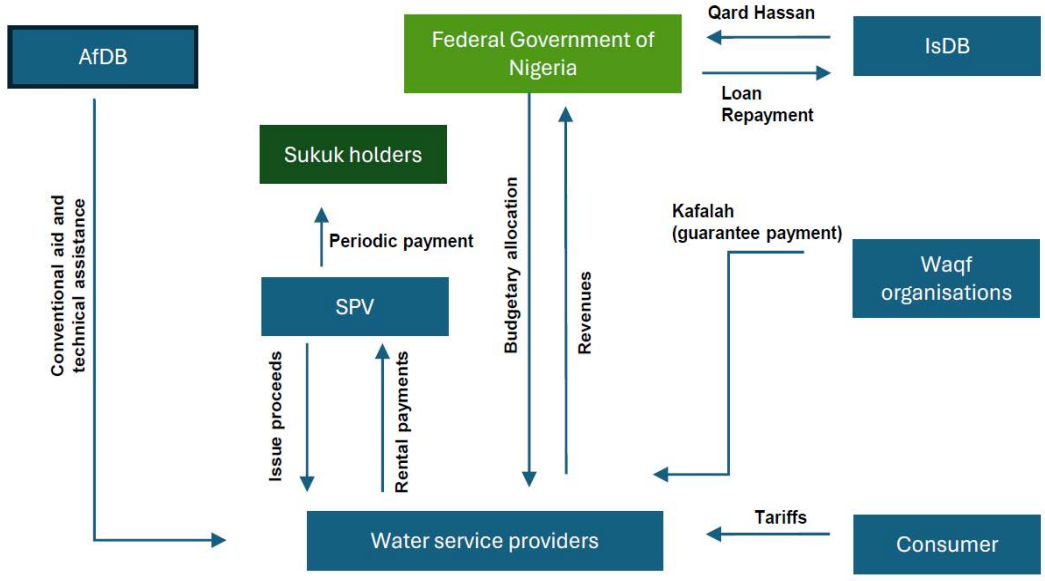
Blended parallel financing for water

Islamic concessional finance (which includes grants and low-margin loans) can be blended with other funding sources to attract commercial investment in impactful projects, including for water. The Lives and Livelihoods Fund (LLF) is a good illustration. Capitalised by the IsDB, the Abu Dhabi Fund for Development and several philanthropic partners, the Fund finances projects across health, agriculture and infrastructure, including small-scale water systems (Pericoli, 2020[79]). By 2021, the LLF's portfolio had reached USD 1.4 billion, of which approximately 14% was allocated to basic infrastructure, notably water supply and sanitation initiatives (LLF, 2022[80]) in countries such as Bangladesh, Côte d'Ivoire and Guinea.

A study suggests that, in **Nigeria**, despite the nascent and relatively small status of the IF industry (with only approximately USD 700 million in Shariah-compliant assets according to some estimates), **parallel blended financing could be a powerful tool for catalysing commercial funds for water** (Musa, Kolley and Aassouli, 2021[81]). In this structure, the Nigerian government could issue a green hybrid sukuk, combining ijarah (lease) and istisna (construction) contracts, through a special purpose vehicle (SPV), with

the proceeds directed to water service providers. The AfDB could supply non-Shariah-compliant aid and technical assistance directly to these providers, while the IsDB could extend a qard hasan (benevolent, zero-interest loan) to the government. In parallel, the government would channel budgetary support to the water service providers, who would in turn share a portion of their revenue from water sales. Waqf institutions could complement these resources by offering a kafalah, an Islamic guarantee that covers the obligor's payment obligations in the event of default (see Figure 3.8) (Musa, Kolley and Aassouli, 2021[81]).

Figure 3.8. Proposed structure of blended parallel financing to improve WASH services in Nigeria



Source: (Musa, Kolley and Aassouli, 2021[81]).

3.3. Ways forward to leverage Islamic Finance for effective water investments

Despite its steady growth, Islamic finance (IF) continues to face limitations in terms of market size, depth and liquidity in some countries, reducing its ability to finance, at scale, investments related to the environment and water in particular. Regulatory fragmentation across jurisdictions create uncertainty for investors, particularly in the green sukuk markets, hindering cross-border transactions (ADB, 2022[7]; OECD, 2020[5]).

This section examines key barriers that hinder the expansion of IF for water-related investments and potential solutions to overcome them. It explores the main challenges to scale up IF for water and analyses potential solutions to overcome these barriers. It also seeks to assess to what extent IF mechanisms can be a source of inspiration for financing water mechanisms focusing on long-term viability and equity.

3.3.1. Main challenges to scale up Islamic finance for water

The relatively limited maturity of the IF industry in certain jurisdictions constrains its capacity to scale financing for water-related investments. Compared to conventional finance, IF faces challenges in some countries such as reduced market depth and liquidity. The size of the IF industry varies significantly across jurisdictions and limited access to Shariah-compliant capital can constrain its development in some countries. Despite its steady growth since the 1970s, the global market value of the IF industry stands at USD 3.4 trillion in 2023 (IFSB, 2024[1]) compared to an estimated USD 34 trillion for the global financial

services sector (The Business Research Company, 2025[82]; Benchmark International, 2024[83]). Additionally, the development of IF varies widely across countries, with less mature markets struggling to align with both ESG and Shariah objectives. For instance, Malaysia (e.g. SRI Sukuk Framework, 2014) and Indonesia have been pioneers in responsible IF markets, while alignment in the GCC (e.g. Qatar Financial Center *Sustainable Sukuk and Bonds Framework*, 2022), MENA and Central Asia (e.g. Bangladesh Bank's Policy on Green Bond Financing, 2022) began later (LSEG and RFI, 2023[13]). This uneven progression poses substantial barriers to expanding IF's role in addressing critical water challenges.

Limited standardisation

Variations in how IF contracts are structured across jurisdictions, driven by differing regulatory frameworks and country-specific Shariah compliance requirements, create challenges for both issuers and investors, especially within the green sukuk segment (World Bank, 2017[39]). Limited standardisation in the structuring of IF contracts, such as green sukuk issuance, particularly with respect to ESG requirements, can complicate cross-border transactions, heighten liquidity risks for investors and reduce the overall attractiveness of IF instruments. While these challenges affect all sectors, high-risk, low-return areas like water investment are especially vulnerable to the lack of unified Shariah standards.

International standard-setting bodies, including the Accounting and Auditing Organisation for Islamic Financial Institutions (AAOIFI) and the IFSB, are **developing global Shariah standards for IF practices**. However, **evolutions are slow and continue to generate regulatory uncertainty**. For example, the adoption of AAOIFI's Sharia Standard 62 on sukuk issuance which favours asset-backed sukuk over asset-based sukuk[37] (distinction explained earlier in the chapter) may impact institutions' sukuk issuance volume due to differences in asset-related risks and repayment structures. Such regulatory shifts may lead to market fragmentation or pose challenges for financial regulators (S&P Ratings, 2024[84]). Although these standards are still under discussion, their eventual adoption could shape the future of IF and its role in responsible finance, including for water investments.

Lack of awareness and expertise on IF instruments

Limited awareness and understanding of IF mechanisms hinder their broader use, in particular to finance impact-driven investments, including for water security. Despite growing international recognition and demand of certain IF products such as sukuk, many global investors and issuers erroneously view IF as exclusively relevant to Muslim-majority countries, overlooking its potential as a flexible and inclusive financing approach for diverse contexts (Di Mauro et al., 2013[85]). This misconception restricts its adoption in global markets and limits its contribution to addressing universal challenges, such as water financing.

A lack of expertise in structuring IF instruments, including green sukuk, further constrains their use for water-related projects (ICMA, IsDB and LSEG, 2024[20])**.** This knowledge gap impedes the development of effective instruments and limits investors' confidence in their benefits. Without targeted capacity-building efforts and awareness-raising initiatives, the potential of IF to mobilise substantial resources for long-term socio-economic and environmental objectives will remain untapped (OECD, 2020[5]).

The absence of sustained dialogue between the IF community and water sector actors hinders mutual understanding and project alignment. Strengthening dialogue and collaboration between IF providers and stakeholders from the water sector can support the expansion of IF for water investments, which can be particularly impactful in water-stressed regions.

The theoretical convergence between Islamic finance principles and environmental and social goals can unintentionally dilute efforts to embed formal ESG frameworks into IF practices. As

Shariah principles already emphasise ethical, social and environmental responsibility, some stakeholders view ESG requirements as redundant, reducing the incentive for their explicit adoption. This has contributed to the absence of standardised ESG methodologies across Islamic financial institutions and to inconsistent application of responsible investment criteria in investment decisions.

Instruments complexity and transaction costs

Ensuring Shariah compliance for financial instruments increases transaction costs and time. Structuring Shariah-compliant products, particularly asset-backed and asset-based instruments, requires extensive legal, financial and religious oversight (Hidayat, 2013[29]; Manjoo, 2014[86]). These complexities hinder the broader adoption of IF and its potential to scale financing for water-related investments (for which transaction costs are already relatively high). However, some experts argue that the cost difference between Islamic and conventional PPPs is less about structural factors and more about financing contracts and the commercial considerations of project sponsors.

Furthermore, aligning ESG criteria with Shariah principles can sometimes be a challenge. Identifying assets that meet both ESG and Shariah compliance criteria increases transaction complexity and limits the pool of projects eligible for green sukuk. This dual compliance requirement poses a barrier to the broader adoption of IF for water financing.

Islamic social finance instruments (e.g. zakat, waqf, qard hasan) require clearer regulation and policy direction to be channelled toward targeted water-related investment. Realisation of this potential is hindered by weak governance, limited transparency and insufficient technical and data-management capacity within zakat and awqaf institutions, many of which operate outside formal government frameworks. While qard hasan is more embedded within institutionalised Islamic finance, in particular Islamic banks, the absence of standardised regulations leads to inconsistent application across financial institutions. Strengthening governance, data systems and allocation mechanisms at the national level is therefore essential to shift these tools from traditional charitable disbursement to effective, impact-oriented financing (OECD, 2020[5]). Moreover, Islamic social finance tools are predominantly administered at the national level, limiting cross-border mobilisation; only a few international applications, such as the International Federation of Red Cross's global zakat initiative for water projects, currently exist (OECD, 2020[5]; IFRC, 2019[87]).

Lack of data and reporting

Limited reporting on the performance and impact of investment, including for water, funded through IF instruments hinder their effective deployment. The IF industry has faced challenges in developing accounting and reporting frameworks. This has delayed the industry's transition towards impact-driven practices and has contributed to higher transaction costs for both borrowers and investors, particularly in capital markets instruments (ADB, 2022[7]). Furthermore, this lack of data impedes evaluation of their effectiveness and areas for improvement (OECD, 2020[5]), and the promotion of successful cases of water investments to encourage the development and scaling-up of similar models. Without reliable data, stakeholders struggle to assess returns on investment or social and environmental impacts, both essential for securing investor trust. This lack of transparency limits the incentives in scaling up impact-driven investments, as potential contributors cannot verify how funds are allocated or whether projects meet intended objectives.

Ownership of assets

Some countries restrict the transfer of ownership of specific asset types to private entities due to national security concerns, which can limit the use of IF for water-related PPPs. A similar constraint arose in Türkiye's hospital PPPs, such as the Konya Integrated Health Campus and the Manisa Hospital,

where an ijarah structure was initially considered. Under a standard ijarah, the Islamic financier (in this case the IsDB) would take ownership of the assets and lease them to the Ministry of Health, with ownership reverting to the Ministry upon completion of repayments. Because hospitals are classified as nationally sensitive assets, this ownership transfer rendered ijarah unsuitable. The project was therefore restructured using an istisna contract, under which an SPV appointed by the financier oversees procurement and construction and delivers the completed asset to the government. This adjustment preserved Shariah compliance while ensuring that asset ownership remained with the state (World Bank, 2017[39]). **Similar considerations may occur for other types of PPP financing in the sector.** In China, concerns over asset transfers to private stakeholders may explain the reluctance of local governments to sell stakes in tap water projects to private companies (Leflaive, Dominique and Alaerts, 2022[88]). However, given that IF structures frequently involve transfer of asset ownership to finance providers, these restrictions may create greater challenges compared to conventional PPPs. Addressing these ownership constraints requires legal frameworks and national policies that balance security considerations with the need to attract private financing.

3.3.2. Opportunities to unlock Shariah-compliant funding and financing models for water at scale

Literature and experts point to the following options for further mobilising Islamic finance for impact-driven investments, including in the water sector. These recommendations draw also on insights shared during the 12th meeting of the Roundtable on Financing Water.

Strengthening policy frameworks, international coordination and standardisation

The definition of national strategies can play a key role to shape the growth and direction of IF by establishing regulatory frameworks, introducing incentives and setting clear impact objectives. These strategies typically incorporate targeted policies, economic incentives and institutional frameworks aimed at leveraging Islamic finance instruments and integrating environmental and social considerations into financial practices. For example, Malaysia's Value-Based Intermediation (VBI) framework, developed by Bank Negara Malaysia (Malaysian Central Bank), demonstrates how governments can steer IF institutions towards embedding responsible and value-based principles in their operations (OECD, 2020[5]; Bank Negara Malaysia, 2018[89]), encouraging them to incorporate impact assessments into investment decisions, enhance transparency and promote financial instruments that generate positive social and environmental outcomes (LSEG and RFI, 2023[13]).

Advancing standardisation for structuring IF products could help align IF with long-term socio-economic and environmental objectives, including related to water. International standard-setting bodies, such as AAOIFI, IFSB[38] and the General Council for Islamic Banks (CIBAFI), could play a key role in developing harmonised standards for IF products, including tailored guidelines for green sukuk issuance (Ismail and Shaikh, 2017[90]). These standards could include specific provisions for their application to water investments. Such provisions could define both ESG and Shariah compliance eligibility criteria for water projects, specify the types of water infrastructure that qualify for financing (e.g. wastewater treatment plants, water supply networks, irrigation systems). Additionally, these standards could outline reporting requirements to ensure that funds are used effectively for water-related objectives. Including such targeted provisions would enhance transparency, facilitate investor confidence and help scale up the use of IF for financing water investments.

Central banks also have a critical role to play in setting sector-specific standards to scale IF for water investments, in line with international standard-setting organisations. In May 2022, CIBAFI issued a *Sustainability Guide for Islamic Financial Institutions*, providing a framework for integrating responsible and value-based considerations into IF operations. Building on such initiatives, the Central Bank of Jordan incorporated sectoral guidance aligned with CIBAFI principles into its Green Finance

Strategy for 2023-2028, aiming to expand impact-driven Islamic finance instruments (CBJ, 2023[91]). Other central banks are also developing frameworks to enhance IF for environmentally focused investments, though not specifically targeting water. For instance, the Central Bank of Bangladesh introduced the *Sustainable Finance Policy for Banks and Financial Institutions* in 2020. While the policy is not exclusively focused on IF, it remains relevant as IF accounts for 21% of the country's banking sector (IFSB, 2024[1]). The framework sets a minimum target for direct impact-driven finance as a share of total loan disbursements, requiring banks to allocate 15% of their portfolios to impact finance, including a minimum of 2% for green finance (Bangladesh Bank, 2020[92]).

Regional and national taxonomies for impact finance should give greater priority to water alongside other environment-sensitive sectors. The ongoing evolution of taxonomies presents an opportunity to strengthen water's position within such classifications. For example, the *Regional Arab Taxonomy for Sustainable Finance*, currently under development, places greater emphasis on water compared to the *EU Sustainable Finance Taxonomy* (UNESCWA, 2022[93]). Incorporating precise technical screening criteria for water activities ensures that taxonomies channel investment into high-impact areas.

Additionally, fostering collaboration among international finance institutions, international organisations, governments and other relevant stakeholders can support the mobilisation of IF for water investments. Current literature and international discussions on leveraging IF for the environment tends to overlook water security. Given the scale of the global water crisis, it is essential to integrate water-related challenges into the agenda of MDBs such as IsDB, ADB and World Bank working on scaling up IF in their environmental objectives. The triennial OIC Water Reports[39] could serve as a platform to introduce a dedicated chapter on the role of IF in water finance, ensuring ongoing analysis and visibility. Such reporting could be reinforced through collaboration with MDBs, highlighting funding and financing mechanisms that integrate IF structures.

Furthermore, robust collaboration between Arab and OECD Development Assistance Committee (DAC) donors could help support the use of IF instruments such as zakat, waqf, sukuk and Islamic microfinancing to support impactful investments (OECD, 2020[5]). Both Arab and DAC donors have an opportunity to demonstrate leadership in this area, leveraging their expertise to promote effective implementation. Certain donors could play a key role in driving this engagement forward by drawing on past experiences and best practices. DAC members could combine their conventional finance with Islamic forms of financing to deliver economic infrastructure and large programmes (OECD, 2020[5]).

Leveraging promising financing instruments

As evidenced in Chapter 2, **Islamic finance instruments and models offer opportunities to scale up water investments through diverse mechanisms**.

Green sukuk, which align with both ESG and Shariah-compliance principles, have emerged as key tools for mobilising capital for impact-driven projects, though their application in water remains limited. Malaysia's Sukuk Kelestarian and Indonesia's sovereign green sukuk illustrate how these instruments can attract both Shariah-sensitive and impact-driven investors to finance large-scale water infrastructure. The survey conducted by the OECD and IsDB, aimed at mapping existing Shariah-compliant financial allocations to the water sector and identifying strategies to scale up Islamic finance for water investments, indicates that experts consider sukuk a highly suitable Islamic finance instrument for water investments (see Figure 3.7).

PPPs incorporating IF provide a structured framework for integrating IF into water infrastructure projects, as demonstrated by Saudi Arabia's ACWA Power Red Sea Utilities project, which has leveraged IF for desalination and wastewater treatment. **Parallel financing**, which blends Islamic and conventional financial instruments, has also been effective in expanding capital availability for large-scale water projects, such as Qatar's Ras Abu Fontas desalination initiatives. **Islamic blended finance**, which combines Islamic

commercial finance with philanthropic resources such as zakat, waqf and qard hasan, has been used to support water projects. Governments and MDBs could expand the application of **waqf assets, including cash waqf mechanisms**, to establish pooled Shariah-compliant funding systems specifically designed for water-related projects. Furthermore, effective mobilisation of **zakat** for water financing requires clear governance, transparency, impact measurement and Shariah compliance. These are essential to avoid fragmentation and underutilisation of these funds. While these instruments and models present strong potential, expanding their role in water investments will require regulatory harmonisation, frameworks' standardisation and the development of dedicated Islamic financial products tailored to water security challenges.

In particular, the impact of zakat, waqf and sadaqah could be amplified by enabling project pooling and cross-border mobilisation, particularly for reaching the populations most in need. Currently confined within national borders, these funds, estimated globally at USD 200 billion to USD 1 trillion, could achieve greater reach and effectiveness through coordinated pooling, harmonised regulations and international cooperation. Initiatives like the UNHCR's 2019 Refugee Zakat Fund demonstrate how global frameworks can channel resources to the most vulnerable, a model that could be adapted for water-related investments (OECD, 2020[5]; UNHCR, 2019[94]). Another illustration is from Indonesia, where Bappenas (Ministry of National Development Planning) and BAZNAS (National Board of Zakat), in collaboration with UNICEF, directed zakat toward WASH services and small-scale infrastructure (Bappenas and UNICEF, 2022[69]), creating a model that integrates Islamic social finance with national development planning and demonstrates potential for sustained investment in essential services. Expanding similar models in other countries could be impactful. Moreover, to enhance its impact, guidelines and policies on zakat collection, management and disbursement are essential. National policy frameworks on zakat or management of Zakat Infaq Sadaqah (ZIS) funds (explained in the previous sections on the topic) could integrate water.

