Protecting water sources for biodiversity conservation:

Financial mechanisms for the protection of watersheds in Ecuador

Final report

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FONDO PARA LA PROTECCIÓN DEL AGUA

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Final report of the project “Protecting Water sources for biodiversity conservation”

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Fotography: Murray Cooper

29th of October Grade School, Intercultural Bilingual Educational Unit, UNEIB in the Parrish of Cangahua, County of Cayambe, Province of Pichincha. Boys and Girls participating in the program “Water Guardians” in 2008

Protecting water sources for biodiversity conservation:

Financial Mechanisms for the Protection of Watersheds in Ecuador

Cooperative Agreement No. 518-A-00-07-00056-00 - USAID

Murray Cooper

Approximately 40 percent of Quito's water comes from Antisana Snow–Capped Mountain in Antisana Ecological Reserve.

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Photography: Murray Cooper

One of the 150 bird species considered vulnerable in the world according to BirdLife International: the Hummingbird is one of the emblematic species in the Antisana Ecological Reserve.

Acronyms

BEDE	State Development Bank
CELEC	Electric Corporation of Ecuador
CEPAL	Economic Commission for Latin America and Caribbean
CFN	National Financial Corporation
CNRH	National Water Resources Council
COOTAD	Organic Code for Land Management, Autonomy and Decentralization
DMQ	Metropolitan District of Quito
ECLAC	Economic Commission for Latin America and the Caribbean
EMAPA	Ambato Municipal Company of Water Supply and Sewerage
EMAPAL	Azogues Municipal Company of Water Supply and Sewerage
EMAPAR	Riobamba Municipal Company of Water Supply and Sewerage
EPMAPS	Metropolitan Public Company of Water Supply and Sewerage of Quito
EPN	National Polytechnic University
ESPOCH	Polytechnic University of Chimborazo
ETAPA	Municipal Company of Telecommunications, Drinking Water, Sewerage and Drainage of Cuenca
FAN	National Environmental Fund
FFLA	Latin American Future Foundation
FLA	Local Environmental Facilitators
FMPLPT	Fund for Management of Moorlands and Fight against Poverty of Tungurahua
FONAG	Quito Water Fund
FONAPA	Water Fund for the Conservation of the Paute Basin
FONES	Fund for the Protection of Water for the Espíndola County
FOPAR	Fund for the Protection of Water for Riobamba
FORAGUA	Regional Water Fund
GAD	Local Government
IWRM	Integrated Water Resources Management
HIDROPAUTE	Hydroelectric Energy Generation Company HIDROPAUTE S.A.
IEOS	Ecuadorian Institute of Sanitary Works
INAMHI	National Institute of Meteorology and Hydrology
INERHI	Ecuadorian Institute of Water Resources
INTERJUNTAS	Federation of Organizations of Water Users in the Province of Chimborazo
IRD	French Institute of Research for Development
MIDUVI	Ministry of Urban Development and Housing
MDG's	Millennium Development Goals
ONU	United Nations Organization
PROCUENCAS	Zamora Water Fund
SENAGUA	National Water Secretariat
SENESCYT	National Secretariat of Higher Education, Science, Technology and Innovation
SNAP	National Protected Area System
TNC	The Nature Conservancy
UNACH	Chimborazo National University
USAID	United States Agency for International Development

Photography: Murray Cooper

"Paper Tree" - Polilepys Incana, a native forest species in the high Andean forests of the Antisana Ecological Reserve.

Executive Summary

The last two decades in Ecuador have been marked by advances and setbacks in terms of integrated water resource management (IWRM). The 2008 Constitution, for example, set new premises for sustainable management of natural resources, among which it was decreed that water and the high grasslands are an Ecuadorian strategic heritage. It also strengthened the National Water Secretariat (SENAGUA); and established differentiated and complementary competencies for watershed management through the approval of the Organic Code for Land Management, Autonomy and Decentralization (COOTAD). Currently, Ecuador recently passed the new Water Law

In this context, the project "PROTECTING WATER SOURCES FOR BIODIVERSITY CONSERVATION: Financial Mechanisms for the Protection of Watersheds in Ecuador" was implemented and signed through Cooperative Agreement No. 518-A-00-07-00056-00 between the Quito Water Fund (FONAG) and the United States Agency for International Development (USAID) for the period September 2007 - January 2014. USAID invested USD $3,600,000 to support FONAG's ongoing efforts with two main components:

(1) institutional strengthening through two strategies: (a) development of FONAG's capacities; and (b) implementation of field conservation activities; and

2) the replication of the "water fund" model in other locations in Ecuador.

The main results were: a) four Water Funds created and strengthened to continue working in Ecuador; (b) co-financed conservation actions for USD$7,178,205 during the period 2007-2014; (c) a model of institutional management that can be replicated at the regional and global levels; and d) half a million hectares with improved conservation and management actions and more than 42,000 people trained.

In strategic alliance with the National Water Authority (SENAGUA), the Pre-council of the Guayllabamba Upper Basin was established to implement its management plan. Data quality control and calibration of approximately 100 hydro-meteorological stations was achieved and computational models were developed which project water demand and supply for the basin, as well as develop probable vulnerability scenarios for climate change. All of this information is available in an interactive system on web portal www.infoagua-guayllabamba.ec

A communication strategy was implemented in parallel to raise awareness among urban and rural populations in the areas of intervention which generated a "new water culture" by emphasizing the importance of conserving high-grasslands in order to obtain water for human consumption.

The project proposed a new institutional model that provides a long-term financing mechanism for conservation. Based on the FONAG example, more than ten replications of the model were created in Latin America and the Caribbean. Many of these initiatives visited FONAG and managed to adapt the model to their own reality in their territories with USAID's support and that of its strategic partners. In Ecuador, six Water Funds were strengthened creating a space for dialogue and collaboration of several institutional actors who had previously worked in isolation. The project managed to gather and promote dialogue among various water users such as municipal water companies, hydroelectric companies, private sector actors, and communities that live

Foto: Murray Cooper

Member of the Community of Oyacachi, Cayambe-Coca National Park, making wooden handicraft in “aliso” (native forest specie)

USAID invested USD 3,600 million dollars on the strenghtening of the water funds in Ecuador.

in the high-grasslands of important watersheds in the provinces of Pichincha, Tungurahua, Chimborazo, Azuay, Loja and Zamora. The project directly benefited more than 13,000 people from communities in the project intervention areas.

Thanks to USAID's investment, these Water Funds are sustainable, have been strengthened institutionally, and have developed a range of integrated water management tools such as: monitoring of water quality and ecological flows, conflict resolution on water use, zoning and prioritization of hydrological interest areas, alternative production models for high-grassland areas, among others. In addition, the project managed to position in the public opinion the emerging theme of water resources management and conservation in a collaborative framework with the Ministry of Environment, SENAGUA, the National Institute of Meteorology and Hydrology (INAMHI), the Secretary of Environment of the Metropolitan District of Quito with the collaboration of the French Research and Development Institute (IRD), the GIZ Development Agency and InWENT, and many other municipalities, provincial governments, NGOs and communities in an effort to provide solutions in the field and make the concept of IWRM and conservation tangible in a holistic manner.

The institutional model of Water Funds has been effective since it ensures long term sustainability and financing for protected areas. An important lesson learned from this process is that clear definition of roles and initial commitments between the institutions interested in the financial mechanism need to be agreed upon prior to the establishment of a Water Fund. A commercial trust fund is a "straightjacket" which may be difficult to modify afterwards. During the project many of the supported Water Funds had to reverse their constitutions and make modifications. This leaves us with a les son learned for future support of USAID on replicas of the model.

This final report presents a brief description, main achievements, lessons learned, and challenges of Water Funds in Ecuador.

Chapter 1

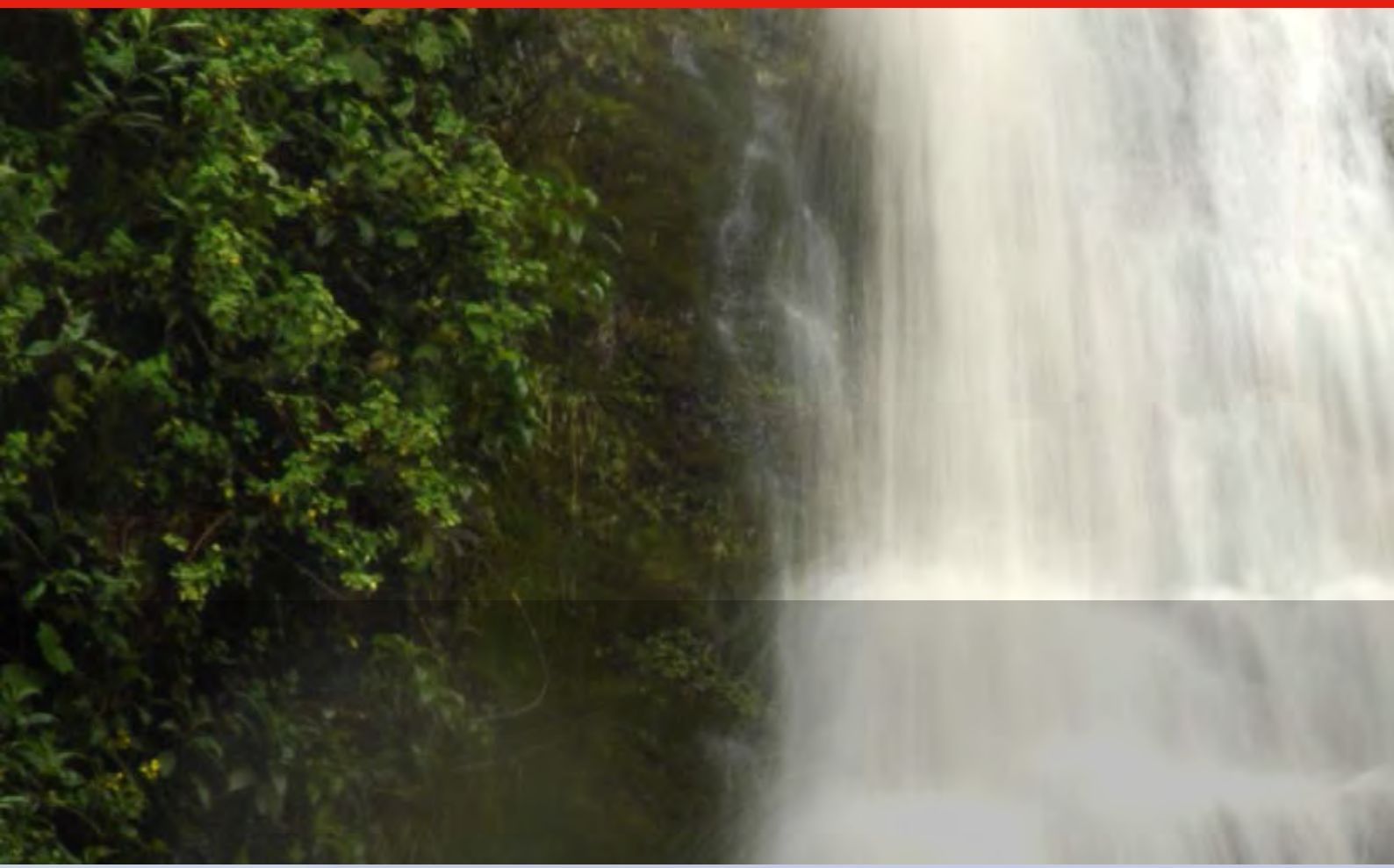
The Project

USAID's conservation priorities in Ecuador: Biodiversity and water

In the mid-90s, the world's concern on financing mechanisms and sustainability for protected areas and national parks emerged, with a special emphasis on those areas that are water sources for human consumption in medium and large cities throughout the Americas. In this sense, USAID's biodiversity conservation strategy has always been linked to strengthening partner countries in their capabilities to manage their protected areas and, therefore, on the long term sustainability of the ecosystem services that they provide. This is how the support and cooperation to FONAG has been framed since the beginning of the 1990s, with the possibility of strengthening a new institutional model that could be replicated in other cities in Ecuador and Latin America.

