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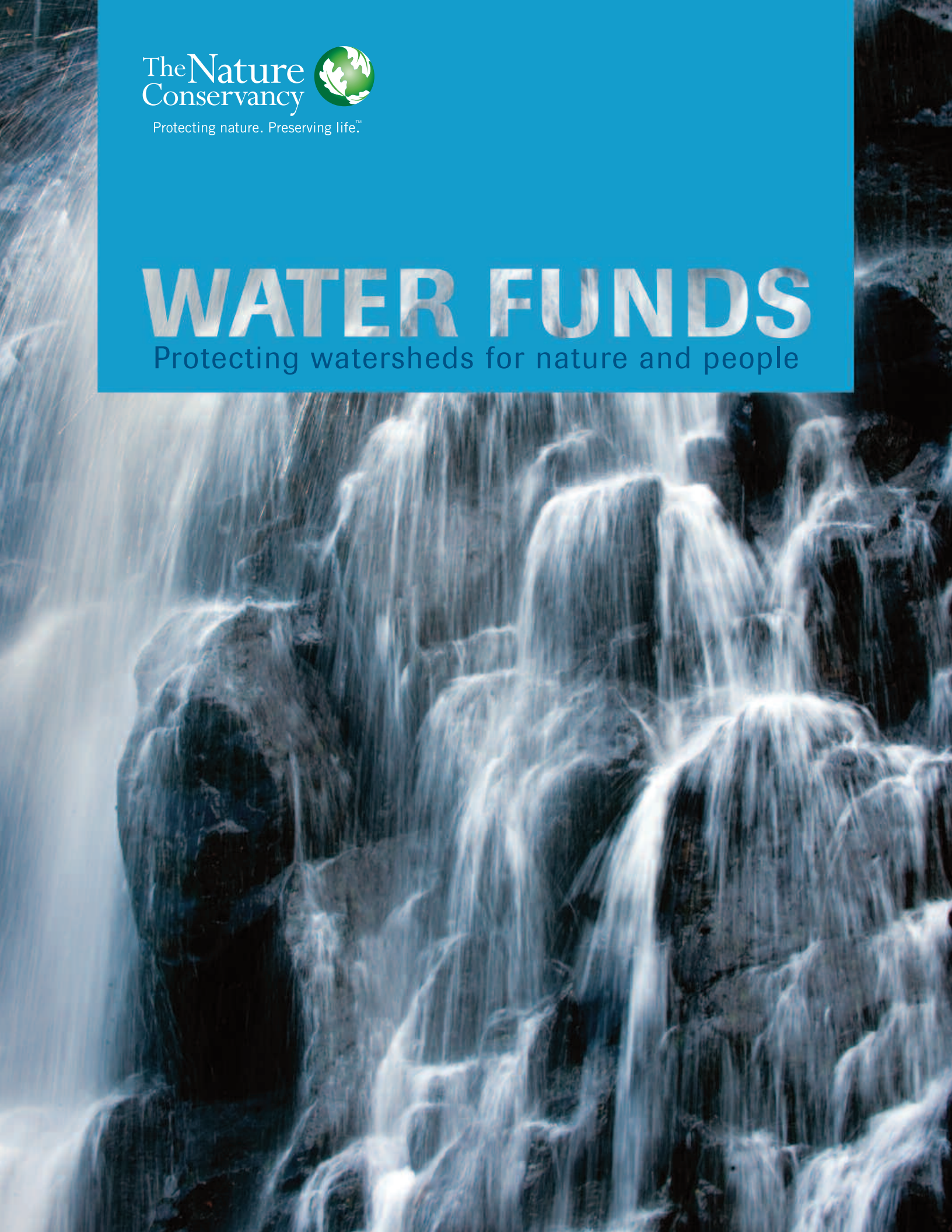
WATER FUNDS