Furthermore, **MDBs and international organisations should consider establishing a Qard Hasan Water Fund to provide Shariah-compliant concessional financing for water infrastructure projects**, predominantly funded by higher-income regions to support lower-income economies. Given the long-term, low-return nature of water investments, which limits commercial appeal (OECD, 2022[22]), such a fund would offer zero-interest or highly concessional loans and grants, thereby mitigating financial risks and enhancing access to affordable capital. This mechanism would promote financial inclusion and ensure the viability and affordability of essential water services, while enabling high-income countries to support impactful investment. Integrating this mechanism within existing MDB-led water initiatives would enhance its impact, ensuring alignment with broader resilience and development efforts.

Public-Private-Philanthropic Partnerships (4P) provide a structured framework for enhancing multi-stakeholder collaboration in water investments, bridging the gap between government initiatives, private sector financing and philanthropic contributions. The growing interest of philanthropists in water-related projects underscores the need for effective governance mechanisms to ensure that funds are allocated efficiently and deliver meaningful impact. Recognising this need, in collaboration with McKinsey and Company, the World Economic Forum's Giving to Amplify Earth Action (GAEA) initiative seeks to strengthen such partnerships by harnessing the complementary strengths of diverse stakeholders. GAEA offers a promising framework for 4P models in water investments by integrating financial resources with impact-driven strategies. Key areas of focus include freshwater conservation through expanded rainwater harvesting, improvements in irrigation efficiency such as the scaling up of drip irrigation and land restoration efforts aimed at safeguarding critical ecosystems like wetlands and mangroves (Neo and Pacthod, 2023[95]). IsDB is also exploring the integration of philanthropic resources into PPPs.

Mobilising private investments

Greater private sector involvement would help attract additional capital into the sector and spur innovation (OECD, 2020[5]), particularly in financing mechanisms as well as in operational and managerial approaches, **and scale IF for water investments**. Showcasing successful examples of private sector engagement in water PPPs and other financing models through dedicated international platforms and publications can be impactful. These platforms, supported by governments, MDBs and other public development banks, international and regional organisations can raise awareness and encourage the replication of effective approaches. Governments can leverage Islamic blended finance to strengthen private sector participation in water investments by integrating Islamic social finance with commercial IF instruments. Establishing government-backed matching funds that co-finance water projects in partnership with Islamic financial institutions could provide additional incentives for private sector engagement while ensuring the viability of investment.

Governments can support efforts to scale IF for water by strengthening the enabling environment through targeted legal, regulatory and economic policy measures. Legal and regulatory enhancements can include the recognition and support of Islamic financial instruments, the creation of dedicated supervisory units within financial authorities, the adoption of international Shariah-compliant standards (e.g. AAOIFI, IFSB) and the development of tailored guidelines for impact-driven Islamic finance instruments. Economically, governments can introduce fiscal incentives, such as tax neutrality and issuance cost deductions. They can also provide concessional financing and risk mitigation tools such as guarantees to incentivise private investment. Moreover, measures like reasonable offtake agreements and partial asset ownership can further attract private sector participation (World Bank, 2017[39]). For instance, sovereign guarantees and offtake agreements provided by the Kingdom of Saudi Arabia enhance the investment attractiveness of the water sector, where the Saudi Water Partnership Company (SWPC) plays an active role in public-private partnerships in the country (KPMG, 2021[96]).

International banks with Islamic windows could act as catalysts for integrating responsible finance into IF and advancing standardisation, thereby supporting the development of water investments. These institutions are well positioned to design and promote harmonised parallel financing frameworks that combine Islamic and conventional financial models, fostering collaboration among diverse financial actors. This, in turn, can enhance the appeal of water investments to private investors by better articulating their economic value and return potential. It can also help close knowledge and implementation gaps, encouraging broader private sector engagement in water-related projects through IF mechanisms. For instance, **banks such as HSBC, Standard Chartered and BNP Paribas are amongst the largest commercial banks with Islamic tranches**.

Strengthening data systems and harnessing technology

Strengthening data systems, including data collection, data management frameworks, monitoring platforms and impact tracking is essential for ensuring accountability and optimising the use of IF resources for water investments. Impact-focused organisations (e.g. CBI) and regulatory bodies (e.g. Securities Commission Malaysia) could collaborate to develop robust mechanisms for monitoring the allocation and utilisation of proceeds from green sukuk, ensuring alignment with intended objectives and maximising impact. Public development banks, international organisations such as the OECD (OECD, 2020[5]) or the Organisation of Islamic Cooperation (OIC) and international standard-setting bodies such as the IFSB could enhance these efforts by advancing data collection and reporting systems to effectively track Islamic social finance flows and their contributions to SDGs. Establishing standardised reporting frameworks for member states would increase transparency and enable stakeholders to evaluate the effectiveness of IF in addressing water-related challenges.

Harnessing technology can contribute to improve the efficiency and impact of IF in supporting viable water investment. IF institutions and governments can deploy fintech solutions to optimise the effectiveness of Islamic social finance, particularly in microfinance initiatives targeting water supply and sanitation. Digital platforms and tools can enhance fund distribution, increase transparency and strengthen monitoring, helping to track whether resources are effectively directed to the communities most in need. For instance, BAZNAS partnered with several Islamic fintech companies to use smartphone applications for zakat collection, expanding the reach and efficiency of Islamic social finance in addressing essential services (Hudaefi et al., 2020[97]).

3.3.3. Islamic finance: a source of inspiration for improving the long-term viability and quality of financing water?

This sub-section analyses the extent to which Islamic Finance could potentially contribute to improving the long-term viability and quality of financing for water-related investments. Rooted in risk-sharing, asset-backed financing and ethical considerations, IF principles seem well-aligned with the characteristics of investments in water security. This sub-section explores how IF can potentially be a source of inspiration for strengthening the viability and quality of water investments, beyond IF.

Enhanced transparency and accountability

IF can be a source of inspiration in terms of transparency and accountability requirements for investment (World Bank, 2017[39])**.** These attributes are important to attract investments in water, as they can enhance investor confidence, which is sometimes lacking in the water sector (due to risk-return profiles and revenue streams which are not always clear). In IF contracts, accountability and contractual transparency between the parties of a contract are strengthened for two key reasons. First, adherence to Shariah principles is foundational, necessitating strict compliance with its rulings (Bank Negara Malaysia, 2019[98]). Second, the risk-sharing nature of IF inherently demands higher standards of information symmetry between parties (OECD, 2020[5]). The rigorous accountability and transparency frameworks inherent to IF, rooted in its risk-sharing principles, can serve as a **valuable model for structuring investments in water**. Indeed, providing visibility to investors can incentivise them to make long-term pledges and provide appropriate financing instruments (Farnault and Sarr, 2024[99]). Achieving these outcomes relies on enhanced transparency, robust monitoring and accountability measures.

Financial resilience

IF has proven to have a higher resilience to financial shocks than conventional finance. This could be an asset for financing water investments, which requires long-term capital and robust risk management. Indeed, empirical evidence highlights the resilience of IF compared to conventional finance, particularly during periods of financial crisis. During the peak of the 2008 Global Financial Crisis, banks with Islamic windows, offering both conventional and Shariah-compliant financial services, demonstrated greater capacity to provide financing through their Islamic windows (Hasan and Dridi, 2010[100]; Farooq and Zaheer, 2015[101]). **This resilience is attributed to the relatively higher asset quality of IF contracts which place assets at the centre of financial agreements. Enhanced cautiousness in choosing assets while structuring financial instruments ensures greater liquidity during times of crisis, a critical feature for financing long-term water projects.** Additionally, risk-adjusted return analyses indicate that IF instruments, particularly sukuk, outperformed their conventional counterparts in terms of financial performance (risk-adjusted returns) during the COVID-19 pandemic (Hasan et al., 2022[102]). For instance, sukuk is naturally less exposed to external financial market shocks and fluctuating interest rates since it is interest-free and can be linked directly to the returns from underlying assets. These features position IF as a reliable and resilient financing option for addressing global water challenges.

Blended finance and risk sharing

Islamic blended finance could potentially offer innovative approaches to addressing some limitations of conventional blended finance mechanisms for water-related investments. In conventional blended finance, private actors often depend on debt-based instruments, which may not meet the principles of equitable risk-sharing or effectively address the needs of underserved regions. In contrast, Islamic blended finance leverages Shariah-compliant instruments, such as sukuk, musharakah[40] and mudharabah[41] which prioritise profit-and-loss sharing, asset-backed structures and social equity. These features reduce reliance on interest-based financing while ensuring more balanced risk distribution among stakeholders. Additionally, OECD DAC reports indicate that only 9% of blended finance facilities target low-income areas (Khan and Badjie, 2022[74]). Therefore, incorporating Islamic philanthropic resources like zakat and waqf into blended finance frameworks, while leveraging their capacity to reach out vulnerable people, could generate additional concessional funding, particularly for water projects in communities with limited access to conventional financial markets.

Public-private partnerships: asset-backed finance and risk sharing

IF offers valuable insights for designing PPPs for the water sector, particularly through its emphasis on asset-backed structures. While Islamic and conventional financiers share similar requirements for project viability, IF aligns financial returns with asset performance rather than relying on fixed interest payments, thereby preventing excessive risk transfer to borrowers. More balanced risk-sharing is a core feature of IF contracts, particularly in equity-based structures such as musharakah[40] and mudharabah[41], where profits and losses are distributed proportionally among stakeholders rather than being borne solely by project developers. In particular, Shariah-compliant financing often ring-fences specific assets to safeguard investors and ensure equitable treatment among stakeholders. Although tangible assets are typically preferred, usufructs can also be used as underlying assets to structure Shariah-compliant contracts. Revenues from water tariffs, user fees or other payment streams can also be ring-fenced in certain contexts (World Bank, 2017[39]).

In IF, asset ownership, whether tangible or intangible, is a standard requirement, offering a structured approach to achieving a fair distribution of risks and rewards in water investments. Integrating asset-backed mechanisms into conventional water PPP models could enhance risk and reward sharing between public and private actors by linking financial returns directly to the performance of underlying infrastructure (World Bank, 2023[103]; World Bank, 2017[39]). This would prevent the use of additional public financing to meet the requirements of the partnership when revenue generation is lower than expected. Asset-backed structures would reduce speculative risks and encourage long-term commitments from financiers by ensuring that funds are allocated to productive and revenue-generating assets (Manjoo, 2014[86]). Furthermore, they could introduce greater discipline in project selection and management, as financing would be contingent on the presence of viable assets with clear revenue streams (World Bank, 2023[103]). These elements could improve financial viability in water PPPs, particularly in emerging markets where credit risk and investment uncertainty remain significant barriers to private sector participation.

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Notes

[1] Shariah refers to Islamic law, and Shariah-compliant finance, that adheres to Shariah, is referred to as Islamic finance.

[2] Sukuk are known as the counterpart of bonds in conventional finance. While conventional bonds are debt instruments, Sukuk are asset-backed or asset-based instruments: instead of earning interest (which is prohibited in Islam), investors receive a share of profits or returns generated by the underlying asset.

[3] An Islamic fund is a pooled investment scheme structured to generate returns in accordance with Islamic principles, ensuring that all activities and underlying assets comply with Shariah law (Md Husin, Aziz and Iqbal, 2024[108]). Islamic investment funds allocate most of their assets to equities, followed by investments in commodities and money market instruments (IFSB, 2024[1]). Islamic funds strictly adhere to Shariah principles, which prohibit investments in the conventional finance sector, interest-based instruments and

industries such as gambling, tobacco and alcohol. Additionally, Shariah compliance excludes the inclusion of speculative instruments, such as hedges and derivatives, from the portfolio.

[4] Takaful, a form of Islamic insurance, is a mutual guarantee in return for the commitment to donate an amount in the form of a specified contribution to the participants' risk fund, whereby a group of participants agree among themselves to support one another jointly for the losses arising from specified risks. Conventional insurance providers can be owned by a third-party entity which can collect the profit stemming from the difference between the total premiums and aggregate claims paid to policy owners. Whereas, in takaful, a company is co-owned only by the policy holders and profits (or losses) are shared among the participants of takaful.

[5] However, limitations in data collection, including those within the TOSSD framework, present challenges to accurately measuring the share of Islamic finance.

[6] In this report, the term "development finance" is used broadly to encompass public and private financing for development objectives, including financing provided by development finance institutions and private capital mobilised through public interventions. It further covers financing through multilateral and bilateral mechanisms

[7] The Value-based Intermediation (VBI) framework is an approach introduced by The Malaysian Central Bank (Bank Negara Malaysia) aimed at aligning the practices of Islamic financial institutions with environmental, social and governance (ESG) considerations. VBI encourages financial institutions to align their activities with Maqasid al-Shariah (higher objectives of Shariah) and the SDGs by incorporating sustainability assessments into investment decisions, enhancing transparency and promoting financial instruments that generate positive social and environmental outcomes (LSEG and RFI, 2023[13]).

[8] In this report, the term "development finance" is used broadly to encompass public and private financing for development objectives, including financing provided by development finance institutions and private capital mobilised through public interventions. It further covers financing through multilateral and bilateral mechanisms.

[9] Due to the limited number of responses, the full results of the survey are not presented in this note, as they may not offer a representative picture. However, selected insights from certain set of responses are included where relevant.

[10] Murabaha is a sale contract whereby one party sells a particular asset on a selling price which is the sum of the cost price and an agreed profit margin.

[11] Official flows encompass both Official Development Assistance (ODA) and Other Official Flows (OOF). OOF differs from ODA primarily in its concessionally, as it includes financial flows with a grant element of less than 25% (OECD, n.d.[104]).

[12] The TOSSD dataset defines mobilised private finance by official interventions as flows from private stakeholders where a direct causal link to an official intervention can be demonstrated. Official interventions include entities such as state and local government agencies, their executive bodies and public sector corporations in which the government holds a majority ownership of more than 50% (TOSSD, 2023[105]).

[13] The *Total Official Support for Sustainable Development* (TOSSD) framework captures global official (Official Development Assistance and Other Official Flows) and officially supported (mobilised private finance through official intervention) flows aimed at promoting long-term development in developing countries, categorising these by financial arrangement types, such as Islamic finance, blended finance and export credits (TOSSD, 2023[105]). The TOSSD dataset may have two main limitations. First, since its establishment in 2019, the dataset is still evolving and aims to incorporate a broader range of donors.

Second, for IF, potential under-reporting persists, as Islamic flows are classified by the provider without independent verification. Despite this, TOSSD data facilitates tracking of IF in water as either official finance or officially supported private finance. Importantly, no officially supported private IF was directed to water from 2019 to 2023.

[14] Official flows encompass both Official Development Assistance (ODA) and Other Official Flows (OOF). OOF differs from ODA primarily in its concessionally, as it includes financial flows with a grant element of less than 25% (OECD, n.d.[104]).

[15] Murabaha is a sale contract whereby one party sells a particular asset on a selling price which is the sum of the cost price and an agreed profit margin.

[16] The prospective adoption of the Shariah Standard 62 of the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI), one of the most prominent international standard setting bodies on sukuk issuances alongside IFSB, could lead a transition from asset-based sukuk to asset-backed sukuk (S&P Ratings, 2024[84]).

[17] The survey conducted by the OECD and IsDB gathered insights from 13 Islamic finance experts affiliated with financial and research institutions. While the sample size is limited, the findings offer indicative perspectives that could inform future research and would benefit from validation through broader data collection.

[18] Cash Waqf Linked Sukuk (CWLS) is an innovative government-issued sukuk structure that mobilises capital through one or more waqf funds (endowments). These waqf funds are channelled into sovereign CWLS sukuk to finance public investments with social and environmental goals. The Indonesian government pioneered this model in 2020, directing proceeds to health facilities. Building on this approach, CWLBS focuses specifically on supporting marine and coastal ecosystems and the communities that depend on them (Mutmainah et al., 2022[34]).

[19] The issuer of sukuk murabaha holds the assets in trust on behalf of the certificate holders. Certificate holders purchase the goods, which are then sold to a third party at cost plus a profit margin, with payment deferred to a later date.

[20] Istisna is a sale contract on whereby manufacturer agrees to produce (construct) and deliver a specific asset in the future and where the sale price may be spot payable, amortized or deferred.

[21] Murabaha is a sale contract whereby one party sells a particular asset on a selling price which is the sum of the cost price and an agreed profit margin.

[22] Ijarah is a lease contract whereby one party leases the usufruct of a specified asset to another for a specific rent and period.

[23] Mudharabah is a limited partnership whereby one partner (the capital owner) provides capital and the other partner undertakes a business activity (the manager).

[24] Musharakah is a partnership whereby all the partners contribute capital in cash or in-kind for a business venture.

[25] Ijarah is a lease contract whereby one party leases the usufruct of a specified asset to another for a specific rent and period.

[26] Sadaqah is voluntary charitable donations aimed at supporting vulnerable populations.

[27] Qard hasan refers to benevolent loans with zero-interest, provided to individuals in need.

[28] Cash waqf is a form of waqf based on cash contributions instead of immovable assets such as land and real-estate property.

[29] Some institutions may charge a nominal service fee on qard hasan loans, though this is a point of debate in terms of compliance with zero-interest requirements.

[30] Since zakat can be distributed directly to beneficiaries, accurately estimating its scale and impact presents significant challenges (OECD, 2020[5]). Furthermore, the estimated potential of zakat varies significantly due to differing assumptions about the percentage of gross domestic product (GDP) used in calculations. This variation stems from the complexity of estimating zakat, which is closely tied to challenges in estimating total wealth. Key factors contributing to this complexity include debates over defining *zakatable* assets in today's intricate financial system (e.g. corporate zakat, financial securities, cryptocurrencies), alongside traditional assets subject to zakat, such as agricultural products, livestock, gold and silver. Existing literature offers a broad range of theoretical and empirical studies on zakat estimation, many of which rely on GDP-based calculations. Prominent methodologies suggest that zakat's potential lies between 1% and 4.3% of GDP (Shaikh and Ahmed, 2019[106]).

[31] Different from zakat, sadaqah and infaq are on a voluntary basis. Sadaqah encompasses charitable acts in a broad sense and does not necessarily involve material or financial contributions, whereas infaq, meaning "spending," typically refers to material or financial donations to others. The term Zakat, Infaq, Sadaqah (ZIS) combines these obligatory and voluntary forms of giving. In Indonesia, ZIS funds, which pool these contributions, are managed by BAZNAS.

[32] Zakat is subject to strict annual distribution rules, with funds limited to some beneficiary categories defined in the Qur'an, notably focusing on the lowest-income households. The definition of Waqf is more flexible and allows broader use, including for sectors such as education, health and infrastructure (Ismail and Shaikh, 2017[90]).

[33] Blended finance refers to the strategic use of development finance to attract additional sources of funding, primarily from commercial investors, to support the achievement of the SDGs in developing countries (OECD, 2018[109]).

[34] Abu Dhabi Fund for Development, Gates Foundation, King Salman Humanitarian and Relief Centre, Qatar Fund for Development (LLF, 2022[80]).

[35] Murabaha is a sale contract whereby one party sells a particular asset on a selling price which is the sum of the cost price and an agreed profit margin.

[36] Line of credit is a form of flexible loan, generating financing of flexible amount of credit up to a certain limit instead of a fixed lump-sum amount.

[37] Asset-backed sukuk and asset-based sukuk constitute the two major groups of sukuk in IF capital markets. They differ in the legal ownership transfer of underlying assets and the role of assets as source of repayment.

[38] AAOIFI and IFSB have issued before a joint guidance on Shariah governance (AAOIFI and IFSB, 2023[107]).

[39] Published by the Statistical, Economic and Social Research and Training Centre for Islamic Countries (SESRIC).

[40] Musharakah is a partnership whereby all the partners contribute capital in cash or in-kind for a business venture.

[41] Mudharabah is a limited partnership whereby one partner (the capital owner) provides capital and the other partner undertakes a business activity (the manager).

