



Financing watershed conservation: Lessons from Ecuador's evolving water trust funds



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ABSTRACT

In early 2000, the city of Quito, Ecuador, established the Water Protection Fund (FONAG) to provide sustainable financing for the management and conservation of surrounding watersheds. FONAG was innovative in that it pioneered the use of trust funds in a voluntary, decentralized mechanism for financing watershed conservation. Since then, at least 15 water trust funds have been created or are under development in the Northern Andes, seven of which are in Ecuador. Ecuador's later water funds share many similarities with FONAG, but there are also important differences. This article analyzes the evolution of Ecuador's water trust funds since the creation of FONAG. It does so by comparing the development and effects-to-date of two of the most-recent Ecuadorian water funds: the Fund for Páramo Management and Fight Against Poverty in Tungurahua and the Regional Water Fund (FORAGUA). The article compares these newer water trust funds with FONAG and early payment for environmental services programs to identify four lessons regarding the financing of watershed conservation and related changes in community-level watershed management within Ecuador. The evolution of Ecuador's water trust funds highlights their ability to adapt to different socio-cultural and political conditions, including those that oppose the commodification of natural resources. As such, water funds provide an innovative model for providing sustainable financing for watershed conservation in countries like Ecuador where privatization is not possible for either legal or cultural reasons.

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1. Introduction

Ecuador, like many countries, grapples with problems of water quality and quantity and is unable to meet the demand for irrigation and human consumption (SENAGUA, 2009). One problem is the destruction of water catchment areas, spurred in part by the expansion of the agricultural frontier. In Ecuador, forests and páramo (high Andean grasslands) serve as collectors and regulators of water flow and prevent soil erosion that damages water quality (Célleri, 2009). Deforestation and the burning of páramo to expand agriculture, as well as the use of agrochemicals, disrupt the watershed's ability to provide these environmental services. Therefore, the conservation and sustainable use of forests and páramo in upper areas is crucial to ensuring an adequate quantity and quality of water available to downstream users.

Financing the conservation and restoration of water catchment areas has been difficult, given Ecuador's political and economic instability in recent decades (Jacome, 2004; Seelke, 2008). Rather than turning to private markets or relying on centralized state management, several Ecuadorian communities developed

innovative, voluntary, decentralized mechanisms for financing watershed management. These have evolved over the last decade, leading to new developments in water financing with important lessons for similar projects elsewhere. This article distills these lessons by analyzing the evolution of Ecuador's water trust funds as vehicles to enhance local capacity for managing water resources in an integrated, sustainable manner while balancing upstream and downstream interests.

Ecuador's experience is noteworthy because it is the site of two pioneering models for financing watershed conservation (Albán and Wunder, 2005). In 2000, the municipality of Pimampiro launched one of the world's first voluntary, decentralized, payment for environmental services programs to protect the watershed where its water originates (Echavarría et al., 2004). That same year, the city of Quito established the Water Protection Fund (FONAG, for its name in Spanish) to provide sustainable financing for the management and conservation of surrounding watersheds (Krchnak, 2007; Troya and Curtis, 1998). FONAG was innovative in that it pioneered the use of trust funds in a voluntary, decentralized mechanism for financing watershed conservation. Soon after the programs in Pimampiro and Quito were created, coalitions of Ecuadorian and international organizations formed to replicate each model through a series of campaigns, both within Ecuador and abroad.

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For reasons described below, over time there has been movement in Ecuador away from Pimampiro-style payment for environmental services programs toward the water trust fund model. Since 2000, at least 15 water trust funds have been created or are under development in the Northern Andes, seven of which are in Ecuador (Goldman et al., 2010; Goldman-Benner et al., 2012; The Nature Conservancy, 2011).¹ Ecuador's later water funds share many similarities with FONAG, but there are also important differences, resulting from learning and varied social and political contexts. Ecuador's early payment for environmental services schemes have also evolved as a result of this learning, including by moving toward the water trust fund model. As a result, Ecuador's newest water funds combine elements of both models.

To analyze the evolution of Ecuador's water trust funds, this article compares the development and effects-to-date of Ecuador's two most-recent funds: the Fund for Páramo Management and Fight Against Poverty in Tungurahua (hereafter referred to as the Tungurahua Fund) and the Regional Water Fund (FORAGUA, for its Spanish name). There are several reasons to focus on these water funds. Both are highly relevant to the issue of agricultural water management; both exist in Ecuador's Andean region in areas that rely on irrigation for agricultural production and that suffer from large water deficits and unequal distribution. In contrast to FONAG and Pimampiro's program, these funds remain understudied. Yet, they are considered to be among Ecuador's most developed water funds. Being newer funds, they provide greater leverage for studying the evolution of the water trust fund concept; their designs reflect lessons learned from earlier experimentations. Although they are recent funds, the process of creating them began shortly after the programs in Quito and Pimampiro were created and took years to come to fruition. During this time, design proposals varied and evolved in response to negotiations among watershed stakeholders. This article traces this process within each case and compares processes across cases to identify mechanisms behind the lessons described below.

Thus, the methodology used involves structured case comparisons and process tracing. Evidence comes from hundreds of primary documents, personal observation, and more than 200 in-depth interviews collected during two years of fieldwork between 2009 and 2011.² Interviewees included people involved in watershed management in each case representing municipal, provincial and national governments; local and international NGOs and donor agencies; private companies; indigenous and farmers associations; community organizations; individual landowners; and water fund managers.

The article proceeds as follows. Since the pioneering programs in Quito and Pimampiro influenced later funds, the next section briefly describes their main features and identifies key differences between them. The following section analyzes in more depth FORAGUA and the Tungurahua fund, comparing them along four lines: the financial mechanisms' designs, their governance structures, the history of social mobilization, and the use of funds' financial resources. Implicit comparisons are also made with FONAG and Pimampiro's payment for environmental services program to highlight changes and lessons learned over time. Key lessons from Ecuador's experience are summarized in the concluding section. Case comparisons suggest Ecuadorians are moving away from strict

payment for environmental services programs toward the use of water trust funds; are linking these funds with independent, participatory watershed management committees; are scaling programs up from the grassroots level; and are mixing their investments between capitalizing trust funds and financing early conservation projects.

2. Comparing Ecuador's original models for financing watershed conservation

Ecuador's two ground-breaking programs—Pimampiro's payment for environmental services program and Quito's water trust fund, FONAG—represent distinct models for financing watershed conservation in a voluntary, decentralized fashion. During the 2000s, coalitions of advocates formed to replicate each model throughout Ecuador. The Nature Conservancy began organizing campaigns to replicate FONAG almost immediately (Troya and Curtis, 1998). In addition to hosting conferences and disseminating publications, The Nature Conservancy enlisted the support of the U.S. Agency for International Development, which funded experts from The Nature Conservancy, FONAG and technical universities to identify important watersheds and work with local governments, NGOs, and communities to establish FONAG-style water funds. By 2009, this coalition helped create water trust funds in five other localities, including in Tungurahua.³ Simultaneously, the Ecuadorian NGO that helped create Pimampiro's payment for environmental services program, CEDERENA (Corporation for the Development of Natural Resources), worked to establish similar programs in municipalities across Ecuador. Examples include Loja, Celica, Puyango, and Pindal, four of the five municipal governments that subsequently founded FORAGUA.