One of the purposes of creating Water Funds in Ecuador was to fill an existing gap to facilitate IWRM and the conservation of key ecosystems

One of the purposes of creating Water Funds in Ecuador was to fill an existing gap to facilitate IWRM and the conservation of key ecosystems for water sources. Over the past two decades, numerous efforts were made to modernize water management with an emphasis on legal and operational frameworks that facilitates wa-



tershed land use sustainable management and the agreements of water users for its conservation and quality. In the case of Ecuador, the legal framework has progressed in terms of the rights of access to and use of water, however there are still many ambiguities in regard to the roles of local and national institutions, and the mechanisms for their financing. One of the biggest difficulties is that IWRM among various actors with competence in watershed conservation needs a space for dialogue and a long-term multi-sectorial planning. Given water management is organized by its use: human consumption, irrigation, industry, hydropower generation; there are few spaces for planning with a global vision of the territory. Local and national planning systems in Ecuador respond to institutional needs and do not necessarily oversee the entire status of conservation of aquatic ecosystems. This gives one fragmented look of the reality and, in addition, very short planning cycles or biased to water production are the main constraints to ensure an integrated management of water resources in Ecuador. Another factor of utmost importance is to generate alternatives and economic schemes to finance the conservation of water sources that are internalized either by the vendor companies, or by companies that use the resource in large quantities or by the users of water depending on the type of use, their amount and payment capacity.

USAID support to the Quito Water Fund (FONAG)

In the second half of the nineties USAID financed the work agenda and lobbying with the municipal and environmental authorities for the creation of a Fund dedicated to the care and preservation of water for Quito. Finally, in 2000, FONAG was created with the objective of preserving the water sources for the capital using the financial returns of the contributions made by the Metropolitan Public Water Supply and Sewage Company of Quito and from other constituents. This effort was made possible through the USAID-funded projects: Condor Bio Reserve Program implemented by The Nature Conservancy (TNC) and the "Sustainable Use of Biological Resources Project - SUBIR" implemented by CARE. The financial contribution of these projects was for approximately USD$272,000 from 1997 to 2005. Later in 2007, USAID's support was channeled directly to FONAG for USD$3,600,000.

Finally, in 2000, FONAG was created with the objective of preserving the water sources for the capital city.

The Project:

• Objectives

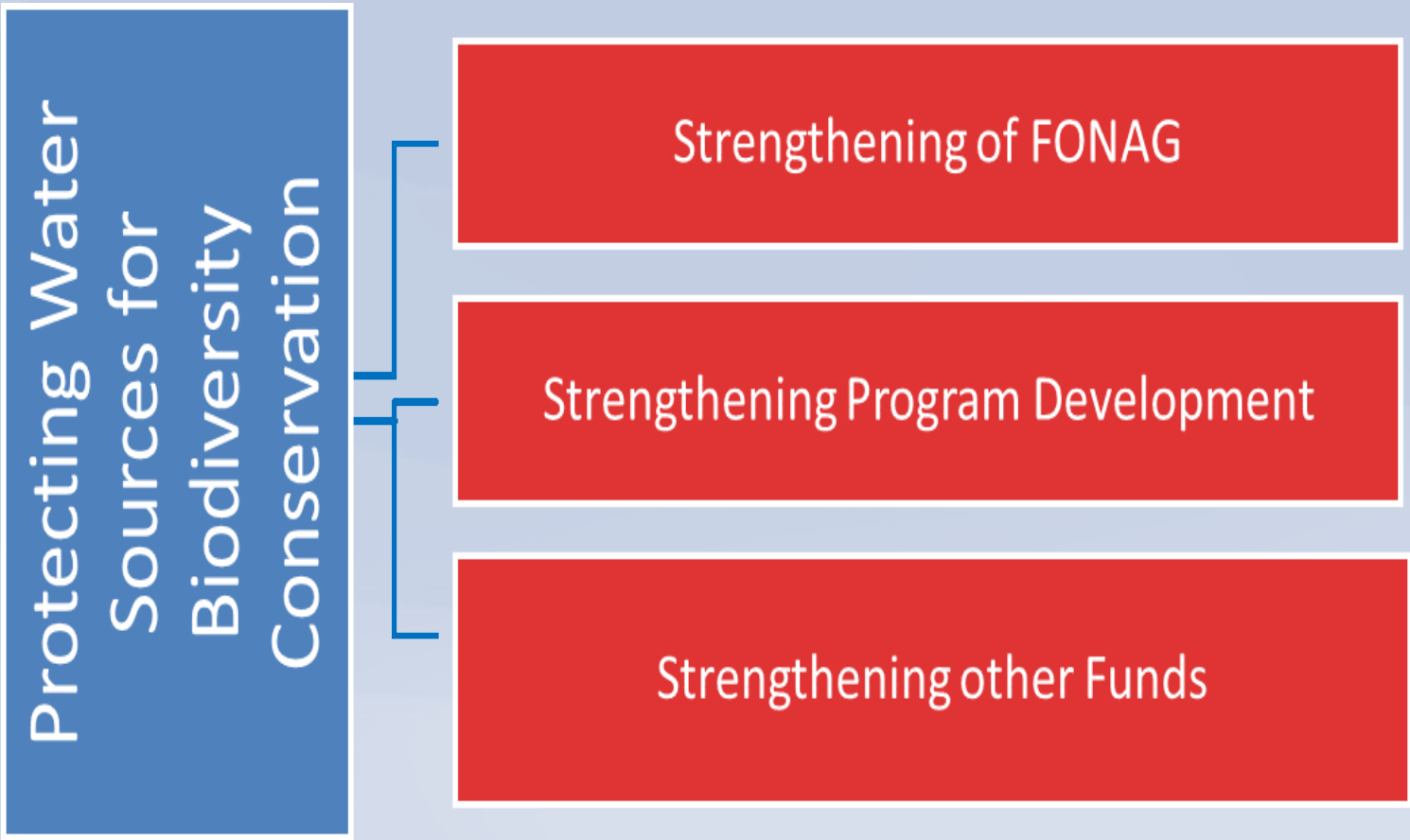
This project was created to strengthen FONAG, in its development as an institution, to support and promote its programs, its administrative, managerial and technical systems; and at the same time for the application of the model in other basins of the country. USAID considered FONAG a strategic partner for sharing experience, technology transfer and sustainability of protected areas in Ecuador. The specific objectives of the project were:

1) to seek the commitment of water users (domestic and industrial) for the protection of key areas for ecosystem services;

(2) contribute to the sustainability of protected areas; and

(3) promote the sustainable use of natural resources through alternative productive activities for the communities that live in the upper parts of the basins.

The geographical areas of intervention were six watersheds in Pichincha, Napo, Azuay, Tungurahua, Zamora and Loja, which supply water to medium-sized and large cities of the country with populations between 20,000 and 2,000,000 and whose sources are located in protected areas such as ecological reserves and national parks. These areas correspond to the remanents of montane forests, high-grasslands and high Andean forests which are part of the Tropical Andes hotspots, biodiverse in species of flora and fauna with a high level of endemism.



Impact In Numbers

Achievements of Project "Protection of Watersheds in Ecuador"
Results by Indicators

INDICATOR	MEASUREMENT UNIT	GOAL	ACHIEVED
Number of hectares in biological areas of importance under improved management as a result of the USAID assistance.	Hectares	480,000	505,027
Number of people with increased economic benefits derived from the sustainable management of natural resources and conservation actions that have been implemented as a result of the USAID assistance	People	12,300	13,267
Number of people trained on natural resource management and/or biodiversity conservation as a result of the USAID assistance.	Male/female Children - Youth	No predetermined	32,000
	Teachers/ Technicians/Community Leaders		42,062
Dollars invested by Water Funds in conservation activities in priority watersheds	Dollars	1,966,381	7,178,205.73
FONAG			3,311,300.00
Tungurahua Fund			1,527,126.92
FONAPA			796,101.39
FORAGUA (Fones - Procuenca)			1,395,854.95
FOPAR			147,822.47

Impact in numbers

Achievements of Project "Protection of Watersheds in Ecuador"
Results by Indicators

INDICADOR	MEASUREMENT UNIT	GOAL	ACHIEVED
Dollars investede to capitalize Water Funds	Dollars	650.000	**14.225.498,99**
FONAG		Not prede-termined	11.442.681,00
Tungurahua Water Fund		100.000,00	1.831.200,00
FONAPA		400.000,00	548.419,99
FORAGUA (Fones - Procuenca)		150.000,00	296.198,00
FOPAR		Not prede-termined	107.000,00
Strenghtening Capabilities of Water Funds			
FONAPA	Percentage of accomplishment	Not prede-termined	65%
Fondo de Tungurahua			82%
FORAGUA			82%
FONAG			86%

Work areas

The Project focused its actions in the following geographical areas:

The Guayllabamba Upper Basin where Ecuador's capital, Quito, is located. This basin has part of the territory that belongs to four protected areas: the Cayambe Coca National Park, the Antisana Ecological Reserve, the Cotopaxi National Park, and the Illinizas Ecological Reserve, all of which are important suppliers of water sources for the city. A water system of approximately twenty rivers that provide water to more than two million and a half inhabitants of the Metropolitan District of Quito (DMQ) originates there. These areas are also the habitat of emblematic species such as the spectacled bear and the Andean condor, Ecuador's national bird.

These national parks go beyond the DMQ administrative-political borders, making its territory also part of the Amazon region which provides the majority of water to the city of Quito. The Paute Basin in southern Ecuador is home to the most important hydroelectric project that generates almost 50 percent of the country's electricity and supplies water for human consumption to the city of Cuenca. The Sangay and Cajas National Parks are among the priority areas for improving the partnerships between the Municipal Company of Telecommunications, Drinking Water, Sewerage and Drainage of Cuenca (ETAPA) and the Hydroelectric Energy Generation Company HIDROPAUTE S.A. for a better water resources conservation. These sites have been recognized as "important bird areas" (IBAs) by BirdLife International.

The Zamora and Loja Basins, also in the southern region of Ecuador and located in its main urban centers, where half of the population lives on just USD$2.00 a day, is one of the areas with the greatest water stress in the country. The Podocarpus National Park and the Yacuri Protective Forest and National Park are large suppliers of water within this basin both for the south of Ecuador and the north of Peru.

The Ambato River Basin, in the central Andean region of Ecuador, provides water to the city that bears its name. Its main source is in the Llanganates National Park. It contains some of the most pristine high Andean ecosystems, especially in the high-grasslands, and where indigenous communities of the sierra live.

Tropical paramo regulates water balance

Geographical location of Water Funds in Ecuador.

• Partners:

The main Project partners that were supported with technical assistance or with the implementation of conservation actions were:

The Nature Conservancy (TNC)

An international non-governmental organization (NGO) whose objective is to promote the protection of the flora and fauna at a global level. During the Project, TNC contributed with technical assistance by defining methodologies for monitoring conservation actions, as well as by strengthening the technical capacities of Water Funds. TNC is a constituent of FONAG and been a partner since its creation and throughout implementation of activities. TNC was directly involved in the project responsible for the replication of the financial model. In 2009, TNC transferred this component to FONAG to be managed directly.

Latin American Future Foundation (FFLA)

An NGO whose institutional vision and experience focuses on the governance of natural resources and techniques for conflict mediation. FFLA facilitated governance processes and the creation of the Guayllabamba Watershed Council.

Paute Water Fund (FONAPA)

FONAPA is a commercial trust legally constituted in 2008 by public and private entities committed to coordinating support for the integrated conservation of the water resources of the basin. Its constituents are ETAPA, Electric Corporation of Ecuador (CELEC) - HIDROPAUTE S.A., the Azogues Municipal Water and Sewage Company (EMAPAL), the University of Cuenca, TNC, and the Cordillera Tropical Foundation. FONAPA helped local governments diagnose and zone areas of water interest in the basin; develop alternative community productive projects that are environmentally friendly; and, in collaboration with the Ministry of the Environment, support conservation actions.

FONAPA helped local governments to diagnose and prioritize areas of interest in the basin and to develop alternative community productive projects that are environmentally friendly

Tungurahua High-grasslands Poverty Reduction Fund of Tungurahua (FMPLPT)

The High-grasslands Fund is an investment mechanism that contributes to the conservation and recovery of the water sources of the Tungurahua province. The Fund was created in 2008 and its constituents are the Tungurahua Provincial Government, representatives of the indigenous movements in the province, the Ambato Municipal Water and Sewage Company (EMAPA), and CELEC-Hidroagoyán and Hidropastaza. FMPLPT currently finances the management plans for high-grasslands located in the southwest of the province.

Riobamba Water Fund (FOPAR)

The Riobamba Water Fund is a commercial trust created in 2008 as an initiative of the Municipality of Riobamba. The constituent members of the Fund are: the Municipality of Riobamba, the NGO Ecuadorian Agricultural Services Unit (CESA) and the Federation of Organizations of Water Users in the Province of Chimborazo (INTERJUNTAS), which is the association of one hundred

and eighty irrigation boards. FOPAR has worked as a technical advisor on issues of water balance, the Chambo Basin committee, and the creation of environmental education committees.