Protecting watersheds for nature and people



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Abbreviations and Acronyms
CIAT: Centro Internacional para Agricultura Tropical (Center for Tropical Agriculture)
ECOSAUT: A model for the Economic, Social, and Environmental Evaluation of Land Use
EEQ: Empresa Eléctrica Quito (Quito Elecrtic Company)
EMAAP-Q: Empresa Metropolitana de Alcantarillado y Agua Potable de Quito (Quito Water Utility)
FIESTA: Fog Interception for the Enhancement of Streamflow in Tropical Areas
FONAG: Fondo para la Protección de Agua (Quito water fund)
FONAPA: Fondo del agua para la conservación de la cuenca del río Paute (Paute water fund)
GTZ: German Technical Cooperation
InVEST: Integrated Valuation of Ecosystem Services
PES: Payments for ecosystem/environmental services
SWAT: Soil and Water Assessment Tool
TNC: The Nature Conservancy
USAID: United States Agency for International Development

Introduction

Ecosystem services, the benefits to people that nature can provide (Daily 1997), are rapidly gaining traction as an innovative and practical approach to advance conservation goals and engage a wider variety of stakeholders in conservation efforts (Goldman et al. 2008; Tallis et al. 2009). These approaches can take a wide variety of forms and serve a variety of functions (Tallis et al. 2009). For example, payment for ecosystem services (PES) projects are widely touted as an innovative finance mechanism for conservation (Salzman 2005; Wunder 2007; Jack et al. 2008). While there is still uncertainty about what factors are likely to contribute to successful ecosystem service projects (Perrot-Maître 2006; Asquith and Wunder 2008; Engel et al.2008; Jack et al. 2008; Daily and Matson 2008), these approaches continue to proliferate. Payments for watershed service projects make up a significant portion of implemented ecosystem services schemes (many others relate to carbon). These schemes often involve water users paying "suppliers" for the delivery of clean, consistent water supplies (Brauman et al. 2007; Krchnak 2007; Asquith and Wunder 2008; Porras et al. 2008).

Over the last decade, The Nature Conservancy's (TNC) Northern Tropical Andes (Northern Andes) program (a geography covering the northern parts of the Andean Mountain countries), in collaboration with numerous partners, has initiated a series of ecosystem services projects called water funds. Water funds are based on the premise that natural ecosystems and conservation management practices by people living upstream in the watershed can help provide a clean, regular supply of water and that downstream service users (including water utility companies, hydropower companies, and other industries) who depend upon these services should pay for their maintenance and persistence.

Given the relatively simple nature of a water funds approach, there is potential for this model to be implemented in other geographies. Water fund projects in the Northern Andes have increased 7 fold (from 1 to 7) in 8 years with another 6 in the design phase within the same time period. In this report, we highlight the major characteristics and components of existing water funds in the Northern Andes. Understanding the region's biophysical characteristics, the history of the water fund projects, and the funds' common features may provide insight into the effectiveness of these projects. We also highlight the challenges to replicating water funds and identify improvements that can enhance them as a conservation mechanism.

Water Fund Goals

Each water fund has its own set of objectives and goals, but, in general, water funds invest in conservation of watersheds in order to accomplish the following:

1) improve or maintain water quality and water quantity for downstream users;

2) maintain regular flows of water throughout the year;

3) maintain or enhance natural ecosystem biodiversity, both freshwater and terrestrial; and

4) improve or maintain human well-being and quality of life for upstream human communities.

Using watershed conservation as a common objective water funds create:

5) a multi-institutional governing body bringing together public and private partners;

6) opportunities to avoid costs of water treatment by investing in nature instead of infrastructure; and

7) sustainable financing for long-term conservation efforts.

These goals and the mechanisms by which they are achieved will vary and can be more explicit depending on the situation, but they are the general framework for water fund operation.

Context and History of Water Funds

The geography of the Northern Andes program in TNC (Figure 1) includes most of Ecuador and Colombia, northern Venezuela, and the very northern tip of Peru. The TNC-defined region contains 20% of the world's biodiversity in an area that covers only 0.2% of the world's surface. The total area of this region is 145 million hectares (1.45 million square kilometers), 24.5 million of which are in protected areas. Most of the region's protected areas are currently relatively intact with a mixture of native forests and high altitude grasslands called *páramo*. Growing demand for land and access to resources to support people's livelihoods may result in conversion of these ecosystems to farm- or ranch-land in the future.

