

## Financing Natural Infrastructure

Quito, Ecuador

Status | Project | Contact

Implemented | Finance | The Nature Conservancy (TNC)

This case study demonstrates how both the water and energy sector have become involved in the investing in natural infrastructure in order to provide benefits to both sectors. Unregulated water extractions and unsustainable land and natural vegetation management practices upstream of Ecuador's capital of Quito are reducing the quantity and quality of water delivered to the city. This is resulting in a critical situation (the truth is that currently we are not facing a crisis, we might, but so far things are under control) within which the water demand of the city's rapidly expanding population and growing economic sector are not being met and the energy production from hydropower plants is being restricted. Due to its financial value, particularly when compared to built infrastructure, investments in natural infrastructure that regulate water quantity and quality were perceived as the best solution. To enable these investments, The Nature Conservancy, in partnership with Quito Water Company, worked towards developing a non-depleting endowment fund which enables Quito's water users to fund upstream programs that will improve the quantity and quality of their water supply. The fund, FONAG, was established in 2000 and although the initial years involved limited investments in natural infrastructure, with a focus upon asset growth to enable sustainable and long-term use, the fund is now making investments. The successes in the establishment and development of FONAG can be attributed to its transparent, accountable and multi-stakeholder approach. FONAG is providing an example for similar endowment funds throughout South America.

### Lessons learned

- Non-depleting endowment funds have potential as a funding source for natural infrastructure; however initial asset growth is slow.
- The initial years of FONAG focused upon asset growth, rather natural infrastructural investments. As this can reduce public support, asset splitting, between investment for growth and short-term projects, is advised.
- For mechanisms such as FONAG to be self-sustaining they need to be driven by water users and become an integral part of water management and allocation policy. To happen, better evidence is required of both on the beneficial impacts of watershed management on the quantity and quality of water resources and on the ability of payments to influence management behaviour.

## The issue

### Case background/context

Quito, the capital city of Ecuador, is located at 2800 metres above sea level in the Andean mountain range. Known as Ecuador's 'economic zone', Quito contains 65% of all manufacturing facilities and with a rapidly expanding population, which currently exceeds 2.3 million, there is increasing pressure upon water and energy resources for both domestic and industrial uses. Water demand in the city is 160 litres per person per day, which when combined with industrial uses, equates to a demand of 9,000 litres per second. Demand is predicted to increase to 15,000 litres per second by 2040. In addition to water use for domestic and industrial purposes, water is also in demand for energy production. Hydropower currently produces two thirds of Quito's total energy and 44% of Ecuador's energy in general. (UNEP & FLASCO 2011)

Quito's water supply originates in the high plateaus of the Andean mountains 70% of which originates in three protected areas and its surrounding zones; the Cayambe Coca National Park, Cotopaxi National Park and the Antisana Ecological Reserve. The reserves and surrounding areas consist largely of *páramos*, high altitude Andean grasslands, which capture and store rainwater. Most water flows within the catchment are rain originated, with additional sources from glacial melt and fog. Despite the reserves' protected statuses, unregulated natural resource-based activities are having a detrimental impact upon the quality and quantity of water delivered to Quito. Practices reducing the quantity and quality of water include unregulated extraction of water resources for agricultural production, deforestation and the burning and grazing of *páramos*, which reduces soil moisture content. This burning and grazing, as well as the deforestation for cattle expansion and, to a lesser extent, timber production, reducing land cover and soil binding, can exacerbate processes of erosion causing sedimentation of water resources and a degradation of water quality. Climate change is predicted to further exacerbate these factors as an increase in evaporation in the highlands and a faster retreat of the water-source glaciers is expected to lead to a reduction, up to 15%, in surface water flows to the city (UNEP & FLASCO 2011).

These changes have the potential to cause future interruptions of water supply for domestic and industrial purposes, as well as a reduction in the quality of water, in the city of Quito. Supply interruptions will be critical for energy production and high sediment yields within water, associated with declining quality, would reduce the energy production capacity. Considering that Quito is the economic zone of Ecuador, reductions in the yield and quality of water resources delivered to the city would have significant potential implications for economic development.

## The response

### The main objective of the case

In response to the increasing demand for water resources within Quito for multiple uses and the upstream pressures resulting in the degradation of the quantity and quality of water supplied, two broad solutions were posed. The first was investment in built infrastructure, including purification plants and river-structures, which would capture and clean water resources as per demand. The second option was to invest in the natural infrastructure of watersheds upstream of Quito in order to sustain and improve their functions as natural regulators of water quantity and quality. Natural infrastructure includes the *Páramos* mentioned in the previous section.