Differences between the two models should not be overstated, but there are some important distinctions. The Pimampiro model is closer to a strict payment for environmental services scheme in which beneficiaries of environmental services voluntarily "buy" these services from "providers" who enact land use practices designed to ensure the services continue.⁴ In Pimampiro, the municipal government acts as the "buyer" of watershed environmental services on behalf of the city's water users. The municipal Environment and Tourism Unit (UMAT) manages the program. It negotiates voluntary agreements with farmers in water catchment areas to conserve and sustainably manage the forest on their land in exchange for cash payments. To finance the payments to farmers (ecosystem service "providers"), the government passed an ordinance levying a 20 percent fee on drinking water.⁵ This money is held in a municipal government account in the National Development Bank. Decisions on how to use these funds are made by a Fund Committee comprised of Pimampiro's Mayor and the directors of the municipality's Financial Unit, UMAT, and Environmental Commission.⁶ In summary, the municipal government serves as the program's governance structure.

Ecuador's water trust funds have several features that make them different from Pimampiro-style payment for environmental services schemes.⁷ First, and most importantly, they are managed

³ The five additional localities include Zamora, Tungurahua, Paute, Riobamba, and Espíndola.

⁴ For details of Pimampiro's program, see Echavarría, 2004; Albán and Wunder, 2005. For a definition and description of payment for environmental services, see Wunder, 2005; Goldman-Benner et al., 2012.

⁵ The Inter-American Foundation and the Ecuadorian NGO CEDERENA also made initial donations.

⁶ There was initially also a representative from CEDERENA until the NGO left in the mid-2000s.

⁷ See Goldman-Benner et al., 2012 for a detailed description of the differences between water trust funds and payment for environmental services programs.

¹ In Ecuador, water funds have been created in Quito, Tungurahua, Zamora, Paute, Espíndola, Riobamba, and Ecuador's Region 7 (FORAGUA). Water funds also exist in Colombia, Peru, Bolivia and Brazil.

² Primary documents were collected from the private archives of watershed stakeholders involved in each case, including the municipal governments, water fund technical secretariats, NGOs, and donor agencies mentioned in the following case studies.

as trusts by financial institutions that are independent of local governments and other watershed stakeholders. These independent trust managers invest the funds' assets (i.e., money collected from watershed service users) in financial markets and distribute the resulting interest income to representatives of watershed stakeholder groups. Watershed stakeholders then use this money to finance a variety of watershed management and conservation activities specified in the trust's contract. The trusts' financial managers provide oversight to ensure the money is used for the intended purposes. This contrasts with payment for watershed services schemes that either use direct financial transfers between so-called "users" and "providers" or allow a watershed stakeholder (e.g., the municipal government) to control the money collected.

Second, while financial experts independently manage a trust fund's investments, decisions on how to use the interest income generated by the trust are made by the fund's board of directors. These are public-private bodies with representatives from local government and various private stakeholder groups. The water users that contribute to the fund are invariably included, but non-contributing stakeholders are often also represented. In this way, water funds provide an institutional space for negotiation and collaboration among various stakeholders (e.g. public agencies and politicians, civil society and non-governmental organizations, and private corporations). Board members assign a technical secretariat responsible for providing technical support, organizing meetings, and implementing decisions. The overall obligation of the board and technical secretariat is to create and implement strategic and operational plans for managing watershed resources.

A third distinctive feature is that water trust funds are contractual arrangements that define member relations and the use of funds. In other words, they are not separate non-profit or non-governmental organizations, but rather contractual relationships among a variety of public and private entities. This provides a degree of transparency (in terms of expectations, roles, and obligations) as well as a relatively low-cost legal mechanism for enforcing agreements.

Fourth, water trust funds offer a wider variety of funding sources for watershed management activities compared to strict payment for environmental services schemes. Invariably there are regular contributions from watershed service users, including public agencies (e.g., water utilities), private companies (e.g., hydroelectric companies), or community associations (e.g., irrigation councils). In some cases these are structured as voluntary payments while in others payments are made obligatory by local government ordinances. Citizens' payments might be channeled through water and other utility bills or some other program. Importantly, the trust also allows for one-time contributions from external donors, such as private foundations and multilateral donor agencies. The trust's legal status as private, independent, financial entity facilitates contributions from external donors who are often reluctant and/or legally prohibited from donating to local government entities.

A fifth distinctive feature is the trusts' long time horizon, as stipulated in the contracts. For example, the contracts creating FONAG and FORAGUA are in effect for 80 years. The long-term nature of trusts' contractual arrangements provides several benefits. It allows for long-term planning and provides further incentives for external donors to support conservation efforts through one-time payments. The ability to contribute to the capitalization of a trust fund that can provide long-term benefits can ease the concerns of donors who would otherwise be skeptical that their one-time contribution would have a meaningful impact on watershed conservation.

In sum, water funds provide a sustainable funding source for watershed conservation that is independently managed for long-term benefits. The independence, contractual arrangement, sustainable revenue stream, and long-term horizon provide a

level of political and financial security lacking in other payment for environmental services schemes. In addition, water funds provide an institutional space linking a wide variety of stakeholders (e.g. local community organizations, public agencies, and private corporations) that facilitates collaborative decision-making and project implementation. By incorporating upstream and downstream stakeholders with multiple interests, the trusts' governance structure provides a platform for taking an integrated approach to watershed management.

3. Comparing Ecuador's newest water trust funds

Ecuador's two newest water trust funds—the Regional Water Fund (FORAGUA) and Tungurahua's water fund—share the common features of water trust funds described above. However, they still contain significant design differences that reflect distinct processes of institutional development. This section compares these developmental processes and analyzes their influence on Ecuador's water trust funds, both new and old. In so doing, the section traces the development process leading to the distinct institutional designs seen in FORAGUA and the Tungurahua fund. These design differences illustrate the flexibility of the water trust fund model to adapt to different socio-economic and political contexts.

3.1. *The Regional Water Fund (FORAGUA)*

FORAGUA was created through the joining of municipal governments that had already established Pimampiro-style payment for environmental services programs or were in the process of doing so. By 2003, Pimampiro's program was widely considered successful, and CEDERENA, the Ecuadorian NGO that helped create it, was looking to replicate the program. With funding from Ecuador's Ministry of Environment and the Inter-American Development Bank, CEDERENA helped establish a Pimampiro-style payment for environmental services program in El Chaco in 2004 (Yaguache et al., 2005). CEDERENA subsequently turned its attention to replicating Pimampiro's experience in several municipalities in Ecuador's southern provinces of Loja and El Oro, including in Celica, Pindal, Puyango, Macará, and Loja.⁸ In 2006, Loja municipality invited the international NGO Nature and Culture International (NCI) to help strengthen their program. In 2007, NCI also began assisting Celica.

For reasons described below, NCI advocated creating a regional water trust fund that would combine and convert the municipal payment for environmental services programs in southern Ecuador. The idea was that municipal governments would continue to collect the environmental fee levied on water use, but this money would pass to a common trust fund administered by an independent financial entity rather than the governments themselves. Municipal governments and civil society organizations could still determine the use of their own funds by developing annual investment plans, which would be financed with money from the trust. This idea came to fruition in July 2009 when FORAGUA was legally constituted.

FORAGUA is not only Ecuador's newest water trust fund, but also the country's first regional fund, created to conserve and restore the environmental services provided by watersheds in three southern provinces: Loja, Zamora Chinchipe, and El Oro. FORAGUA's founding members include NCI and five municipal governments: Loja, Celica, Puyango, Pindal, and Macará. By mid-2013, five additional municipalities had joined and six more were in the process of

⁸ Author's interview with Robert Yaguache, CEDERENA watershed management expert, Loja, Ecuador, January 20, 2010. See also Carrión, 2009.

joining.⁹ Ultimately, FORAGUA hopes to create watershed management programs in all 37 municipalities in Ecuador's Region 7 and incorporate them into the regional trust fund.