4. Results-based finance (RBF) in the water sector: Use, rationale and conditions for success

Results-based finance (RBF), which links financial rewards or penalties to a set of pre-agreed results has been deployed across the water sector, from rural sanitation to stormwater management, with successful outcomes, demonstrating that the instrument can effectively lead to results. Typically, RBF models achieve results by disrupting “business-as-usual”, whether by incentivising organisations to increase service levels (increasing coverage rates in hard-to-reach areas or improving quality of services) or to adopt innovative technologies and operational processes. However, there is limited data on the costs of designing and managing RBF projects. Future efforts should pull evidence on the cost-effectiveness of RBF schemes and develop guidance on when and how to deploy RBF most effectively.

Key messages

- **Results-based finance (RBF) links financial rewards or penalties to a set of pre-agreed results**. It can be appealing to funders looking to maximize impact and value for money.
- **RBF has been deployed for results across the water sector, from rural sanitation to stormwater management**, with successful outcomes.
- **RBF can be embedded in grant and repayable finance mechanisms and has been used in contracts with private service providers as well as public sector organisations**.
- **Whilst initial RBF models focused on rewarding output-level results**, such as the number of water supply connections, there has been a **gradual integration of outcome-level results** relating to services' viability and effectiveness.
- **RBF seeks to achieve results by disrupting "business-as-usual", whether by incentivising organisations to increase service levels** (increasing coverage rates in hard-to-reach areas or improving quality of services) **or to adopt innovative environmentally responsive technologies and operational processes**. RBF can also be used to **incentivise institutional reforms**, which requires strong organisational buy-in.
- **The introduction of RBF models should be carefully assessed against potential limitations and challenges, which include**: (i) design and implementation costs (particularly for setting commonly agreed performance metrics and for the verification agent); (ii): the capacity of funding recipients, which may require providing them with technical assistance to mitigate the risks of failure; (iii) the risk of service providers' relying on results-based grants rather than identifying opportunities for efficiencies and more stable sources of funds; (iv) replicability at scale: few large-scale development finance organisations have adopted results-based contracting, limiting the adoption of this funding modality at scale.
- **Funding facilities that have adopted results-based payment structures**, such as the Uptime Catalyst Facility, **offer the opportunity to pool funding from different sources and could help overcome funders' internal barriers to RBF**. Indeed, most of the institutions that have implemented RBF mechanisms have set up pilots within specific projects, without adopting RBF as institutionalised financing instruments (as procedures differ from standard processes). Dedicated financing facilities with established, standardised procedures could facilitate broader adoption of RBF mechanisms.

4.1. Introduction

Results-based finance (RBF) refers to a variety of instruments linking financial rewards and/or penalties to the achievement of pre-agreed results. RBF mechanisms are set in contracts between funders and funding recipients that typically feature the following components:

- Clearly defined targets for agreed results.
- A payment structure for each specific result.
- Independent verification of the achieved results prior to payment release.

RBF appears increasingly relevant considering emerging funders' priorities and profiles. The focus of RBF tools on results with payment triggers strictly attached to their achievement can appeal to public

funders facing budget constraints and seeking value for money. RBF can also be attractive for private impact investors, increasingly interested in water-related investments and keen to see financial as well as social and environmental returns. Innovative RBF instruments are emerging, such as SLBs, which tie the cost of capital to the achievement of pre-agreed results (ICMA, 2024[1]).[1]

Such instruments could potentially help tackle water sector challenges. Globally, 400 million people lack access to improved water supply and nearly one billion lack improved sanitation (WHO, 2022[2]). In addition to access to services, the water sector is confronted with the challenges of long-term viability, inclusion and resilience. Far too often, investments in infrastructure provision do not lead to viable services. In many countries, wastewater treatment plants are under-utilised, due to limited sewerage connections, resulting in plants severely under-performing (Kennedy-Walker et al., 2020[3]). Investments in urban water supplies are wasted in leaking pipes as many cities and utilities lack capacity and incentives for asset maintenance. A study estimates that up to 346 million cubic meters of water are lost daily, representing a financial loss of USD 39 billion every year (Liemberger and Wyatt, 2018[4]). In some regions, rural water infrastructure is at an even greater risk of failure, with water systems sometimes left for non-professional groups to manage (Kativhu et al., 2022[5]). In addition, in some countries, services' expansion has mostly benefited the more well-off and more densely populated areas, leaving pockets of peri-urban and rural populations under-served (Mitlin et al., 2019[6]). Environmental changes only exacerbate these challenges, as it increases the risks of service failure through the impact of droughts and flooding events.

This chapter examines the use of RBF contracts in the water sector for improving the durability, efficiency and impact of water-related investments. It first analyses the extent of the use of RBF for water-related results, noting an emerging focus on rewarding services' performance improvements and the different types of funding instruments embedding the RBF element. The chapter then presents how RBF has been deployed to incentivise changes within organisations' *modus operandi* for greater impacts at service level. Finally, this chapter draws lessons on conditions of success of RBF schemes.

Findings in this chapter build on eight selected case studies of RBF initiatives for water-related investments. These initiatives include one-off RBF contracts and dedicated funding facilities deploying multiple RBF contracts simultaneously. The choice of case studies was guided by their scope (geography, sector and funding instrument), but also the availability of documentation. This chapter has been prepared based on a literature review and some complementary interviews. Authors did not access independent evaluation reports of these initiatives. As there is limited data on the costs of designing and implementing RBF projects, this chapter focuses on their design features and outcomes at organisational and service delivery level.

4.2. How is results-based finance applied in the water sector

This section is an overview of selected results-based finance initiatives implemented in the water sector in recent years. It presents their main characteristics, including the type of outcomes those initiatives set to achieve as well as their funding structure.

4.2.1. RBF for a range of outcomes, with an emerging focus on services' performance

RBF has been deployed to deliver results across the water sector, from rural sanitation to stormwater management. Table 4.1 presents a selection of RBF programmes implemented globally. These programmes are initiated and managed by different types of funders and implementers, including IFIs, foundations, private impact investors, NGOs and utilities. Recipients of RBF are central governments themselves, utilities, SMEs as well as NGOs.

Table 4.1. RBF projects and initiatives related to water and sanitation discussed in this chapter

Project/initiative Sub-sector - country	Funder	Fund manager	Implementer	Results/payment triggers (selected)
Programme for-Results (PforR) Rural sanitation - Egypt	World Bank (IBRD)	World Bank	Government of Egypt	New household wastewater connections Improved operating ratios of public utilities Adoption of a National Rural Sanitation Strategy
Urban Water Catalyst Initiative (UWCI) Urban water - Global	Bilateral donors,	Urban Water Catalyst Initiative Turnaround Facility	Selected utilities	Utility KPIs (selected on a case-by-case basis)
Development Impact Bond (DIB) Rural sanitation - Cambodia	USAID[2]	Stone Family Foundation	iDE	Number of toilets installed
Results-based loan programme for water utilities Urban utilities - Kenya	Bilateral donors, philanthropies	Aqua for All	Selected utilities	Non-Revenue water Energy efficiency Metered connections
Social Impact Incentives (SIINC)/Impact-linked Financed (ILF) Water & sanitation - Global	Bilateral donors, philanthropies	Aqua for All/ Roots of Impact	Local SMEs	Increase in household connections in designated areas
Uptime Global/Uptime Catalyst Facility (UCF)) Rural water - Global	Bilateral donors, philanthropies (via Uptime Global)	Uptime Catalyst Facility	Selected rural water service providers	Waterpoint uptime (uninterrupted service) Volume of water sold Revenue generated
OBA for sanitation Urban sanitation- Ghana	World Bank	GPRBA	Service providers	Number of toilets constructed
Environmental Impact Bond Stormwater – US	Goldman Sachs and Calvert Impact Capital	N/A	District of Columbia Water and Sewer Authority (DC Water)	Reduction in stormwater runoff

These RBF contracts set two broad types of objectives, which can be categorised as follows:

1. **Increase access to infrastructure**: this type of results is measured by indicators on the availability of the infrastructure at one point in time. Typical indicators include the number of water and sewerage connections, or the number of toilets installed; and
2. **Improve service performance:** this type of results is measured by metrics related to operational and financial performance, such as Non-revenue Water (NRW), stormwater runoff, treatment efficiency, metered and working connections. In some cases, improving services' performance may also require intermediary results, such as organisational changes, measured through the adoption of new tools (e.g. business plans, sector strategy), or procedures and technologies.

Initial RBF contracts only focused on the availability of infrastructure. In Accra (Ghana), the Global Partnership for Results-based Aid (GPRBA) programme for urban sanitation focused on the number of toilets constructed.[3] The programme was initiated in 2014 at a time when the Government of Ghana started to embrace non-sewered sanitation as a potential technology for densely populated areas. The output-based payment, amounting to 70% of the total toilet cost was introduced to incentivise service providers promoting the technology and to reduce the cost of purchase for households. In total, an estimated 70 000 toilets were constructed in Accra using a similar approach since 2014 (GPRBA, 2021[7]).

More recent initiatives continue to focus on infrastructure development. Aqua for All's impact-linked finance portfolio, for example, provides grants to selected water utilities for developing piped water services in harder-to-reach rural areas. The impact-linked finance instrument deploys outcome-based grants to

reward enterprises for achieving additional social impacts, including water connections (Aqua for All, 2024[8]).

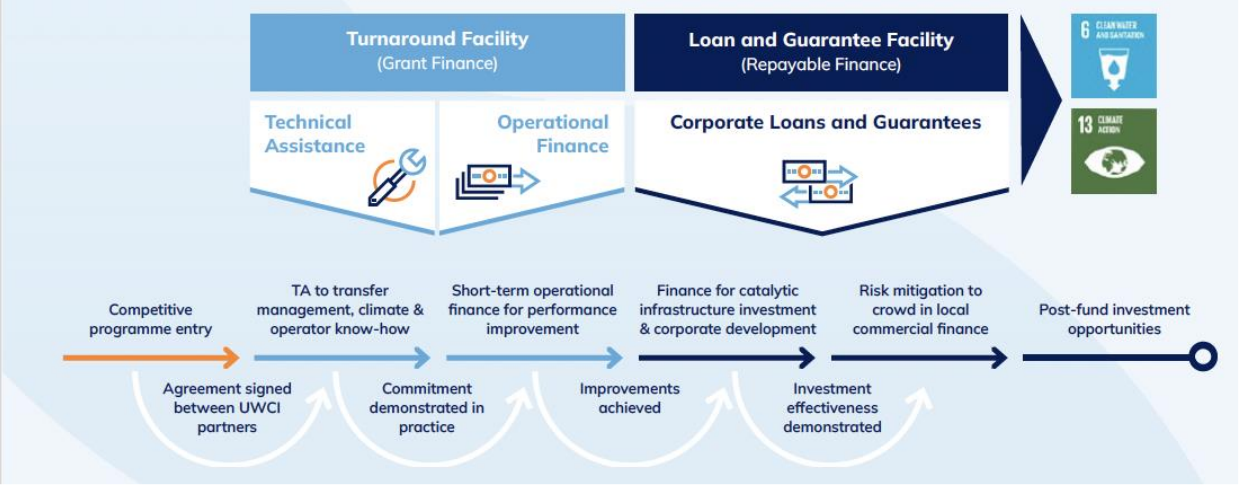
In addition, recognising the challenges of services durability, funders are increasingly using RBF to incentivise improved water service performance beyond the delivery of infrastructure. The World Bank rural sanitation "Programme for Results (PforR)" in Egypt combines payment triggers for infrastructure delivery, organisational development and improved service performance. The USD 1.15 billion programme has been running since 2015 with USD 550 million financing from the World Bank with a specific focus on the development of wastewater services in rural areas. World Bank financing is delivered on achievement of results measured by so-called "Disbursement-Linked Indicators (DLIs)" that were pre-agreed with the government. These **payment triggers combine results at institutional level** (for example, the approval of a revised strategy for rural sanitation), **organisational level** (for example, the operating ratio of local Water and Sanitation Companies or WSCs) and **infrastructure coverage** (World Bank, 2018[9]).

The adoption of services' performance as a payment trigger requires more complex metrics to measure results. Uptime Global was set up in 2020 to address the lack of durability in rural water services provision, with a focus on the most vulnerable**.** Uptime provides quarterly results-based grants to selected service providers operating in rural areas on the **condition that infrastructure is functioning for at least 96% of the time**. Payments are made retroactively on the basis of verified results, based on volume of water sold and sales revenue (see Box 4.5). In 2024, Uptime introduced additional results-based payments related to **water safety and water quality metrics**. As of 2025, Uptime estimates that more than 5 million people in 16 countries benefit from safe and reliable water services delivered through results-based contracts (Uptime Global, 2024[10]).

Some RBF mechanisms involve strategic partnerships to enable access to various sources of financing and build capacity towards results. Aqua for All, for example, initiated in 2025 a three-year RBF programme with the Kenyan bank Co-op Bank and the international NGO Water.org to support investments in efficiency improvement for public utilities targeting NRW reduction, energy cost saving (solarization and efficient pumps), metering and last mile connectivity. According to the programme concept, such improvements require small operational capital of around KES 50 million/USD 385 000. Aqua for All has secured Co-op Bank's participation for the provision of commercial loans to eligible utilities, and up to 15 utilities will receive technical assistance from Water.org to prepare loan proposals. Aqua for All will disburse results-based grants to eligible utilities capped at 25% of the principal loan. The payment to utilities is conditional on achieving their pre-agreed outcome targets and full repayment of the loan. Co-op Bank has committed to disburse USD 3.85 million in loans to selected utilities, whilst Aqua for All will disburse a total of USD 825 000 in results-based grants and Water.org will provide USD 257 000 in technical assistance.

The Urban Water Catalyst Initiative (UWCI) launched in 2025 is also a partnership set-up to **improve operational and financial performance of selected urban water utilities and enable them to access repayable finance**. The programme, supported by the German and Dutch cooperation and the EU, has a two-stage approach. It first addresses the technical and financial performance of eligible utilities through Water Operator Partnerships (WOPs). Provided that utilities meet performance improvement targets, they can also benefit from repayable finance at attractive terms, enabled by a loan and guarantee facility. The second phase of the programme still relies on development finance (with loans and guarantees provided by KfW, the European Commission and other interested financial institutions), while increasingly positioning development finance in a catalytic role to mobilise local finance – including local currency lending – through the provision of guarantees (UWCI, 2025[11]). The main rationale for the programme is **to better link finance** (especially development finance) **to performance and durability of service provision**, **measured through utility KPIs such as NRW, working ratio and energy efficiency.**

Figure 4.1. Urban Water Catalyst Initiative – a programme to incentivise operational and financial performance and unlock finance

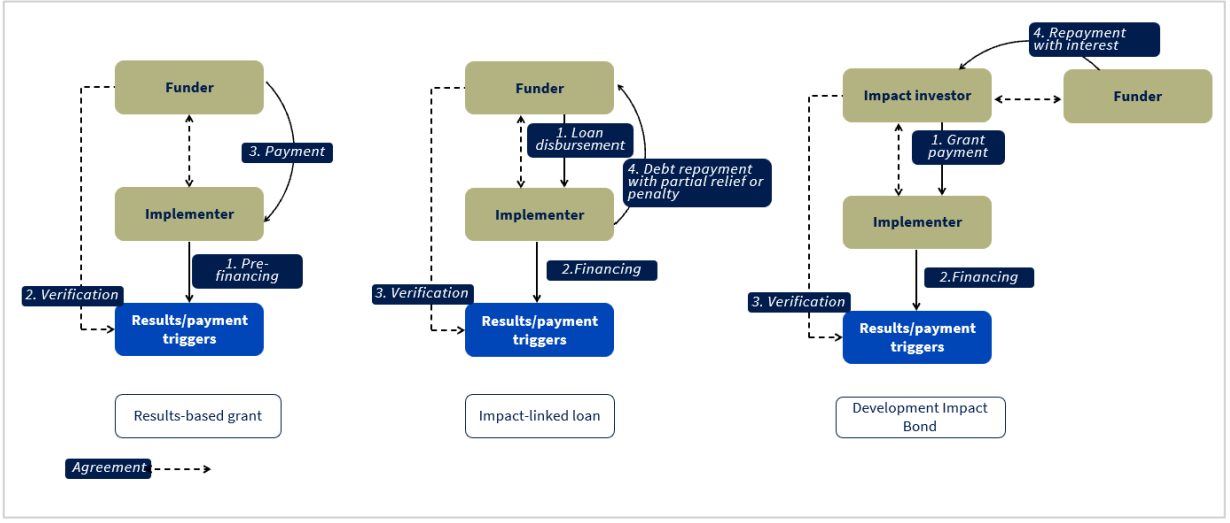


Source: (UWCI, 2025[11]).

4.2.2. RBF embedded in grants and repayable finance to shift some risks onto implementers

RBF initiatives have various funding structures, channelling either grants or repayable finance (or both) to implementers (or funding recipients). Figure 4.2 presents some examples of RBF structures. A common RBF structure is the **results-based grant model**, which was initiated by the World Bank GPRBA. In this model, the results-based grant is simply delivered upon achievement of pre-agreed results, as verified by an external agent. In recent years, more sophisticated structures of RBF have emerged. For example, in the **impact-linked loan model shown** below, the results-based element takes the form of a partial debt relief if pre-agreed results are achieved, or a penalty (additional payment due) if results are not achieved. In the **Development Impact Bond structure**, an additional funder is introduced (the impact investor), who will provide a typical grant but will be repaid with interest (in the form of "outcome/performance-based bond") if the implementer succeeds in achieving the pre-defined results.

Figure 4.2. Selected RBF funding channels and instruments



A common characteristic of several RBF structures is to shift some financial risks to the implementer. This is the case, for example, of Uptime which only pays service providers *after* results have been achieved and confirmed. It therefore shifts the financial risks on the service providers, who face the prospect of implementation costs not being recovered if pre-agreed results are not achieved. Such a funding structure requires service providers to have the capacity to deploy funding for these investments and operations upfront.

Shifting this risk to service providers and requiring them to fund all investments upfront can limit the deployment of RBF at scale. The Development Impact Bond (DIB) designed to increase the uptake of sanitation facilities in Cambodia sought to address this limitation of RBF instruments, whilst retaining a focus on results. Unlike in a typical RBF structure, service providers do not pre-fund investments and operations. Initial funding is provided by the impact investor who only recovers the investment from an "outcome funder" after results are achieved. **In a DIB, impact investors, rather than service providers, bear the bulk of financial risks** (See Box 4.1).

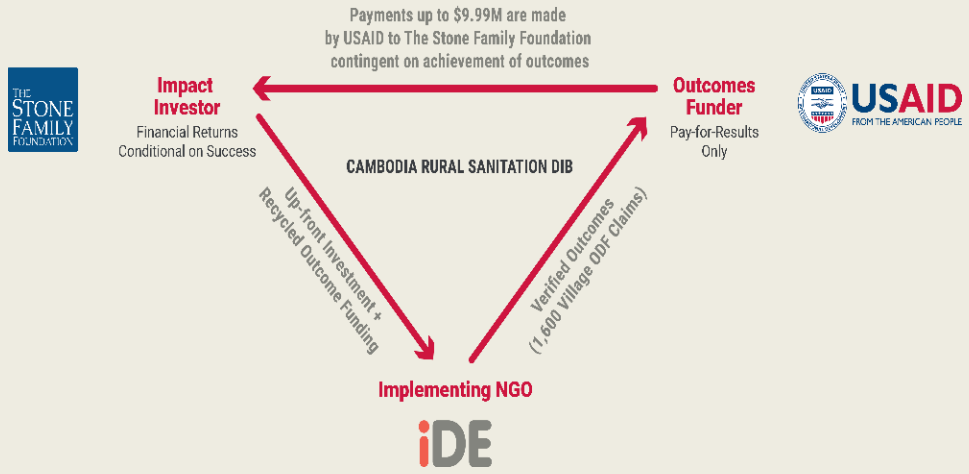
Box 4.1. What are Development Impact Bonds (DIB) and how they work

DIBs are a spin-off from Social Impact Bonds (SIBs). SIBs are performance-based financing mechanisms in which the ultimate funder (outcome payer) only disburses funds based on the achievement of pre-agreed outputs and/or outcomes related to a social intervention. Unlike earlier performance-based financing structures with an outcome funder and a service provider, SIBs involve an additional, intermediary funder. This intermediary funder (the impact investor) provides upfront capital to the service providers. If and when intended results are achieved, the impact investor recoups its investment (with interest) from the outcome payer. The major benefit of the model is the availability of capital for service providers. Specific outputs/outcomes are pre-agreed and targeted at the design stage, and pre-funding to service providers is made available. Service providers do not have to concern themselves with building the initial working capital, as is often required in more classic results-based schemes.