The protected areas in these watersheds are essential for water-related services such as a clean and regular supply of surface water flows upon which millions of people depend. Despite numerous protection efforts or attempted drinking water projects, few programs address the link between protected area management (the ultimate water source) and this drinking water (Echavarria 2002; Benitez et al. 2010). A further complication is that the level of government investment in the conservation of these water sources, i.e., protected area boundaries, is not sufficient. This results in financial gaps throughout the Northern Andean countries in protected-area annual budgets.

FIGURE 1: Northern Andes region as defined by TNC and geography that includes most of TNC water funds.

Tradeoffs between conservation of natural ecosystems and people's livelihoods further complicate protected-area management. Growing populations, demand for land for agriculture and ranching, deforestation, and the potential effects from climate change can impact the ability of natural ecosystems and protected areas to support biodiversity and to continue to supply water-related services.

The Northern Andean watersheds share similar conditions that may contribute significantly to water funds as a viable conservation strategy. One of the most important conditions is the presence of relatively intact ecosystems essential for water provision (regulation, supply, and quality) in the upper watersheds along with users of these services downstream, users that have adequate funds and a willingness to pay for the service(s). Intact ecosystem types can vary, but in the case of current water funds the watersheds include:

1) unique ecology/biology of *páramo* ecosystems (high altitude grasslands) that capture, store, and regulate the release of water;

2) forest ecosystems including cloud forests that serve as key water regulators, natural water purifiers, erosion control mechanisms, and fog interceptors contributing to surface flow; and

3) surface water flows upon which people downstream depend for consumption or production.

Taken together, these key conditions mean that conservation and ecosystem protection can help deliver valued ecosystem services to downstream users.

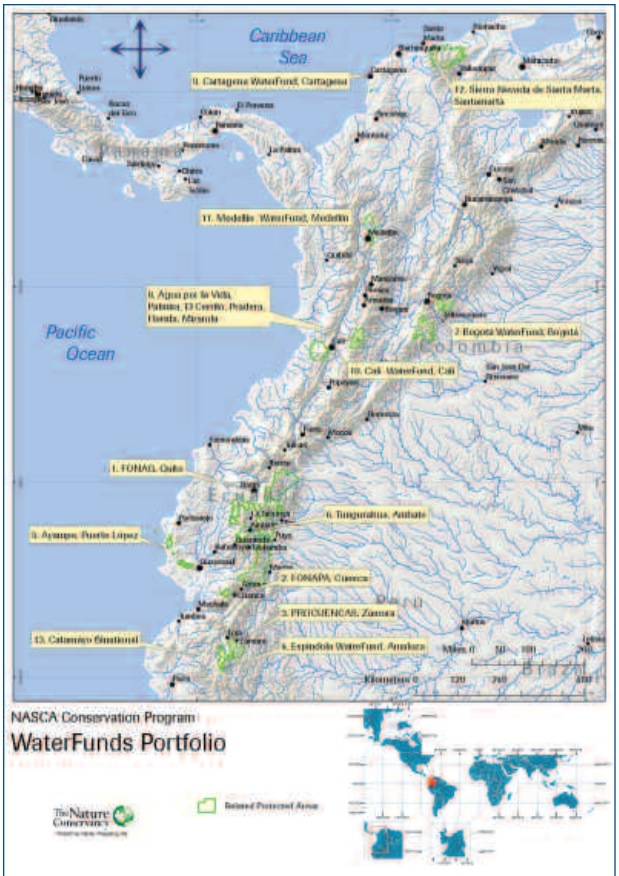

FIGURE 2: Location of water funds that are operational and under development in the Northern Andes.

In early 2000, TNC and key partners launched the first water fund in Quito, Ecuador with two primary goals: 1) to provide a clean, regular supply of water for nearly 2 million people living in Quito, and 2) to provide financing for existing protected areas critical for the city's water-related services. The idea was conceived in the late 1990s when Quito was a growing cosmopolitan city demanding large amounts of clean water. More than 80% of the water source for Quito is contained within three protected areas (Reserva Ecológica Cayambe-Coca, Reserva Ecológica Antisana, and Cotopaxi National Park), the headwaters of more than 20 rivers and 6 larger watersheds. These protected areas and their buffer zones contain about 5% of Ecuador's land area and provide critical habitat for many of Ecuador's bird and mammal species.

