IWRM Action Hub

IWRM TOOL - D2.06

Water and Climate Finance

There is an increasing understanding that good water management can play a role not only in climate adaptation but also in mitigation. The water sector is in fact becoming better at demonstrating its green contributions and thus is gaining more attraction from climate financiers. This Tool introduces the conceptual interlinkages between climate change and water resources management, presents key characteristics making water and climate projects more attractive to climate investors, maps out the main sources of water and climate funding, and discusses innovative financial instruments that can be used to leverage new investment for water and climate related initiatives.

Interlinkages between Climate Change and Water Management

The earth's climate and the terrestrial water cycle have a very close and complex relationship. Climate-change related processes will impact the water cycle and our water resources management practices in a number of different ways (UNESCO and UN-Water, 2020). At the same time, however, it is important to recognise that the way we manage our water resources will also have an impact on climate change. Here are some concrete examples of this two-way relationship and the interlinkages between climate change and water resources management:

- **Water stress**: Climate change will increase water demand and reduce water supply. Water use has been growing at more than twice the rate of population in the last century (FAO, 2013), being one of the main drivers' of migration to densified cities. Additionally, water demand tends to grow with rising temperatures. This may accentuate water stress in drier regions and conflicts over water uses in those with abundant resources.
- **Food production**: Climate change will alter global food production patterns as a function of water availability. A growing demand for food (and consequently for water) due to increasing populations and their standards of living will also have to deal with crop productivity changes related to climate variability (to be negative in low-latitude and tropical regions but somewhat positive in high-latitude regions) .
- **Water quality**: Climate-induced harmful algae blooms (HABs) are increasing due to warmer water temperatures caused by global warming. Many lakes and estuaries around the world, which provide drinking water for millions of people and support ecosystem services, already have toxic, food web-altering, hypoxia-generating blooms of harmful cyanobacteria.
- **Biodiversity losses**: Climate change is likely to further stress the world's wetlands and aquatic ecosystems. Competing water uses and growing withdrawals and worst

water quality will impact negatively the sustainability of vital environmental flows, ecosystems and biodiversity.
- **Water infrastructure**: Investments are needed not only in new infrastructure but also in the maintenance and operations of the existing stock, to improve their efficiency and reduce water losses. Climate change generates additional risks to water-related infrastructure, requiring an extra focus on the inclusion of adaptation measures.
- **Extreme weather events**: Changes in precipitation patterns under climate change conditions are expected to increase the intensity and frequency of flood and drought events in many regions which demands new adaptation measures to reduce vulnerability.

Making Water Projects Attractive to the Climate Financiers

The main challenge for the water sector is "to leverage climate finance mechanisms to provide additional funding to improve water management, and by doing so improve safe water and sanitation access through actions that also mitigate and/or increase resilience to climate change, often providing other co-benefits at the same time" (UNESCO and UN Water, 2020). While there is no single silver bullet to this difficult challenge, there are certainly few basic characteristics that tend to make water-related projects more attractive for climate finance investors:

- **Climate bankability**: To become more attractive, water projects should be bankable from a climate change perspective, that is, projects must directly address climate change impacts (through scientific evidence), align to national sustainable strategies and funders' climate goals, and follow standard banking procedures. Water professionals cannot think that their project will inherently have positive impacts on climate resilience simply because water is so deeply linked to climate change. Water projects need to think beyond the "water box" and articulate themselves as having water and climate intentions.
- **Recognition of the "real" value of water**: Projects should consider giving the total economic value of water and demonstrate its contribution to different sectors and to the economy (Tool D1.02). Building a strong investment rationale for water investments will increase the attractiveness of water-related interventions. Methods such as Benefit-Cost Analysis and different techniques around shadow pricing can help evaluate the total economic benefits related to water.
- **Pro-poor and GESI perspective**: Projects that incorporate actions to reduce vulnerability to climate change for the poorest populations, particularly those living in least developed countries and small island nations states, might become more attractive to development funding institutions, as these beneficiaries are the most affected by climate change extreme events (droughts and floods) and the least prepared to adapt to them. Projects with clear gender and social inclusion components are also more likely to be attractive to climate financiers.
- **Mitigation and adaptation**: To be more financially attractive, a water project should address both climate mitigation and adaptation. In terms of mitigation, the typical projects are those that aim to reduce green house gases (GHG) emissions from water and wastewater treatment plants (e.g., reduction in chemicals for water treatment; use of methane emissions from wastewater treatment, thus, reducing energy