FORAGUA's evolution from municipal payment for environmental services programs accounts for its unusual, highly decentralized institutional design. FORAGUA is designed to give stakeholders in each micro-watershed control over local watershed management policies. To join FORAGUA, each municipal government must create its own ordinances that establish municipal ecological reserves and a fee on water use to finance local conservation and restoration projects. Municipal governments collect this fee monthly and transfer the money to the trust, which is independently managed by the National Financial Corporation. Ten percent of the money is used for FORAGUA's administrative expenses, including the Technical Secretariat's operating budget. The Technical Secretariat provides oversight, training, and technical assistance to municipal governments to ensure their programs are financed and executed in accordance with the rules stipulated in the trust's contract. The remaining ninety percent is used to finance local watershed management activities. Each municipal government prepares an annual investment plan, in coordination with FORAGUA's technical staff. Once approved, the trust releases money to each municipal government as needed to finance activities outlined in these plans. Municipal governments must provide receipts to ensure the funds are only used for approved activities. Failure to do so results in the withholding of funds by the trust. In this way, the trust provides oversight on the use of these funds.

FORAGUA was initially capitalized by having member municipal governments transfer the assets from their individual payment for environmental services programs. These assets consisted of the money collected to date from the environmental fees levied on water use minus the amount already spent on conservation projects. These transfers included \$240,000 from Loja, \$11,263 from Celica, \$48,146 from Puyango, and \$3,351 from Pindal (Rengel, 2012). NCI contributed \$229,500 and transferred to the trust the titles of the land they had purchased for conservation. As of 2013, Macará had promised \$50,000 and was expected to transfer the money once its ordinances were in place.¹⁰ In total, FORAGUA was constituted with \$582,150. This money is invested in financial markets and held for emergencies.¹¹

Each month, member municipalities transfer to the trust the environmental fees collected from water users. Initially, municipal transfers to FORAGUA were irregular, complicated by difficulties with bureaucracy and political will. A new system was developed in which monthly transfers were automatically made through accounts held by each municipality in Ecuador's Central Bank. This greatly increased compliance by removing the possibility of bureaucratic and political obstacles. By mid-2012, only Pindal was still not making regular transfers.¹²

One role of FORAGUA's Technical Secretariat is to grow the fund by recruiting additional contributions from national and international partners, both public and private. Thus, FORAGUA benefits municipalities by providing a mechanism for soliciting and channeling external donations to member governments. By 2013, FORAGUA had received \$1,453,000 in external donations for

thirteen different projects managed by FORAGUA's Technical Secretariat. Donors range from Ecuador's National Water Secretariat (SENAGUA) to a variety of international foundations and donor agencies. These donations financed various watershed management activities in member municipalities, including reforestation, monitoring of water quality and quantity, and environmental awareness campaigns, among other projects. FORAGUA's smaller municipalities in particular benefit from the support provided by FORAGUA's Technical Secretariat since their technical capacity is typically limited and the costs of financing the secretariat fall disproportionately on larger municipalities.

3.2. *The fund for Páramo management and fight against poverty in Tungurahua*

Tungurahua's water trust fund also emerged from an earlier effort to create a Pimampiro-style payment for environmental services program. In the late 1990s, the German Organization for Technical Cooperation (GTZ; now GIZ), the Tungurahuan provincial government, and two Ecuadorian NGOs—CESA (Ecuadorian Center for Agricultural Services) and IEDECA (Institute of Ecology and Development of Andean Communities)—were collaborating to promote the conservation of the Upper Ambato watershed.¹³ GTZ advocated a payment for environmental services system and, with the provincial government's support, hired a team of Costa Rican experts in 2001 to design such a system. In his keynote speech at the province's first Water Resources Forum, held in January 2002, Prefect Fernando Naranjo announced the government's plans to create a payment for environmental services program (*Foro Provincial de los Recursos Hídricos en Tungurahua, 2002*). Carlos Sánchez, the government's Director of Water Resources, announced the government would make an initial investment, but the program would subsequently be financed through a fee on water use. The provincial government and GTZ were confident the proposal would receive widespread social support. Noting people's increased understanding of watershed management issues, Sánchez asserted that "many [people] are prepared to cooperate and pay the [Provincial] Council fees to be reinvested [in watershed management]. If the Provincial Council makes an investment of around \$100,000 over the next two or three months, they [the public] will be willing to invest with their fees for at least thirty years" (*Foro Provincial de los Recursos Hídricos en Tungurahua, 2002*, p. 19).

The Costa Rican team's plan was unveiled at a public assembly in February 2002. It called for a fee of two cents per cubic meter of water to finance conservation, restoration, and development efforts. Based on usage rates, the fee was estimated to generate \$21 million annually (*Comisión Ejecutiva Provincial, 2002*). Given previous social support for watershed management reform, GTZ and the provincial government were shocked when the proposal met with fierce resistance. Members of farmer associations and irrigation councils complained the plan would finance the program on the backs of poor farmers least able to afford it.¹⁴ Indigenous groups shared this concern, but also rejected the idea of markets for ecosystems services, particularly individual payments, on moral grounds. They feared these would lead to the privatization and commodification of nature, which violated indigenous principles.¹⁵ The severity of the backlash startled the provincial government, and Prefect Naranjo later declared he would never accept a

⁹ See www.foragua.org. The new members include Centenela del Condor, Chinchipe, El Pangui, Zamora, and Zaruma. Atahualpa, Calvas, Nangaritzta, Paltas, Santa Rosa, and Sozoranga are in the process of joining.

¹⁰ Author's interview with Eduardo Rengel, Technical Secretary of FORAGUA, telephone communication, June 29, 2012.

¹¹ Emergencies include unexpected events, such as drought, disease, or unforeseen budgetary shortfalls. In such cases, FORAGUA's Board of Directors decides on the use of these funds.

¹² Author's interview with Eduardo Rengel, Technical Secretary of FORAGUA, telephone communication, June 29, 2012.

¹³ In January 2011, GTZ was restructured as GIZ (German Society for International Cooperation).

¹⁴ Author's interview with Mauricio Realpe, IEDECA Director, Ambato, Ecuador, December 1, 2009.

¹⁵ Author's interview with Carlos Moreta, ex-President, Indigenous Movement of Tungurahua, Ambato, Ecuador, November 18, 2009; Author's interview with Carlos Sánchez, Ambato, Ecuador, October 12, 2009.

payment for environmental services system.¹⁶ The phrase “payment for environmental services” became toxic, and subsequently no organization (including GTZ and the provincial government) publicly supported such a program.

Interestingly, while indigenous communities living in the páramo opposed a payment for environmental services program, which they viewed as privatization, they embraced the idea that they should be compensated for their efforts to protect and restore the páramo, the watershed’s catchment area. Rather than cash payments to individuals, they wanted resources for poor communities to enhance agricultural production in lower, less ecologically fragile areas to improve the quality of life in those communities. Indigenous leaders agreed to negotiate with GTZ and others on creating a financing mechanism that would combine the dual goals of watershed conservation and poverty reduction, but rejected the previous approach of creating a market for environmental services. The province’s participatory Water Parliament (discussed below) became a forum for community members to discuss the idea of getting different water users to voluntarily contribute to a common fund to finance local economic development initiatives and conservation programs at a community level.

GTZ agreed and in 2006 worked with The Nature Conservancy-Ecuador to develop a proposal modeled on FONAG. When indigenous leaders refused to sign this proposal, GTZ asked them to develop their own and offered technical support. As negotiations continued, GTZ recruited Pablo Lloret and Marta Echavarría (leading experts on FONAG) to promote the water trust fund model and raise awareness and support among various water users. In the end, GTZ, The Nature Conservancy, and their allies gained the support of the watershed’s two hydroelectric companies, Ambato’s municipal water company, the provincial government, and the province’s three indigenous movements (MIT, MITA and AIET).¹⁷ The indigenous movements finally accepted the model once they visited FONAG, studied its operation, and became convinced it did not involve the commodification and privatization of natural resources.¹⁸

On June 4, 2008, the Fund for Páramo Management and Fight Against Poverty in Tungurahua was legally created. As the name implies, the fund finances and promotes projects to conserve the páramo ecosystems where water collects while simultaneously improving local populations’ standard of living through eco-agricultural projects. The fund has seven original members representing the local government, the watershed’s main water user groups, and farmers living in the catchment area. Members include Tungurahua’s provincial government, EMAPA-A (the municipal water company for Ambato, the capital city), two hydroelectric companies (Hidroagoyan and Hidropastaza), and the province’s three indigenous movements, which represent the communities living in the páramo as well as small-holder farmers throughout the watershed. In October 2011, the Ambato Regional Electric Company also joined.