The competing needs and uses for the protected areas—for conserving biodiversity, for providing water for people, and for productive land use by farmers and ranchers—made management difficult. In 1997, TNC and partner Fundación Antisana discussed options for creating a payment for watershed services program. The goals were to help protect biodiversity in the protected areas and to secure the water supply.

TNC and its partners began negotiations in 1997 with the municipality of Quito through the mayor's office and with Empresa Metropolitana de Alcantarillado y Agua Potable de Quito (EMAAP-Q), the main water utility for Quito, to explore the possibility of water users making voluntary financial contributions to pay for water services generated by a well-conserved watershed. The appropriate finance mechanism for this scheme was carefully evaluated and selected based on it being ecologically sustainable, legally feasible, politically viable, efficient, and participatory (Krchnak 2007). In January 2000, it was decided that voluntary donations from stakeholders would be placed into a trust fund that would form the financial basis of the water fund (see section on "financial mechanism" for more details).

Incentives for participation in the water fund varied but were complimentary. The main incentive for EMAAP-Q and for other stakeholders that later joined, was avoiding or reducing future costs for water treatment and supply, functions provided by the conserved ecosystems. For TNC and Fundación Antisana, the incentive was long-term financing for the conservation of protected areas.

Water fund name	Watershed or Associated City	Area (Ha) included in water fund	People benefiting (2008)	Creation date	Funds in hand	~ Funds in 6 years
FONAG (el Fondo para la Protección del Agua)	Quito, Ecuador	500,000	2,093,000	2000	$6,500,000	$11,500,000
Pro-cuencas	Zamora, Ecuador	30,000	25,000	2006	$ 36,000.00	$2,600,000
Espindola	Amaluza, Ecuador	20,000	15,000	2008	$ 6,000	$1,300,000
FONAPA (Fondo para la conservación de la Cuenca de Paute)	Paute, Ecuador	300,000	800,000	2008	$490,000	$4,400,000
Tugurahua	Ambato, Ecuador	526,000	350,000	2008	$ 460,000	$1,100,000
Agua por la vida y la sostenibilidad	East Cauca Valley, Colombia	125,000	920,000	2009	$1,800,000	$7,100,000
Bogota	Bogota, Colombia	150,000	6,840,116	2009	$1,500,000	$8,900,000
Medellin	Medellin, Colombia	116,000	2,700,000	Feasbility studies underway	TBD	TBD
Cartagena	Cartagena, Colombia	12,000	892,545	In design and negotiation	$220,000	$2,200,000
Cali	Cali, Colombia	206,000	2,100,000	In design and negotiation	TBD	TBD
Santa Marta	Sierra Nevada de Santa Marta, Colombia	400,000	600,000	Initial phases of development	TBD	TBD
Catamayo	Catamayo-chira, Ecuador-Perú	91,946	TBD	Initial phases of development	TBD	TBD
Ayampe	Puerto López, Ecuador	60,000	20000	Initial phases of development	TBD	TBD

TABLE 1: The 13 water funds in the Northern Andes implemented or under development with details about number of hectares, people impacted, and money in the fund by date of formation.

From this joint interest emerged el Fondo para la Proteccion del Agua (FONAG), the Quito water fund. In 2000, FONAG had $21,000 invested in the trust fund—money from EMAAP-Q and from TNC. By 2008, the trust fund had grown more than 250 fold to about $5.4 million through contributions by other key stakeholders such as the Quito electric company and a local brewery (Cervecería Nacional), as well as increased contributions from EMAAP-Q and TNC. This endowment yielded, in 2008, about $690,000 in interest that was available to spend on conservation projects (FONAG 2008).

FONAG is structured so that only endowment interest is used, but the fund has also had a great deal of success in leveraging additional money to invest in conservation. From initiation through 2008, $7.1million was donated to FONAG as matching funds from a variety of other donors. The United States Agency for International Development (USAID), in particular, has been one of the most important supporters of FONAG since its early days up until now; other donors to FONAG inculde InWEnt—Capacity Building International, Germany; the Inter American Development Bank, COSUDE from Switzerland, and EcoFund (FONAG 2008).