The DIB in Cambodia is the first globally for sanitation and for WASH in general. It involved four main actors (see Figure 4.3):

- The Stone Family Foundation (SFF) provided the upfront working capital, which enables the service provider iDE to plan securely all required activities.
- iDE provided service provision expertise.
- USAID[4] provided outcome funding (up to USD 10 million worth of outcome-based payments), which included a return on investment (premium) for the impact funder and therefore an incentive for the investor (SFF).
- The government of Cambodia is the verification agent.

Figure 4.3. Cambodia rural sanitation DIB funding structure



Source: (Stone Family Foundation, iDE & USAID, 2019[12]).

The programme aimed to ensure that 1 600 villages in six Cambodian provinces were open-defecation-free through the adoption of low-cost toilet facilities. In addition to reaching impact, the project aimed to serve as a demonstration project for DIBs for water and sanitation. By the end of 2023, the DIB outperformed its initial targets with over 1 700 villages declared open-defecation-free.

Source: (Stone Family Foundation, iDE & USAID, 2019[12]).

RBF can also be embedded in impact-linked loans or bonds in a manner that incentivises borrowers through debt repayment terms. Examples of this use of RBF in the water sector include:

- The NGO Aqua for All's loan product, which interest and principal repayment may be reduced if the borrower achieves pre-agreed targets; and
- The Environmental Impact Bond (EIB) with the public utility DC Water, which has to adopt green infrastructure for stormwater management (US EPA, 2017[13]) (see Box 4.2).

Box 4.2. The results-based element in the Environmental Impact Bond for stormwater management

In 2016, the public utility DC Water issued an Environmental Impact Bond (EIB) to finance green infrastructure aimed at reducing stormwater runoff and mitigating combined sewer overflows. The USD 25 million tax-exempt bond, purchased by Goldman Sachs Urban Investment Group and Calvert Impact Capital, introduced a **Pay-for-Success model, linking investor returns to the actual effectiveness of green infrastructure in stormwater retention.** The project implemented 20 acres of green infrastructure, including bioretention rain gardens, permeable pavements and green parks in the Rock Creek sewershed. Performance was independently monitored, with financial payouts contingent on runoff reduction levels. The payment was structured to overcome DC Water's reluctance to invest in green infrastructure: the city was already heavily investing in grey infrastructure and there was limited evidence of the effectiveness of green solutions. Transaction advisors estimated a range of runoff reduction (between 18.6% and 41.3%), above which DC Water would pay investors a USD 3.3 million bonus. If the green infrastructure underperformed (below 18.6%) it would trigger a USD 3.3 million payment to DC Water. If the reduction was within the expected range, no additional payment was made. Results showed a nearly 20% reduction, within the expected range, demonstrating the viability of green infrastructure for urban stormwater management, without financial losses to any party.

Source: (World Water Council, 2022[14]; US EPA, 2017[13]).

4.3. Results-based finance as a lever of change

RBF is typically introduced to disrupt "business as usual" and incentivise shifts in funding recipients' *modus operandi* for greater impacts. Using reward and/or penalty mechanisms, RBF seeks to generate greater ownership of the process and buy-in for the pre-agreed results, critical to secure the achievement of desired outcomes. Drawing on the case studies, this section examines the different pathways to change RBF have introduced for achieving greater results at service delivery level.

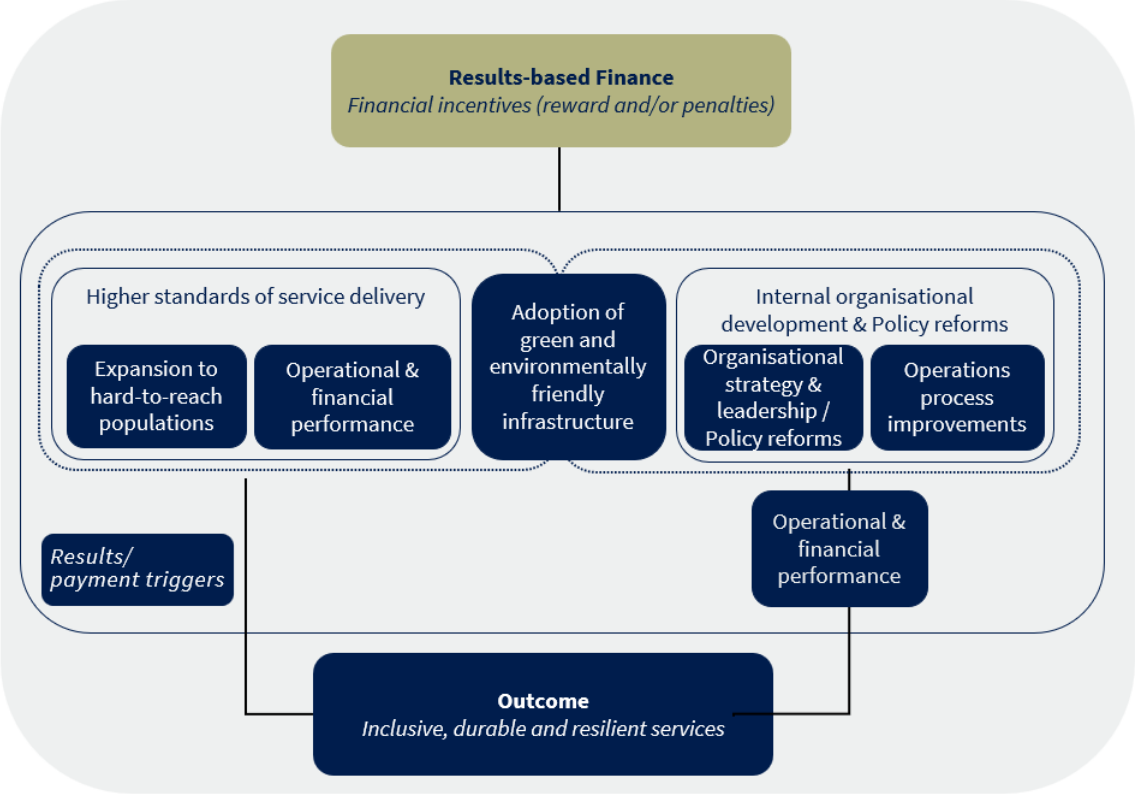
4.3.1. RBF to disrupt business as usual

RBF instruments have been used to incentivise three broad types of changes within organisations:

- Internal **organisational development and/or policy reforms**, as demonstrated by institutional reforms at government level and the adoption of improved organisational processes at corporate level.
- The delivery of **higher standards of services**, as evidenced by the expansion of services to underserved areas and the achievement of higher performance indicators.
- The adoption of **green infrastructure**.

For some organisations, results are first expected at the organisational level – without which service level results will not be achieved (see Figure 4.4). In the case of better performing organisations, significant changes at the organisational level may not be required, but RBF are introduced to stimulate higher impacts, more challenging to achieve and representing a shift in the way the organisation would "normally" operate. These three types of changes are further discussed below.

Figure 4.4. Different pathways to disrupt "business as usual" and enable greater impact



4.3.2. Internal organisational development and policy reforms

One main objective of RBF schemes has been to incentivise organisational development and/or policy reforms, including at the level of government institutional systems, in order to improve the delivery of water and sanitation services. The PforR instrument of the World Bank is an example of RBF introduced to incentivise governments' system change. The instrument is designed to build capacity within country recipients and enhance the effectiveness, efficiency and sustainability of results. Unlike other World Bank instruments, PforR uses countries' own institutions and processes for project implementation, linking the disbursement of funds directly to the achievement of specific programme results. The World Bank and the government agree on disbursement-linked indicators, which can relate to service delivery, institutional reforms or any other intermediary results. As the programme builds around government systems, it offers the opportunity of co-funding and therefore leverages partnerships with other funders. The rural sanitation programme in Egypt illustrates the rationale for using the RBF instrument when a whole government system change is required (see Box 4.3).

Box 4.3. The government system's change under the rural sanitation programme in Egypt

In Egypt, the PforR for rural sanitation was introduced following previous traditional project lending that failed to deliver the expected services. This experience showed that planning for infrastructure alone was not sufficient: by the end of the project, although wastewater networks had been laid, wastewater treatment plants (WWTPs) were not operational, with beneficiaries lacking access to the full chain of services.

The PforR set to address these issues by strengthening government systems for stronger impacts at the service level. The PforR built on the national sanitation programme and identified all intermediary steps that were missing for effective service delivery. Discussions between the World Bank and the government established the disbursement-linked indicators, which would incentivise the implementation of reforms and accelerate the achievement of results. Such intermediary indicators included, among others, the introduction of a sanitation strategy (setting clear goals, targets and strategic measures for the sector) and land acquisition (to avoid construction delays) in addition to KPIs on utility performance. By 2023, when the first phase came to a close, the programme had achieved all expected results, both in terms of improving government systems and service levels (see Table 4.2).

Table 4.2. Results achieved under Phase 1 the Egypt PforR (2015-2023)

Government systems level	Service level
• National rural sanitation strategy adopted to provide clear objectives and strategic directions • Standard Operating Procedures (SOPs) for land acquisition approved to streamline the process for future infrastructure expansion • Sector monitoring system in place through the Egyptian Water Regulatory Agency (EWRA), with annual performance reports published on rural sanitation	• 167 000 new household connections to working sanitation systems have been established across the governorates of Beheira, Dakahliya and Sharkiya • 833 000 people with improved sanitation services across the service chain • 10% of the new household connections established in satellite areas, which are remote and underserved populations

RBF has also been deployed to incentivise changes at utilities' organisational level. Among the case studies, the UWCI has a strong focus on utilities' performance improvement, which can require significant organisational changes, such as leadership development, business planning, processes and procedures for asset maintenance as well as efficient human resources policy. In the first phases of the programme, the UWCI intends to provide technical assistance to partner utilities to build their capacities in these areas through Water Operator Partnerships (WOPs). Participating utilities will be able to access finance from the Facility only when deemed to have made significant improvements, as reflected in their financial performance. The PforR in Egypt also includes measures (and payment triggers) related to Water and Sewerage Companies' performance (measured by their operating ratios).

4.3.3. Higher standards of service levels

For many funders, reaching remote areas and populations is the main outcome expected through the RBF model. The rural sanitation DIB in Cambodia and the Ghana's output-based aid for urban sanitation, for example, were designed to incentivise service providers to enter markets they would not necessarily consider because of perceived risks. The results-based feature of the grant acted as an incentive for service providers to accelerate the pace of services' uptake. In Cambodia, the NGO iDE who was the funding recipient of the DIB was already involved in rural sanitation provision and had significant hands-on experience with "selling" sanitation. The RBF project was designed for iDE to use this experience in remote areas where open defecation was high. Aqua for All also entered into an RBF contract in

Cambodia to enable poorer or more remote communities to benefit from services from an operator that was already well-performing (see Box 4.4).

Box 4.4. Aqua for All's contract to incentivise utility services' expansion in hard-to-reach areas

Aqua for All implements an RBF programme (referred to as "ILF for WASH" or SIINC) that provides **grants in the form of Social Impact Incentives** (or SIINC) **to impactful SMEs**. In 2020, the water enterprise Khmer Water Supply Holding (KWSH) entered into an agreement with Aqua for All for a SIINC. At signing, KWSH already offered clean and affordable water services to about 12 000 (semi) rural households, demonstrating a strong capacity for impact. It had already acquired and upgraded five license areas (areas where the provider has the license to operate). Due to higher investment costs, more difficult-to-reach and often poorer households and areas were in some cases left behind. The SIINC for WASH was **designed to encourage and reward the enterprise for going the extra impact mile**. This is measured through two metrics that incentivise KWSH to create additional impact: (i) **percentage of connected households** and (ii) **additionality level of new license areas**. The second metric aims to steer KWSH's decision to acquire stations in the next three years, where their intervention would have deeper impact. The extent of new license areas' impact is assessed using three criteria: i) **percentage of poor households**; ii) **coverage rate** (expressed in percentage); and iii) **percentage of people with access to clean water**. SIINC for WASH only rewards **medium and high additionality areas**. In total, the transaction involved EUR 350 000 in impact-linked funding (non-repayable) over three years, with impact verification scheduled every 12 months.

Source: (Aqua for All, 2024[8]).

Whilst all RBF initiatives target the improvement of services, some put particular emphasis on increasing the quality of services, with the disbursement of funds linked to the achievement of specified standards. Uptime for example, was set-up to incentivise professional service delivery models and address the lack of lasting water services in rural areas. Its results-based contracts with selected service providers include key performance indicators, in addition to incentives for improving revenue collection. Box 4.5 illustrates the Uptime's model based on one of its contractors' experiences, UDUMA, a rural water operator. Additional revenues generated through the RBF agreements incentivise the operator to maintain reliable service levels in vulnerable communities where revenue collection may be below cost recovery.

Box 4.5. Rewarding performance for higher service levels and the viability of services: Uduma and the Uptime Catalyst Facility

Uptime designs and executes results-based grants to selected operators based on performance data related to **water systems' "uptime"** (referring to the continuity of services), the volume of water sold, and revenue collected by rural water operators. The model was **designed to address the lack of lasting rural water services**, in the context of poor capacity to pay by vulnerable populations and lack of access to predictable funding.

UDUMA is a private company specialised in water services operating in four countries in Africa. It mainly operates under lease contracts with governments for the management of standpipes and water connections in rural and small-town water systems. The company has a results-based contract agreement with the Uptime Catalyst Facility for 38 water points in Burkina Faso and 272 water points in Mali.

The grant amount disbursed by Uptime is determined every quarter based on the performance of each water point. The payment comprises:

- A "**results payment**" or a top-up on the revenues from water sales for each water point that is functional 96% of the time: for water systems using a flat fee, UDUMA receives up to USD 50 per water point, minus local revenue collected; for systems using a volumetric tariff, UDUMA receives up to USD 0.50 per m³ of water sold.
- A "**revenue-match payment**": UDUMA gets an additional 50% of the local revenue collected to encourage cost recovery.

Such results-based grants provide strong incentives for operators such as UDUMA to enter markets where operating rural water systems requires some subsidies and to ensure water systems offer continuous services. At the same time, the matching payment based on revenue incentivises operators to continue to seek revenues from sales rather than relying on grants only.

Source: *Interview with UDUMA,* (UDUMA, 2025[15]).

4.3.4. Adoption of green and environmentally friendly infrastructure

RBF has also been used to incentivise the adoption of greener and environmentally friendly technologies, which service providers are not always able or willing to prioritise. DC Water's Environment Impact Bond is a case in point. When the bond was designed, DC Water was already implementing a USD 2.6 billion grey infrastructure project to control sewer overflow. This mega project was a response to intense rainfalls, which have led to combined sewer systems overflowing into river ways – an estimated 2 billion gallons of raw sewage was dumped into river ways each year. The Environmental Impact Bond set up a results-based financing structure to test an alternative and complementary flood management system via green infrastructure. As DC Water was reluctant to invest in the green infrastructure, the bond (the first of its kind in the US) was structured such that DC Water would incur an additional one-time payment to investors if the reduction in the runoff was better than anticipated (contributing to sewer overflow reduction); or if the green infrastructure performed less, with greater runoff, then DC Water would receive a one-off payment from investors.

4.4. Making results-based finance work: conditions for success

RBF schemes have the potential to enhance the results deriving from investments in the water sector, but they also come with limitations and implementation challenges. These include:

- **Costs:** RBF contracts can be costly to design and manage as resources are required to identify results that will be payment triggers and to structure the associated financial reward (or penalty). The success of RBF schemes is also dependent on setting up adequate performance verification mechanisms, which come with an additional cost.
- **Higher risks for implementers (funding recipients):** In most RBF contracts, payments are strictly linked to the achievement of results, which may put service providers in a difficult financial position and in turn affect project implementation. In addition, as discussed above, RBF can be used to incentivise significant changes at the organisational level, which implementers may not be ready for.
- **Perverse incentives:** Where grants are provided to service providers (for example, for serving remote areas), RBF risk creating a dependency on external funding rather than more stable sources of funds (for example, tariffs).
- **Performance data management:** With funding dependent on results, only reliable performance data management systems (from reporting to verification) provide credibility to RBF initiatives. This requires strong capacity and data management systems on both the funder and implementation side.

Funders considering the use of RBF should take these limitations and challenges into account and put appropriate mitigation measures in place from the project preparation stage. Examples of such measures are provided below.

4.4.1. Project preparation: consulting and building on experience

RBF are partnerships between funders and implementers and require a collaborative effort from the project preparation stage for setting ambitious yet achievable targets. During the project preparation stage, funders can assess, in consultation with the implementer, all the risks involved together with potential mitigation measures. These consultations should lead to a consensus on (i) the level of results to be achieved and potential intermediary results, striking the balance between ambition and the risk of non-achievement, (ii) the funding amount and (iii) the level of flexibility of the agreement in case of unforeseen events.

Where RBF models build on an established partnership between donors and implementing agencies, achieving this balance is generally more straightforward. This is the case of the World Bank PforR in Egypt, the Development Impact Bond for rural sanitation in Cambodia and the Urban Water Catalyst Initiative, for example. Previous experience between stakeholders can be a stepping stone for the development of results-focused programmes and can facilitate a common understanding of the results to be achieved, of potential challenges and of any intermediary results that should also be considered.

4.4.2. Providing technical assistance where needed

Given that payments are conditioned on verified results, thereby imposing substantial performance and financial risks on implementers, their effective deployment may necessitate robust technical assistance mechanisms. In the case of the PforR in Egypt, the World Bank provided technical assistance to the government for carrying out the necessary reforms. Technical assistance was funded through the Global Water Security and Sanitation Partnership (GWSP), which enabled the government to meet expected results at government systems levels. Aqua for All has also embedded technical assistance

strategy in several of its results-based grants and lending programmes. The results-based loan programme for water utilities in Kenya, for example, includes a technical assistance activity for project preparation and business case development (provided by Water.org), to enable utilities access loans. Similarly, as mentioned above, the UWCI has integrated technical assistance in the first phase of utilities' participation to strengthen their operations and financial capacities.

4.4.3. Addressing risks of perverse incentives in results-based grants

RBF models can address the risk of substituting more stable sources of funds for grants.

- First, funders can restrict the use of RBF to selected geographies, where alternative sources of funding are difficult to secure due to affordability constraints. This requires funders to screen geographies and clearly identify targeted areas.
- Second, RBF can embed specific measures to incentivise financial performance, in addition to service coverage or quality. Uptime, for instance, derives its results-based disbursements from water-sales revenue reported by service providers, with grant amounts scaled proportionally to the level of revenue generated. Rather than substituting for water sales income, Uptime rewards the generation of higher revenues (Uptime Global, 2024[10]).

In the case of Aqua for All's results-based grant programme, eligible funding recipients are private entities that have the capacity to access repayable finance. The impact-linked grant is linked to the achievement of results creating additional impact, for example by reaching customers who would not otherwise be served.

4.4.4. Strengthening the results verification process

The credibility of RBF approaches is fundamentally determined by the rigor of their results-verification processes, starting with the precise setting of performance measures. Some RBF schemes have set sophisticated results indicators, requiring high level expertise for establishing the baseline, measuring and rewarding improvements. The Environmental Impact Bond for stormwater management through green infrastructure (DC), for example, required hydraulic engineering to set the baseline and establish measures of payment triggers. DC Water monitored rainfall and sewer flow for 12 months in the specific areas where the green infrastructure was to be installed. The analysis allowed DC Water to estimate the baseline (current amount of stormwater runoff) and then estimate the performance of the green infrastructure (in terms of reduction of stormwater runoff).