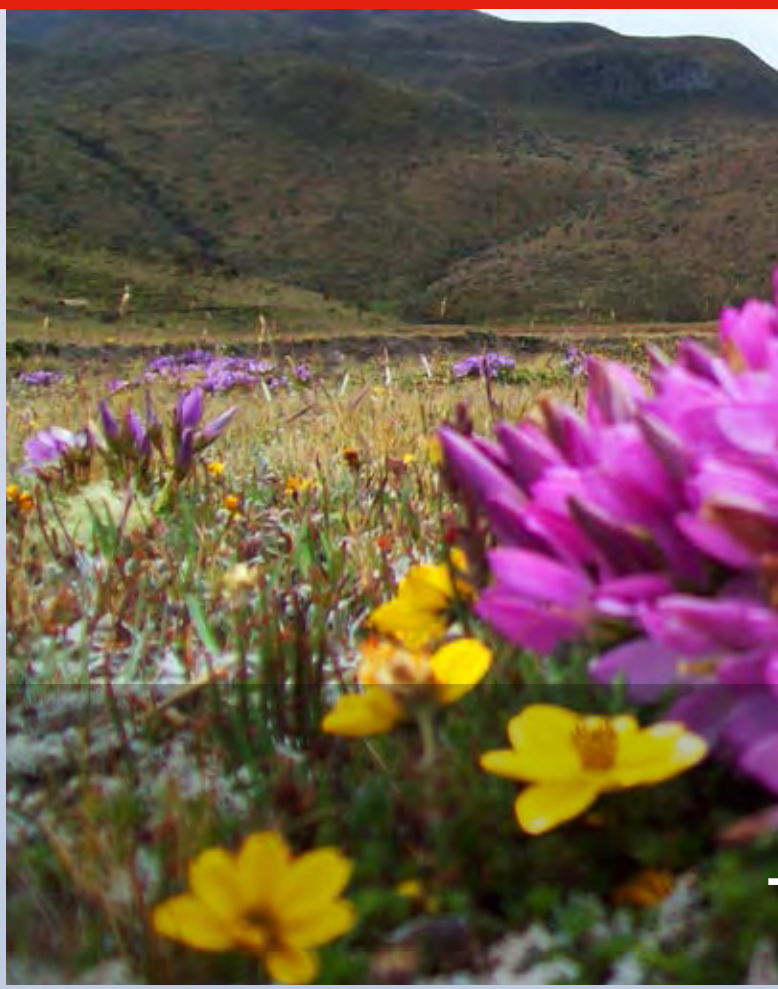
Regional Water Fund (FORAGUA):

FORAGUA was created under the initiative of five municipalities in southern Ecuador: Celica, Loja, Macará, Puyango and Pindal, with the support of the Nature & Culture International Corporation. The Fund was created in 2009 to conserve, protect and restore its environmental assets, especially the most fragile and threatened. The contribution mechanism to the Fund is regulated by each local government's municipal ordinances. Funds are collected through municipal allotments within the annual budget of each municipality. The Fund's resources are used in IWRM programs of the member municipalities (FORAGUA, 2012). As of 2014, eleven municipalities had joined FORAGUA, as an alternative for financing and sustaining their environmental activities, especially those aimed at water protection.

Zamora Water Fund (PROCUENCAS):

PROCUENCAS is a financial mechanism for the management and administration of financial resources to ensure the implementation of initiatives that promote the sustainable use of natural resources and biodiversity in the watersheds that supply Zamora with water. The Fund seeks to link water users with the conservation of natural resources of the watersheds. Its activities focus on environmental education activities, monitoring, communication, productive projects and institution-building.

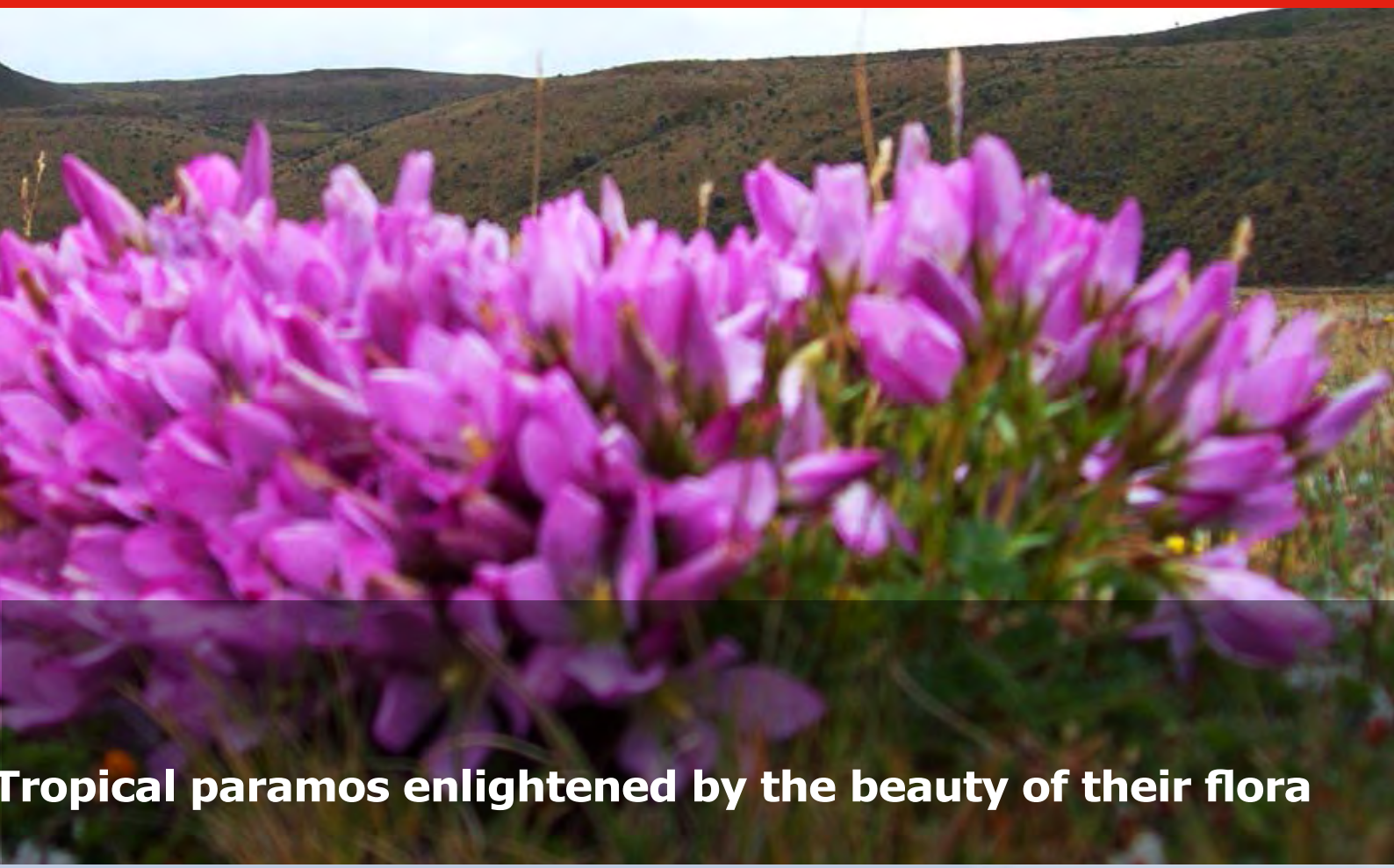
The Fund was set up with the participation of the Municipal Local Government of Zamora, the Arcoiris Ecological Foundation,



As of 2014, eleven municipalities had joined FORAGUA, as an alternative for financing and sustaining their environmental activities, especially those aimed at water protection.

the Ministry of the Environment, the National Environmental Fund, TNC, and Conservation International (CI) in March 2006 (TNC, 2009). The contributions received by PROCUENCAS are voluntary; there is no legal fundraising mechanism.

PROCUENCAS sought also to ensure the sustainability of the institution through a commercial trust, however due to high administrative costs this was not feasible. At this time, is managed as an account within the National Environmental Fund (FAN). In 2012, Zamora became part of FORAGUA.



Tropical paramos enlightened by the beauty of their flora

Fund for the Protection of Water for the Espíndola County (FONES):

FONES was born as a seed contribution of the Prohídrico Project, through the Municipality of Espíndola, in the province of Loja. FONES showed the same case of PROCUENCAS, initially it was meant to formalize the Fund through a commercial trust, however it could not be established due to high maintenance costs, so it was formalized through the creation of a sub-account within FAN.

FONES started its first activities in 2008, focused on environmental education, support to productive projects, communication, monitoring and institutional strengthening. There is no legal document that formalizes the contributions of the Fund, so contributions are voluntary.

In Ecuador, protected areas provide an estimate of 70% water flows of human consumption and hidroelectric generation.

Initially FONES worked for water sources protection in Espíndola exclusively, but expanded its vision leading the creation of a Fund of the Commonwealth of the Catamayo River Basin, which includes five municipalities around this basin: Espíndola, Quilanga, Sozoranga, Gonzanamá and Calvas. However, given the scale of this potential Fund and with the support of USAID, it was recommended that these local governments join FORAGUA. Currently, they are in the process of entering the Regional Fund.

Adaptive management and programs' approach

The Project was initially intended to be executed from 2007 to 2009 with an initial budget of USD$940,000. Subsequently, given its results and USAID's flexibility to modify the project based on local realities in each territory, the project had several modifications. It was extended through January 2014 with a total amount of USD$3,600,000; allocating 30 percent for strengthening other Water Funds in Ecuador and 70 percent for FONAG's capacity building and programs.

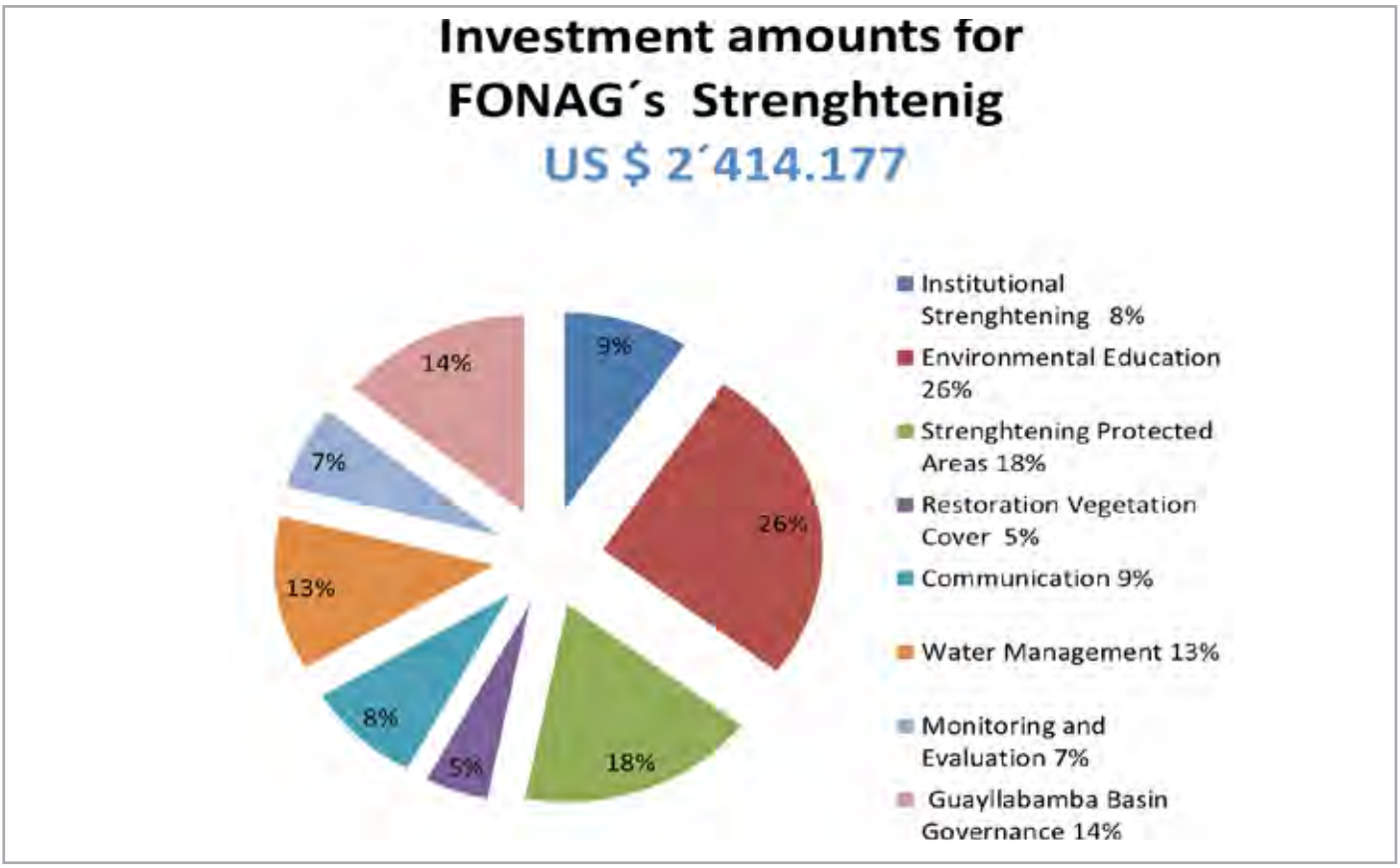
The Project adapted its investment according to the local context changes that were taking place. In this sense, the Project established its global goals but the specific investments were modified in response to achievements and new priorities that political, legal, and institutional contexts demanded.