consumption; replacing fossil fuels with renewable energy technologies for energy generation; using wastewater treatment by-products as fertilisers; industrial water reuse to reduce water withdraws for agriculture). However, the most promising projects are those that also have an adaptation dimension, such as: a) controlling runoff and floods due to higher precipitations might be handled with green infrastructure and nature-based solutions, which complement grey infrastructure projects, thus, reducing investment requirements; b) adoption of water efficiency technologies has been gaining attention from project developers in countries suffering from water stress and as a measure to deal with growing demand for water in megacities; c) lower crop productivity due to water stress and raising temperatures might be tackled with climate-smart agriculture techniques, regenerative agriculture practices, and ecosystems restoration activities.

Sources of Water and Climate Finance

Funding for water climate resilient projects is available from several sources:

- **Specialised multilateral climate finance organisations**: This includes examples such as the Green Climate Fund, the Global Environment Facility, and the Adaptation Fund, which provide both reimbursable and non-reimbursable funding for climate change related projects, conditioned to strict economic and financial evaluation criteria, social and environmental safeguards, secured matching compromises from national and regional governments and private investors, and thorough public consultation among potential beneficiaries.
- **Global financial development institutions, regional and sub-regional development banks**: This includes the World Bank, Interamerican Development Bank, African Development Bank, Asian Development Bank, Asian Infrastructure Investment Bank, New Development Bank, among others. They provide reimbursable funding in the form of loans for public bankable projects. It is important to highlight that those loans are backed-up by national governments, which are the direct recipients of the funds. In the case of private sector projects, some of the organisations have specialised investment vehicles, such as the World Bank's International Finance Corporation, which provides resources in the form of equity or traditional commercial loans. These investments facilities also provide non-reimbursable funds for project preparation, social or environmental activities directly related to the project.
- **Bilateral development agencies:** Agencies such as GIZ (Germany), USAID (USA), AFD (France), AECID (Spain), FCDO (UK), SDC (Switzerland), SIDA (Sweden) are among the most important providers of funding for climate change related projects. Not only those countries provide non-reimbursable funds through their development agencies but also conditioned reimbursable loans through exports-imports banks, which finance adoption of specific technologies developed in those countries.
- **National and subnational development banks**: For example, China Development Bank, National Development Bank of Botswana, Development Bank of Jamaica, etc. are public-owned banks. They provide concessional loans (lower interest rates, longer repayment periods, partial condonation of loans) for development projects. There is a new trend of greening the operations of these institutions which has become an active player in the green bonds market.

- **Private sector investors**: This includes private equity funds, multinational corporations, insurance companies, commercial financial institutions, among others have become an important source of funding for climate change projects when lending and investments structures take the form of blended finance (Tool D2.05). The growing interest in this sort of projects is based on the experience gained in the last two decades in addressing risks and using innovative financial instruments to hedge against them (Deutz et al., 2020).
- **Philanthropy**: Institutions such as Climate Works Foundation, Rockefeller Foundation, MacArthur Foundation, etc. have been and will continue being an important source of funding for water and climate projects for least developed countries which have limited access to traditional funding. This includes corporate and family foundations and specialised NGOs in water access and sanitation. This sort of funding might be of particular importance to achieve the WASH SDG 6 component.

Climate Finance Instruments

The water and climate sector uses the same financial structures (project finance, public-private partnerships) and instruments (loans, guarantees, bonds, insurance, equity) that any other industry. However, there are some financial structures that work better for water and climate resilient projects (Table 1).

Table 1. Summary of Climate Finance Instruments. Source: World Bank (2020).