Tungurahua’s fund is capitalized with annual voluntary contributions from its eight partners, who serve on the trust’s board of directors. GTZ (now GIZ) has contributed money on behalf of the three indigenous movements to ensure indigenous communities are represented on the board. In the fund’s first four years (2008–2011), member contributions averaged \$485,000 per year

(see Table 1). Sixty percent of these contributions are invested to grow the fund, while 40 percent go toward financing projects defined in annual operating plans (Rojas, 2012). Projects are also financed by interest from the trust’s investments and special donations from external organizations such as GIZ, the U.S. Agency for International Development, FONAG, and others. As the trust has grown, so has the interest income generated, from \$29,947 in 2009 to \$57,337 in 2011. Special donations vary by project and totalled \$252,857 by 2011 (Rojas, 2012).

As with FORAGUA and FONAG, the Tungurahua fund illustrates the flexibility of the water fund model to adapt to local socio-cultural and political contexts. With its voluntary contributions and lack of direct payments to landowners, Tungurahua’s water fund fits better with local indigenous priorities regarding community well being, as well as their concerns about the commodification and privatization of natural resources. Unlike a strict payment for environmental services scheme, Tungurahua’s trust fund does not directly compensate individuals. Rather, like FONAG, it finances a range of activities (described below) designed to benefit the ecosystem as a whole, including the communities that live within it. According to Tungurahua’s indigenous leaders, this distinction is crucial because it emphasizes the public nature of natural resources and the focus on human well being.¹⁹

3.3. Participatory governance structures

One difference between FONAG and Ecuador’s newer water trust funds is that the newer funds are being created as part of a watershed management system that includes a local, participatory decision-making body independent of these funds. As mentioned above, all trust funds’ boards of directors serve as collaborative, multi-stakeholder decision-making mechanisms. However, major water users (the main contributors to the funds) often dominate the boards of directors. Increasingly, Ecuador’s water trust funds are being linked to other participatory decision-making bodies that incorporate a wider array of watershed stakeholders, including those that are not trust fund members. At a minimum, these participatory bodies provide oversight for water funds, but they often serve as a space for collaboratively setting priorities and developing projects that are later financed through the trust funds. In some instances, they are even given authority to control the transfer of money to the trust funds.

3.3.1. Tungurahua’s Water Parliament

One example of these participatory institutions is Tungurahua’s Water Parliament, created in 2004 as part of the province’s New Governance Model. In 2002, shortly after the popular rejection of the original payment for environmental services proposal, the provincial government and GTZ held workshops with community organizations to set a development agenda (*Honorable Consejo Provincial de Tungurahua, 2002*). In April 2003, 355 representatives of various public and private organizations attended a provincial assembly to agree on a development agenda and plans for moving forward. The participants proposed constructing a New Provincial Government of Tungurahua that would be “participatory and in which all actors would combine forces to achieve development in the province, improve the population’s living conditions, and deepen local democracy” (*Gobierno Provincial de Tungurahua, 2009*, pp. 7–8).

The New Provincial Government of Tungurahua was constituted one year later through the creation of three participatory institutions related to the three issue areas identified as pillars of

¹⁶ Author’s interview with Fernando Naranjo, Ambato, Ecuador, January 6, 2010.

¹⁷ Tungurahua’s three indigenous movements include the Indigenous Movement of Tungurahua (MIT), the Indigenous Movement of Tungurahua-Atocha (MITA), and the Association of Evangelical Indigenous Peoples of Tungurahua (AIET).

¹⁸ Author’s interview with Washington Chapalbay, October 26, 2009; Author’s interview with Marta Echavarría, Quito, Ecuador, October 15, 2010.

¹⁹ Author’s interview with Carlos Moreta, ex-President, Indigenous Movement of Tungurahua, Ambato, Ecuador, November 18, 2009.

Table 1
Annual partner contributions to Tungurahua's water trust fund (\$U.S.).

Partner	2008	2009	2010	2011	Total
Provincial Government	300,000	300,000	300,000	300,000	1,200,000
Hidroagoyan	50,000	100,000	100,000	100,000	350,000
EMAPA-A	50,000	50,000	50,000	50,000	200,000
Hidropastaza	50,000	50,000	0	0	100,000
Indigenous Movements	10,000	10,000	10,000	10,000	40,000
Ambato Regional Electric Company				50,000	50,000
Total per year	460,000	510,000	460,000	510,000	1,940,000

Rojas (2012).

development: water, people, and work. Civil society organizations soon demanded that these participatory institutions be given legal and institutional powers on par with the Provincial Council. As a result, in 2006 they were legally reconstituted as “parliaments” within the provincial government. These three “parliaments” allow any interested individual to participate in working groups tasked with discussing and developing policy related to each issue area. The Water Parliament was comprised of four working groups dealing with the páramo, irrigation, potable water, and sanitation. As noted above, the Water Parliament was an important space where watershed stakeholders discussed the need for a local financing mechanism and negotiated the characteristics of Tungurahua's water trust fund.

The Water Parliament provides a space for hundreds of public and private actors to specify common objectives, set priorities, formulate proposals, make policy decisions, provide oversight, and form working teams to spur policy implementation regarding watershed management in the province. The bulk of activity happens in the four working groups. A technical unit provides technical and logistical assistance to advance proposals and facilitate institutional coordination. The Water Parliament's páramo working group has been an important space for developing and monitoring páramo management plans created at the community level through a participatory process. The implementation of these plans is financed by Tungurahua's water fund. The water fund also finances conservation projects developed by the Water Parliament's other working groups. As a member of the Water Parliament, the fund's technical secretariat contributes to the Parliament's decision-making and provides technical support.

3.3.2. FORAGUA's environmental services committees

In FORAGUA, several member municipalities have Environmental Services Committees. Whereas municipal governments are the only local representatives on FORAGUA's board of directors, these Environmental Services Committees include representatives of local government, landowners living in the watersheds' upper catchment areas, water users below, and other interested parties, such as environmental activists. Therefore, these committees provide the main mechanism for multi-stakeholder participation. Ideally, these committees provide a space for jointly setting priorities, supporting the planning process, and providing oversight of FORAGUA's activities. In Celica, for example, the committee has the authority to purchase land for conservation, negotiate compensation for conservation agreements with landowners, hire guards to monitor compliance, and approve financial transfers to FORAGUA.

3.4. Grassroots social foundations

It is no coincidence that the participatory decision-making bodies described above preceded the creation of FORAGUA and Tungurahua's water fund. Ecuador's newer water funds are being built on social foundations created by years of training and organization around watershed management at the grassroots level. In

the cases of FORAGUA and Tungurahua's water fund, advocates of watershed conservation worked for years before water funds were created to train local watershed management experts and community promoters as well as foster voluntary conservation agreements at the community level. Over time, these community agreements were aggregated to allow for watershed management at a larger scale. Once created, the water funds not only provided a financing mechanism, but also a way to link multiple local watershed conservation efforts to take a more integrated approach to watershed management. In this way, Ecuador's newer funds reflect a process of scaling up watershed conservation from the grassroots to the watershed level and beyond.