Replicating and improving this approach, TNC and partners have designed and implemented numerous water funds throughout the region (Figure 2; Table 1). Some of these water funds are fully functional while others are in various stages of development. More details about the make-up of these water funds and their ecosystem services and biodiversity benefits are in subsequent sections of this report. In addition to these existing funds, TNC and partners are initiating the development of water funds in new locations, such as Peru and Mexico.

Key Components of Water Funds

Water funds are more than a conservation and service delivery approach. They are ecosystem service-based projects that use a multi-institutional governing board and a trust fund financial structure to establish a long-term, sustainable source of funding and a decision-making entity to protect or restore watersheds in order to provide a regular supply of clean water to downstream users.

Ramos et al. (*forthcoming*) describes the detailed steps for creating a water fund. Here we focus on the general components, as introduced previously:

1) *ecosystem services mechanisms* that include people and nature;
2) sustainable *financial mechanisms* with transparent management;
3) multi-stakeholder *institutional mechanisms* including public and private partnerships;
4) *concrete conservation actions* to generate services and conservation benefits; and
5) an *accountability system* to ensure delivery of services and protection of natural ecosystems.

Component 1: Ecosystem Services Mechanisms

In any water fund the water service "suppliers" and water service "users" are important components. In the Northern Andes water funds, service suppliers come from two different systems:

1) natural ecosystems which in many of the water funds are páramo and tropical montane forests; and
2) adjacent working lands including a mix of small- and large-scale holdings both for agriculture (e.g., bananas, plantains, corn, coffee, and potatoes) and ranching.

In general, surface water flows originate in high-altitude, natural ecosystems. Surrounding these ecosystems are poor, rural ranching and farming communities that rely on the rich soils and abundant grasses in the *páramo* and forest ecosystems for grazing and for crops. If these natural ecosystems are converted, water quality, the regularity of water flows, and biodiversity can be compromised. At the same time, preventing these uses outright creates stresses on people. Ensuring good conservation management and providing incentives to discourage further encroachment on natural ecosystems can provide long-term protection for the watershed if the incentives are sufficient to compensate people.

The end users of the water services (those who will provide the incentives to the service providers) vary by water fund but generally include public water utilities, major public hydroelectric facilities, irrigation systems and agricultural associations, and private companies such as beer companies (e.g., Cervecería Nacional in Ecuador and Bavaria in Colombia) and bottled water companies (e.g. ,Tesalia in Ecuador). End users have an incentive to invest in conservation efforts in areas that will yield the greatest return of services they value. A variety of feasibility studies can be used to prioritize water fund investments and identify areas of high service supply.

Such studies use a variety of models and tools—hydrological, ecological, and socioeconomic—to map service flows and to demonstrate through scenarios the importance of watershed conservation to the supply of water services. In addition, the studies should include an analysis of the water users often with financial details and potential revenue streams. Feasibility studies can be used to engage stakeholders, establish finances, set objectives, develop strategies, and prioritize areas for water fund investment within the watershed.

For example, In the Agua por la vida y la sostenibilidad water fund in the East Cauca Valley of Colombia, TNC is using a variety of models to help prioritize water fund investments. Currently, TNC and two partners—Centro Internacional para Agricultura Tropical (CIAT) and Kings College in London—are conducting research to analyze the effectiveness of three different water models to identify priorities for water fund investment in this watershed: the Soil and Water Assessment Tool (SWAT), Fog Interception for the Enhancement of Streamflow in Tropical Areas (FIESTA), and the Integrated Valuation of Ecosystem Services (InVEST).

Feasibility studies can also be used to assess the impact of climate change on water fund investments and to reprioritize or change strategies accordingly. InVEST, a tool developed by The Natural Capital Project (a partnership between TNC, Stanford University's Woods Institute for the Environment, and World Wildlife Fund), maps, quantifies, and values the flow of ecosystem services from the landscape. The maps are especially relevant for land-use planning and for assessing impacts on services under different land-use and, potentially, climate scenarios. It is now being used in East Cauca Valley watershed to assess the impacts of climate change on the watershed. From there, TNC and partners will develop adaptation strategies based on the model outputs.