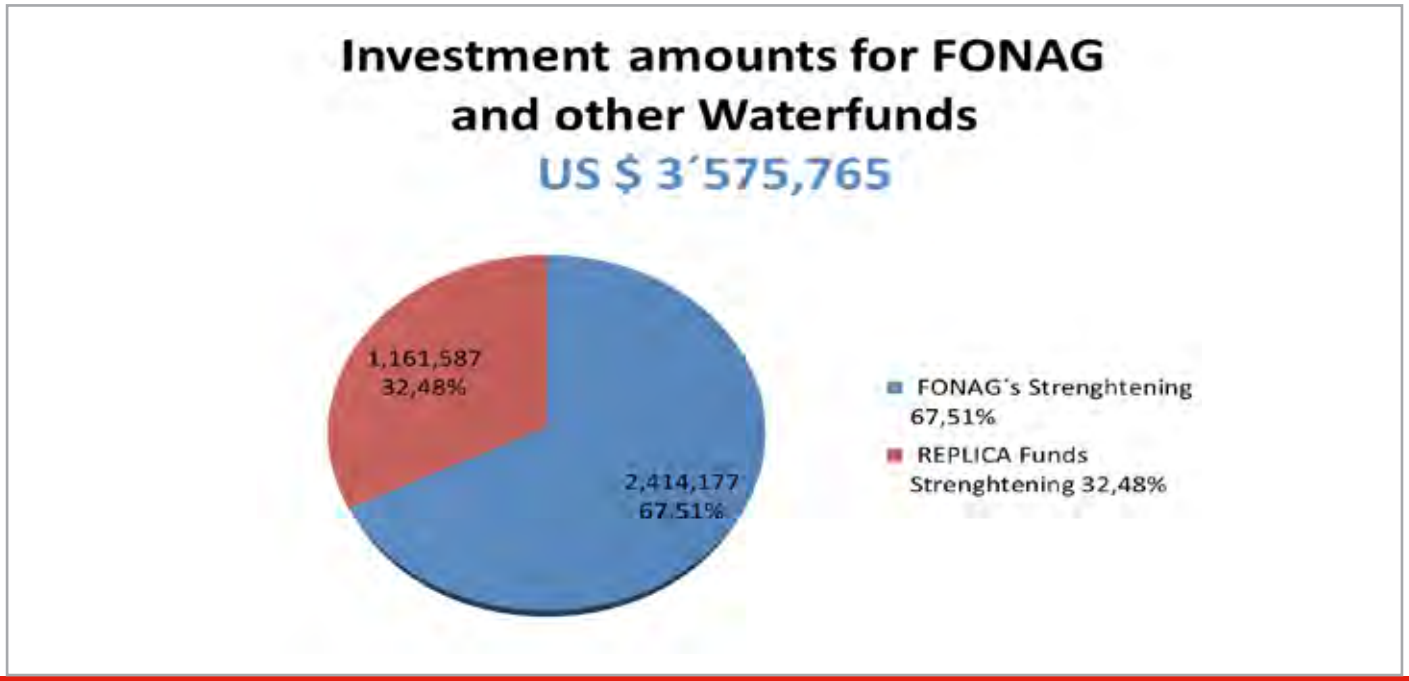
For example, in 2009, given the opportunity and the good relationships between FONAG and the SENAGUA, the project was modified in order to support national efforts for IWRM. This involved support to SENAGUA for developing software for water concessions and promoting spaces of citizen participation around water uses within the basin, taking as an example the area of intervention of FONAG - the Guayllabamba basin. This contributed to the creation of a watershed pre-council.

The first component of the Project focused on FONAG's strengthening and supported the implementation of its programs: environmental education, communication, water management, vegetative cover restoration,

and control and patrol. Additionally USAID strengthened FONAG's administrative, financial, technical systems and manuals, strategic plans, and in general its institutional capacity.

A second component of the Project was the support given on the implementation of activities in the field, consolidating FONAG's programmatic intervention approach. This meant that in contrast to the short cycles of multi or bilateral cooperation projects, FONAG had the institutional capacity (trust for 80 years) to plan long-term interventions. The Project supported the consolidation of methodological approaches and management instruments.

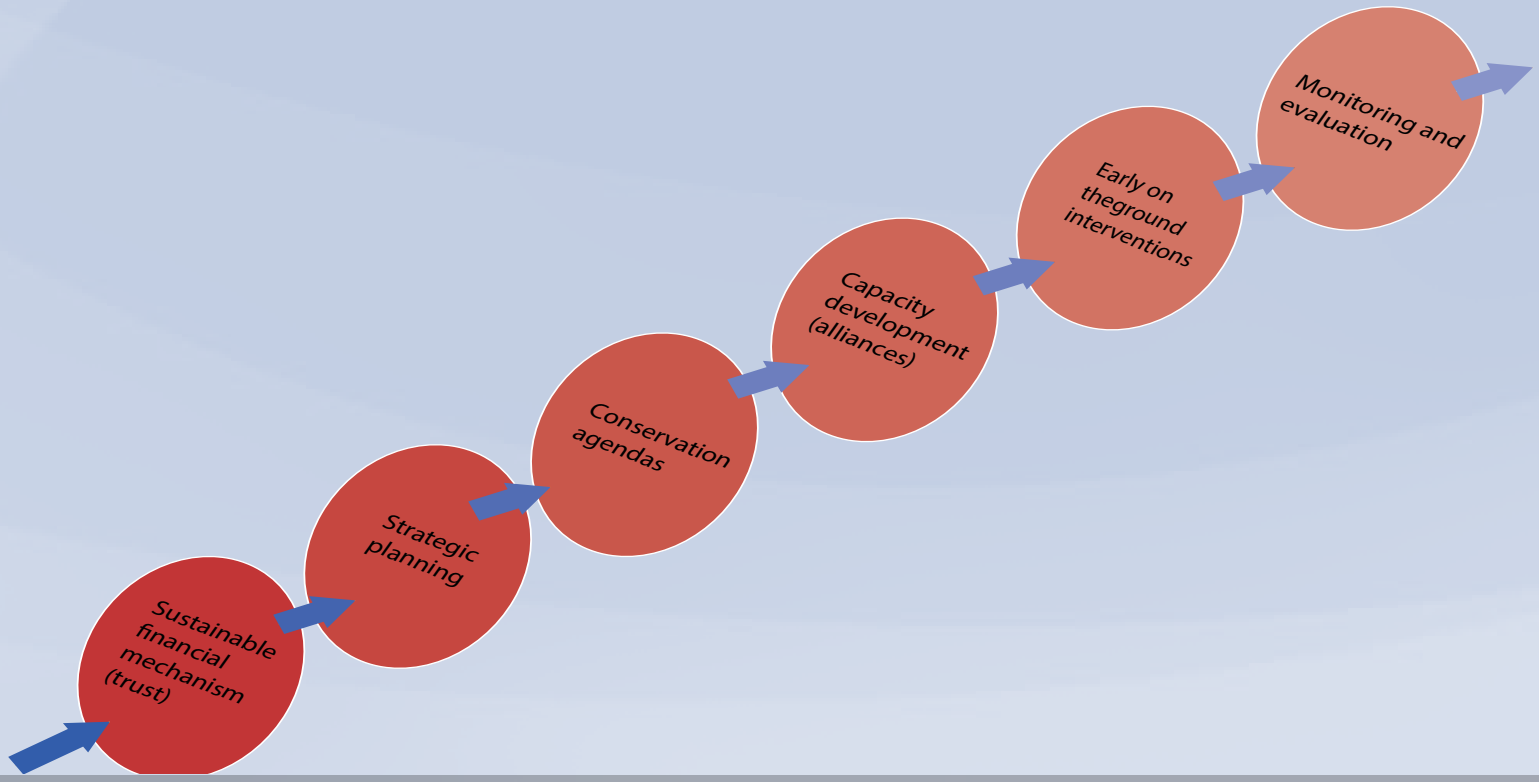




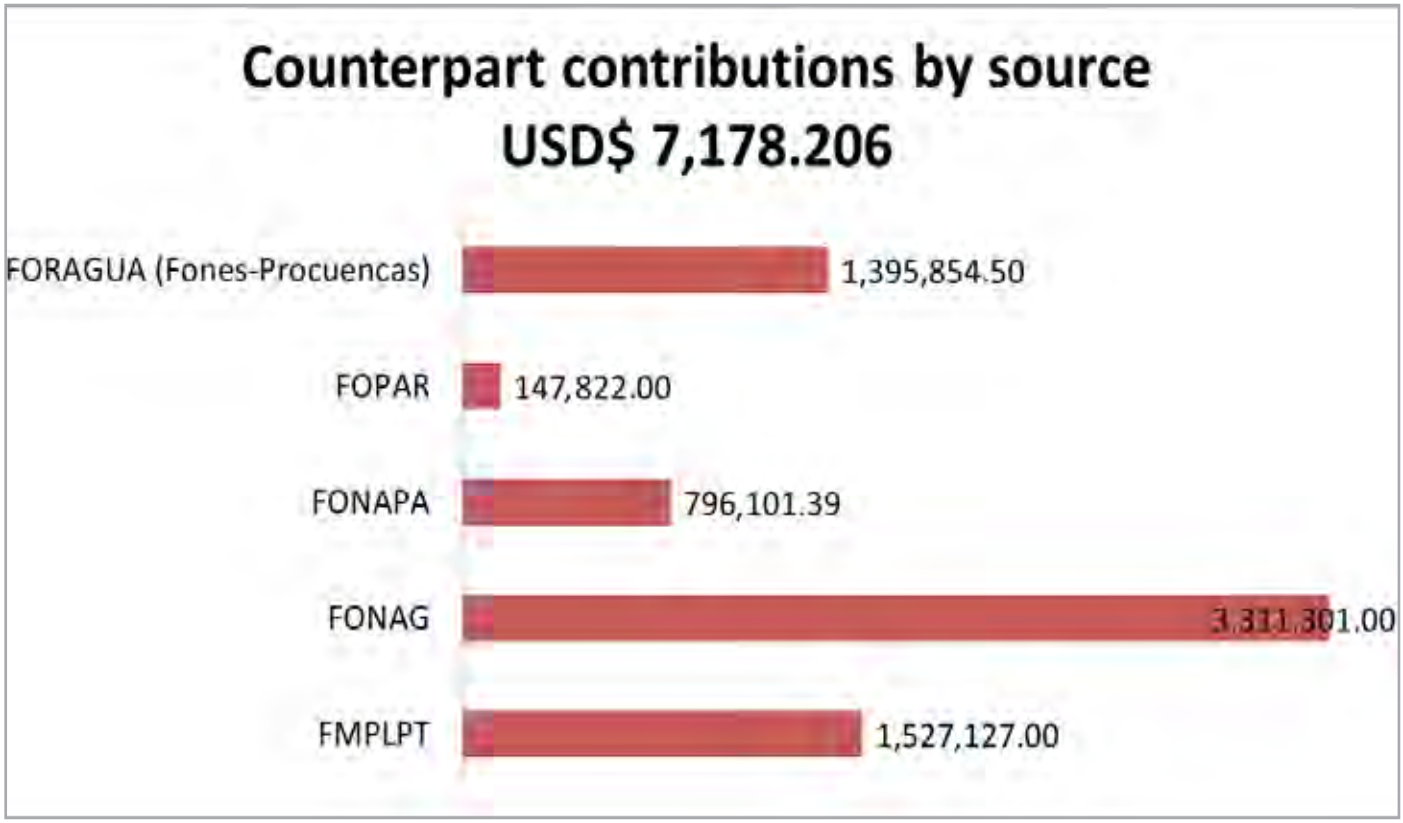
Finally, the third component supported local initiatives in other watersheds with the objective of creating similar models to FONAG for watershed conservation. The Project initially included working with four sites (Tungurahua, Paute, Zamora and Loja), however it was able to support additional efforts that were not planned such as Espíndola and Riobamba.