This is clearly seen in the case of FORAGUA, where municipal watershed management programs were combined to take a more integrated approach at the regional level. The seeds of FORAGUA can be traced to the training and organizing around watershed management that occurred under the project Community Management of the Dry Forests and Micro-Watersheds in the Southwest of Loja Province, commonly known as the Dry Forest Project (Bustamante, 2004). The project was established in December 1997 by the Dutch development agency SNV in collaboration with Ecuador's national forestry department, INEFAN. The program was a response to the growing problem of water scarcity in southern Ecuador during the 1990s, aggravated by agricultural practices like the over-grazing of cattle, uncontrolled burnings of land, and the degradation of soil through deforestation and corn monoculture (Proyecto Bosque Seco, 1998). The project identified three strategies for addressing this problem: (1) organizing and training rural community members in environmental management, (2) strengthening inter-institutional coordination to link the municipal government and various private actors, and (3) training stakeholders to create integrated watershed management plans (Proyecto Bosque Seco, 1999, 3). In short, the project aimed to create institutional linkages among a trained cadre of local stakeholders to pursue a participatory, integrated approach to watershed management.

FORAGUA has its roots in the Dry Forest Project. The project ended in 2004, just as CEDERENA was looking for places to replicate Pimampiro's payment for environmental services program. CEDERENA's top watershed management expert, Robert Yaguache, was a native of Loja province and was interested in working there. The vulnerability of the region's dry forest ecosystem made it a strategic priority. Yaguache was well aware of how the Dry Forest Project had placed watershed management on the local agenda of municipal governments and constructed a network of trained local experts. Given CEDERENA's participatory approach, Yaguache saw these as promising conditions for implementing local payment for environmental services programs. In this way, a decade of training and organizing at the grassroots level preceded the creation of municipal watershed conservation programs that were later scaled up to the regional level through FORAGUA. As noted above, the scale of watershed conservation through FORAGUA continues to expand through the incorporation of new municipalities.

The Tungurahua case similarly illustrates the scaling up process built on decades of grassroots organizing. By the late 1990s, Ecuadorian development NGOs CESA and IEDECA had been working with indigenous communities for years to improve agro-ecological production. However, in the late 1990s they began to focus more on changing communities' use of the páramo, the water catchment area for the Ambato River watershed. CESA and IEDECA did this in part by strengthening civil society organizations and training them in integrated watershed management techniques, including páramo management.²⁰ Many local community promoters embraced integrated watershed management principles and helped institutionalize changes through community accords and community-produced páramo management plans. The first accords and plans were reached in the late 1990s and rapidly spread in the early 2000s. They resulted from years of work to build the trust of community members and to change their perceptions of how the páramo should be valued and managed. Where successful, the agreements produced significant changes, including limiting the agricultural frontier and relocating families and animals out of strategic catchment areas. In exchange, these communities demanded financial and technical assistance from the government and water users below, both for protecting the páramo and for improving their production capacity outside the páramo.

As described above, these community demands spurred negotiations that produced Tungurahua's water fund. In addition, the community-level accords and páramo management plans have become the basis for the fund's activities. The increase in the number of páramo management plans financed through Tungurahua's water fund illustrates the scaling up of watershed management activities. Initially, the fund focused on three sections of páramo in the upper Ambato Watershed where community agreements and plans were strongest. By 2010, eight community páramo management plans, covering most of the watershed's catchment areas, were incorporated into the fund's plans. Since then, Tungurahua's water fund has expanded its projects to include neighboring micro-watersheds, including those for the Pachanlica and Cutuchi rivers. Tungurahua's three indigenous movements, with the support of the fund's technical secretariat are currently working to combine these individual páramo management plans into a single, comprehensive, integrated watershed management plan.

3.5. Investments in watershed conservation

In Tungurahua's fund, 60% of member contributions are invested to grow the trust while 40% are spent on projects. The fund's technical secretariat, appointed by the board, creates the annual operating plans, which determine the projects financed each year. Funding decisions are made in accordance with the trust's contract, its strategic institutional plan (created in July 2010 through a participatory process), Tungurahua's Provincial Development Agenda, and participatory budgeting documents collectively created by social organizations through the province's Water Parliament. Priority is given to financing páramo management plans created at the community level and coordinated by the province's three indigenous movements.²¹

Tungurahua's fund also finances eight programs meant to complement the community páramo management plans. These include: (1) "Communication and inter-institutional relations"

(for institutional strengthening; promoting the fund; and recruiting new members and donations); (2) "Training" (to strengthen the technical capacity of professionals and community members working to conserve páramo ecosystems); (3) "Environmental education" (to create a culture of environmental protection); (4) "Intercultural programs" (to ensure respect for diverse cultural traditions and thought regarding water and páramo management); (5) "Monitoring of environmental and socio-economic variables" (to gather the scientific information necessary to make effective decisions); (6) "Production and economic revitalization" (to improve local communities' economic opportunities and create ecologically friendly production processes); (7) "Conservation of protected areas" (to improve monitoring and enforcement of Llanganates National Park); and (8) "Climate change adaptation" (to evaluate future risks and vulnerability in the province) (Rojas, 2012).

In 2008, the fund's first year of operations, expenditures focused on building the fund's infrastructure and financing the only two completed páramo management plans. While communities were formulating additional plans, the fund focused on institutional strengthening and the complementary programs described above. By 2012, 10 páramo management plans existed and received funding. Over time, funding has shifted away from administrative expenses and complementary programs toward the páramo management plans (see Table 2). By 2012, roughly 85% of expenses went toward financing these community-designed plans (which include projects to improve agricultural production), conservation, and environmental education, with 10% going toward administrative expenses and 5% toward financial capitalization.²²

Tungurahua's water fund has already achieved significant results. By the end of 2011, 17,635 hectares of páramo were being conserved and restored for the first time through community agreements. Anecdotal evidence suggests some improvement in vegetation and water quality. In the páramos of Yanahurco, for example, natural vegetation is returning in roughly 80% of the territory. Analysis using the Water Quality Index (WQI) shows water quality has increased from .60 to .71.²³ A network of 20 hydrometeorological stations is being installed to better evaluate changes in the quality and quantity of water. In terms of socio-economic effects, more than 2,000 community members have been trained in conservation, sustainable agriculture and irrigation, the social management of water, páramo management, and economic management. Nearly 2,200 families have benefited from economic and production assistance (Rojas, 2012). Perhaps the biggest changes are the improved social capacity and commitment to sustainable watershed management seen in the province, demonstrated by the community development and implementation of páramo management plans.

In FORAGUA, only members' initial transfers were used to capitalize the trust fund. All subsequent member contributions are used to finance projects. In contrast to FONAG and Tungurahua's fund, the monthly contributions sent by member municipalities are not used to further capitalize FORAGUA, but to finance municipalities' annual investment plans. Interest income generated by the trust is not the main source of project funding; rather, financial sustainability comes from municipalities' environmental fees, which are mandated through municipal ordinances (passing these ordinances is a requirement for membership in FORAGUA). According to FORAGUA's contract, funds may only be used for the conservation and restoration of natural vegetation; reforestation with native species; infrastructure to protect watersheds (e.g., wire and

²⁰ For examples and details of these trainings, see Cisneros et al., 2000; CESA, 2000, IEDECA, 1998.

²¹ Author's interview with Oscar Rojas, Technical Secretary, Fund for Páramo Management and Fight Against Poverty in Tungurahua, telephone communication, July 4, 2012.

²² Ibid.

²³ The finding is from a water quality study performed by the Tungurahua fund's technical secretariat, provided to the author by the fund's technical secretary, Oscar Rojas.

Table 2
Annual expenditures for Tungurahua's water fund (S.U.S.).