The adoption of outcome-level indicators as payment triggers can be a challenge for measuring performance. As shown in this chapter, several schemes aim to achieve improved services' performance, which may be more difficult to measure compared with output-level indicators (for example, access to infrastructure). For instance, Uptime monitors data provided by more than a dozen service providers reporting on thousands of water points. To address this challenge, Uptime has set-up a comprehensive data integrity process, combining quarterly validation of reporting from service providers, annual onsite verification (site visits) and a virtual data audit to identify anomalies. Minor anomalies are addressed directly with service providers, while major data concerns may lead to penalties or potential contract suspension (see Box 4.6).

Box 4.6. Uptime data management system

Uptime's data system underpins its results-based contracting mechanism. Uptime ties financial disbursements to objectively verified service results, reducing the risk of inefficient spending.

The methodology integrates (i) quarterly validation of results submitted by service providers, including automated anomaly detection, and (ii) annual virtual and on-site verification (audit and site visits).

Data audits and site visits verify service reliability, volumes of water distributed and revenue collected, with major discrepancies leading to financial penalties or withholding of payments. Uptime has also introduced onsite verification of water safety metrics, including sanitary inspections, microbiological and chemical testing, thereby expanding verification beyond infrastructure reliability.

Source: (Armstrong et al., 2025[16]).

In some cases, the RBF approach, because it requires data for verification, can enhance organisations' own sector data management systems. This is the case in the World Bank-funded rural sanitation programme in Egypt. The programme introduced a key performance indicator and payment trigger related to the financial performance of water and sanitation companies in charge of wastewater assets. As a result and due to reporting requirements, the programme led to the establishment of a sector monitoring system through the Egyptian Water Regulatory Agency (EWRA), which publishes annual performance reports on the rural sanitation sector. Adopting technologies such as remote sensing and earth observation-based monitoring of the impacts, especially in the areas of improving water use efficiency, surface water infrastructure, and others, are way forward to enhance and scale RBF approach (see Box 4.7). Currently such technologies are not mainstreamed because of lack of easy-to-use platforms and required capacity.

Box 4.7. Role of digital technologies such as remote sensing & Earth Observation in monitoring results

In the water sector, remote sensing and Earth Observation (EO) provide crucial capabilities for implementing and validating results-based financing initiatives. These technologies enable the objective monitoring and assessment of key water-related outcomes across various scales, which is essential for the verification step required in RBF. For instance, satellite data can be also used to track the projects aimed at improving water availability such as installation of hand pumps, tanks, newer constructions, and canals. In addition, satellite data can track changes in surface water extent (lakes, reservoirs, rivers), estimate water volume in reservoirs, map the area and efficiency of irrigation schemes, monitor groundwater-dependent vegetation, assess flood inundation extents or even provide proxies for water quality parameters like turbidity or chlorophyll concentrations. This allows RBF programs focused on goals such as increasing water storage, improving irrigation efficiency, restoring watersheds or enhancing water access to independently verify whether the contracted results have been achieved before disbursing payments, thereby increasing accountability, transparency and the overall effectiveness of financing for water management.

Recently, there have been increasing demand from the ministries to improve their capacity in using remote sensing for monitoring water use efficiency and identifying hotspots for further interventions. For example, Egypt has set up a remote sensing-based water accounting and water productivity analysis group within their Ministry of Water Resources & Irrigation (MWRI) leveraging remote sensing-based satellite datasets. They have been using satellite data to identify the impact of interventions to improve water use efficiency in the Nile Delta through multiple programs.

Source: (Guzinski et al., 2014[17]; FAO and IHE Delft, 2020[18]).

4.5. Opportunities to scale up RBF for water investments

RBF is used across the water sector, demonstrating multiple approaches to better tie funding with results. At least four of the initiatives reviewed in this chapter have led to improved and higher standards of service delivery: the Development Impact Bond in Cambodia, which outperformed expectations, the PforR in Egypt, which has delivered on all results initially defined and received additional financing, the Uptime Catalyst Facility and the Environment Impact Bond with DC Water. Other initiatives are promising but are at early stages of implementation.

Increasingly, RBF are embedding durability indicators, moving away from narrow infrastructure-level results (e.g. number of connection). Indicators relate to the performance of water and sanitation services (continuity of supply, green infrastructure performance) as well as organisational performance (working ratios and revenue, for example, in the case of utilities). This use of RBF demonstrates that such mechanisms can be deployed to shift the focus towards more impactful outcomes. However, measuring associated results can be challenging, requiring adequate skills and resources.

Although they can address multiple water sector challenges, from inclusion to resilience, RBF contracts are not a panacea. There should be a clear rationale for introducing RBF based on the results to be achieved, the capacity of implementers and an assessment of risks of failure.

A key factor of success of RBF initiatives is a transparent and constructive partnership between funders and implementers. Such a partnership contributes to designing RBF contract terms that are

challenging, yet achievable. It is also critical to identify potential requirements for technical assistance, especially for utility and government organisational level results.

Going forward, further engagement between funders and implementers is needed to replicate and scale RBF approaches. Few international finance institutions are equipped for such RBF mechanisms in practice. When the Development Impact Bond in Cambodia ended, despite its impressive results and interest from impact funders, the model did not replicate due to the lack of interested outcome funders. The lack of interest can be linked to the absence of structures within some international finance institutions for RBF.

A model that could be explored further to overcome the funder's internal barriers to RBF is the funding facility model. Indeed, RBF mechanisms have not been widely replicated partly because they require procedures that differ significantly from the standard processes used by funding agencies. Funding agencies piloted RBF mechanisms within specific projects, rather than adopting them as an institutionalised financing instrument. To facilitate broader adoption of such mechanisms, dedicated financing facilities with established, standardised procedures should be created. Uptime is an example of such a facility. It can receive funding from multiple sources and manage results-based payments on behalf of funders. The challenge, however, with this type of pooled funding, is to ensure that the scope of the facility (in terms of targeted services, implementers and geographies) is wide enough to address different funders' policy priorities, while retaining a credible data management system.

Finally, further analyses should be carried out to better understand the value for money of RBF schemes. To date, there is limited evidence on the cost-effectiveness of RBF versus other funding modalities. Whilst the initiatives reviewed in this chapter show that RBF have succeeded in delivering expected outcomes, there is limited data on the costs of designing and managing such contracts and the overall cost-effectiveness of RBF initiatives. Such an assessment would require greater transparency over the total costs of RBF programmes.

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Notes

[1] SLBs are bonds where the proceeds are exclusively applied to finance or re-finance a combination of both green and social projects. Its financial and/or structural characteristics are contingent on the issuer achieving predetermined environmental and social objectives, incentivising organisations to improve their performance in these areas.

[2] The references to USAID as a model funder of results-based finance mechanisms should be understood in their historical context, as US development finance architecture has evolved significantly and USAID no longer exists.

[3] GPRBA is a Trust Fund managed by the World Bank. Initially named Global Partnership for Output-based Aid (GPOBA), it has allocated 29% of its resources to water sector projects since inception in 2003 (GPRBA, 2021[7]).

[4] The references to USAID as a model funder of results-based finance mechanisms should be understood in their historical context, as US development finance architecture has evolved significantly and USAID no longer exists.

5. Revisiting public-private partnerships (PPPs) for water and sanitation: Balancing risks, focusing on results

Globally, experience with water-related PPPs has been mixed, with some being relatively successful and others failing to bring finance to the sector or being terminated prematurely due to lack of improvements in services. New partnership models are emerging, indicating that PPPs can be better structured with a more balanced risk allocation, whilst providing incentives for the private sector to improve performance and deliver efficiency gains. This chapter examines selected water-related PPP models and how they have balanced the risks between public and private actors.

Key messages

- **A key challenge in designing PPP transactions is to balance the risks between private and public actors to ensure they deliver policy outcomes** whilst retaining value for money for the public sector.
- Recent Build-Operate-Transfer (BOT) and concession contracts in the water sector demonstrate **that PPPs can be deployed to achieve policies related to investment mobilisation as well as viable, inclusive and efficient water services**. For instance, in the State of Rio (Brazil), PPPs are deployed to achieve universal water and sanitation services coverage. In Jordan and India, governments are calling on the private sector for improving treatment services beyond the construction phase. In France, environmental vulnerabilities are leading some municipalities (Lille municipality, for example) to embed new performance measures in PPP contracts related to water consumption efficiencies.
- **Such partnerships come with risks, but contracts can be structured to mitigate risks for both parties**. All contracts can embed clear and measurable results for which contractors are accountable. BOT-type contracts can incentive performance by embedding a results-based funding element (tying payments from the public sector to the achievement of results, at least partially). In some contexts, concession contracts for large service areas that include different population income levels, can benefit from blended finance to balance financial risks and incentivise private sector investments.
- **Enabling conditions for successful PPP transactions include**: (i) clear government policies backed by legal provisions, particularly on private sector participation conditions, contract structures, tariffs and service level performance; (ii) strong public sector capacity for contract preparation, negotiation and management (iii); stakeholder engagement, including with citizens; (iv) readiness to deploy blended finance; and (v) a robust private sector, ready to take on technical and financial risks.

5.1. Introduction

Public-Private Partnerships (PPPs) continue to attract governments seeking to mobilise investment capital as well as technical expertise for durable water and sanitation services. Recognising the important role of the private sector in addressing water sector challenges, the Global Commission on the Economics of Water (GCEW) highlighted the need for PPPs in which risks and benefits are shared in a balanced way between public and private actors (GCEW, 2024[1]).

Globally, experience with water PPPs has been mixed, as some failed to bring finance to the sector and others were terminated prematurely due to lack of improvements in services (Marin, 2009[2]). However, new partnership models are emerging, indicating that PPPs can be better structured with a more balanced risk allocation, whilst providing incentives for the private sector to improve performance and deliver efficiency gains (Delmon, 2015[3]).

This chapter examines selected water PPP models and how they have balanced the risks between public and private actors. In this chapter, “PPP” refers to a broad range of agreements between public and private actors related to water and sanitation service delivery, falling in the scope of concession contracts and Build Operate Transfer (BOT) modalities (see Box 5.1). The common denominator of these partnerships is the sharing of a range of risks between actors, including financial risks.

Box 5.1. Scope of PPPs in this chapter

There is no clear definition of what constitutes a PPP. The OECD broadly defines PPPs as long-term agreements between the government and a private partner, whereby the private partner delivers and funds public services using a capital asset base, sharing the associated risks. PPPs may deliver public services with regard to both infrastructure assets (such as bridges, roads) and social assets (such as hospitals, utilities, prisons). In this chapter, PPPs include (BOT)-type contracts and concession contracts but excludes full assets' privatisation (see Figure 5.1). Unlike lease or management models, these forms of private sector participation expect some levels of investment from the contractor.

Figure 5.1. Types of private sector participation



BOT refers to different forms of contractual arrangements generally introduced for the development and management of new assets. The model can include Build-Own-Operate-Transfer (BOOT) and Build-Transfer-Operate (BTO), in which ownership of the asset is transferred at different stages of the contract. BOTs can also exclude ownership transfer, with assets remaining under public ownership.

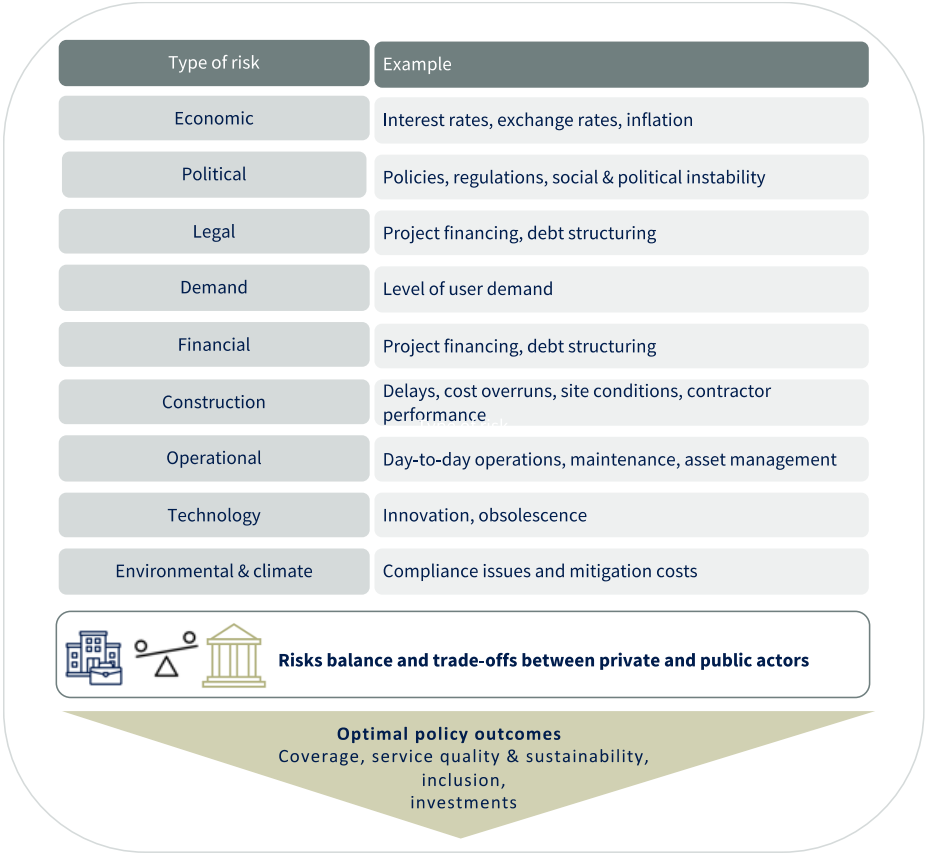
Concessions are generally introduced for the management of existing assets together with their rehabilitation and/or the development of new assets. They are medium (10-15 years) or long-term contracts (20-25 years), with the distinguishing feature that remuneration of the private sector is through users' tariffs and charges.

Some governments make a distinction between PPP in a strict sense, whereby the private sector is only remunerated through payment from the government and concession contracts, in which the private sector is remunerated through users' tariffs and charges. The Brazilian law, for example, distinguishes between user-pays and government-pays projects. Brazil's Concessions Law governs PPP projects fully paid for by users; other PPP projects are governed by the PPP Law.

Source: (OECD, 2025[4]; World Bank, 2017[5]; OECD, 2008[6]).

All PPPs come with a certain level of risk, both for the private sector looking for financial returns and the public sector looking to achieve policy outcomes. These outcomes may include improved service coverage, quality, viability and, increasingly, resilience. PPP risks range from those related to operational risks to the wider economic and political risks, which are potentially more difficult to anticipate and mitigate (see Figure 5.2).

Figure 5.2. The range of risks involved in PPPs



The main challenge when structuring a PPP is to adequately balance the risks between public and private actors, such that they deliver policy outcomes, whilst providing some value for money for the public side. At one end, a partnership that shifts too many risks onto the private sector may become too costly for the public sector as higher perceived risks typically result in higher financial return expectations. On the other end, shifting too few risks, such as frontloading payments to the private sector before contract execution, may disincentivise performance and result in poor value for money.

Some recent PPP contracts indicate that a fair balance of risks can be achieved. These PPPs have set clear and measurable performance indicators, integrating operational efficiencies, investment responsibilities, as well as service level objectives into the partnership. Under specific enabling conditions, these contracts can lead to stronger performance and value for money for the public sector.

The present chapter seeks to draw practical lessons from practical experiences with balancing risks in PPP contracts. It is based on case studies, selected because they include contract modalities, terms and conditions that seek to mitigate and balance risks between actors involved, whilst addressing pressing water sector challenges.

Selected cases studies include:

1. **Concession contracts between the State Water and Sewerage Company of Rio de Janeiro (CEDAE) and private operators in Brazil**: Through these contracts, the State government sought to mobilise a total of USD 3.2 billion to provide 13 million people with access to durable water and sanitation services.
2. **A BOT contract in Jordan for wastewater treatment and improving water reuse efficiency**, which was partly financed through local commercial debt.

3. **A BOT-type Hybrid Annuity Model (HAM), introduced in India to strengthen the operational performance of wastewater treatment services**. The model involves an annual payment to the private sector based on wastewater treatment performance.
4. **The concession contract between Lille municipality and the private operator Veolia**, which was designed to address water shortages risks: the contract provides financial incentives for saving 65 million m3 of water in the form of penalties imposed on the concessionaire for not meeting targets.
5. **The State of Paraná-owned company Sanepar's BOT-type contracts in Brazil**, which have been used to achieve water and sanitation for all nearly across the State.

This chapter presents and analyses the rationale for introducing these PPP models, their risk-sharing structure and the enabling conditions of such partnerships. Drawing on the case studies, this chapter first highlights the type of results governments can anticipate from a partnership with the private sector, noting that PPPs have been structured for a range of policy outcomes. The chapter then considers the different types of risks allocated between the public and private parties and highlights the corresponding mitigation measures introduced to make these contracts viable for both parties. The chapter then reflects on the enabling factors for successful PPPs, noting the importance of policies and legal instruments, the use of blended finance instruments as well as public and private capacities for such transactions.

The present chapter is the result of a rapid review of PPP contracts and models, rather than an exhaustive evaluation of their underlying structure and results to date. It is based on a review of existing knowledge and communication products and, in some cases, interviews with key stakeholders.[1]

5.2. Public-Private Partnerships structured for durable services

This section presents the key features of selected PPP contracts, highlighting how they have been structured to address key policy concerns, from viable and resilient water and sanitation services to increasing coverage in low-income areas.

5.2.1. A focus on efficient and viable services with measurable results

Case studies show that governments have structured PPPs to pursue a range of policy outcomes, with a focus on efficiency and long-term viability, including environmental and social considerations. In addition to results in terms of service delivery (for example, the extension of the water distribution network), governments have introduced performance indicators related to operational efficiencies, such as non-revenue water and wastewater treatment levels. Table 5.1 below presents some key features of the selected PPP contracts, including results' Key Performance Indicators (KPIs) and project costs. These costs refer to the investment expected over the duration of the contracts and can be a mix of public and private funds, depending on the contract.

Table 5.1. PPP contracts type, duration and scope of service

	Case study	PPP Type	Signature date	Duration (years)	Contracting authority	Contractor(s)	Expected services	Project cost	KPIs
1	Sanepar (Brazil)	BOT	2023	24	Sanepar	Aegea Saneamento	Water & sanitation services, + efficiency improvements	USD 250M	Increased water and sanitation coverage Reduction of NRW, improved billing and collection rates
2	As-Samra (Jordan)	BOT	2012	25	Ministry of Water and Irrigation (MWI)	Samra Wastewater Treatment Plant Company Limited (SPC) (Morganti, Infilco Degrémont, Suez)	Design + construction of WWTP expansion (from 267 000 to 365 000 m^3 capacity per day) +operations	USD 223M	Increased treatment capacity (+37%) Compliance with environmental and sludge management standards
3	Hybrid Annuity Model (India)	BOT-type	2017	15	National Mission for Clean Ganga (NMCG) & state water authorities	Consortium led by Essel Infra Projects Limited (Varanasi) HNB Engineers Private Ltd (Haridwar)	Design+ construction and operation of a 50 MLD STP in Varanasi and an 82 MLD STP in Haridwar	USD 24M (Varanasi), USD 27M (Haridwar)	Availability sewage treatment plants and associated facilities Treated effluent discharge + digested sludge quality standards Treatment capacity increased Zero untreated wastewater discharge target by 2026
4	Rio de Janeiro (Brazil)	Concession (four concession blocks)	2021	35	State Water and Sewerage Company of Rio de Janeiro (CEDAE)	Aegea Saneamento (2 blocks) Iguá Saneamento S.A Águas do Brasil	Design + construction of water and sanitation networks' extension + operations	USD 4.3B	Water and sanitation coverage increase to 90-100% by 2033 Percentage of treated sewage 25% NRW down from 40%; 75% of planned investments executed in first 12 years
5	Veolia-MEL (France)	Concession	2024	10	Métropole Européenne de Lille (MEL)	Veolia	Water distribution	USD 60M	65 million cubic meters of saved water 5 000 acoustic censors for leak detection installed

Note: Project costs refer to the cost of infrastructure development and upgrade planned under the PPP.