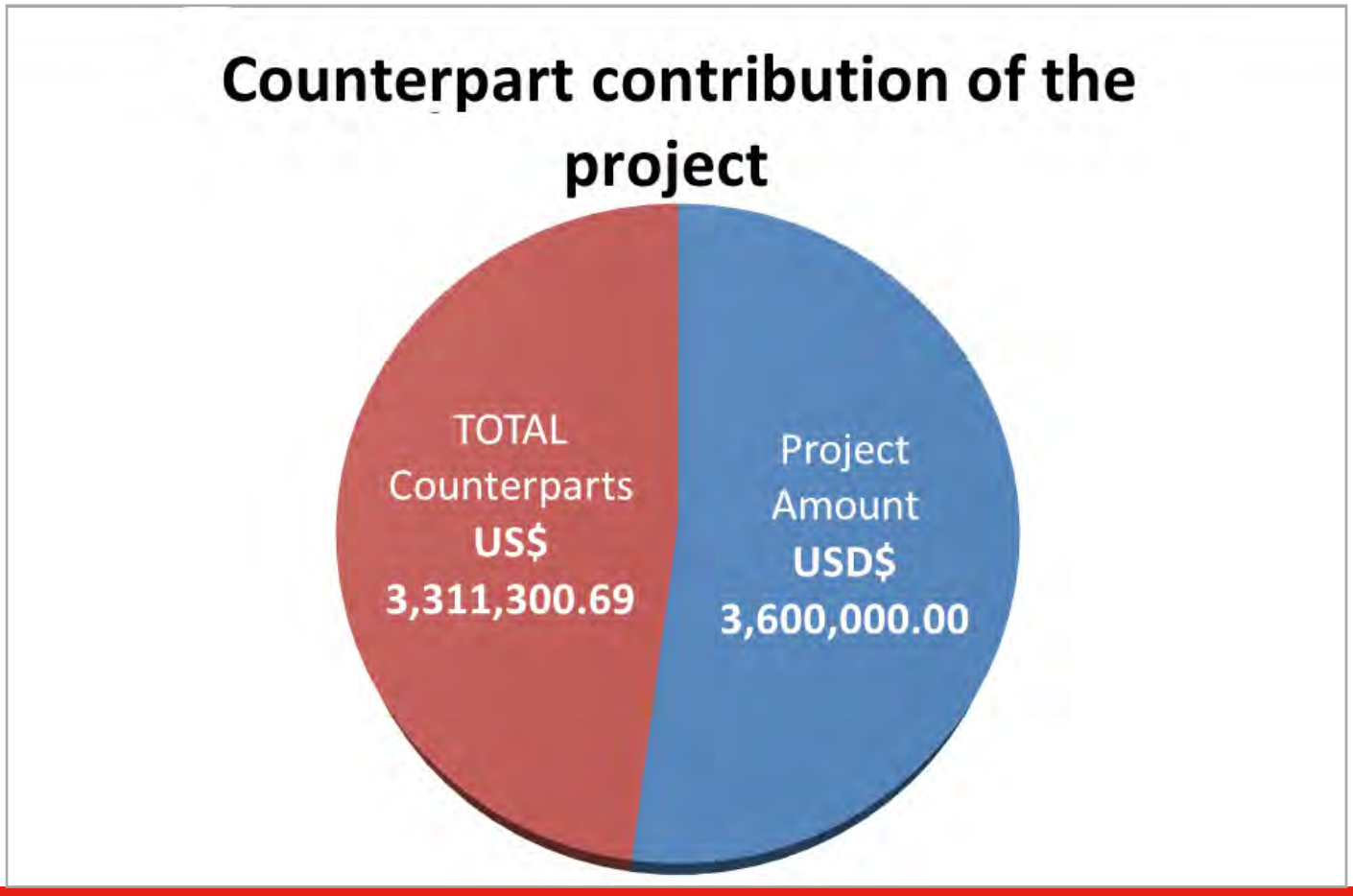
The project's approach had defined steps to strengthen FONAG and other Water Funds. First, it provided technical assistance to Water Funds to build their capacity as solid institutions, providing them with the legal framework and financial mechanisms, to ensure long-term sustainability. Later, each Fund's Technical Secretariat received support to develop annual budgets and strategic planning instruments, as well as basic equipment for its offices. In parallel, the project contributed funding for preliminary watershed analysis; and developed Conservation Agendas that prioritized scopes and contents of each intervention.

The Project supported institutional lobbying agendas that could build alliances and positioning of Water Funds as new conservation institutions with targeted investments in key sites. This lobbying agenda had the goal of creating Funds, including a funding mechanism with annual contributions from interested members. This took considerable time and effort at various levels in public institutions. The Project also implemented parallel actions in the field at the early stages of the Funds based the Conservation Agendas in each site. These early and emerging actions were designed to draw attention to the Fund demonstrating concrete actions for local populations, which in turn would allow them to gain credibility and citizen support in the future. Finally, the project worked with the Funds to develop tools for monitoring and evaluating the compliance of actions and to demonstrate their impact on conservation. From the beginning, the project requested partners and beneficiary contributions, either in time or labor, which were considered counterpart contributions.



Steps to institutionally strenghthen Water Funds


Counterpart contributions by source
USD$ 7,178.206
FORAGUA (Fones-Procuencas)
1,395,854.50
FOPAR
147,822.00
FONAPA
796,101.39
FONAG
3,311,301.00
FMPLPT
1,527,127.00


Counterpart contribution of the project
TOTAL Counterparts US$ 3,311,300.69
Project Amount USD$ 3,600,000.00

Chapter2

Conservation capacities: The case of FONAG

Panoramic view of the Cotopaxi Snow-capped Mountain

Legal and Political Context: integrated water resources management in Ecuador

When people began talking about water governance in Latin America three decades ago, the absence of the State in water management was notable. Access to information about water was provided by water community boards, irrigation committees, universities, local governments, and non-governmental organizations instead of the State. In Ecuador, community systems have historically remained at a noticeable disadvantage, except for a short period (1965-1980) in which the State assumed the ECLAC model of import-substitution and created the Ecuadorian Water Resources Institute (INERHI) and the Ecuadorian Institute of Sanitary Works (IEOS). The first was dedicated mainly to the construction of hydraulic works with emphasis on irrigation; and the second, which built, rehabilitated, and provided technical assistance for community drinking water systems. However, paradoxically, in the first years of the 1990s, these institutions were part of the Water and Sanitation Subsecretary within the Urban Development and Housing Ministry (MIDUVI) and later on disappeared.

The new ecuadorian Constitution (2008) established that water management could exclusively be public or community-based.

In Ecuador community systems for water consumption and irrigation play a very important role in the provision of potable water and sanitation systems, particularly in rural areas, as well as food security products for national consumption. For this reason, the new Ecuadorian Constitution (2008) established that water management could exclusively be public or community-based. In addition, it clearly mandated that the State must support community management through public-community alliances. In terms of irrigation there are major issues that both public and civil society face. According to SENAGUA1 the country has a productive area of more than 3,000,000 hectares, of which only about 850,000 hectares are irrigated. This means that 70 percent of the country's agricultural production is rain-fed, which implies serious risks. This same institution recognizes that one of the most serious problems this sector faces is unequal access to water: small users (88 percent) have between 6 and 20 percent of the available water, while the big landowners (between[1] and 4 percent) have 60 percent of the water.

"SENAGUA recognizes that one of the most serious problems this sector faces is unequal access to water"

One of the critical problems that irrigation faces in the country is that it has disproportionately benefitted production destined for export, in detriment of the agriculture intended for domestic consumption, which is in the hands of small and medium-sized farmers[2].

Small water users (88 percent) in Ecuador have between 6 and 20 percent of the available water, while the big landowners (between 1 and 4 percent) have 60 percent of the water.

The agro-export model in Ecuador has generated a soil and ecosystems erosion rate so high that the 2008 Constitution mentions that the high-grasslands are considered a fragile and threatened ecosystem along with wetlands,cloud forest, dry tropical forests, and mangroves; and that, due to their socio-ecological and environmental importance, the State will regulate their conservation. Likewise it also mentions that water constitutes a "strategic national heritage that is an unalienable right and for public use".

In general, Ecuador faces a structural problem, which has deep historical roots. Therefore, it is very difficult for national government agencies or Municipal Local Governments to solve this problem. In order to overcome these structural problems, the State must become involved and provide a clear legal framework with dedicated economic resources and the active and conscious participation of citizens and users. Water Funds in Ecuador intend to support and facilitate these two last roles: financial resources for the conservation and the promotion of multi-sectorial dialogue between users. While the current legal framework defines unique and complementary roles in the management of watersheds through the Organic Code for Land Management, Autonomy and Decentralization (COOTAD), there are still gaps and unclear roles for water management.

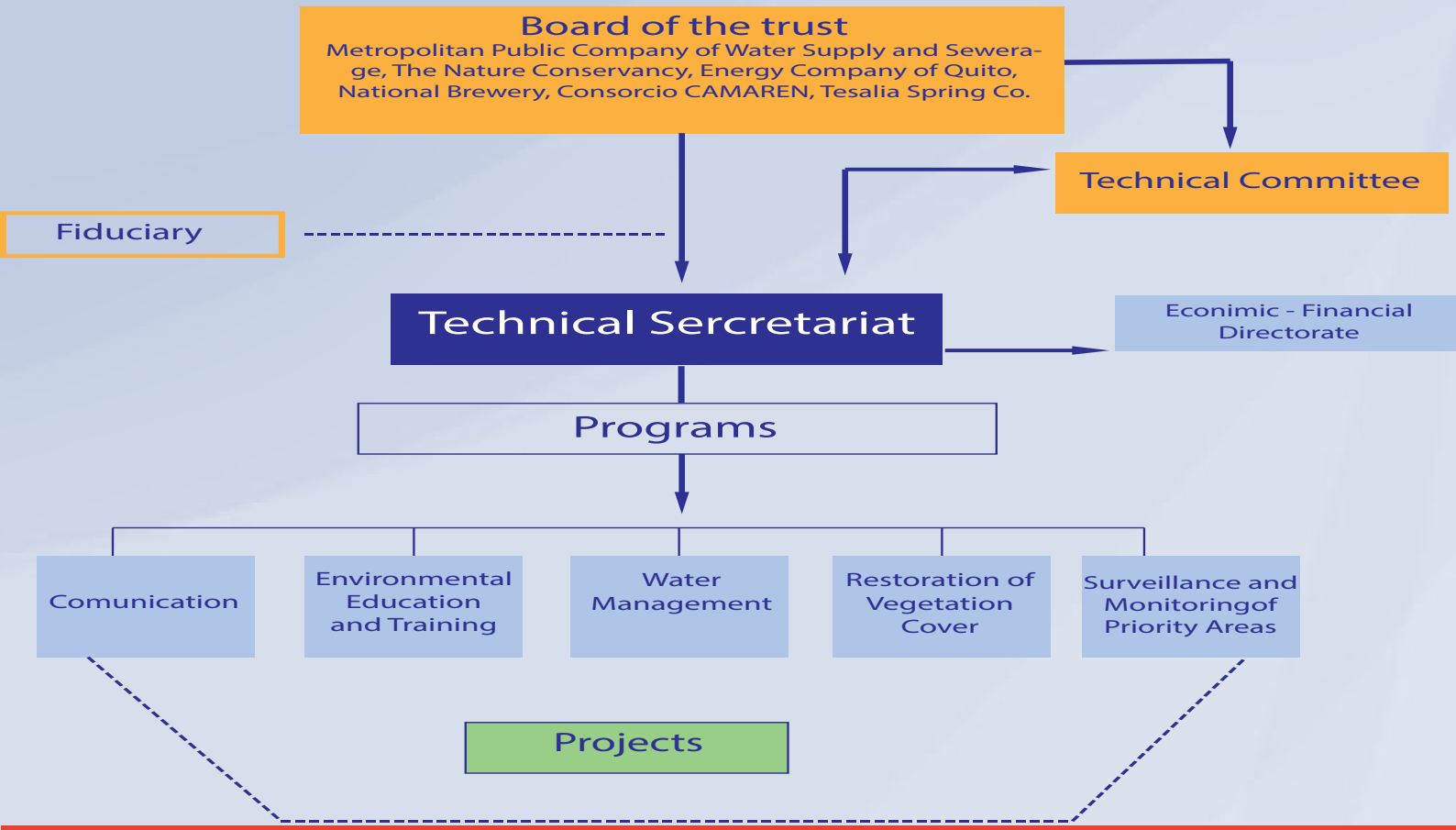
1. SENAGUA, Management Report 2008 – 2010, Quito, Ecuador
2. The Water Resources Forum produced an excellent study on the situation of irrigation in Ecuador that presents a general and critical vision of the problem: The Depriving of Water, FWR, Quito, 2008.