A final example of the use of feasibility studies is the Bogota water fund. TNC and other water fund stakeholders worked with CIAT and Econometría to articulate the importance of watershed conservation and the technical, financial, and legal options for creating the fund (White et al. 2009). The analysis included maps of vegetative cover and calculations based on models of avoided sedimentation inside and outside protected areas. The work also used the socio-economic model Economic, Social, and Environmental Evaluation of Land Use (ECOSAUT) to assess the institutional feasibility of the water fund approach.

Component 2: Financial Mechanism

The fiduciary structure of a water fund involves an independent financial institution that manages the fund as a trust. The trustee (non partisan) manages and distributes payments to recipients (in this case watershed community members for improved management practices or to hire them as park guards) based on decisions made by the trustors, i.e., the water users who are generally also the main contributors to the fund. The trustors make decisions based on the best information available regarding priorities for maintaining or recovering ecosystem services. National and regional rules and regulations dictate the preferable investment scheme for the fund (private, non-government, etc.). For example, for the Bogota water fund it is more politically feasible to use a national environmental fund than a private bank. All the funds have long-term contractual arrangements explicitly defining fund use.

The water funds can be financed from a variety of private and public sources including the following:

- *public agencies (*e.g., water utilities, hydropower companies) that can be the largest beneficiaries and thus probably the largest contributors (in TNC experience almost 50% of the money in a particular fund);
- *private companies* thus far mainly beer companies, bottled water companies, and agricultural associations;

- *citizens* either directly, through voluntary donations on their water bills, or indirectly through contributions from public taxes, levies and programs;
- *grants and private foundations* as revenue sources for water fund investments;
- *bi-lateral and multi-lateral donor agencies and cooperations* can provide financial support due to their interest in conservation and development. USAID, for example, has supported FONAG and several other water funds in Ecuador and Colombia; and
- financial returns generated from the trust fund.

The makeup of revenue sources varies from one water fund to the next depending on the country's legal framework, private sector opportunities, types of environmental service provision, and governance strategy.

As described, donations are put into a trust fund, the principal of which accrues interest revenue for conservation projects. Ideally, the principal is left untouched and only the interest is used. From experience, however, TNC and partners learned that in order to secure more partners and more contributions, at times it is important to use part of the principal in the first few years to demonstrate tangible progress as interest takes time to accumulate. Thus, part of the financial arrangement at the onset must include what percentage of the fund, if any, can be used. Some of the water funds, Fondo del agua para la conservación de la cuenca del río Paute (FONAPA) for example, have designated a portion of the money to go directly to conservation activities. This makes particular sense in smaller watersheds that are less likely to have a large capital investment that can provide interest revenue on a reasonable time-scale.

Component 3: Institutional Mechanism

Water funds establish a multi-institutional governing body to make decisions about how to spend money in the watershed. The main governing body is the water fund board of directors, generally comprised of those entities that contribute money to the water fund. Each contributor gets a seat on the board and decisions are collaborative. The board, which often contains public and private members, prioritizes investment based on the feasibility studies and often on advice from a technical committee as described below. The board elects and approves a technical secretariat that then manages the water fund, calls meetings, and works to implement decisions. Importantly, water funds are not a separate non-profit or non-government entity; rather, they are a contractual partnership.

Direct contributions are not a requirement for a seat on the board. Non-contributors and indirect contributors also can have a seat. For example, in the Procuencas water fund in Zamora, the Ministry of the Environment, a non-contributor, has a seat on the board as their input and support is essential for the fund's success. In Tungurahua, there are numerous, important indigenous communities in the watershed that will be affected by the water fund and that have invaluable knowledge about the watershed. The German Technical Cooperation Agency GTZ donated money in the name of these indigenous communities, so the communities have representatives on the board to ensure their voice is heard. TNC is also often an in-direct contributor supporting water funds through various means, such as financing feasibility studies, and frequently has a representative on water fund boards.

While the board of directors has the power to make decisions, in most cases these decisions are informed by a technical committee. In some cases, for example the FONAPA water fund in the Paute watershed, the technical committee offers scientific input. The committee members are from the same set of institutions as the board of directors, but they are scientists and engineers. In Agua por la vida y la sostenibildad, the nine watersheds that feed the East Cauca Valley each has a grassroots, non-profit organization that has been working with the communities for many years. The director of each of these organizations has a seat on the technical board to ensure that the communities have input in decision- making.