As it was perceived that improved ecosystem regulation through investments in natural infrastructure would benefit residents of Quito through improved quantity and quality of water resources, downstream water users were perceived as potential investors for the project. The objective of the project was therefore to generate money from water users and channel these funds upstream, investing in programmes that would enable sustainable resource management and improvements in the condition of natural infrastructure, thereby improving the quality and quantity of water yields and ensuring the future availability of water resources for Quito's growing population.

In 1997 The Nature Conservancy (TNC) and partners began negotiations with two main stakeholders to explore the possibilities on how to achieve this objective. The two initial stakeholders were:

-  The Municipality of Quito; through the mayor's office
-  Empresa Metropolitana de Alcantarillado y Agua Potable de Quito (EMAAP-Q); municipal utility

In 2000, after successful negotiations, the city of Quito established the Water Protection Fund (FONAG) to provide sustainable financing for natural infrastructure investments surrounding the city. FONAG is a non-depleting endowment fund; a fund within which it is not the original endowment that is invested in green infrastructure but rather the financial returns made upon this endowment. This is contrary to more traditional approaches to ecosystem protection, such as Payments for Ecosystems Services (PES), where fees from service users are directly channelled into management projects. The use of such a fund ensures the future availability of financial resources, thus ensuring the financial sustainability of long-term investment in ecosystem services that naturally regulate the quantity and quality of water resources.

## The results

### Outcomes

After initial negotiations on the type of fund, FONAG was established with initial seed funding of \$21,000 provided by Empresa Pública Metropolitana de Agua Potable y Saneamiento (now EPMAPS) (\$20,000) and TNC (\$1000) (Echavarría 2002). FONAG was a pioneer in the establishment and use of a trust fund as a voluntary, decentralised mechanism for financing natural infrastructure. It was created with an 80-year contract initially signed by EPMAPS and TNC, who were later joined by the municipal electricity company Empresa Eléctrica Quito (EEQ), a private brewery company Cervecería Nacional (SabMiller), , Tesalia Springs, and the Swiss Cooperation COSUDE. The Fund is managed by a private asset manager and overseen by a Board of Directors. Although the fund is independent from the government it cooperates with environmental authorities to ensure complementarity with government programmes. In December 2006, Quito passed a municipal ordinance that established a permanent contribution of EPMAPS' to FONAG and that will increase from 1% to 2% of revenue generated by water fees (before EPMAPS contribution was voluntary). Water fees are differentiated between non-extractive users (e.g. hydropower and recreation) and extractive users (e.g. irrigation and drinking). By 2013 these contributions rose to US \$1 million per year. Several downstream users now support the fund including Quito's water and electric companies, the local brewery (Cerveceria Nacional), and the bottled water company (Tesalia Springs).

FONAG has been remarkably successful in funding upstream watershed protection and has an annual budget to invest in conservation activities of approximately 1.7 million dollars and a trust fund of 12 million dollars. In order to reduce the vulnerability of FONAG to political upheavals, lobbying has led to it being institutionalised in municipal legislation.

So far 2, 668 hectares of land have been replanted with several native shrubs and tree species including *polylepis* genus, with local communities and other contracts paid to carry out the planting. These trees and shrubs have a large root system for binding the soil and support water infiltration. In addition to these reforestation programmes weather and soil monitoring stations have been established in order to better establish the water balance within the watersheds upstream of Quito in order to better understand the impacts of investment in green infrastructure and enable better targeting.

Investments have also been made in a control and surveillance program, which currently is conserving 30,000 hectares. Additionally an environmental programme has been established which is undertaking water monitoring.

The successes in the establishment of FONAG and the growth of assets can be attributed to a number of factors:

-  It creates a semi-independent body transparently manage money
-  It provides a sustainable funding mechanism that can provide long-term financing



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- It supports the development of upstream-downstream multi-stakeholder partnerships
- It provides concrete conservation actions that generate services and conservation benefits
- It provides accountability to ensure delivery of services

Water funds are now sprouting up throughout Latin America that include Ecuador, Colombia, Mexico, Brasil, Guatemala, Peru Ecuador, Colombia. TNC, the InterAmerican Bank, FEMSA Foundation, and the Global Environmental Fund launched a new initiative in 2001, the Water Fund Partnership, to establish 32 water funds by 2016.

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