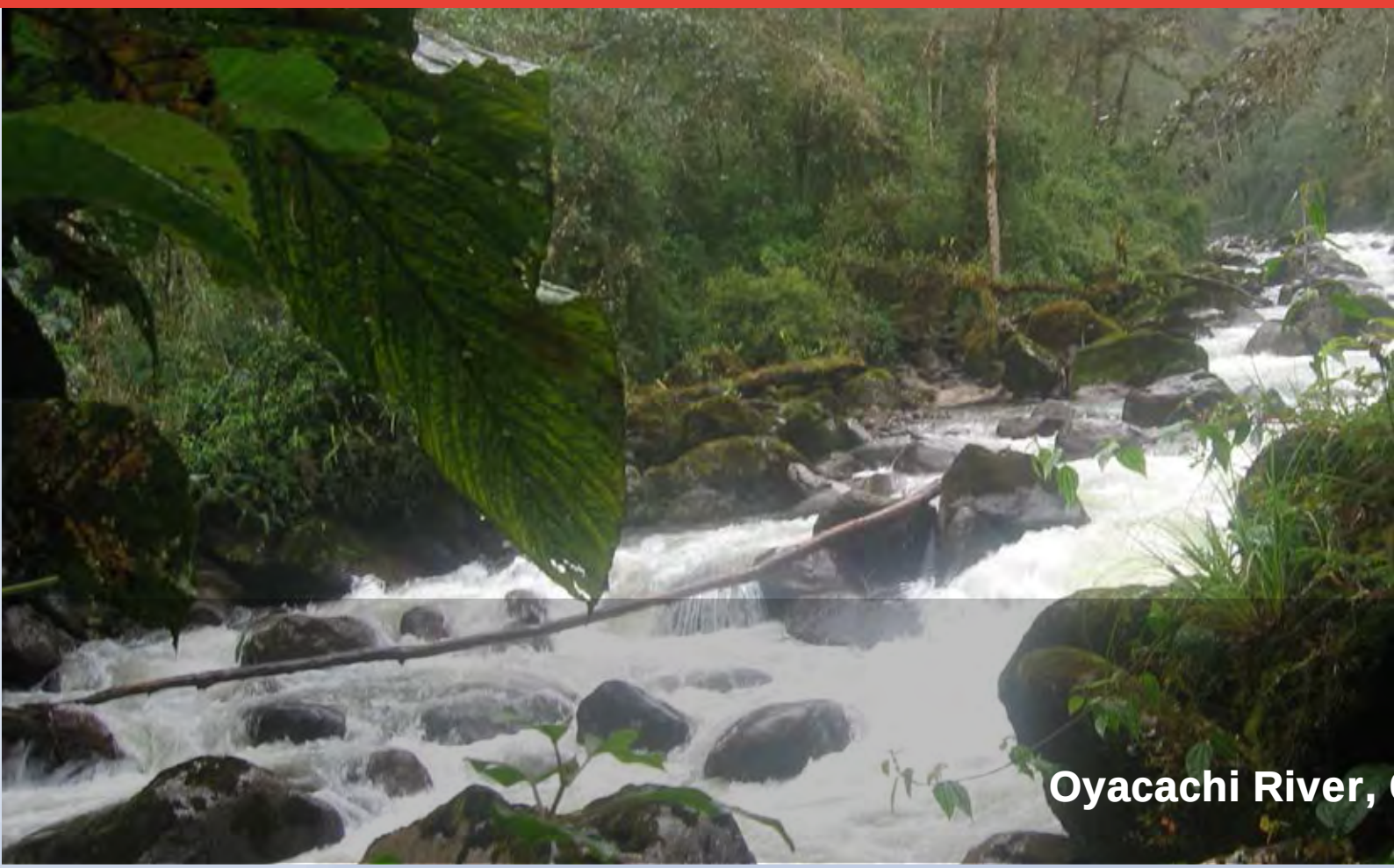
What is a Water Fund?

Protected areas have their importance not only for biodiversity but also because they are the main source for water supply to the entire population. However, financing the National Protected Areas System (SNAP), both in Ecuador and in other countries of Latin America, is severely lacking in public allocation of funds for its management plans. With the purpose of providing greater financial sustainability to protected areas, during the nineties, efforts were made to design and create private financial mechanisms that constituted a stable and long-term source of funding to cover the main investment needs of these critical sites. A Water Fund is a financial mechanism which aims to generate continuous financing in order to meet the investment needs for the conservation of water sources. This financial patrimony is provided by several constituents, public and private contributors who provide periodic financial allocations to increase the asset base of the Fund. The constituents form the board of directors of the institution. The technical secretariat is the operational unit of the Fund responsible for financial management and the planning and implementation of actions in the watersheds.

However financing the National Protected Areas System (SNAP), both in Ecuador and in other countries of Latin America, is severely lacking in public funds allocations for its management plans.

Institutional Organization Chart



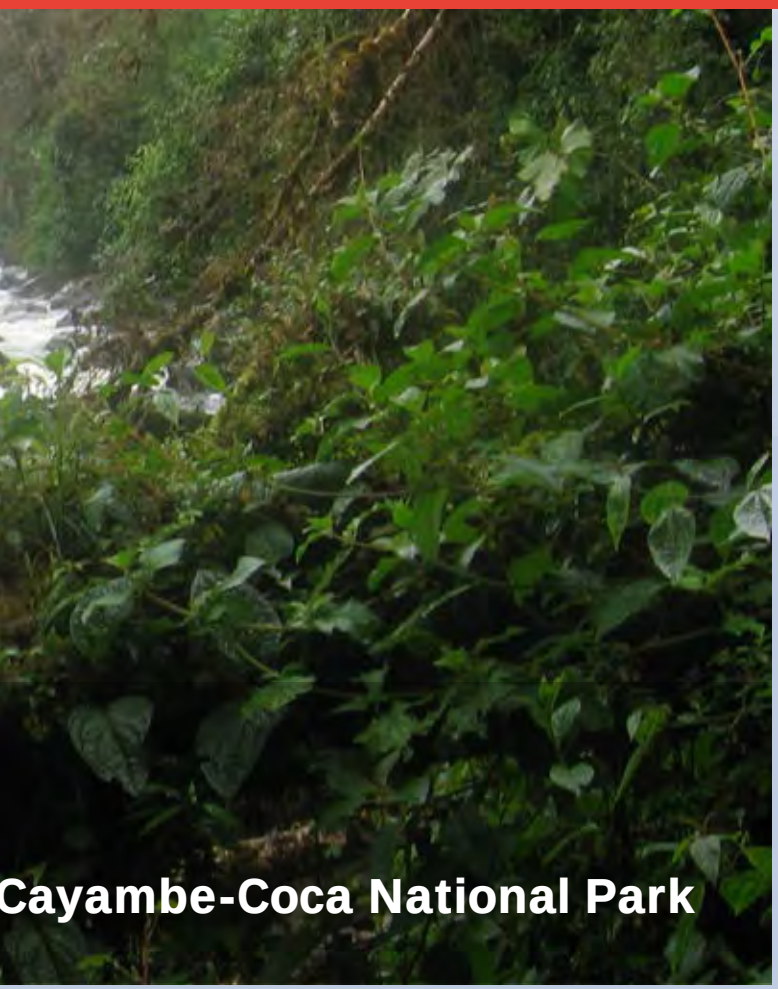


The Quito Water Fund (FONAG)

Created in January 2000, the Quito Water Fund (FONAG) is an institution legally supported by a private commercial trust which is focused on the protection of the water sources that supply Quito. Its capital fund started with USD$21,000 and by 2003 grew to an amount that allows the implementation of activities to achieve its objectives. Its constituents are: EPMAPS, (EEQ), the National Brewery (private), Tesalia Springs Company, the CAMAREN Consortium and TNC.

Municipal Ordinance No.213 of 2007 acknowledges the existence of FONAG and assigns a contribution of one percent from EPMAPS of the water user tariffs as a contribution to the Fund's patrimony for conservation of water sources. This annual contribution allows FONAG to expand its patrimony, which generates annual financial returns from this capital. The Municipal Ordinance was later reformed and the contribution was increased over a four-year period to up to two percent. This increase meant an important and gradual increase in capital which, in turn, increased the financial yields which constitute the only resources available to be invested in conservation actions in priority watersheds for Quito. In 2012, FONAG's Board approved the use of 30 percent of the constituents' annual contribution for direct field investments.

Trust funds are capital management investments with enormous reputation because of its levels of security and transparency. For watershed conservation the trust fund is considered a cutting-edge model and due to lack



As any other institutional figure, recognition and legitimacy of water funds is built when a problem or need from the population is met and resolved.

of information on how it works, many confuse it with the privatization of a public service. Far from that, an environmental trust fund is a way of guaranteeing both private and public donors that the investments made will be exclusively allocated in the subject of the public contract of the Fund; in this case, for funding activities for the protection of water resources. The management of a trust fund includes a component of financial management, which involves the selection of financial products in which the patrimony or capital will be invested, and the annual monitoring of revenues; and, a second component of administrative and technical management of the activities done by the programs. The trusteeship is in charge of both in coordination with the Technical Secretariat of the Fund.

In 2000, the economy was dollarized and central government regulations limited public companies and funds' ability to invest in financial products. The rate of capitalization of a patrimonial Fund is viable depending on macroeconomic conditions in a country and its legal framework, and must be keenly aware of timing its projection and the breaking point where it is no longer profitable. For this reason, a diversified portfolio of income, from revenues and others leveraged from international cooperation or the private sector (which could be framed within their social and corporate responsibility strategies) is key. Another alternative could be potential contributions from initiatives such as the voluntary carbon market as promoted by the methodologies of the water and carbon footprint, especially those focused on industrial and trade sectors that could be framed within a municipal environmental compensation plan and incentives for land use management.

Key elements for a trust fund's sustainability are the legitimacy of its actions and a permanent institutional attitude of accountability which regularly demonstrates tangible results. As with any institution, legitimacy is built to the extent that the institution resolves a problem or meets a need of the population.

Strengthening FONAG's capabilities

The Project's challenge was to gather various social actors in the Upper Guayllabamba Basin to commit to a sustained use of the basin and develop management conservation agreements. The first problem encountered was the limited inter-agency planning spaces and lack of global information that could be considered standard for the entire basin on water demand and supply, and its distribution among different users. This generated a recurrent problem for SENAGUA since its inventories were not validated by any interactive mechanisms. For example there was a gap of information on how many cubic meters of water had been provided, and who the beneficiary was. In addition, no one knew when, and in which geographical location there was hydrological stress on the water flow within a given territory. This water stress generated conflict among users, especially when the same water was shown as being allocated to multiple users at the same time. At the time the Project decided to support and update SENAGUA's inventories, the concession sys-

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FONAG, through the Project, strengthened the Pre-council of the Upper Guayllabamba Basin and provided technical assistance to SENAGUA to modernize their inventory systems in order to be able to provide accurate statistics. The Upper Guayllabamba Basin was the pilot case of a management model that would provide the elements for national legislation and policy. Because it was considered a pilot initiative, the Project was able to attract cofinancement to update their data through a participatory process in the field. In addition, the Project also supported investments to standardize a series of climatic data on more than 100 hydro-meteorological stations belonging to several public and private organizations in the Upper Guayllabamba Basin. The Project sponsored the development of software to automate the quality control of this data in such a way that it is statistically robust to show climatic patterns for the watershed and support calculations that projected water demand and supply.