Expenditure	2008	2009	2010	2011	Total	Percent
Páramo Management Plans	11,200	39,200	71,634	103,760	225,794	32.3%
Other Conservation	0	5,900	59,322	66,037	131,259	18.8%
Complementary Programs	0	74,369	60,122	64,318	198,809	28.5%
Administrative Expenses	4,275	45,113	57,634	35,610	142,632	20.4%
Total	15,475	164,582	248,712	269,725	698,494	100%

Rojas (2012).

live fences); scientific investigation; monitoring and control; environmental education; and other activities permitted in municipal reserves as outlined in municipal ordinances.

Because FORAGUA is so young, it is difficult to measure its effects. However, there have been increases in the amount of land placed under conservation. When FORAGUA was created, roughly 600 hectares were being protected through land purchases and projects financed by the fund. By 2012 that number had increased to around 3,000 hectares (roughly 2,500 in Loja and 500 in the other municipalities).²⁴ In total, more than 20,000 hectares of ecological reserves have been created through municipal ordinances. As a result of these ordinances and projects, 51% of the water catchment areas serving the city of Loja are being protected. These numbers are 21% for the city of Celica, 21% for the city of Alamor in Puyango, and 11% for Macará.²⁵ FORAGUA is currently working with FONAG and the US Agency for International Development to create a methodology for measuring the impacts of this conservation. While difficult to measure, the technical staff of FORAGUA and affiliated member governments report changes in local attitudes regarding environmental issues and conservation, particularly among government officials. These issues, which were traditionally seen as unimportant, are now on governments' agendas and are regularly included in planning processes.

4. Changes in Ecuador's evolving water trust fund model

FORAGUA and Tungurahua's water fund share with FONAG the characteristics common to all water trust funds described above. Yet, these newer water trust funds have distinct design features resulting from their different developmental trajectories and socio-economic and political contexts. They also share certain commonalities with each other—and differences with Ecuador's original watershed financing programs—that reflect an evolution in thinking about financing watershed conservation in Ecuador. These changes are due to lessons learned over the last decade by local stakeholders and watershed management practitioners. This section summarizes four broad changes to the financing of watershed conservation in Ecuador and the lessons that inspired them.

4.1. Moving from Pimampiro-style programs to water trust funds

One observable change over the last decade is the move away from Pimampiro-style payment for environmental services programs toward water trust funds. As the above case studies note, both FORAGUA and Tungurahua's fund emerged from initial attempts to implement payment for environmental services programs. In Tungurahua's case, the switch to a water trust fund came early on, when a watershed financing mechanism was still being designed. In FORAGUA's case, individual payment for environmental services programs were aggregated and converted into a water

trust fund program. This conversion is not unique to FORAGUA member municipalities, however. El Chaco, the municipality with the country's second-oldest payment for environmental services program, is planning a similar transformation. In 2010, Esteban Zarria, Director of El Chaco's payment for environmental services program, began talks with The Nature Conservancy to switch the municipality's payment for environmental services program to a FONAG-style water trust fund.²⁶

According to representatives of local watershed stakeholder groups, there are four main reasons for Ecuadorians' decision to move away from strict payment for environmental services programs toward water trust funds. First, water trust funds provide greater protection against political instabilities plaguing local payment for environmental services programs, particularly the politicization of watershed management programs and the diversion of funds for other purposes. Since independent financial institutions manage the trusts according to contractual arrangements set by trust members, the trust prevents local politicians from diverting money for watershed conservation toward other uses. Also, the long-term contracts and relatively high barriers to exit provide some continuity through changes in administrations and mitigate the effects of clientelistic politics. New mayors often try to abolish and discredit programs of the previous mayor, which can undermine longer-term development efforts.

A common feature of Ecuador's water trust funds is that local governments can only withdraw after mayors convene all stakeholders and publicly justify their decision. In FORAGUA and FONAG, new mayors announced their intention to withdraw from their respective water funds. In both cases, however, the mayors reversed their decisions after learning the exit rules. The experience in Celica (a FORAGUA member municipality) is both illustrative and representative. Before Celica joined FORAGUA, Celica's mayor pressured the citizen-based environmental services committee to divert money to buy trash collectors and pay salaries of government employees, which was strictly prohibited by the program's regulations. This diversion of funds was made impossible once Celica joined FORAGUA. The independent financial managers within the National Financial Corporation (hired by FORAGUA's members to manage the trust) had strict control over the disbursing of funds and were not vulnerable to local political pressure.

In hindsight, FORAGUA seems to have been crucial to the survival of Celica's watershed financing program. Signing the contract to join FORAGUA was one of Mayor Jorge Jaramillo's final acts before leaving office in 2009. As is common in Ecuadorian municipalities, incoming mayor Roberto Jaramillo sought to undo many of the programs initiated under his predecessor. In a December 2009 meeting with NCI, Roberto Jaramillo announced his intention to withdraw from FORAGUA and end the environmental services program. New municipal council members allied with the mayor also said they wanted to leave FORAGUA. However, they changed their minds once they discovered the legal process for withdrawing. According to Jimmy Cuenca, Celica's municipal government representative to

²⁴ Author's interview with Eduardo Rengel, Technical Secretary, FORAGUA, telephone communication, June 29, 2012.

²⁵ See www.foragua.org/ (accessed April 6, 2013).

²⁶ Interview with author, El Chaco, Ecuador, April 20, 2010.

FORAGUA, I explained that to leave, you have to convene a meeting of all the members of the trust fund—the other mayors, citizen representatives and others – and explain your reasons for wanting to leave. This is more difficult for politicians to do because it suggests they are putting their personal political interests ahead of the interests of the common good, which is uncomfortable for politicians. The force comes from the group. So now the mayor is willing to continue.²⁷

In sum, difficult exit rules and the prospect of public shaming appear to have deterred Celica's new mayor and his political allies from dismantling Celica's watershed conservation program. It provides an interesting example of how the water trust fund's institutional structure was able to mitigate the negative effects of local clientelistic politics.

A second advantage of water trust funds for Ecuadorians is their ability to overcome concerns about privatization and the commodification of nature associated with strict payment for environmental services schemes. Ecuador's skepticism about privatizing nature, particularly water, is reflected in the country's constitutional ban on such privatization (e.g., Articles 12 and 318). These constitutional provisions partly resulted from a decades-long campaign by the country's indigenous movements against the commodification of nature and for more equitable access to natural resources (Becker, 2011). In many communities, particularly those with a strong indigenous presence, direct compensation to individuals is avoided out of the belief that this implies private ownership of watershed resources and services. Individual cash payments are particularly problematic as this implies a market for environmental services, which for many Ecuadorians suggests the commodification of nature. These concerns, combined with the fact that Pimampiro-style environmental services programs were initially based around individual payments, made the term "payment for environmental services" highly unpopular in Ecuador and elsewhere in Latin America (Poats, 2007, 9).

Ecuador's water trust funds have overcome concerns about the commodification and privatization of nature in two ways. The first is by using funds to finance a variety of projects at the watershed and community levels, rather than providing compensation directly to individuals.²⁸ Ecuadorian stakeholders often prefer this approach because they believe it reinforces the notion of watershed resources being public goods and promotes a sense of community responsibility. A second strategy is to replace direct cash payments with in-kind compensation, often in the form of technical assistance and materials to help communities improve their agricultural production and conservation efforts. This move away from individual compensation and direct cash payments exists not only in areas with large indigenous populations, such as Tungurahua, but also in non-indigenous communities. For example, El Chaco and many members of FORAGUA have switched from individual cash payments to providing in-kind compensation in the form of production assistance.