The overall obligation of the board with input from the committee(s) is to create and implement and a strategic and an operational plan. These plans should include specific objectives and the types of activities and strategies used to achieve those objectives. The Board approves activities and is the ultimate decision-maker regarding fund investments and project implementation.

Component 4: Water Funds and Conservation

In general, water funds invest in strategies that aim to resolve potential conflicts between the resource needs of watershed communities and the conservation needs for water-service supply. Thus, investments focus on:

1) securing protection of natural ecosystems; and
2) implementing best management practices on productive systems to provide ecosystem services.

Securing Protection of Natural Ecosystems

As stated, the *páramo* and forests in the Northern Andes are relatively intact and are often part of a national protected area threatened by conversion for other uses. Water funds invest in protection by hiring, training, and paying park guards from the local communities to ensure the integrity of these systems. Park guards work with communities to remove cattle and to police the boundaries of the park. Hiring local guards involves the community in conserving the area and also provides a stable income source.

In addition, one of the main objectives of water funds is to reduce and eventually remove deficits in annual budgets for national protected areas that exist in the Northern Andean countries. As an example, in 2005 in Ecuador, there were 31 protected areas and the difference between the funding needed to fully protect those areas and the amount in hand was $9,505,894. For even the most basic management the gap was still $3,587,688 (Ministerio del Ambiente 2005).

Implementing Best Management Practices on Productive Systems

Numerous families that rely on small-scale crop- and ranch-lands for income live around the forests and *páramo*. Management of these lands can have a major impact on water quality, the timing of flows (particularly floods), fires, and freshwater biodiversity. Water funds seek to minimize these impacts by providing indirect payments (payments through projects) to families for conservation management that includes protecting riparian areas (putting fences up to keep crops and cows away from river banks), re-vegetating riparian areas (to provide a natural filter for sediments and other pollutants), planting live tree fences to delineate property boundaries and isolating/fencing off of headwaters and steep slopes. The water fund provides the supplies and materials for fencing and the seeds for re-vegetation, for example.

There are many other ecosystem service-based approaches that provide landowners direct payments to compensate them for loss of production from conservation management. In the Northern Andes countries, indirect payments seem to provide the best approach.

Specific conservation management practices supported by the water funds will vary by location, but investing in land management is essential for providing ecosystem services. These services can benefit the landholder (through enhancing soil stability and nutrient cycling), other people in the watershed (through provision of clean and consistent water flows), as well as the broader ecosystem (through protecting habitat and biodiversity). Changing management practices is not, however, without cost. Restricting the relatively poor watershed communities from accessing fertile soils in natural ecosystems and encouraging conservation management on productive lands involves tradeoffs. Families are left with less area for livelihood activities, so enforcing protected area boundaries and providing materials for conservation management on farms and ranches is impractical and unsustainable if they are not adequately compensated.

Water funds take a holistic approach to conservation agreements by providing both indirect payments, as described, and by supporting community projects to compensate for impacts on livelihoods. Ideally, conservation management activities will enhance farm/ranch productivity through the production of on-farm ecosystem services such as soil stabilization and enhanced soil fertility, but these benefits will not be immediate and are not guaranteed. In the shorter term, conservation management agreements include livelihood investments such as environmental education programs, alternative income sources such as guinea pig farms, alternative food sources such as organic vegetable gardens, and expanded capacity for the production of goods such as building a milk bottling plant in the community to reduce shipping costs and payments for outside bottling fees.

Component 5: Accountability

Water funds engage the public and private sectors and civil society in the conservation of watersheds. The trust fund financial structure is sustainable and provides an incentive for stakeholders to continue engaging and making decisions together. Even if one stakeholder stops collaborating, the revenue source for conservation still exists and other stakeholders can continue to make conservation decisions. This institutional sustainability, i.e. regularly convened stakeholder meetings, also represents one of the best structures for the sort of adaptive management that will be essential in the future given the unpredictable impacts from climate change.