In the PPPs under review, the private sector has been brought in as a partner for achieving ambitious service coverage targets, including to reach the poorest communities. In the case of the concessions in Brazil, the private sector is accountable not only for operating assets in an efficient manner (with minimal NRW) but also for extending the infrastructure up to the poorest communities in the service area. The three 35-year concession contracts tendered for the four blocks (or service areas) in Rio involve an investment programme heavily front-loaded in the first years, so as to reach near universal targets by 2033. At the time of signature in 2020/21, the rate of access to water services in the area was near universal, but residents in poor areas relied on informal connections due to a lack of infrastructure. Access to sanitation only amounted to 50%, with poorer citizens particularly affected, leading to significant environmental pollution. The concessions were designed to enable investments of up to BRL 1.8 billion (USD 315 million) in interventions benefiting specifically underprivileged communities. Contracts were specifically designed so that high and low-income areas alike benefit from improved service levels via cross-subsidisation between municipalities.

Ambitious environmental and social outcome measures can also be embedded as performance indicators in PPP contracts. The contract between Veolia and the municipality of Lille (Métropole Européenne de Lille, MEL) contains an innovative economic model for water conservation (see Box 5.2). In Jordan, the contractor operating the As-Samra treatment plant is required to meet effluent standards under Jordanian regulation, with payment contingent upon demonstrable compliance. Similarly, the HAM in India is designed so that payments for services over the 15 years of operation are tied to performance in effluent treatment quantity and quality.

Box 5.2. Water efficiency measures in the concession contract between Métropole Européenne de Lille (MEL) and Veolia

Water resources are severely decreasing in Lille's river basin, due to changing weather patterns and the slowing of groundwater recharge rate. The area of Lille comprises 66 municipalities and 1.2 million people. Water production is the responsibility of the public company Sourcéo, whilst distribution services have been delegated to the private sector since 1996.

For MEL, avoiding a "ground zero" moment required a significant reduction of water consumption. Following two years of consultations with private operators, citizens and public authorities, MEL designed a new type of contract for meeting its ambitious water efficiency (sobriété hydrique) objectives. In 2024, MEL and Veolia signed a contract for water distribution services with innovative economic features to incentivise a reduction of 65 million m^3 in water use over 10 years.

In this contractual model, the concessionaire is subject to financial penalties if reduction objectives are not met. The contract signed with Veolia features specific volumes of water to be purchased from Sourcéo, above which the concessionaire is subject to a financial penalty: the price of bulk water would double.

To meet water consumption targets, Veolia committed EUR 60 million in investments targeting water loss reduction and for engaging with water users. For example, Veolia is planning the introduction of "water efficiency contracts" with large consumers, which will commit them to reducing water consumption (with technical assistance from Veolia) and the distribution of water saving devices to its customers.

Source: (Intercommunalités, 2024[7]).

5.2.2. Structuring PPPs to incentivise results' achievements

Governments have structured PPPs in a way that mitigates risks for both parties and incentivises performance.

In PPP contracts reviewed, governments have mitigated operational risks (leading to poor performance) by tying under one contract construction and operations. This is the case in both BOT and concession contracts included in this chapter. As future operators are also responsible for construction (and in some cases, for design), they can optimise the design features, bringing innovations, which can lead to more efficient operations. All PPPs considered in this chapter expect the operator to also be responsible for infrastructure development.

PPP contracts' remuneration structure can also introduce operational performance incentives. Remuneration can be exclusively linked to tariffs or be service fees paid by the contracting party (see Table 5.2). Where the remuneration is linked to tariffs (and therefore, to water consumption), the operator is incentivised to increase demand or connection rates (as in Rio de Janeiro). To mitigate the risk that the operator only focuses on affluent areas (with potentially higher consumption rates), governments can specify in the contract the areas that should be served. Concession contracts, in which the operator is also responsible for operational cost recovery, are well-suited to incentivise operational performance.

Table 5.2. PPPs' remuneration structure

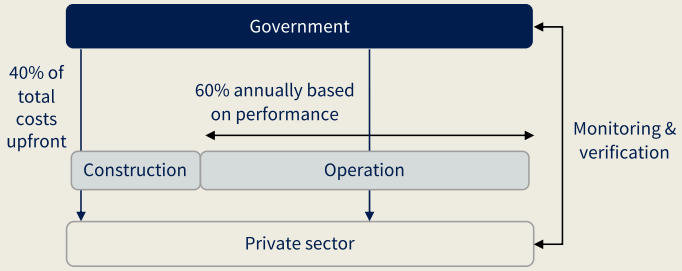
PPP	Private sector remuneration
Sanepar-Aegea (Brazil)	Service fees from Sanepar (State utility)
As-Samra (Jordan)	Service fees from Water Authority of Jordan Biogas and hydropower generation, covering ~80% of the plant's energy needs
Hybrid Annuity Model (India)	O&M payments over 15 years paid on a quarterly basis + power charges at actual costs
Rio concessions (Brazil)	Tariff revenue + (limited) performance-based incentives
MEL-Veolia (France)	Tariff revenues

A service fee remuneration from the contracting party to the private sector can also be designed to stimulate performance. The India's HAM case study shows that conventional BOT models can be improved upon, with a conditional remuneration structure that incentivises effectiveness and efficiencies after the construction phase. BOT models can be risky for the public sector, especially as they are usually introduced for large infrastructure such as desalination plants, bulk water production systems and wastewater treatment plants. **Failure to adequately structure BOT contracts can lead to widespread environmental and social damage and a financial loss for the public sector**. In India, the HAM contracts were introduced by the government on the back of poor experience with more traditional contracts (Engineering, Procurement and Construction - EPC or classic BOT). Prior to the HAM, the government's effort to clean the Ganges River largely focused on creating sewerage infrastructure assets that local governments operated and maintained. This approach, primarily driven with a focus on constructing assets, failed to adequately invest in their operation and maintenance, and as a result, to improve the quality of the Ganges River (C-WAS, 2018[8]). The government of India sought the support of the International Finance Corporation (IFC) to structure a PPP model that leverages private sector expertise to construct, operate and maintain treatment facilities. As detailed in Box 5.3 below, the remuneration structure was partly conditional on the achievement of operational performance.

Box 5.3. Remuneration under the India's Hybrid Annuity Model (HAM) for sewage treatment

The HAM model involves two types of payments from the government to the private sector. A first transfer occurs at the start of the contract and covers 40% of the total contract cost, including operations (but excluding energy costs). The remaining 60% is paid over the construction phase, through annual payments. Over the construction period, these annual payments are conditional on the operator meeting sewage treatment standards, as set in the contract.

Figure 5.3. Transfers of funds over the construction and operation phases



Source: (IFC, 2018[9]).

5.2.3. Shifting risks and accepting trade-offs

Whilst all PPPs come with risks, for both the public and private sector, some PPPs are riskier than others for the private sector. For example, the concessions in Rio, are riskier ventures for the private sector due to the following factors, among others:

- The remuneration structure, entirely dependent on demand and revenues from tariffs.
- Operational constraints since the operator must service all designated areas, regardless of the level of demand.
- A 35-year duration, which heightens political, social, economic as well as environmental risks.

The level of investment required, which puts significant financial responsibilities on the private sector.

Table 5.3below illustrates some of the main risks implied in this concession contract, compared with As-Samra BOT model. A key difference between the two models is the remuneration structure. In the BOT model, remuneration is guaranteed, as long as the operator meets the operational standards (treatment quality and quantity), without bearing the demand risk since the only customer is the Water Authority of Jordan. In this case, it is the Water Authority of Jordan, the public utility in charge of operating the water distribution and sewer system, who bears the bulk of the demand-side risk. In the case of the concession, remuneration is directly linked to the demand for services, which is uncertain to some extent.

Table 5.3. Illustrative risk levels of different PPP transactions from the private sector perspective

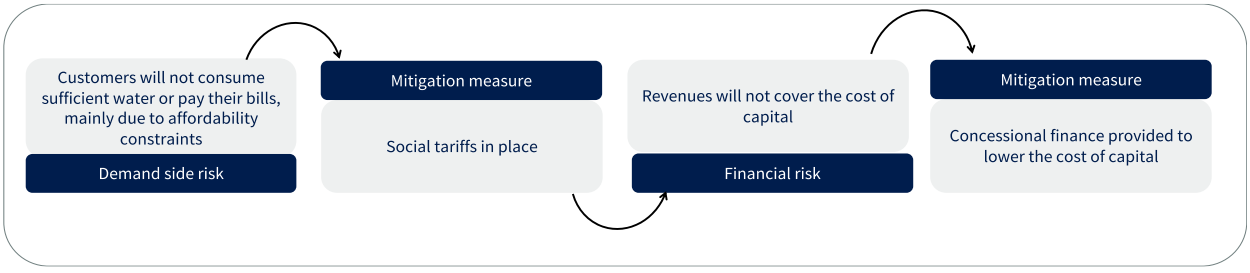
As-Samra BOT	Risks	Rio concessions
25-year duration	Political	35-year duration
Interest rate fluctuation, inflation	Economic	Interest rate fluctuation, inflation
Fixed remuneration from the water authority	Demand	Remuneration linked to tariffs from water sales
Debt servicing for about 55% of project cost (most at market rates)	Financial	Debt servicing for nearly 100% of project cost (of which about 45% at market rates)
Unpredictable weather patterns and hazards can affect water production, limiting volumes of wastewater	Environmental	Unpredictable weather patterns and hazards can affect access to freshwater for distribution

Legend: Risk level
Low
Medium
High

Long-term contracts are particularly vulnerable to environmental hazards, given increasing uncertainty in weather patterns and their impacts on water resources, **and therefore may incorporate specific mitigation measures**. Contracts should account for such risks and factor in some flexibility to enable both partners to address unforeseen events effectively. Risks include flooding, extreme droughts and landslides, which can damage water and sanitation assets and affect operations. Such risks can be addressed through Force majeure provisions that set each party's responsibility. The specific definition of a Force majeure and the risks these provisions include are set on a case-by-case basis. In countries particularly exposed to environmental hazards, these provisions should be balanced with incentives for developing resilience (World Bank, 2017[5]).

Considering the various risks exposed above, balanced PPP contracts include trade-offs and incentives for the private sector. In the Rio concessions, for example, demand side risks are addressed by ensuring social tariffs are in place, which will allow services to be affordable for the poorest. With the planned expansion of the water system in Rio de Janeiro, the population benefiting from the social tariff is likely to increase tenfold. Whilst the social tariff acts as a mitigation measure for the demand risk, it can create financial uncertainties related to debt servicing – since a larger volume of water is likely to be sold at a lower price. To address the risk, the transaction includes access to concessional finance from the federal development bank, the National Bank for Economic and Social Development (Banco Nacional de Desenvolvimento Econômico e Social – BNDES). The role of BNDES in this transaction is further discussed below.

Figure 5.4. Risks and mitigation measures in the Rio concession contracts

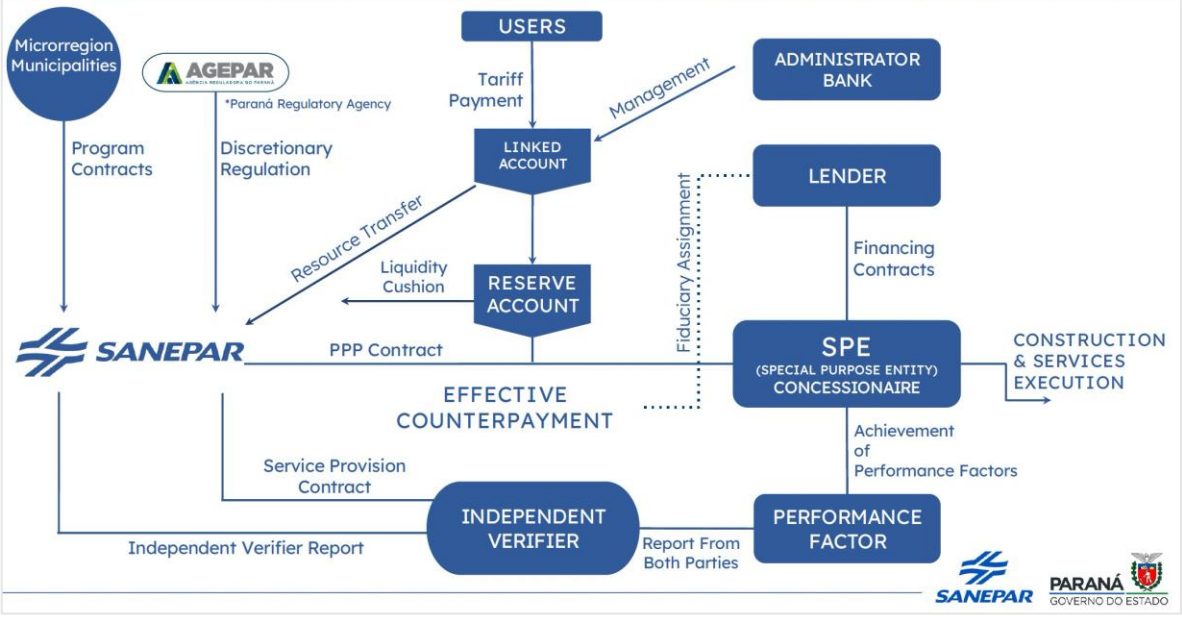


Financial risks falling under the public sector can also be mitigated. In India, under the HAM model, the government remains responsible for covering energy costs of wastewater treatment operations, which

are paid based on actuals. These arrangements are designed to shield the private sector from energy prices inflation risks. To mitigate the risk of inefficiencies and excessive energy consumption, the contract introduces a Guaranteed Energy Consumption, which commits the private sector to delivering services within a specified energy consumption limit. If the limit is surpassed, then the contract envisages penalties affecting remuneration.

Sanepar's[2] BOT PPP model also embeds **strong risk mitigation measures for the public sector, providing incentives for the private sector to perform and achieve the expected outcomes**. Under this arrangement, the private operator, typically a Special Purpose Entity (SPE), is contracted to develop and operate the services. User payments are collected by the SPE and transferred to Sanepar, which subsequently disburses funds back to the SPE (Sanepar, 2023[10]). The SPE's performance is subject to stringent oversight: an independent verifier appointed by Sanepar conducts all required performance assessments. In parallel, the state regulator, AGEPAR,[3] closely supervises Sanepar's compliance with performance standards and may impose penalties on the state utility in cases of non-compliance. This framework provides strong incentives for the PPP to deliver on the expected outcomes, i.e. increased water and sanitation coverage, reduction of NRW, improved billing and collection rates.

Figure 5.5. Financial and institutional arrangements of Sanepar's PPP contracts



Source: (Sanepar, 2023[10]).

Another important risk to mitigate on the public sector side is the total PPP project cost. Many PPPs help governments to bring in additional capital or to defer and pace capital investments, depending on the contract. The trade-off, however, is that calling on private capital, which is generally accessed on commercial terms, increases the project capital cost. This applies to the two BOT contracts considered in this chapter, which require private investments, whilst embedding regular government transfers to cover the total project costs over time.

Mitigation measures of projects' capital costs can be introduced to minimise the capital costs through careful project preparation and competitive bidding. In India's HAM, bidders were required to submit their price based the total lifecycle of the project, including operations charges (and the Guaranteed Energy Consumption cost mentioned above), over the year of operations. A well-prepared

public sector, equipped with a full view of potential project cost, is in a good position to evaluate the bids, without the risk of under-bidding.

5.3. Enabling conditions for balanced PPPs

At least five enabling conditions contribute to the design and implementation of balanced PPPs: (i) enabling policies and regulations, both economic and environmental, (ii) a robust and well-equipped public sector, (iii) stakeholder engagement, (iv) ability to mobilise blended finance where required and (v) the capacity of the private sector.

5.3.1. Enabling policies and regulations

Balanced PPPs require clear government policies backed by robust legal provisions. The cases above illustrate that structuring and implementing such complex arrangements demand substantial resources, time and strong commitment from both the public and private parties. Their effectiveness is driven primarily by coherent government policy, the legal instruments that operationalise these policies and regulatory authorities that enforce compliance. Clear PPP requirements embedded in legislation, promoting transparency, competition and political-risk mitigation, **help attract experienced and well-capitalised investors and operators** to the water sector.

In Brazil, the Rio concessions and other PPP contracts implemented in recent years are the result of legal reforms that opened water and sanitation services to competitive tenders (see Box 5.4).

Box 5.4. Brazil's 2020 New Sanitation Law – a market changer

Brazil's New sanitation Legal Framework remarkedly changed water and sanitation markets in the country. Approved in 2020, the law was introduced to stimulate investments in the water sector. It introduced competition in the tendering of water and sanitation systems' management, opening opportunities of private investments. The law set the specific goal of providing access to drinking water to 99% of the population and access to sewage collection and treatment services to 90% of the population by 2033.

Until 2020, the concession for the supply of services was carried out through so-called program agreements (*contratos de programa*), which are contracts entered into between cities and states and public or semi-public companies, without a competition and bidding process. The New Sanitation Legal framework prohibits the provision of water and sanitation services through such program agreements and establishes that the concession of the services must be carried out through public bidding, in which both public and private companies can participate. The expectation is that the regulation will open opportunities for private sector participation and pave the way for increased private investments in the sector. Specific changes introduced with the new law are presented in Table 5.4 below.

Table 5.4. Reforms introduced with the new sanitation law in Brazil

Topic	Previous Framework	New framework
Universalisation objectives	No defined targets for universalisation or requirements to achieve them	Objective of achieving nationwide basic sanitation by 2033 with 99% drinking water coverage and 90% sewage treatment. These are mandatory goals for all operators
Regulatory standards	Several regulatory agencies, while the national regulator National Water Agency (ANA) had a limited role to set national standards	ANA gains responsibilities to regulate the sanitation sector in Brazil, including setting national quality standards and unifying regulations for tariffs and contracts
Concession tenders	Municipalities were allowed to sign direct contracts with publicly-owned companies, with no competition	All new concessions should be made through tenders, where public and private companies may compete on the same terms, with obligation to invest for universalisation.
Sanitation blocks (large intermunicipal areas)	There were no joint concession modalities	Possibility of sanitation blocks encouraging public consortia and cooperation agreements for better service access and economy of scale.

Source: (CAF, 2025[11]; Arcadis, 2023[12]).

Well-defined and adequate regulatory frameworks across the PPP project cycle, from contract design to monitoring contribute to making PPPs more effective. Such regulations may concern:

- The different contract types, to enable public sector actors to select the optimum partnership model from a range of PPP models (concessions, BOT, HAM, etc.).
- Model contract terms that allow performance-based contracting and flexible risk allocation between parties.
- Mechanisms for tariff adjustments and cost recovery, that balance financial viability with affordability.
- Frameworks for monitoring and enforcing performance standards with clear and measurable KPIs.
- Rules governing contract modifications / renegotiations to address long-term uncertainties such as extreme weather and environmental risks.

Rules for contract renegotiation are key to enable innovative and large-scale contracts with stringent performance indicators. Large, complex and innovative PPPs face uncertainties and unforeseen events, whether technical issues, changing weather patterns or financial constraints. The capacity to adjust strategies and measures over the course of contract implementation is critical to achieve the overall goal of the partnership. To ensure that a contract is manageable throughout its life and will subsequently deliver value for money, some flexibility should be introduced (EPEC, 2014[13]). For example, contract terms can introduce periodic reviews of the contract to ensure that pre-agreed results and targets are fit to evolving realities (for example, those related to energy and other material costs, changing water customers' behaviour, etc.)