In addition to concerns about privatization, many environmental activists and municipal representatives argue that individual cash payments fail to instill a sense of value in conservation among farmers living in watersheds. Rather than leading these farmers to see conservation as an inherently valuable activity, cash payments can lead them to view the financing of watershed conservation as

a way to extract additional rents. Watershed conservation activists and municipal representatives allege that in extreme cases, individual cash payments have led to situations of "blackmail."²⁹ Farmers have threatened to purposefully deforest catchment areas if they do not receive higher payments from municipal governments (e.g., Echavarría et al., 2004).

A third reason for the move toward water trust funds is that the funds' public-private, multi-stakeholder decision-making mechanisms facilitate greater collaboration, particularly when combined with community-level projects. This institutional structure has cultural resonance in Ecuador because it is consistent with the Ecuadorian tradition of *mingas*. *Minga* means "collective work" in the Quichua language and refers to the centuries-old indigenous tradition of family labor exchange. It is an important concept throughout Ecuador, particularly among popular and poor sectors, both indigenous and non-indigenous. *Mingas* use norms of exchange and reciprocity to motivate community members to participate in voluntary, unpaid projects that benefit community members. Traditionally, *mingas* are used mostly in farming and building houses. More recently, however, community *mingas* are organized by water fund members to implement conservation and restoration projects financed by the funds.

A fourth reason for the increase in water trust funds is that trusts can facilitate external donations to boost funding for watershed management. As mentioned above, many donors are reluctant or legally prohibited from providing money directly to government entities. Private trusts provide a mechanism for overcoming these difficulties. In addition, the trust increases donors' confidence that even a one-time donation can contribute meaningfully to watershed conservation. Their contribution can be used to further capitalize the trust fund, and the interest income generated by the trust can finance watershed conservation over the long term.

Access to external financial, technical, and informational resources is particularly important for facilitating watershed conservation in small Ecuadorian municipalities. Individually, small municipalities cannot raise enough money through local environmental fees to engage in meaningful conservation. They also typically lack sufficient technical and informational resources. In addition to providing increased access to financial resources, trusts provide local watershed stakeholders with technical support through their technical secretariats. This compensates for a lack of institutional capacity common in small, rural municipalities.

4.2. Linking with participatory watershed management institutions

As discussed above, a second change observable in Ecuador's evolving water trust fund model is that it is placing water funds within a watershed management system that includes a local, participatory decision-making body independent of these trust funds. Participatory decision-making institutions such as Tungurahua's Water Parliament and FORAGUA members' Environmental Services Committees include a broader array of watershed stakeholder groups than is included on the trusts' board of directors. These participatory institutions are meant to incorporate a greater number of stakeholders into the watershed management process, from identifying needs to developing and implementing projects financed through the trust funds to monitoring and providing oversight.

²⁷ Interview with author, Celica, Ecuador, March 11, 2010. Note: when water trust funds purchase land for conservation, that land is owned by the trust and managed according to the rules stipulated in the trust's contract.

²⁸ Water trust funds do not preclude direct payments to individuals, and these exist where local norms permit, but trusts' flexible designs allow for a wider array of activities to fit local socio-political conditions.

²⁹ Author's interview with Luís Suarez, Executive Director, Conservation International-Ecuador, Quito, Ecuador, July 28, 2011; Author's interview with Robert Yaguache, CEDERENA water expert, Loja, Ecuador, January 20, 2010; Author's interview with Verónica Arias, Country Representative, The Nature Conservancy-Ecuador, Quito, Ecuador, June 23, 2011.

Broad participation by stakeholders from different sectors and parts of the watershed is believed to facilitate a more integrated, effective and sustainable watershed management process.

This move toward linking trust funds with independent participatory watershed management bodies is illustrated not just by Ecuador's newer funds, but also by FONAG, the original water trust fund. Like all water trust funds, FONAG's board of directors does provide a mechanism for public-private, multi-stakeholder collaboration. But FONAG's board of directors only includes the water users and external donors that contribute to the trust. A participatory watershed committee was not part of FONAG's original design. However, FONAG is learning from Ecuador's newer funds and taking steps to place FONAG within a watershed management system that includes local, independent, participatory, decision-making bodies.

In 2007, seven years after its founding, FONAG partnered with the Ecuadorian NGO Fundación Futuro Latinoamericano (FFLA) to create a more-participatory and integrated approach to watershed management in the Guayllabamba watershed, which feeds Quito. With funding from the Inter-American Development Bank, in 2008 FFLA began organizing watershed stakeholders with the goal of creating a "Multi-Actor Platform"—a space where stakeholders representing multiple sectors (e.g., energy, irrigation, consumption) and scales (e.g., national, watershed, and sub-watershed) would collaboratively design and implement watershed management plans financed through FONAG (Cabrera Haro, 2011). The plan is to create micro-watershed committees to provide participatory planning and implementation processes at the community level. A watershed council will link committees within a given watershed to ensure an integrated approach at the watershed level.

Roughly 300 representatives of 120 organizations have participated in related assemblies and workshops (Cabrera Haro, 2011). However, the process of creating the Guayllabamba Watershed Council remains a work in progress. This process has been slowed by the national legal and institutional changes resulting from the 2008 Constitution, as well as the continued uncertainty caused by Congress's failure to finalize a new Water Law. Nevertheless, Ecuador's Water Secretariat (SENAGUA) has expressed support for the creation of watershed councils throughout the country, suggesting the trend of linking water funds with local, participatory decision-making bodies may continue.

4.3. *Scaling up watershed conservation from the grassroots*

As discussed above, Ecuador's newer water funds are being built through processes that began with grassroots training and organizing and then scaled up watershed management by integrating these individual efforts into a more comprehensive program. The scaling up of watershed management programs has greatly facilitated the ability of Ecuador's new water funds to collaborate with local communities and contributes to the funds' effectiveness. These funds are reliant on local actors for their participation in all stages of watershed conservation and management, from agreements to conserve and restore catchment areas to monitoring and sanctioning those who violate the agreements. Local communities each set and enforce their own penalties for burning páramo, deforesting, or placing animals in protected areas. Sanctions include fines and the confiscation of animals. The role of local actors in designing, implementing, monitoring, and enforcing watershed management plans illustrates the significant changes in community-level watershed management underway in Ecuador. As described above, the country's water funds are both affected by and contribute to these changes.

4.4. *Investing early in conservation projects*

A fourth change seen among Ecuador's newer water trust funds is the decision to spend a significant portion of the trust's assets to fund conservation in the first years of operation. Ecuador's newer water funds differ from FONAG in that a portion of their assets is spent on watershed conservation projects rather than being invested to grow the fund. By contrast, FONAG only spends the interest income generated by the trust's investments; the trust's assets remain untouched to ensure the sustainability of financial resources. The decision whether or not to spend a trust's assets on projects involves a tradeoff. Not touching these assets allows a fund to grow more rapidly, lessening the time before the interest on investments provides a sustainable revenue stream large enough to finance conservation. However, this can mean waiting years before financing conservation. Unable to see tangible results, water users and other stakeholders may become disillusioned with the process.

Spending part of a fund's assets on conservation and related projects can produce short-term effects that give water users an incentive to support the fund. But this lengthens the time before the interest on investments provides a sustainable revenue stream. FONAG focused on growing its assets, and it was four years before it began investing in watershed conservation. During this time FONAG received criticism because an important amount of money was going to the fund, but the impact on conservation was small. From FONAG's experience, Ecuador's newer funds learned the importance of funding projects in the short-term to maintain credibility with local stakeholders and potential donors. For this reason, newer water funds split the use of financial assets between capitalization and projects, as described above.