The project purchased hydrological and meteorological stations which currently are part of FONAG´s network stations (17 in total).

FONAG Pluviometric Station

Water Resources Information System (SIRH-CG) – FONAG 2009

Parallel to this, the Project purchased hydrological and meteorological stations which currently are part of FONAG's network stations (17 in total).

To make this information publicly accessible, the Project financed the design of an interactive web portal system. The Water Resources Information System for the Guayllabamba Basin www.infoagua-guayllabamba.ec is the first system that provides access to information on the status of water resources through an interactive portal. It allows consultations on water supply and demand by watershed and projects water stress periods in the basin and also estimates how climate change could affect water availability. Simultaneously, the Guayllabamba watershed pre-council was created and developed public policy instruments with SENAGUA. The Project maintained a strong interest in strengthening the capacities of water company staff and technicians from the Water Funds on specific topics such as: water flow calculations, conservation planning tools, financial planning, and monitoring and evaluation instruments for conservation of biodiversity and water. Training was provided on public communication, institutional branding and accountability.

"The Water Resources Information System for the Guayllabamba Basin was the first system that provides access to information on the status of water resources through an interactive portal."

"The project maintained a strong interest in strengthening the capacities of water company staff and technicians from the Water Funds."

Water Resources Information System SIRH – CG FONAG 2009

Success stories

Communities acting for their own development

The communities of Paquiestancia rounded up cattle from the high grassland of the Cayambe-Coca National Parke buffer zones. The Project supported rural communities and the environment by providing local residents sustainable economic alternatives. The communities are now dedicated to improved grazing and cattle ranching below the buffer zones (3,600 m). This community received training in pasture and cattle management, fire control, use of organic fertilizers and agricultural best management practices. This activity benefited 115 people. By removing their cattle water sources are being protected and families have improved their livelihoods.

Virginia Pilca, a woman leader living in the Cayambe Coca National Park buffer zone, Cangahua, benefited from the program's productive component. Local authorities requested that many families in Cangahua remove their cattle from unproductive and fragile high-elevation grasslands, home to the threatened spectacled bear. Virginia and many others now had to travel to jobs in the Cayambe flower industry, far from their children and families. FONAG provided the families in Cangahua with local economic alternatives such as guinea pig raising enclosures and employed members of the community as park guards, allowing them to work in their communities. With these eco-productive opportunities, the families improved their

Mejora de cultivos. Comunidad de Paquiestancia

Virginia Pilca, a productive Project participant, Community of Cangahua

food security, spent more time with their children, and revitalized the indigenous culture.

Since 2005, more than 32,000 students, mainly from the Pichincha province, have participated in environmental education activities offered by FONAG's Water Guardians Program. The program promotes attitudes, practices, and knowledge in children and youth to protect the environment and conserve water sources. The objective is to encourage a new "Water Culture" which results in the sustainable use of natural resources, especially water.

To achieve this mission, the Program applied a methodology that promotes the active participation of students, education in values, and meaningful learning. The program aims to be entertaining and there has been a wide range of educational resources and materials created by the Program. An eco-systemic approach is used in all activities and water was a cross-cutting theme. This methodology and form of intervention is what has enabled FONAG's Environmental Education Program to be successful and has served as the experience for future environmental education programs. Another feature of the Program is that it is constantly being improved; adding new activities over time, this flexibility has made it a more robust program. Some of the activities that have been developed and that have been replicated in other water funds have incorporated FONAG's methodologies These activities include training events with communities and partner institutions in management of organic waste and water (Takakura Method); awareness tours to the Antisana Ecological Reserve (Yakuñanes) which have allowed various DMQ audiences to learn about the hydrological cycle and the path of water from its sources (high-grasslands) to reach their homes; and the creation of an Envi-

Ludic activities are part of the learning process in the Environmental Program of FONAG

ronmental Education Network with institutions that seek to strengthen the impact of environmental education in the city.

Since 2009, FOPAR, with USAID's support, carried out a series of interventions for protecting the environment from the emerging problems in the Chambo River. One of the components FOPAR worked on was teaching environmental modules in elementary schools to teach children about caring for the environment and the importance of protecting the watershed. The environmental education program was developed in 30 schools located in the Guarguallá micro-watershed (located in the Sangay National Park buffer zone), the Chibunga micro-watershed (located in Chimborazo Reserve buffer zone), the Guano micro-watershed, as well as the Guilles small canyon. During the first phase one of the main results was the formation of Local Environmental Facilitators (teachers), and "Environmental Management Committees" in each school, comprised of parents, students and teachers, all engaged in developing activities such as sustainable school farms, solid waste management, compost, and reforestation. The environmental education program achieved the creation of school associations based on the Environmental Management Committees of each member school, which consisted of schools organized and committed to the use and care of natural resources. With these results, the Environmental Education Program went beyond merely a formal education activity, to creating individuals with conservation behaviors and the will needed to act in favor of the environment. Currently, the Environmental Education Program is focused on the monitoring and strengthening of environmental community projects within the participating schools in previous phases.

Chapter3

Strengthening conservation management in Ecuador

Watershed panoramic landscape

Strengthening the capabilities of water funds

The Project promoted Conservation Agendas to encourage protection and/or restoration actions in priority water sources. This included programmatic areas such as: environmental education, control and patrol, alternative productive projects with communities and coordinated work with the Ministry of Environment, the administration of its national parks as well as a permanent work agenda with the water and hydroelectric companies and local governments with legal competences in land use and watershed management.

Each Fund received technical assistance for strategic plan development, preparation of baseline statistics of the degradation of areas of interest, zoning of territorial priorities of intervention, and designing of a monitoring system to demonstrate improvements in the management of these areas. This process was carried out on an annual basis with each Water Fund and monitored more than half a million hectares with improved management".

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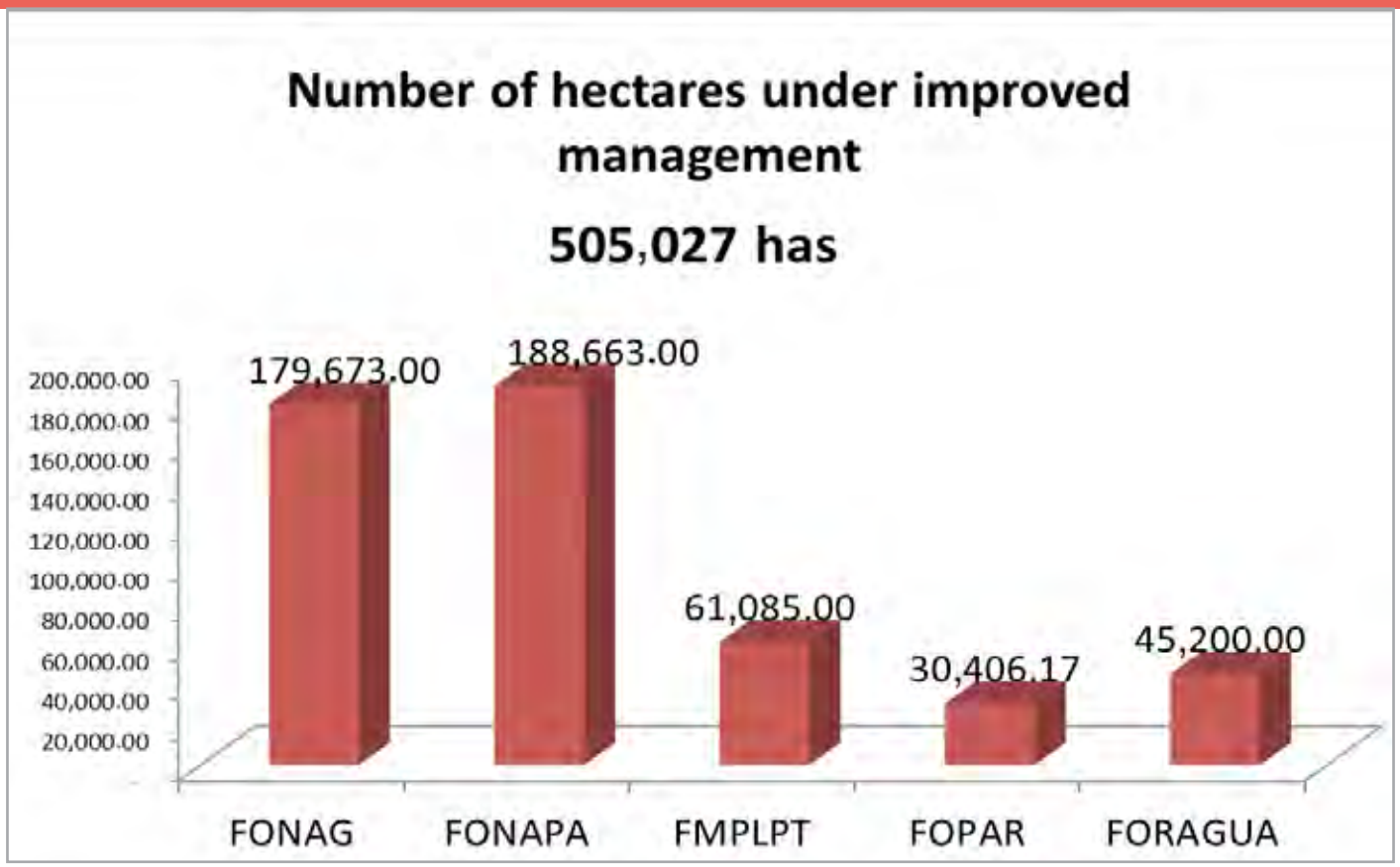
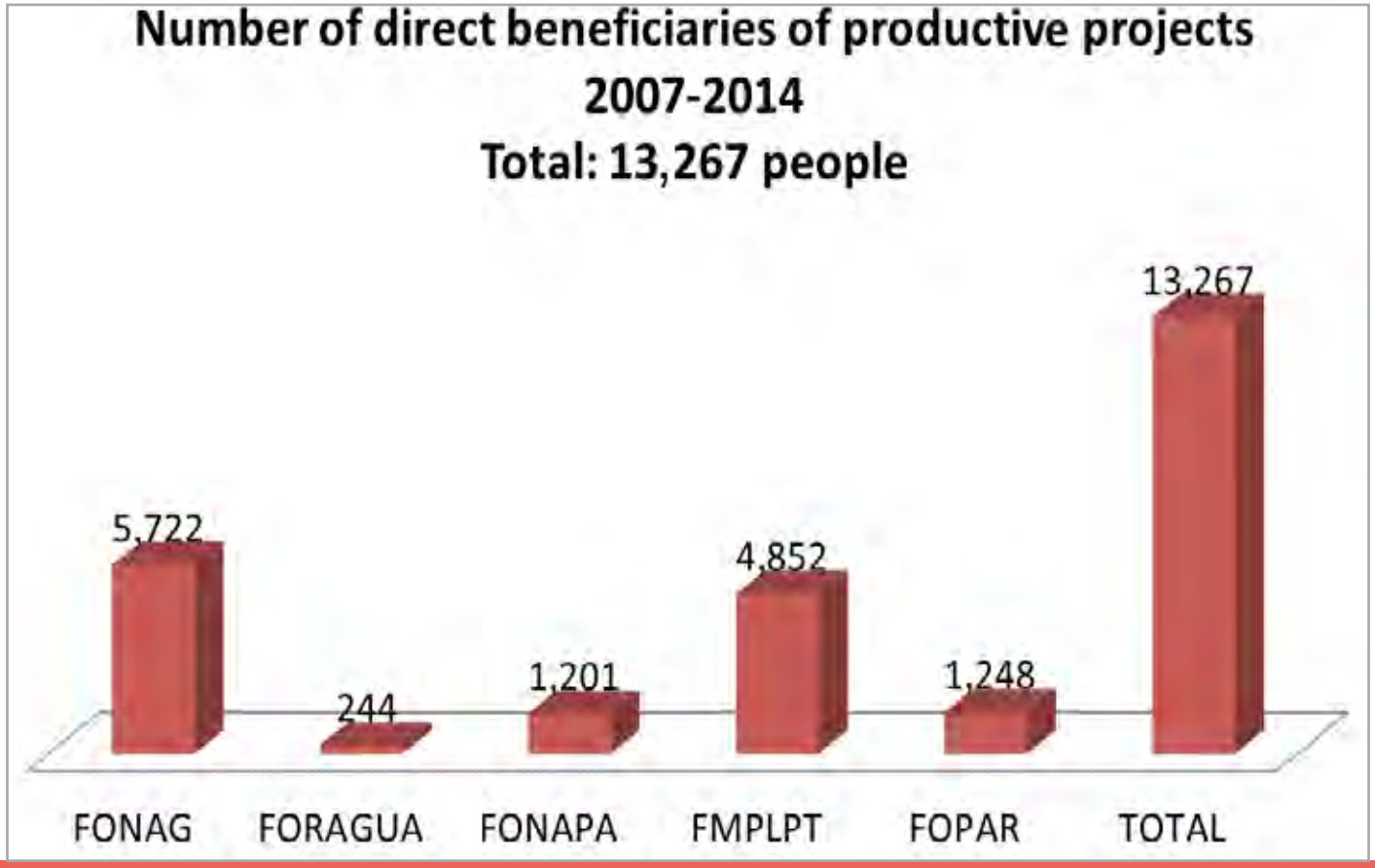
Each Water Fund's Conservation Agenda used participatory processes to identify priority actions to restore key ecosystems as well as to generate alliances and commitments from



local populations for sustainable land use in high grassland and Andean forests.