Effective regulation of the private sector's performance contributes to successful PPPs. Regulation is effective when clear performance indicators for the PPP are established. Across the PPPs selected, these performance standards relate particularly to:

- Coverage rates (especially where significant pockets of the population are deprived from basic services, as in Brazil)
- KPIs on water and sanitation services' operational efficiencies

- Environmental regulations, defining effluent standards
- Environmental regulations that incentivise resource efficiency and durability

5.3.2. Strong public sector: from project preparation skills to contract monitoring and regulation

Balanced PPP contracts that provide value for money to the public sector require competent and adequately resourced public authorities (OECD, 2025[14])**.** Strong public sector capacity is required for the following functions:

- Assess and allocate risks appropriately between public and private parties.
- Structure contracts that incentivise performance while ensuring value for money.
- Evaluate lifecycle costs including operations, not just construction.
- Design and conduct competitive bidding processes that consider both price and quality.
- Monitor contract compliance and enforce performance standards.

Such capacity can stem from long-standing public sector experience with water management and PPPs. In Lille, for example, MEL remains primarily responsible for water supply in its territory, a responsibility that it carries out through awarding concession contracts to private operators since 1996. MEL also has direct responsibility for water resources management and for sanitation (both sewered and non-sewered) services. This experience and technical capacity have enabled the municipality to design, negotiate and monitor innovative contracts, such as the PPP with Veolia.

Where capacity is lacking at municipal level, central government agencies and development partners support the project preparation process. The national public development bank BNDES in Brazil has played a critical role in the design and tendering of the concession contracts in the country. Public development banks can bring this experience from PPPs in other sectors, such as energy. In India and Jordan, IFC has provided technical assistance to structure contracts in a way that meets government's, investors' and operators' interests. Given the complexity of PPP transactions, **critical skills should be concentrated in a "PPP unit" (whether municipal or central level, or both), which can provide support to authorities seeking to enter into PPPs** (OECD, 2025[14])**.**

Public sector capacity for contract monitoring is also a contributing factor to successful PPPs. In Brazil, following the adoption of the New Sanitation Law, monitoring of contract performance and regulation have been strengthened, providing incentives for the partnerships to deliver policy outcomes and greater confidence to both the public sector and the private sector on the process for performance verification.

5.3.3. Stakeholder engagement

Citizen engagement is a critical enabling condition that can mitigate political and social risks embedded in PPP structures. Early engagement with citizens, especially in areas transitioning from public to private services, is essential to make PPPs work. By consulting citizens during the project-preparation phase, governments promote a **participatory approach** and enhance **communication regarding perceived risks** (e.g. rising tariffs, inadequate service delivery and grievance-redress mechanisms) and the **measures** incorporated in the PPP to mitigate them. Such consultations are also essential to **identify potential inclusion-related risks for specific groups, which can be mitigated by social tariffs or even direct subsidies** where necessary. Both concession contracts in Lille and Rio include special tariffs measures to protect vulnerable groups.

Recent experiences show that citizen engagement should not be a one-off endeavour but should be factored in throughout contract implementation. Both government and the private partner should continue to assess and monitor social perceptions of the partnership and customer satisfaction of the

services delivered. In Lille, MEL and Veolia carry out regular outreach and communication campaigns to guarantee citizens' engagement in the ambitious water efficiency programme (Giscard d'Estaing, 2024[15]).

5.3.4. Readiness to deploy blended finance

Most PPPs reviewed in this chapter have benefited from blended finance, in one way or another. Blended finance has been deployed to make the transaction financially viable and attractive for the operator/investor, particularly where government ambitions of service coverage and efficiency were high, thus requiring significant investments.

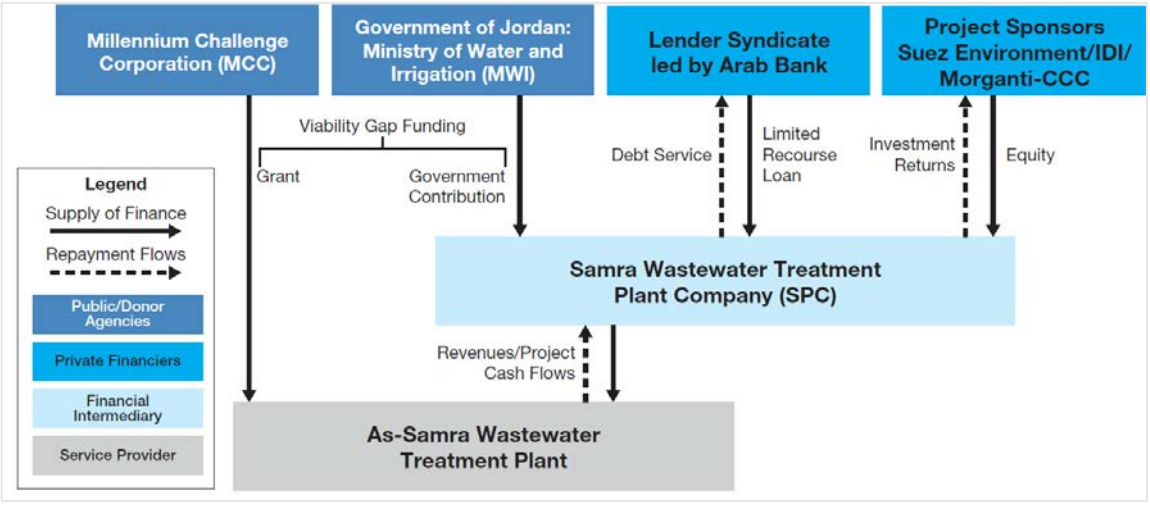
Table 5.5. Blended finance modalities deployed through selected PPPs

PPP	Blended finance modality
Sanepar-Aegea (Brazil)	Concessional finance (BNDES) + private finance
As-Samra (Jordan)	Private finance (equity and loan) and Viability Gap Funding from the government
Hybrid Annuity Model (India)	Private investments (for pre-financing) and government transfers for infrastructure development
Rio concessions	Concessional finance (BNDES for concessional loans IDB and Proparco for guarantees) + private finance (equity and loan)
Veolia-Lille	N/A

Mobilising public funds for blended finance and mitigating public sector risks require careful transaction skills and capacity. Such skills are required to combine different financing instruments to optimise risk allocation and structure payments mechanisms that incentivise performance, such as the hybrid annuity model. Government and financing partners' capacity to deploy guarantees and other credit enhancement measures greatly facilitate access to commercial finance and blended finance models.

The financing arrangement for As-Samra treatment plant in Jordan is a typical blended finance structure (see Figure 5.6). It combines public grants, private equity and debt financing to ensure financial viability, whilst balancing risk-sharing. The Millennium Challenge Corporation (MCC) and the Jordanian government provided grants to bridge the financing gap. Private sponsors contributed equity and a syndicate led by Arab Bank extended limited recourse loans, enabling commercial funding and mitigating the government's risk exposure.

Figure 5.6. Financial arrangements for As-Samra Wastewater Treatment Plant Expansion, Jordan



Source: (World Bank, 2016[16]).

5.3.5. Robust private sector

Innovative and long-term PPP contracts require risk takers backed by strong technical and financial capacities. When looking for such risk takers, governments need to pay specific attention to the following capacities:

- demonstrated ability to meet operational efficiency targets
- capacity to optimise both construction and operations when combined
- experience implementing innovative technical solutions
- strong asset management capabilities for long-term viability
- ability to take on appropriate levels of demand and revenue risk
- access to both commercial and concessional financing
- financial strength to engage on long-term contracts (25-35 years)
- capacity to pre-finance investments where required by contract structure
- experience managing projects with complex payment mechanisms

In some contexts, and depending on the contracts, consortiums of private organisations in joint venture (or special purpose vehicles) can meet such requirements. This is the case in Jordan, for example, where Morganti-Infilco-Degrémont-Suez have formed a consortium. In other cases, well-established single entities can lead the contract with the private sector, as Veolia with Lille and Aegea Saneamento with the state of Rio or Parana.

5.4. Opportunities to scale up PPPs for water-related investments

Entering into PPP arrangements to improve water and sanitation services entails a series of trade-offs between public and private stakeholders. These trade-offs help redistribute and mitigate risks while establishing incentives for enhanced performance. From the government's perspective, a key trade-off is the potentially higher overall project cost associated with mobilising private capital. Additional trade-offs include: (i) improved financing mobilisation, which enhances project readiness and supports the achievement of policy objectives; (ii) the assumption of deferred financial liabilities in cases where future government payments are required, such as under BOT-type contracts; and (iii) potential efficiency gains resulting from private-sector expertise, innovation and operational discipline. For the private sector, trade-offs may involve accepting greater financial and performance risks in exchange for longer-term, higher-value contracts and opportunities to deploy innovative solutions that meet efficiency and service requirements. Collectively, these trade-offs facilitate a more balanced allocation of risks and strengthen the prospects for effective public–private collaboration. In an environment characterised by rising economic, political and environment-related uncertainties, such trade-offs have become increasingly significant and central to the viability and resilience of PPPs.

Comprehensive project-preparation processes, supported by structured engagement with private-sector stakeholders and civil society, enable the identification and assessment of acceptable trade-offs. Tariff increases, for example, are often associated with private sector participation and can be a reason why many citizens (or their representatives) reject or are fearful of it. Yet, two of the large concession contracts reviewed in this chapter did not lead to significant tariff increases. MEL (Lille) has one of the lowest tariffs in France and has stepped up social measures to ensure all citizens have access to water at an affordable price. These measures have been introduced when the operators are expected to make reductions in the volume of water sales. In Rio, the total number of people that will benefit from social tariffs is likely to increase tenfold over the course of the PPP contract.

Governments can draw on such experiences to design well-balanced PPP contracts that maximise value for money on the public sector side, whilst enabling financial gains for the private sector. Experience shows that large concession models are well-suited for water and sanitation, provided that private sector investments are secured through long-term contracts and enabled through blended finance where necessary. Other types of partnerships, such as BOT may be riskier for the public sector (due to many unknowns at contract start) but can enable the achievement of policy objectives. Public sector risks can be minimised through detailed project preparation and contract design, particularly by linking payments to measurable and binding performance indicators.

Going forward, emphasis should be given to building public sector capacity for preparing, tendering and monitoring PPP contracts, in addition to addressing regulatory barriers. Public sector capacity is amongst the several enablers of balanced PPPs, but it is also critically lacking in many countries where public institutions are starved of capable human resources or do not have access to technical expertise. Building this capacity is critical for the public sector to act as a partner throughout the partnership with the private sector, allowing flexibility where required whilst remaining firm on the contract's objectives.

Where public sector institutions are well-equipped with access to technical expertise, greater emphasis should be placed on the balance of risks to ensure PPPs deliver environmentally responsible and efficient services. This may require clearer policies on environmental priorities and strategic measures for water and sanitation.

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Notes

[1] The PPP contracts themselves were not directly accessed.

[2] Brazilian water supply and sewage company owned by Paraná state.

[3] Agência Reguladora de Serviços Públicos Delegados do Paraná.

6. Summary of key findings and policy recommendations

This chapter summarises the key findings and policy recommendations arising from the analyses conducted within the framework of this report. This includes key findings and recommendations on: i) leveraging bond finance for water investments; ii) mobilising Islamic finance for water investments; iii) deploying results-based finance in the water sector: use, rationale and conditions for success; and iv) revisiting public-private partnerships for water and sanitation: balancing risks and focusing on results.

6.1. Leveraging bond finance for water investments

Key findings

- **Bond finance holds significant potential for mobilising capital to support water-related investments**. The mobilisation of capital from a broad investor base, combined with medium- to long-term repayment terms, makes it in principle well-aligned with the specificities of water-related investments. Additionally, bond finance is gaining prominence globally, which represents a timely opportunity for water investments.
- **Investments in water through bonds is rising but it still represents a marginal share of GSSS bonds**, which itself represent a marginal share of the global bond market. Water- and blue-labelled GSSS bond issuance rose from USD 1 billion in 2022 to USD 6.4 billion in 2023, before reaching USD 4.7 billion in 2024. Despite this recent increase, water- and blue-labelled bonds account for less than 1% of total GSSS bond issuance, which reached USD 1.1 trillion in 2024. In parallel, bonds with at least one mention to "water" or "blue" in their use of proceeds reached USD 290 billion in 2024, which means that a large proportion of water-related investments financed through bonds do not carry a "water" or "blue" label.
- **The expansion of bond finance for water is being driven by various enabling factors**, such as growing investor demand, increasingly stringent Environment, Social, Governance (ESG) criteria, the growth of the GSSS bond market and supportive policies. Similarly, several types of bonds (including corporate, sovereign and municipal bonds) are gaining traction and are likely to continue to grow in the coming years.
- However, **several challenges persist**, such as difficulties in clearly tracking the allocation of proceeds in multi-labelled bonds, consequent limited visibility into investments supporting water and related sub-sectors, investor concerns about revenue stability, complex regulatory environments and underdeveloped local capital markets in many developing countries.
- **Unlocking greater investment in water security and freshwater through bonds** can be supported by the development of guidelines and standards for the issuance such bonds, the development of water finance taxonomies and the strengthening of impact reporting. Improving risk-return profiles through credit enhancement mechanisms, innovative financing mechanisms (such as revolving funds) or economic incentives (such as tax exemptions in the United States) can also help attract investors.

6.1.1. Policy recommendations

- **Support the structuring of bond instruments that meet investors' demands**, notably by:
  - **Strengthening the capacity of issuers, particularly public utilities and municipalities, and backing them to enhance their credit rating.** Issuers with strong credit ratings are generally more attractive to investors, as such ratings indicate lower default risk and enable access to capital on more favourable terms.
  - **Supporting the aggregation of diversified portfolios of water-related projects to facilitate the provision of large, market-standard issuances with long tenors and high-grade credit profiles.** Scale is a determining factor for investor interest and bond market viability. Project consolidation and pipeline development is key in meeting investor expectations and facilitating access to capital markets.

  - **Deploying sovereign or sub-sovereign credit-enhancement instruments,** such as guarantees, insurance mechanisms and first-loss tranches, to improve the creditworthiness of water-sector investments.
  - **Positioning water bonds within the context of adaptation, resilience and biodiversity** to strengthen their appeal to investors.

- **Ensure that taxonomies defining "sustainable activities" are comprehensive and inclusive of all water-related investments that support environmental and social objectives, including freshwater-related investments.** While taxonomies can effectively guide finance toward durable projects, their impact depends on how criteria and thresholds are set. Narrow definitions risk excluding critical investments, such as expanding water access to underserved communities, water conservation, wastewater treatment, irrigation and ecosystem restoration that may not meet strict technical criteria but are essential for long-term viability. Broadening the scope to reflect multiple environmental goals, including water resource protection and equitable access, will enhance their effectiveness and alignment with real-world needs. These enhanced taxonomies will improve the precision of activity classification and improve clarity and consistency in reporting. By doing so, they will promote greater transparency, comparability and investor confidence, ultimately mobilising more effective capital flows toward long-term water investments.
- **Develop clear regional and national standards and frameworks dedicated to water bonds, to structure and scale the market, aligning with recognised international standards and taxonomies** (e.g. EU Green Bond Standard) **and supported by independent second-party opinions** (e.g. Shades of Green by Cicero and now Standards & Poor)**.** Although most issuers align their bonds with the principles developed by the ICMA, several local standards are emerging at regional or national levels. Country experiences show how national finance frameworks can provide clarity for issuers by rigorously classifying water-related sectors and investments, helping to ensure transparency, reducing greenwashing risks and building investor confidence, thereby attracting more capital toward investments in water security.
- **Mandate robust impact reporting for all water-related bonds** (e.g. detailed annual reporting on environmental impacts such as reduced flood risks or improved water quality) and **independent verification** with quantitative metrics to build investor confidence and facilitates comparability across issuances. Drawing on best practices from disclosure regulations and certification standards, issuers should disclose reliable, consistent and comparable information. In parallel, **promote methodological consistency to improve market transparency**. While labelled issuance remains limited, broader estimates that include any mention of water in use-of-proceeds suggest much larger volumes, creating confusion about actual market size. Consistent and transparent reporting of both labelled and water-referenced bonds is essential to provide a balanced market view. Aligning and explaining methodologies is essential to ensure reliable data, support informed decision-making and avoid misleading signals on capital flows.
- **Recognise the complementary roles of labelled blue bonds and water-referenced bonds in mobilising capital for the sector.** The choice of the bond category is context-specific and critical in securing investor interest. In certain regions, bond instruments are more commonly classified as green rather than blue, primarily due to higher levels of standardisation; however, in other contexts, categorising them as blue may appeal to thematic investors. The **emergence of blue bonds presents an opportunity to direct capital more explicitly towards water-related outcomes**, provided consistent standards and robust taxonomies for investments in water security are developed.
- **Strengthen the engagement of public development banks, including MDBs, DFIs, and regional or national development banks, in the water and blue bond markets**. These institutions are well-positioned to derisk water investments and catalyse private capital by providing

credit guarantees, co-investment structures, direct bond purchases and concessional finance. However, **their involvement in water-focused bond issuances remains comparatively limited relative to sectors such as energy and transport infrastructure**. Strengthening their engagement in water and blue bond markets could involve:

- deploying targeted **credit-enhancement instruments**
- acting as **issuers** to leverage capital or **anchor investors** to strengthen market confidence
- establishing **dedicated facilities to support water and blue bond issuance**
- supporting governments in designing and implementing **regulatory and policy frameworks** conducive to the issuance of water-related bonds

- **Support the development of subnational bond markets:** Subnational governments are often responsible for service delivery but face obstacles in accessing capital markets, including difficulties in achieving the critical mass required for benchmark-sized issuance. Developing subnational bond markets would entail:
  - **supporting municipal bonds by establishing clear legal and regulatory frameworks** that enable local authorities to issue debt efficiently and transparently and that enhance investor appeal (including tax incentives)
  - **issuing bonds in local currency** to enable municipalities and utilities to tap into domestic investor bases, such as pension funds and insurance companies and to reduce exposure to exchange rate risk, thereby improving predictability for both issuers and investors and supporting the development of domestic capital markets
  - **strengthening the capacity of issuers**, particularly public utilities and municipalities
  - **developing platforms to aggregate small/medium-scale investments** and develop pipelines to meet investor expectations and facilitate access to capital markets
- **To address SLBs bottlenecks**, support technical assistance, develop local sustainability guidelines, select ambitious KPIs and targets, strengthen data capacities, improve bond design and scale market transactions in developing countries (OECD, 2024[1]).

6.2. Mobilising Islamic Finance for water investments

Key findings

- **The Islamic Finance (IF) market has grown substantially over the years**. The IF industry was valued at USD 3.4 trillion as of 2023 (IFSB, 2024[2]), while it was representing USD 200 billion in 2000. This growth has been observed in both Muslim-majority countries, such as Saudi Arabia, Malaysia and the UAE, and other jurisdictions including the UK, Luxembourg and Hong Kong.
- De**spite this steady growth, water investments still represent a marginal share of IF**. For instance, water represents 0.2% of Islamic Banking investments according to the Prudential and Structural Islamic Financial Indicators (PSIFI) dataset of the Islamic Financial Services Board (IFSB). Similarly, the share of water in Islamic development finance is around 2.3%, including hydro-electric powerplants and agricultural water resources (classified under the energy and agriculture sectors, respectively) according to the Total Official Support for Sustainable Development (TOSSD) dataset.
- **This is due to some obstacles to the expansion of IF in the water sector**, which include relatively limited market size, depth and liquidity in some countries, regulatory fragmentation across jurisdictions, limited awareness and understanding of IF mechanisms, and lack of reporting and data for its use in sustainable and water investments.
- **Opportunities to leverage IF for water investments** include strengthening policy frameworks, international coordination and standardisation, leveraging promising Islamic finance instruments, mobilising private investment, strengthening data systems and reporting.
- **IF principles and instruments have synergies with the specific needs of water investments**. Harnessing the potential of Islamic finance for water is promising, not only due to the substantial volume of capital available, but also because of the underlying principles and specificities of financing models which **can – to some extent – be source of inspiration of viable water financing models**, including PPPs and innovative financing structures, most specifically with regards to transparency and accountability, financial resilience, asset-backed mechanisms and risk sharing.