5. Conclusion

Ecuador's water funds—new and old—are evolving within the context of broader changes in community-level watershed management around the country. They are emerging from longer-term processes of building integrated watershed management systems at the local level. The differences between FONAG and later funds reflect lessons learned through these processes. Ecuador's newer funds are also contributing to and shaping these processes. Their effects can be seen in the various projects being financed through the funds—educating citizens to create a culture of conservation; training local professionals to build communities' capacity for watershed conservation; improving the efficiency of agricultural production and expanding farmers' access to commercial markets in order to compensate communities for the costs of conservation; providing an institutional space for collaborative decision-making among multiple stakeholders at multiple scales; gathering scientific information to improve decision-making; and providing a sustainable financing mechanism.

The growing number of water trust funds in Ecuador and beyond suggests these funds offer many advantages for financing watershed conservation. The independence, contractual arrangement, sustainable revenue stream, and long-term horizon provide a level of political and financial security lacking in other payment for environmental services schemes. In addition, water funds provide institutional spaces linking a wide variety of stakeholders (both upstream and downstream), which facilitates collaborative decision-making and project implementation. Finally, water trust funds are easily adapted to fit different local socio-cultural and political conditions, including those that oppose the commodification of natural resources. As such, they provide an innovative model for providing sustainable financing for watershed conservation in places like Ecuador where privatization is not possible for either legal or cultural reasons.

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References

- Albán, M., Wunder, S., 2005. Decentralized Payments for Environmental Services: Comparing the Cases of Pimampiro and PROFAFOR in Ecuador. In: Paper presented at the The ZEF-CIFOR workshop on Payments for Environmental Services: Methods and Design in Developing and Developed Countries, Tübingen, Germany.
- Becker, M., 2011. Correa, indigenous movements, and the writing of a new constitution in Ecuador. *Latin Am. Perspect.* 38 (1), 47–62.
- Bustamante, M., 2004. Gestión Ambiental Concertada: Una Experiencia en Participación Ciudadana [Coordinated Environmental Management: An Experience in Citizen Participation]. SNV; Proyecto Bosque Seco, Loja, Ecuador.
- Cabrera Haro, P., 2011. Sistematización del Proceso de Gobernanza Interescalas para la Gestión de los Recursos Hídricos: El caso de la Cuenca Alta del Río Guayllabamba [Overview of the Multilevel Governance Process for Water Resource Management: The Case of the Upper Guayllabamba Watershed]. Fundación Futuro Latinoamericano, Quito, Ecuador.
- Céleri, R., 2009. Estado del Conocimiento técnico Científico Sobre los Servicios Ambientales Hidrológicos Generados en los Andes [State of the Scientific Knowledge of Hydrological Environmental Services Generated in the Andes]. CAMAREN, Lima, Peru.
- CESA, 2000. Programa de Formación Empresarial y Desarrollo Local en La Parroquia Quisapincha [Training Program for Business and Local Development in Quisapincha Parish]. CESA, Ambato, Ecuador.
- Cisneros, I., Chicaiza, L., Chontasi, R., Moreno, C., 2000. Manejo de Páramos y Zonas de Altura: Elaboración y Ejecución de Planes de Manejo de Páramos [Management of Páramos and High Zones: Creation and Implementation of Páramo Management Plans]. CAMAREN, Quito, Ecuador.
- Comisión Ejecutiva Provincial, 2002. Propuesta Para la Implementación del Pago por Servicio Ambiental Hídrico en la Provincia de Tungurahua y su Aplicación en una Zona Piloto [Proposal for the Implementation of a Payment for Water Environmental Services in Tungurahua Province and its Application in a Pilot Zone]. Gobierno Provincial de Tungurahua, Ambato, Ecuador.
- Echavarría, M., Vogel, J., Albán, M., Meneses, F., 2004. The Impacts of Payments for Watershed Services in Ecuador: Emerging Lessons from Pimampiro and Cuenca. International Institute for Environment and Development, London.
- Foro Provincial de los Recursos Hídricos en Tungurahua, 2002. Recopilación Detallada de Talleres Provinciales, Entrevistas, Foro Provincial y Mesas de Trabajo [Detailed Summary of the Provincial Workshops, Interviews, Provincial Forum, and Working Groups]. CAMAREN, Ambato, Ecuador.
- Gobierno Provincial de Tungurahua, 2009. El Nuevo Modelo de Gestión: una forma diferente de ser Gobierno Provincial de Tungurahua [The New Governance Model: A Different Form of being the Tungurahua Provincial Government]. Gobierno Provincial de Tungurahua, Ambato, Ecuador.
- Goldman, R.L., Benitez, S., Calvache, A., Ramos, A., 2010. *Water Funds: Protecting Watersheds for Nature and People*. The Nature Conservancy, Arlington, VA.
- Goldman-Benner, R., Benitez, S., Boucher, T., Calvache, A., Daily, G., Kareiva, P., Kroeger, T., Ramos, A., 2012. Water funds and payments for ecosystem services: practice learns from theory and theory can learn from practice. *Oryx* 46 (1), 55–63.
- Honorable Consejo Provincial de Tungurahua, 2002. *Tungurahua - Plataforma Única de Desarrollo 2002* [Tungurahua—Single Development Platform]. Honorable Consejo Provincial de Tungurahua, Ambato, Ecuador.
- IEDECA, 1998. Manejo y Conservación de Recursos Naturales en la Zona de la COCP—Llangahua [Management and Conservation of Natural Resources in the Zone of COCP—Llangahua]. Instituto de Ecología y Desarrollo de las Comunidades Andinas, Ambato, Ecuador.
- Jacome, L., 2004. The Late 1990 Financial Crisis in Ecuador: Institutional Weaknesses, Fiscal Rigidities, and Financial Dollarization at Work. International Monetary Fund, Washington, DC.
- Krchnak, K.M., 2007. Watershed Valuation as a Tool for Biodiversity Conservation. The Nature Conservancy, Arlington, VA.
- Poats, S., 2007. Report on the Latin American Regional Workshop on Compensation for Environmental Services and Poverty Alleviation in Latin America. World Agroforestry Centre, Nairobi, Kenya.
- Proyecto Bosque Seco, 1998. Plan de Operaciones: Manejo Comunitario de los Bosques Secos y Microcuencas del Suroccidente de Loja [Operational Plan: Community Management of the Dry Forests and Microwatersheds of Southwest Loja]. SNV, Celica, Ecuador.
- Proyecto Bosque Seco, 1999. 3er Informe Semestral: Enero a Junio 1999 [Third Semi-annual Report: January to June 1999]. SNV, Loja, Ecuador.
- Rengel, E., 2012. Informe Rendición de Cuentas [Accountability Report]. Secretaría Técnica, Fondo Regional del Agua, Loja, Ecuador.
- Rojas, O., 2012. Informe de Gestión, Febrero 2012 [Management Report, February 2012]. Fideicomiso Fondo de Páramos Tungurahua y Lucha Contra la Pobreza, Ambato, Ecuador.
- Seelke, C.R., 2008. Ecuador: Political and Economic Situation and U.S. Relations. Congressional Research Service. Library of Congress, Washington, DC.
- SENAGUA, 2009. Informe de Rendición de Cuentas 2008–2009 [Accountability Report 2008–2009]. Secretaría Nacional del Agua, Quito, Ecuador.
- The Nature Conservancy, 2011. *Creating Water Funds for People and Nature*. Available online at www.nature.org/ourinitiatives/regions/latinamerica/Water-Funds-of-South-America.xml (Accessed August 9, 2013).
- Troya, R., Curtis, R., 1998. *Water: Together we can care for it! A Case Study of a Watershed Conservation Fund for Quito, Ecuador*. The Nature Conservancy, Arlington, VA.
- Yaguache, R., Domínguez, D., Carrión, R., Zarría, E., 2005. La Experiencia del Cantón El Chaco en la Protección de sus Fuentes de Agua [The Experience of El Chaco Canton in the Protection of its Water Sources]. Ministerio del Ambiente del Ecuador, Gobierno Municipal de El Chaco, El Chaco, Ecuador.