Financing for Water

# Funding Innovations in Water Resource Management

ICED
Infrastructure & Cities for Economic Development

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

**Organisations around the world, regardless of their ultimate motivations, are increasingly seeking solutions to challenges in water resource management**. Having defined some of the technical ways to better manage water resources and ensure downstream efficiency, this section explores some of the more well-known examples, but also highlights that these cases are not financially sustainable, which negatively impacts their scalability, replicability, and likelihood of continuity. A common thread throughout this section is the differentiation between funding and financing, and the fact that dependence on funding from governments and corporate social responsibility does not lead to predictable flows or sustainable financial models at the scale required to address the problem of water resource management.

**Investors struggle to find ways to invest in projects that are specifically labelled as 'water resource management' opportunities, and the packaging of such projects needs to be aligned with investor expectations.** This section begins to identify funding solutions which, in this case, are representative of pioneering efforts to introduce traditional funding through non-traditional means. These largely include purely government prerogatives, which are dependent on resource allocations driven by a political agenda, or a combination of public and charitable funds, which are similarly constrained by factors that extend well beyond the need of the intervention.

### Covering the costs of New York City's water supply

The New York City Water Supply is the largest unfiltered water supply system in the world. Providing 1.3 billion gallons (c. 5.9 million cubic metres) of water a day to city consumers, the system is fed by two watersheds generally referred to as the East of Hudson or Croton Watershed and the West of Hudson or Catskill/Delaware Watershed. Covering over 2,000 square miles of eight counties in upstate New York, the watershed, including its various reservoirs, aqueducts and associated facilities, has provided clean, unfiltered water to millions of people since the 1800's. The 1.3 billion gallons of water a day provided to over 9.5 million New Yorkers, though, comes at a considerable cost.

New York City's Department of Environmental Protection (DEP), which is responsible for maintaining the water supply and all its related expenses, incurs costs that would not be manageable for most sub-national governments; in 2015, it paid USD 157 million in taxes on the parcels of land where its reservoirs sit, and the DEP's capital budget makes up approximately 20%, or USD 9 billion of a total USD 45 billion in planned expenditure from 2019 through 2022.[21] This magnitude of investment, in both absolute and relative terms, would be extremely difficult for governments in the global South to replicate.

## Alien Invasive Species: The Nature Conservancy

**In its efforts to support higher levels of efficiency in watersheds through the removal of invasive alien plant species, the Nature Conservancy completed a business case for the establishment of the Greater Cape Town Water Fund.** The business case argued that widespread alien plant infestation (over 69% of the 24 source water sub-catchments in the Western Cape Water Supply System) had led to severe degradation of the water supply and higher costs for downstream users who see a lower quantity of water introduced as supply. More specifically, these species have either (1) increased evapotranspiration rates because of their height and larger leaf surface than native plants or (2) introduced extensive rooting systems which allow them to access groundwater and keep growing, even during drought. These alien plant invasions in the main water source areas of the supply system reduce the amount of water that reaches the rivers and dams that feed the region, resulting in a loss of an estimated 55 billion litres of water a year, equivalent to nearly two months of Cape Town's annual water supply. The argumentation and associated scientific evidence indicate that funding to address this upstream problem will create hundreds of jobs and have a net positive impact when compared with the initial capital costs associated with this work.[1]

**The challenge of this approach, in line with the theme of this section, is that financial sustainability is highly dependent on the local government as well as donations** from multi-national corporations that are

[1] The Nature Conservancy (2018) Greater Cape Town Water Fund – Business Case.

themselves water-intensive in their industrial applications (Pepsi, Coca-Cola, breweries, etc.). Despite comprehensive analyses that show the merit of the introduction of water funds, there is no mechanism through which investors can participate and see predictable returns.

### Aquifer Recharge: The City of Cape Town

**In response to the worst drought in its recorded history, the City of Cape Town has determined that it needs to diversify its water sources; it plans to augment its surface water through a combination of desalination of seawater, direct reuse of effluent, and aquifer recharge.** Cape Town has specifically called out the Cape Flats Aquifer as its focus area, with plans to:

- Reduce and limit contamination (immediate & ongoing);
- Implement modular treatment for potable groundwater use; and
- Establish bio-remediation measures to reclaim stormwater and wastewater for enhanced aquifer recharge.

To achieve this goal, the city will undertake three specific tasks:

- Exploratory drilling, reaming and equipping new boreholes and refurbishing existing boreholes inclusive of power supply and permanent security cages;
- Design and construction of steel panel service reservoirs complete with concrete slab; and
- Construction of filtration units, chlorination units, booster pump stations, collector pipe systems, and connection pipe systems as well as earth works for wet-land recharging.

The cost of the aquifer recharge is anticipated to be approximately USD 200 million, and is anticipated to be financed through a mix of Green Climate Fund reimbursable grants, and contributions from the city itself.[2]

**Similar to the response to alien invasive species, this solution is highly dependent on an ongoing commitment from the city as well as concessionary financing from an international body**, which plans to lend not on the bankability of the project but instead the creditworthiness of the municipality. Given the high levels of financial management in Cape Town, particularly when considered relative to other entities across the global South, this is unlikely to be replicable.