Climate finance instruments		Description
Investment financing	Equity	The provision of public finance in the form of equity stake/shareholder investment to support an enterprise or one of a series of discrete projects.
	Investment loans	The provision of public finance in the form of loans to government projects, an enterprise, or a series of discrete projects.
	Investment grants	The provision of public finance in the form of cash, goods, or services, for which no repayment is required.
	Guarantees	The provision of support by a public actor to transfer certain risks from investors or national governments to the public actor.
	Intermediated financing	The provision of financial support through intermediaries such as banks, microfinance institutions, or other actors.
Results-based financing (RBF)		The provision of funds to a recipient linked to the achievement and independent verification of a pre-agreed set of results from an investment or policy, including prizes, competitions, and payments for investment and policy outcomes.
Policy-based financing		The provision of public finance conditional on the borrower fulfilling their policy commitments.
Trade finance		The provision of finance to bridge the gap in time between import payment and export receipt of payment.
Technical assistance (TA)		The provision of finance in the form of grants or non-financial assistance provided by specialists, to finance or provide support in the form of information sharing, expertise, skills training, knowledge sharing, or other consulting-type services.

Moreover, the last decade has witnessed the emergence of innovative financial structures which are being piloted and can be replicated and scaled-up at a global level. Here are some of the most innovative financial structures in the market (N.B. this is a selection rather and an exhaustive taxonomy of these sort of financial instruments).

- **Green debt**: It takes the legal form of a traditional lending product, where a private or public borrower obtains credit from a bank in return of a financial commitment (interest rate) to use the proceeds to finance projects or assets that deliver environmental outcomes (mitigation and/or adaptation goals). Depending on the borrower's size and risk profile, these loans are syndicated by lenders and have shorter maturity than in the case of other financing instruments such as green bonds. The difference between traditional loans and green debt is that the latter have become more attractive, as the introduction of new technologies for water and waste water treatment might reduce significantly operation and maintenance costs and increase revenue generation, which downplays the risk of default. Moreover, there is a special structure called "Sustainability-Linked Loans", defined as loans provided by lenders in return for sustainability commitments assumed by the private borrowers and agreed between borrowers and lenders that, if accomplished, might result in interest-rate reductions (Deutz et al., 2020).
- **Green Bonds**: They are debt instruments issued by either public or private organisations to raise capital in the domestic and international capital markets (public offering) or placed privately with a limited number of investors (not listed on a public exchange). Investors receive full repayment of the bond issuance amount (the "principal") in addition to interest payments on outstanding principal amounts (the "coupon payments"). Green bonds are similar to ordinary bonds except that investment proceeds are restricted to finance green projects and assets. The determination of whether a bond is actually "green" is left to issuers and investors (For a taxonomy of water projects that can apply to green bonds financing, see table 2). The water sector accounted for 8% of the total climate-aligned bonds (US $101 billion) or 10.1 % of the green bonds in 2018, with proceeds used for improving the climate resilience of water assets (Deutz et al., 2020)

Table 2. Green Bonds Taxonomy for the Water Sector Projects. Source: Climate Bonds Initiative (2021).

	Asset type	Asset specifics	2 degree compliant	Screening indicator	Certifiable
WATER INFRASTRUCTURE	Water monitoring	Smart networks, early warning systems for storms, droughts, floods or dam failure, water quality or quantity monitoring processes	●		●
	Water Storage	Rainwater harvesting systems, storm water management systems, water distribution systems, infiltration ponds, aquifer storage, groundwater recharge systems, sewer systems, pumps, sand dams	●	No net GHG emissions are expected, and the issuer discloses the justification for this decision with supporting documentation OR	●
	Water treatment	Drinking water treatment, water recycling systems, wastewater treatment facilities, manure and slurry treatment facilities Ecological retention system, current force reduction mechanisms	●	Negative net GHG emissions are expected, and the issuer has estimated and delivered the GHG mitigation impact that will be delivered over the operational lifetime of the project or asset	●
	Water distribution	Rainwater harvesting systems, gravity fed canal systems, pumped canal or water distribution systems, terracing systems, drip, flood and pivot irrigation systems	●		●
	Water desalination	Seawater desalination plants and brackish water desalination plants	●	The average carbon intensity of energy used to power the plant must be at or below 100g CO2/kWh over the remaining lifetime of the asset	●
	Flood defences	Surge barriers, pumping stations, levees, gates	●		●
	Nature based solutions	Water storage from aquatic ecosystems, aquifer storage, snowpack runoff, groundwater recharge systems, riparian wetlands	●	No net GHG emissions are expected, and the issuer discloses the justification for this decision with supporting documentation	●
		Flood defences by ecological retention, restoration of riparian wetlands, relocation of assets	●	OR Negative net GHG emissions are expected, and the issuer has estimated and delivered the GHG mitigation impact that will be delivered over the operational lifetime of the project or asset	●
		Drought defences by aquifer storage, recharge zone management, wetland management	●		●
		Water treatment by natural filtration systems, forest and fire management	●		●
		Stormwater management by permeable surfaces, erosion control systems, evapotranspiration systems	●		●
	Products	Water saving technologies	●		