6.2.1. Policy recommendations

- **Leverage the untapped potential of Islamic finance instruments and models to mobilise additional capital for water investments**, in particular:
  - **Green sukuk**, which can attract both Shariah-sensitive and impact-focused investors to finance large-scale water infrastructure.
  - **PPP models integrating IF**, including through parallel financing which blends Islamic and conventional financial instruments to expand capital availability for large-scale water projects.
  - **Shariah-compliant commercial finance and Islamic blended finance**. International banks with Islamic windows could act as catalysts for integrating responsible investment practices into commercial IF, building on the experience of conventional financing windows.
  - **Islamic social financial instruments**, at national level but also at regional or international level, including zakat (mandatory almsgiving), waqf (endowments), sadaqah (voluntary

charitable giving) and qard hasan (benevolent zero-interest loans), which primarily provide funding to underserved populations.

- Commission in-depth studies on the specific features of **asset-backed and asset-based financing mechanisms** and how it can **inform and strengthen conventional financing models to improve the long-term viability of water-related investments,** particularly with respect to **transparency, accountability, financial resilience and balanced risk sharing.**
- **Guide the development of IF for water investments through targeted legal, regulatory and economic policy measures.** This includes the creation of dedicated supervisory units within financial authorities, the adoption of international Shariah-compliant standards (e.g. AAOIFI,[1] IFSB[2]) and the development of guidelines for green Islamic finance products. Measures such as economic incentives, risk mitigation tools, reasonable offtake agreements and partial asset ownership can support private sector engagement. Governments can also encourage IF institutions to align operations with socio-economic and environmental considerations by strengthening impact assessments, improving transparency and promoting financial instruments that deliver measurable impact.
- **Advocate for the creation, by international standard-setting bodies, of harmonised standards for IF products that incorporate water investment criteria, among other objectives.** These standards should define both ESG and Shariah compliance requirements for water projects, specify the eligible types of infrastructure and require transparent impact reporting. Clear, sector-specific provisions can lower transaction costs, improve market comparability and strengthen investor confidence in water-focused IF instruments, including green sukuk.
- **Support the setting, by central banks, of sector-specific standards to scale IF for water investments.** Building on initiatives such as the CIBAFI[3]'s 2022 *Sustainability Guide*, central banks, exemplified by Jordan's *Green Finance Strategy* (2023-2028), should integrate sector-specific guidance aligned with these principles to expand green IF instruments. Additionally, central banks developing such frameworks, like Bangladesh's 2020 *Sustainable Finance Policy*, should explicitly incorporate water-focused IF to leverage its growing market share and enhance environment and water-related investment outcomes.
- **Support enhanced data collection, reporting and monitoring to track IF flows into water investments.** Governments, along with international organisations, public development banks and standard-setting bodies, can improve consistency in data collection, reporting and analysis. Improved availability and sharing of data on IF flows for water investments would enable a clearer understanding of current financing patterns, support the identification of opportunities for scaling and strengthen the evaluation of the effectiveness and impact of IF allocations, thereby enhancing investor confidence and interest.
- **Create a framework and/or a technical assistance facility aimed at developing and implementing innovative Islamic finance instruments for sustainable water investments.** It would support the development of tailored Islamic finance instruments to address water challenges (such as scarcity, non-revenue water, rural supply), providing a scalable framework to guide project preparation and financing.
- **Consider establishing an international qard hasan** (benevolent zero-interest loan) **water fund to provide Shariah-compliant concessional financing for water infrastructure projects,** which could for instance be predominantly funded by higher-income regions to support lower-income economies. This mechanism would promote financial inclusion and ensure the viability and affordability of essential water services, while enabling high-income countries to advance their international financing commitments.

- **Promote the integration of water security at the heart of international debates and action plans on leveraging IF for economic development, as it is currently often overlooked.** For instance:
  - **Enhance collaboration between Arab and OECD Development Assistance Committee (DAC) donors to support the use of IF instruments for development.** Both Arab and DAC donors have an opportunity to demonstrate leadership in this area, leveraging their expertise to promote effective implementation.

6.3. Deploying results-based finance in the water sector: use, rationale and conditions for success

Key findings

- **Results-based finance (RBF) links financial rewards or penalties to a set of pre-agreed results**. It can be appealing to funders looking to maximize impact and value for money.
- **RBF has been deployed for results across the water sector, from rural sanitation to stormwater management**, with successful outcomes.
- **RBF can be embedded in grant and repayable finance mechanisms and has been used in contracts with private service providers as well as public sector organisations**.
- **Whilst initial RBF models focused on rewarding output-level results**, such as the number of water supply connections, there has been a **gradual integration of outcome-level results** relating to services' viability.
- **RBF seeks to achieve results by disrupting "business-as-usual", whether by incentivising organisations to increase service levels** (increasing coverage rates in hard-to-reach areas or improving quality of services) **or to adopt innovative environmentally responsive technologies and operational processes**. RBF can also be used to incentivise institutional reforms, which requires strong organisational buy-in.
- **The introduction of RBF models should be carefully assessed against potential limitations and challenges, which include**: (i) design and implementation costs (particularly for setting commonly agreed performance metrics and for the verification agent); (ii): the capacity of funding recipients, which may require providing them with technical assistance to mitigate the risks of failure; (iii) the risk of service providers' relying on results-based grants rather than identifying opportunities for efficiencies and more stable sources of funds; (iv) replicability at scale: few large-scale development finance organisations have adopted results-based contracting, limiting the adoption of this funding modality at scale.
- **Dedicated funding facilities that have adopted results-based payment structures offer the opportunity to pool funding from different sources and could help overcome funders' internal barriers to RBF**. Indeed, most of the institutions that have implemented RBF mechanisms have set up pilots within specific projects, without adopting RBF as institutionalised financing instruments (as procedures differ from standard processes). Dedicated financing facilities with established, standardised procedures could facilitate broader adoption of RBF mechanisms.

6.3.1. Policy recommendations

- **Develop guidance to funders on where, when and how to apply RBF and for what policy outcomes to facilitate the adoption of the instrument**. Many funders (and implementers) are unfamiliar with RBF or require additional guidance to embed RBF in their projects and programmes. A guidance document would consolidate knowledge on the multiple instruments (grants, loans, bonds) that can be designed and deployed using an RBF approach for water-related investments, including flood protection, water conservation as well as water supply and sanitation. Such guidance document would also consolidate knowledge on the type of metrics that can be used to measure infrastructure development and environmental and social outcomes. The guidance would include insights on the pros and cons of RBF and the conditions required to introduce RBF successfully.
- **Promote transparency on the costs of designing and implementing RBF**. While substantial evidence exists regarding the design and effectiveness of RBF schemes in achieving targeted outcomes, considerably less information is available on the costs associated with managing these schemes, particularly from the funder's perspective. Because RBF arrangements typically require rigorous performance monitoring and verification processes, they may entail additional administrative and transaction costs for funders. To date, however, few initiatives promote data sharing on the costs of RBF programmes. Improved availability of such data would enable funders to more accurately assess the net benefits and value proposition of RBF models. Enhancing transparency around the full cost profile of RBF schemes will require the development of a commonly agreed cost-accounting methodology (including clear guidance on which cost components should be captured during design and implementation) as well as the establishment of data-sharing mechanisms, such as dedicated platforms and technical working groups.
- **Commission studies on the cost-effectiveness of RBF models**. Additional research is required to generate robust evidence on the cost-effectiveness of RBF mechanisms, particularly in comparison with traditional input-based funding models. Currently, empirical evidence on the relative cost-effectiveness of RBF versus alternative financing modalities remains limited. Although the initiatives reviewed in this report indicate that RBF schemes can achieve their intended outcomes, data on the full costs associated with the design, implementation and administration of these contracts are scarce, constraining assessments of their overall economic value. A rigorous cost-effectiveness evaluation would necessitate enhanced transparency regarding the total programme costs of RBF schemes. Such studies should be based on sound methodological approaches, including the use of appropriate comparators and the comprehensive identification, measurement and valuation of all relevant costs and outcomes.
- **Develop credible methodologies to measure operational long-term viability, effectiveness and impact for complex infrastructure**. Operational and financial viability (beyond infrastructure availability) is a type of result that is potentially complex to measure, especially in large-scale infrastructure. In piped water supply projects, such results call for measuring the continuity of supply, non-revenue water or energy efficiency, among others. In flood protection projects, they may imply measuring the reduction in flood-prone areas or, in nature-based solutions, the volume of run-off water diverted from grey infrastructure. Scaling-up the use of RBF in these areas require rigorous methodologies to define the results to be achieved (and measured) and specific indicators of success (or failures), including clearly delineated geographical perimeters, sampling methods and reporting/verification requirements. Whilst each project or programme is unique and there cannot be a one-size-fit all approach, developing commonly agreed results measurement methodologies could contribute to reducing the design costs of RBF schemes and to increasing investors' confidence.

6.4. Revisiting public-private partnerships for water and sanitation: balancing risks, focusing on results

Key findings

- **A key challenge in designing PPP transactions is to balance the risks between private and public actors to ensure they deliver policy outcomes** whilst retaining value for money for the public sector.
- Recent Build-Operate-Transfer (BOT) and concession contracts in the water sector demonstrate that **PPPs can be deployed to achieve policies related to investment mobilisation as well as viable, inclusive and efficient water services**. For instance, in the State of Rio (Brazil), PPPs are deployed to achieve universal water and sanitation services coverage. In Jordan and India, governments are calling on the private sector for improving treatment services beyond the construction phase. In France, environmental vulnerabilities are leading some municipalities (Lille municipality, for example) to embed new performance measures in PPP contracts related to water consumption efficiencies.
- **Such partnerships come with risks, but contracts can be structured to mitigate risks for both parties**. All contracts can embed clear and measurable results for which contractors are accountable. BOT-type contracts can incentive performance by embedding a results-based funding element (tying payments from the public sector to the achievement of results, at least partially). In some contexts, concession contracts for large service areas that include different population income levels, can benefit from blended finance to balance financial risks and incentivise private sector investments.
- **Enabling conditions for successful PPP transactions include**: (i) clear government policies backed by legal provisions, particularly on private sector participation conditions, contract structures, tariffs and service level performance; (ii) strong public sector capacity for contract preparation, negotiation and management (iii); stakeholder engagement, including with citizens; (iv) readiness to deploy blended finance; and (v) a robust private sector, ready to take on technical and financial risks.

6.4.1. Policy recommendations

- **Build capacity of public sector institutions for designing and managing balanced PPPs. Designing PPPs** that ensure a more equitable balance of risks and rewards requires, first, aligning expectations between the contracting parties. In many contexts, PPPs are still associated with the promise of large private investments with little costs for the public side, creating a mismatch between public sector's expectations and private investors' perception of water-related investments as high risks and low return potential. Building the capacity of public sector institutions can help bridge this gap. Capacity building should focus on the different types of PPP structures, the risks involved (for both parties) and the mitigation measures as well as the process for a PPP project preparation. In addition, capacity should also be built at the organisational level to mandate and equip institutions on the design and management of PPPs, including contract design and monitoring.
- **Develop detailed PPP projects feasibility assessments to identify all potential risks, mitigation measures and trade-offs**. Where policy is favourable to PPPs, governments should invest in detailed feasibility studies that combine technical appraisal to assess investment needs as well as institutional and financial assessments. Such feasibility studies are critical to turn policy

into practice, as they provide the basis for assessing all potential risks (from environmental to financial risks), related mitigation measures and the need for trade-offs. For example, where feasibility studies indicate that existing tariffs are too low to enable returns on investment for the private sector, specific measures can be introduced to lower investment costs (through measures such as providing land or existing public assets, financing project preparation, offering direct capital contributions or viability gap funding) or borrowing costs (for example, through the provision of concessional finance or guarantees).

- **Gradually initiate the regulatory reforms required to enable balanced PPPs**. PPPs require enabling regulatory frameworks, from clear environmental and water regulations essential to incentivise performance, to appropriate economic regulation that address the value of water and provide a level playing field for potential investors in the context of increased environmental risks. A reform agenda should be set-up to gradually address any regulation gap.
- **Engage with the private sector to create trust and build awareness of water-related investment opportunities**. As governments engage in policy and regulatory reforms to enable PPPs for water and sanitation, they should engage with potential private operators and investors to raise their awareness of government policy and understand their perceived risks. This engagement, upstream of the PPP project, will contribute to designing appropriate risk-sharing structures and mitigation measures.
- **Engage with local financial structures and channels to enable the deployment of blended finance**. Global experience has shown the critical role of local financing institutions in financing PPP projects, including local commercial banks and public development banks. These institutions can provide local currency lending, which can be backed by credit guarantees. Public development banks are particularly well-placed for enabling blended finance through the provision of concessional finance in PPP projects with significant societal and environmental returns.
- **Address political risks through citizens' engagement**. Governments should ensure citizens' representations in national and local fora on forthcoming and ongoing PPP projects, through water consumer associations and engagement with elected officials. Specific measures should be in place to enable citizens to voice their perceived risks and the government to act upon and set-up adequate mitigation measures.

References

IFSB (2024), *Islamic Financial Services Industry Stability Report 2024*, https://www.ifsb.org/wp-content/uploads/2024/09/IFSB-Stability-Report-2024-8.pdf. [2]

OECD (2024), "Sustainability-Linked Bonds: How to make them work in developing countries, and how donors can help", *OECD Development Perspectives*, No. 44, OECD Publishing, Paris, https://doi.org/10.1787/7ca58c00-en. [1]

Notes

[1] Accounting and Auditing Organisation for Islamic Financial Institutions: international not-for-profit organisation primarily responsible for development and issuance of standards for the global Islamic finance industry.

[2] Islamic Financial Services Board: an international organisation committed to promoting the soundness and stability of the Islamic financial services industry by developing international standards for the regulation and supervision of the industry.

[3] General Council for Islamic Banks and Financial Institutions: provides policy advocacy, capacity building and best practice guidelines to support Islamic banks and financial institutions worldwide.

Annex A. Scopes of the datasets and methodology

The datasets and their composition

The three datasets used for this analysis include data from the *Green Bond Database*, the *Social and Sustainability Bond Database*, and the *SLB Database* of CBI, which **provide detailed bond issuance-level information**, including the issuer, type of issuing institution, issuance amount, date, country and the use of proceeds (i.e. how funds raised through the bond are used to finance different types of investments). The first two databases cover the GSS bond market. The third dataset focuses on SLBs, a relatively recent type of bond distinct from GSS bonds due to its performance-based structure. The combination of these datasets cover the GSSS bond market (CBI, 2024[1]) (see Figure 2.1). The definitions of each type of bond are available in the first section of this chapter.

The three datasets cover a common time period, from 2015 to 2024. They include all issuances within this timeframe that feature water- or "blue"-related keywords in the issuer-defined original labels, use of proceeds (UoP) descriptions, or key performance indicators (KPIs).

The datasets contain three key variables that allow mapping bond issuance which provide financing for water-related investments: the original bond label, the use of proceeds and the KPIs (the latter being used only for SLBs). The original label assigned by the issuer categorises the bond based on its primary financing objective, which offers insight into the intended purpose of the proceeds. The use of proceeds (UoP) outlines the specific sectors, subsectors or projects that will be financed through the funds raised by the issuance. This chapter relies primarily on the original label to determine whether a bond supports water-related investments, as not all issuances provide detailed UoP descriptions. **KPIs are defined exclusively for SLBs**. Unlike GSS bonds, which allocate proceeds to specific projects, SLBs do not have a designated use of proceeds. Instead, they are tied to impact objectives, with financial or structural adjustments based on the issuer's achievement of these targets. Further details on the different types of bonds in the GSSS bond market can be found in the chapter.

In total, 12 092 distinct bond issuances bearing water or blue mentions in their original labels, UoPs or KPIs have been identified in the datasets, amounting to USD 1.6 trillion over the period of 2015-2024. These figures represent the total volume of GSSS bond issuances during this period that were explicitly mapped as water- or blue-related based on their original labels, UoP, or KPIs.

Water and blue labels assigned by bond issuers share similarities but differ in scope. There is no clear distinction between water- and blue-labelled bonds in CBI documentation. The CBI's Bond Taxonomy categorises *water* as a sector but does not include *blue* as a separate classification (CBI, 2021[2]). According to the data, blue-labelled bonds may finance ocean-related UoP, water-related UoP, or a combination of both, whereas water-labelled bonds tend to focus exclusively on investments in water security, such as water supply, water management, and wastewater treatment, and freshwater-related investments.

Methodology for the analysis

The methodology used in this chapter to map water- or blue-labelled bonds is based on the issuer's original labelling as the primary variable for classification. The analysis includes all bonds explicitly labelled with water- or blue-related tags by issuers, as recorded in publicly available data from the CBI databases.

This approach is guided by two main considerations. First, while not all issuances provide detailed UoP descriptions, every bond carries at least one label assigned by the issuer, reducing the risk of missing data. Second, this methodology aligns with the approach used by the CBI in its report *Sustainable Debt: Global State of the Market 2023* (CBI, 2024[1]), ensuring consistency with existing literature.

However, this choice involves certain trade-offs. Some bonds may include water-related keywords in their UoP descriptions but lack an explicit water or blue label from the issuer: these have not been included in the assessments which are based on original labels. Mapping water-related bond activity at a global scale remains complex, with multiple methodologies available. The approach applied in this analysis relies on issuer-provided labelling, acknowledging that alternative methods may yield different results. On the other hand, as highlighted in the chapter, harmonisation of methodologies is required for effectively assessing the size of water-related bond markets. Beyond labelling, post-issuance reporting mechanisms should be promoted to track the contribution of bond finance for water investments effectively. Furthermore, it is important to note that alternative methodologies to track the capital raised by bonds for water investments, including tracking water-related keywords in UoPs, could yield different results regarding the capital market landscape for water.

The presence of multiple labels on a single bond makes it difficult to disaggregate the proportion of financing allocated to each category. In consequence, the methodology applied in this chapter captures the total volume of capital raised through bonds explicitly labelled as water or blue by their issuers but does not quantify the actual amounts allocated to water-related investments. The average number of original labels for bonds issued between 2015 and 2024, containing at least one mention related to "water" or "blue", is 1.27. Based on this estimate and flat allocation[1] methodology, approximately 80% of the capital raised by the total blue- or water-labelled bonds in the period of 2015-2024 is likely to have been allocated to water-related investments.

References

CBI (2024), *Sustainable Debt Global State of the Market 2023*, https://www.climatebonds.net/files/reports/cbi_sotm23_02h.pdf. [1]

CBI (2021), *Climate Bonds Taxonomy*, https://www.climatebonds.net/files/files/CBI_Taxonomy_Jan2021.pdf. [2]

OECD Studies on Water

Financing Water Security

Models and Approaches for Investments that Last

Water-related investments are central to economic development. They strengthen water security and support other sectors such as agriculture, industry, energy, health and education. Yet, across OECD and non-OECD countries alike, the long-term viability of many water-related investments remains a concern.

Discussions on financing for water often focus on the scale of capital required to close investment gaps. However, the effectiveness and durability of investments depend not only on the volume of resources mobilised, but also on the quality, structure and purpose of the financing deployed. This highlights the importance of financing models that can support long-term, impactful investment outcomes.

This report examines funding and financing approaches that can improve the long-term viability of water-related investments and mobilise capital at scale. Focusing on bond finance, public–private partnerships, results-based finance and Islamic finance instruments, the report aims to help policymakers, financial institutions and investors understand how financing structures, risk allocation mechanisms and incentive frameworks influence investment outcomes over time. It also explores how underutilised pools of capital, particularly those linked to growing demand for impact-driven assets, can be mobilised more effectively.

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