### Relief Efforts: Aid Agencies and Multi-lateral Development Banks

**Pre-emptive responses to flooding can have significant impacts for river basins and downstream users.** Following flooding (which directly impacts vulnerable populations in the immediate aftermath but also has negatively affects businesses and citizens on a long-term basis without proper responses), re-building and insurance claims can cost upwards of USD 8 billion per instance.[3] Developing economies are ill-equipped to respond to floods, particularly as their frequency is increasing due to climate change, changes in river patterns due to urbanisation, and other factors. The Thai city of Nakhon Sawan, devastated by flooding in 2011, and the Nigerian city of Ibadan, similarly negatively impacted, have benefited from support from the World Bank and other agencies to determine better ways to be responsive to flooding through significant capital investment in their urban infrastructure. Although largely funded through donor support and government contribution, these efforts have led to the incorporation of flood response techniques into capital raises from the private sector.

### Better Agricultural Practices: The Nature Conservancy

**Sustainable land use management can help address a wide range of climate and water security challenges.** The Tana River in Kenya provides 80% of the drinking water for Nairobi, generates 70% of the country's hydropower and irrigates about 645 km$^2$ of farmland. Steep hillsides and areas adjacent to rivers have been converted to agriculture, resulting in erosion. Sedimentation has reduced the capacity of reservoirs and increased the costs of water treatment for Nairobi.

**The Upper Tana-Nairobi Water Fund was launched in March 2015 to provide residents in the basin with the opportunity to mitigate the threats associated with watershed degradation**. In addition, the fund aims to secure Nairobi's water supplies while improving agricultural livelihoods, maintaining dry-season flow in selected watersheds, and thus contributing to resilience to droughts. The fund is a public–private partnership and, in the first four years of development, it was able to mobilise USD 4 million through voluntary contributions. There are important multilateral funders, including the Global Environment Facility (GEF), which aims to contribute USD 7 million during the course of the fund validity. It brings together

[2] Coca Cola Africa (2018) Water Fund Replenishes Cape Town's Largest Aquifer; Cape Town Water Strategy 2019; Adelana, M. & Xu, Y. (2006) Contamination and Protection of the Cape Flats Aquifer. Groundwater Pollution in Africa.
[3] Simpson, A. G. (2018) FEMA to Issue First Catastrophe Bond for Flood Insurance Program. Insurance Journal.

multiple stakeholders, such as county government, the water resource authority, the forest service, the regional council of governors, the Nairobi water utility and private sector actors.

**A USD 10 million investment in sustainable land management is being disbursed over a 10 year-period, leading to a return of USD 21.5 million in economic benefits over a 30-year timeframe**. Interventions include: improved riparian management, the terracing of hillslopes, the reforestation of degraded lands, measures to encourage grass strips in farms, and the mitigation of road erosion. More specifically, the Water Fund can, based on past performance and anticipated future continuity, expect the following financial benefits:

- Up to USD 3 million per year in increased agricultural yields for smallholders and agricultural producers;
- Over USD 600,000 increased annual revenue for KenGen (national power supplier) as a result of increased power generation and avoided shutdowns and spillages;
- Approximately USD 250,000 in cost savings a year for Nairobi's water and sanitation utility, NCWSC, stemming from avoided filtration, lowered energy consumption, reduced sludge disposal costs and fewer shutdown days;

**However, from the point of view of the investment community, there has been no conclusive evidence thus far that proves a definitive link between the upstream funding flows into the Tana River and the downstream revenues that have been generated**, a prerequisite for many investors considering any sort of financial instrument.[4]

## River Restoration: C40 Cities Finance Facility

**The City of Durban's Sihlanzimvelo initiative, supported by the C40 Cities Finance Facility, will help Durban's infrastructure to cope with the increase in storms and heavy rainfall caused by climate change**. The project is conceptualised around the City's waterways providing ecosystem services analogous to that provided by water-related built infrastructure. The scheme uses community co-operatives to manage small stretches of streams, ensuring coverage of the whole network and creating employment opportunities across the city. The project seeks to implement, at a city-wide scale, the Sihlanzimvelo programme, which is currently being piloted in two areas of the city. C40 and the project organisers are hoping that, should this approach prove to be successful, it will provide a suitable model for African river systems management.

**The funding for this project is anchored in city government and its belief that the project is critically important and leads to a mix of tangible and intangible benefits,** as in the other instances above. The strength of Durban's balance sheets, more than the bankability of the project itself, is the linchpin for any external funding that may eventually support this project.[5]

## Concluding notes on section

**The interventions highlighted above are important elements in addressing water resource management**. Unfortunately, they do not afford ways for the private sector to meaningfully engage and are, therefore, ultimately not financially sustainable. More directly, each of the examples cited above show the impact of funding flows for projects, and clearly demonstrate that there is scope for piloting these interventions in a number of places. However, there is no measurable or direct causal link (with the exception of the savings on long-term operational expenditures for utilities that invest in green elements to their grey infrastructure) between the capital spent to introduce these solutions and the revenue or benefits associated with these solutions.

**Essentially, these solutions largely allow for the continuation of the 'free-rider' problem, where downstream beneficiaries are able to meaningfully benefit from the activities of others without contributing themselves.** When taken holistically, the benefits are not only for the service providers or users but also for the financiers who are supporting these interventions and, as a result, there is strong potential for demonstrating the need for sustainable financial investment, even if couched in terms that may seem unfamiliar to the proponents of the solutions introduced in this section. The following section highlights some of the new thinking around the mobilisation of resources, and looks beyond innovation in its efforts to start to consider long-term viability.

[4] The Nature Conservancy (2015) Upper Tana - Nairobi Water Fund Business Case
[5] C40 Citeis Finance Facility (unknown) eThekwini (Durban) Sihlanzimvelo Programme

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