- **Results-based financing**: This structure is “a financing modality or approach under which a donor or investor (also known as “principal”) disburses funds to a recipient (also known as “agent”) upon the achievement and independent verification of a pre-agreed set of results” (World Bank, 2017). In the water sector one of the innovative experiences of the use of results-based financing is wastewater treatment in Brazil with PRODES (River Basin Clean-up Programme in English), established in 2001 by the National Water Agency. This programme aimed to reduce water pollution in watersheds by giving financial subsidies to public investors based on pollution targets (reduction in discharge of untreated sewage, that is, “payment for results”) instead of giving financial support to projects while they were built (“paying for the work”). Since it was created, a total of 80 wastewater treatment facilities were constructed through this programme, benefitting about 9M people. Approximately US $118 million has been disbursed in subsidies and the equivalent to US $468 million has been leveraged in total investments (ANA, 2016).
- **Environmental Impact Bonds**: This a financial instrument through which a beneficiary party (or outcome payor), often a governmental entity, enters into a contractual relationship with a group of risk investors to procure a needed service or intervention on a pay-for-success basis. The outcome payor benefits from the fact that it is not required to repay the investors unless predetermined metrics (which indicate the service or intervention has been successful) are achieved. Given the conditionality of the returns, it is in the investors’ interest that competent service providers are hired and that these service providers deliver strong results that satisfy the predetermined metrics (Deutz et al., 2020). The first bond of this class was issued in 2016 by the District of Columbia Water and Sewer Authority (USA) to control storm

water runoff in excess due to increasing urbanisation (conversion of natural landscapes into housing projects) and changes in precipitations due to climate change. The proceeds have been used to construct green infrastructure practices designed to mimic natural processes to absorb and slow surges of storm water during periods of heavy rainfall, ultimately reducing the incidence and volume of combined sewer overflows that pollute the District's waterways. If the predetermined runoff control thresholds are achieved in excess, investors will get a performance payment of US $3.3 million; if the solutions perform as expected, investor will not get any premium and are paid at a market rate; however, if those solutions underperform, investors will pay the District of Columbia Water and Sewer Authority a US $3.3 million risk share payment (**DC Water, n.d.**).

- **Green Insurance and Catastrophe Bonds**: The insurance industry offers to different products that fits the objective of adaptation in the water sector. Based on the model of a parametric insurance, defined as "an agreement to make a payment upon the occurrence of a triggering event" (Swiss Re, 2018), a Catastrophe Bonds (CAT) is a financial instrument by which "the holder (i.e., the beneficiary) of the policy receives a pay-out when a disaster reaches a predetermined threshold, and investors lose part, or all, of the principal that they have invested. If no disaster exceeds the threshold that triggers a pay-out, the investor receives the promised interest on his investment and the principal is returned at the close of the coverage period" (Cooley et al., 2020). An example of this instrument is Jamaica's CAT that will provide the government with financial protection of up to $185 million against losses of three Atlantic tropical cyclone seasons ending in December 2023 (World Bank, 2021). A special type of CATs is Resilient Bonds, which "links insurance premiums to resilience projects in order to monetise avoided losses through a rebate structure that is used to fund proactive risk reduction projects and reactive disaster recovery actions" (Veolia Institute, 2018). The first Resilient Bond was issued by the European Bank for Reconstruction and Development to use the proceeds to finance existing and new climate resilience projects such as the rehabilitation and modernisation of a 60-year-old hydropower plant in Tajikistan and a water conservation project for an irrigation system in Morocco (EBRD, 2019).

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