Are water funds having the impacts that users are paying for? Does fencing waterways in these geographies decrease sedimentation? Do park guards efficiently keep cattle off *páramo*, and does removing cattle from *páramo* actually enhance ecosystem biodiversity? Is the money saved growing vegetables in organic gardens enough to compensate for income lost from reducing cattle herds on small ranches? Is the water fund board an effective decision-making entity? These are the true measures of impact; the answers to these questions will demonstrate whether water funds are effective.

Impact measures are currently being designed for two water funds: FONAPA (near Cuenca, Ecuador) and Agua por la vida y la sostenibilidad (in the East Cauca Valley, Colombia). These measures will be based on an experimental design assessing effectiveness at two scales:

1) at a broad- (large) scale: assessing what would happen in these watersheds if we did not use water funds to encourage best management practices on agricultural/ranching landscapes and to conserve natural ecosystems;
2) at a smaller-scale: using experiments to determine how to measure the effects of our conservation strategies (best management practices and conservation of natural ecosystems) on selected indicators.

Experiments and indicators have been defined for water quality, water quantity, water flow, terrestrial biodiversity, freshwater biodiversity, socioeconomic impacts, and the effectiveness of governance and financial structures. The major link between the broader- and smaller-scales of measures is how the sum of the parts (small-scale measures) adds up to demonstrating the basin-scale (large-scale) effectiveness of the water funds as a multi-institutional, sustainably financed decision-making strategy.

All water fund projects should be, and currently are, grounded in sound science. Conservation activities such as securing protected areas, fencing riparian areas, and re-vegetating working landscapes have demonstrable benefits for biodiversity and ecosystem services such as water purification and flood mitigation in various ecosystems (e.g. Buytaert et al. 2007; Sullivan et al. 2007). For several decades, conservation organizations have focused on advancing ways to control ecosystem conversion for various land uses. Only in the past few years has the need to expand conservation goals to measuring impacts been acknowledged (Pullin & Knight 2001; Sutherland et al. 2004; Ferraro and Pattanayak 2006; Ferraro 2009). Water funds are certainly not the only conservation project lacking impact measures, but they are one of the now growing number of conservation projects taking steps to implement them.

Replication: Challenges and Obstacles

While clearly replicable in Colombia and Ecuador where most of the 13 current water funds are either operational or under development, there are challenges to replicating them globally. Creating a water fund requires time, leadership, particular biophysical and social conditions, and a "fit" with national and regional laws. Developing feasibility studies, identifying good regions for the water fund approach, engaging stakeholders, selling the model, and establishing relationships involve large upfront costs. Effective replication in new regions requires people to undertake these tasks and charismatic leadership to engage new stakeholders.

The water fund model requires particular biophysical and social watershed features, namely downstream users who can pay for water and who depend upon surface water flows for their well-being. These flows need to be threatened to drive the incentive for watershed conservation. Identifying these geographies worldwide will require good data and analysis. In many cases, however, there may be a supply of ecosystem services and a demand for them, but the users may be poor and do not have the ability to pay.

Finally, national and regional laws can lead to challenges for replicating water funds. In Ecuador, for example, the national constitution states that ecosystem services cannot be "appropriated." Water funds do not own water or the ecosystem service, but the private-public governing board makes them vulnerable to these types of laws. Ecuador also has laws regulating where public monies can be invested thereby limiting options for trust funds managed by private entities. In other regions of the world, complex structures regulating water resources can increase transaction costs to such an extent that the water fund approach might not work.

Conclusion

Water funds that are fully launched and operational (a total of 7) in the Northern Andes serve over 11 million people and are working to conserve over 1.6 million hectares of watershed. Adding water funds under development (6, for a total of 13), these numbers grow to almost 15 million people and 2.5 million hectares. Water funds have engaged new stakeholders in conservation efforts, invested in environmental education for both rural and urban children, conserved some of the most diverse ecosystems in the region, and created a model for financially sustainable conservation.

Further replication and leverage will require institutional, financial, and biophysical assessments, but current replication in the Northern Andes across different regions, geographies, and countries demonstrates that these are not insurmountable obstacles. One remaining challenge is accountability, that is, putting in place monitoring that assesses whether expectations are met and if water funds deliver both biodiversity conservation benefits and important water-related ecosystem services.

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WATER FUNDS

Protecting watersheds for nature and people