These priorities were: strengthening productive projects such as agro-ecological farms, small animal management, medicinal plants, and ecotourism initiatives, development of community management plans, orchid and tree nurseries, alpaca management, and construction of irrigation channels, among others. The objective of these activities was



to promote the adoption of soil best management practices and avoid expanding the agricultural frontier to community high grasslands, thus preserving their status as water and biodiversity reserves. Between 2007-2014 more than 13,000 people benefited directly from these productive projects.

Usually, institutions in charge of environmental management only have access to limited information which does not allow them to understand hydrological patterns in the area, and therefore they cannot make long-term plans to ensure a stable water flow that benefits all users. This also occurs with water balances and updates of its supply and demand. Water Funds managed to establish partnerships with academic and public institutions to operate hydro-meteorological networks and maintain a continuous processing system with quality data. These alliances were extremely useful because they allowed these institutions to rely on complete, relevant and high-quality information on the status of water resources in watersheds of interest.

Some examples of these alliances are: FOPAR in Riobamba partnered with the Riobamba Municipal Water and Sewage Company–(EMAPAR), the Chimborazo National University– (UNACH), the Higher Education, Science, Technology and Innovation National Secretariat (SENESCYT), and the University of Calabria in Italy for the development of the Riobamba Aquifer water balance. In addition, the alliance for the quarterly monitoring of water quality with the National Institute of Meteorology and Hydrology (INAMHI), the UNACH, and the Polytechnic University of Chimborazo (ESPOCH) was developed. Another example is the alliance among FONAPA, the Tropical Andes Foundation and the University of Cuenca for data processing of the hydro-meteorological network. In the case of FONAG, cooperation links were established to achieve the standardization and quality control of the data series for more than 30 years through a network of stations belonging to various actors in the Upper Guayllabamba Basin including EPMAPS, INAMHI, the Hydroelectric Company Ecoluz, and HCJB Radio. The National Polytechnic University and the French Institute of Research for Development (IRD) also supported the design of a mathematical model to calculate the projected water balance of the Guayllabamba Basin.

The objective of these activities was to promote the adoption of soil best management practices and avoid expanding the agricultural frontier to community high grasslands.

FONAPA in Paute, sponsored the creation of a community Park Guard microenterprise with the goal of providing control and patrolling services in watersheds; not only to the Water Fund but also to the water and electricity companies, and local governments. Training was provided with a curriculum that included: conflict resolution, biodiversity and water quality monitoring, reporting of critical points, and design of patrolling routes. This microenterprise reduces annual costs of public organizations such as the water company or the Ministry of the Environment, and ensures that large areas in national parks or private reserves key for water sources are protected from external threats and thus guarantee good use of public lands.

Water Funds promoted vegetation restoration actions through its environmental education initiatives, and involved the academic sector in reforestation activities, supported the establishment of community conservation

"Water funds managed to establish partnerships with academic and public institutions to operate hydrometeorological networks and mantain a continous processing system of high quality data generation"

agreements, and helped the design and implementation of management plans. In this sense, Water Funds led environmental awareness campaigns and outreach actions within the general population in the watersheds. In the case of FONAG, the Environmental Education Program surpassed the set targets and worked with more than 32,000 children and youth and more than 300 elementary schools in urban and rural areas within the Metropolitan District of Quito.

Among the most important events that can be mentioned are the World Water Day and World Environment Day that have already been placed in the cultural calendars of Quito, Ambato, Loja, Riobamba, and Cuenca. There were also countless media and education materials produced that were supported and coordinated through alliances with the Ministries of Education and Environment to enhance sustainability.

The Project consolidated various communications products. For example, FONAG developed the bimonthly newspaper "Agua a Fondo" (Water In-depth) specialized in water issues, with 30 editions published during the Project. This newspaper provided an editorial space to inform the general public on water issues. Another important action was the strengthening of online communication and social networks—creating and developing web pages for all Water Funds. Twenty

"Living Planet" radio programs were transmitted every 15 days through the Ecuadorian Cultural House Radio in Quito. Massive radio campaigns were developed which left 12 radio spots with awareness messages and other outreach materials that promoted the protection of high grassland within Quito.

The Project supported the creation of a small editorial fund containing publications detailing FONAG's best practices, but most of all, the various methodologies used for the protection of the water resources. A complete systematization of products was developed containing books, technical publications, and pamphlets on: organic fertilizers, breeding of guinea pigs, evaluation and monitor projects, training materials for park guards, environmental education and outreach materials such as "Agua Clara" (Clear Water) comics--brochures that analyzed water issues such as: what is a high grassland, its importance, water pollution, water in the Constitution, etc. At the same time, Water Funds always sought spaces to spread their actions. Therefore, representatives participated in Global Environmental Summits, workshops, and thematic conferences, in the formulation of water legislation. They received hundreds of delegations interested in learning the Water Fund model and its work on hydrological basins of Ecuador. This has placed Ecuador among the pioneers of Water Funds in the world.

"Water funds led environmental awareness campaigns and outreach actions within the general population in the watersheds"

Cattle ranching in high andean shrublands is one of the principal causes of water quality contamination.

Monitoring and evaluation

"In cases where activities overlapped with protected areas, conservation efforts were jointly planned with the Ministry of Environment."

One tool that was adapted to the specific needs of Water Funds was the methodology on how to measure "areas effectively conserved" originally designed by TNC and adapted by FONAG and USAID. This methodology used a geo-referenced system, to establish three main aspects: 1) the viable areas for biodiversity conservation, 2) the threats to these identified areas, and 3) management actions and their status within a watershed. Once the initial situation was identified, the Project prioritized areas in the watershed and defined activities to improve management. Afterwards, in a participatory process with the communities and private land owners, management models were developed for rivers, creeks, restoration of vegetation cover and alternative production activities. In cases where activities overlapped with Protected Areas, conservation activities were jointly planned with the Ministry of the Environment. Finally, progress was monitored and maps were prepared showing changes in land use practices and how activities contributed to the conservation of these areas.

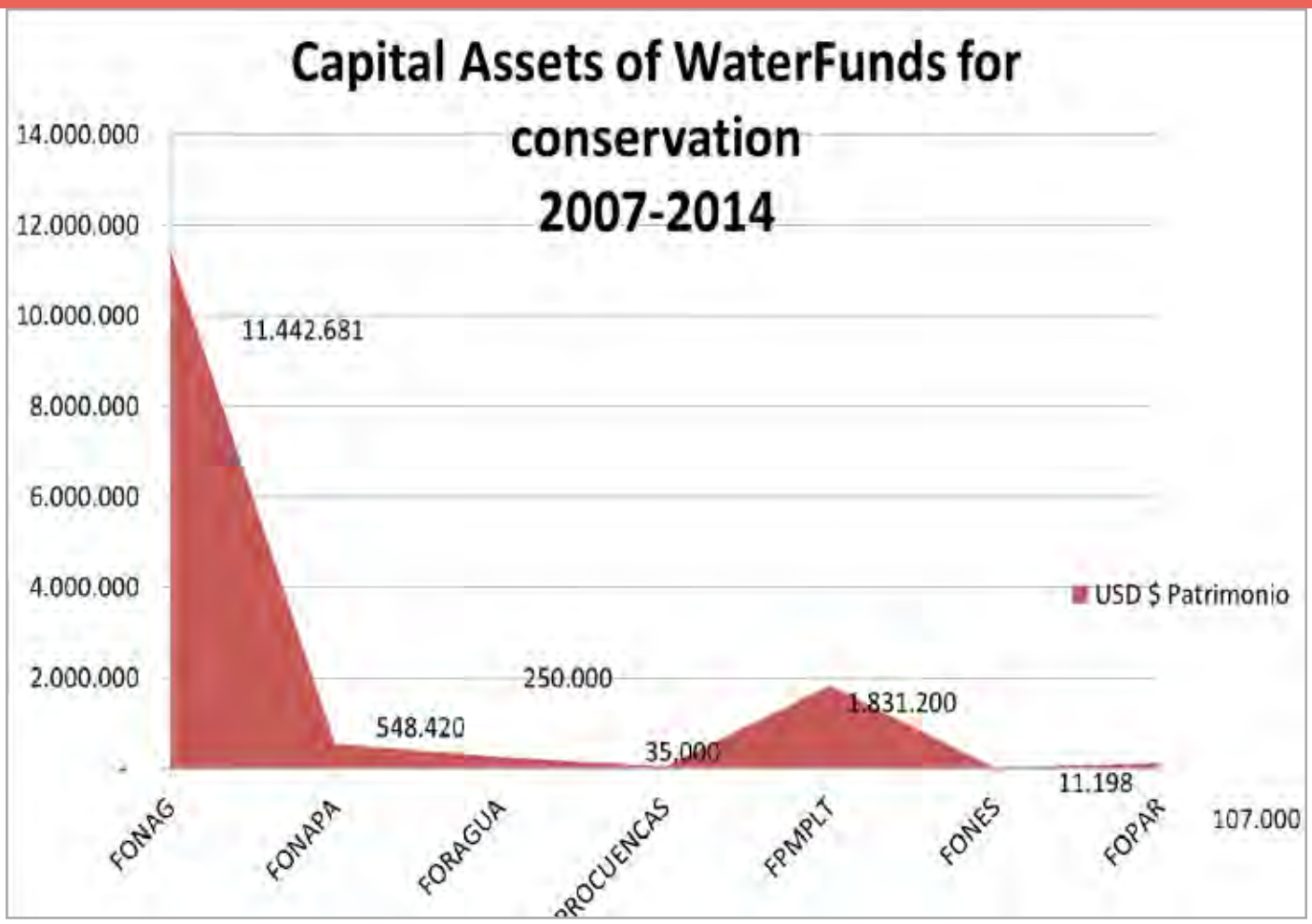
The project established a close follow-up on the benefits to communities and its impact

Biomonitoring practice with FONAG´s guardparks.

on the biophysics and the economy of their territories. There were tangible benefits in income, water quality, and appropriation of best productive practices. However, in many cases it could not be concluded that the improvement was only due to the presence of the Project given the lack of baselines and the need for increased frequency in data collection and monitoring. This factor is a pending challenge to the future strengthening of Water Funds in Ecuador.

"There were tangible benefits in income, water quality and flows and community appropiation of best productive practices."

Various pilot exercises, tools and methodologies were developed as part of the project's monitoring activities including: (a) the creation of a baseline for water quality versus the status of vegetation cover led by TNC and the University of San Francisco of Quito; (b) community bio-monitoring of water quality led by the park guards allowing communities to identify the points of pollution and measures for their recovery on a regular basis; (c) the multi-temporal analysis of land use with interpretation of satellite images within all areas of intervention of FONAG made for 1999 and 2007 exclusively, an exercise which was the cartographic base for the design of interactive modules of the InfoGuayllabamba System; and (d) the methodology of conservation targets and reporting of critical threat points in the areas of intervention.



Strengthening water funds legal and institutional frameworks

In four of the six municipalities (FOPAR, FMPLPT, FORAGUA, FONAG), the adoption of municipal or provincial ordinances was approved, which established the annual financial contributions to these Water Funds to capitalize their patrimony steadily over time. In the case of FOPAR, due to lack of contributions, the initial fund is experiencing a trend towards de-capitalization because of the annual administration costs by the trustee in charge. FONES and PROCUENCAS faced a similar situation since they failed to commit contributions from local governments and/or producers' associations. USAID-provided support to analyze different scenarios and recommended that these two smaller water funds become part of the Regional Water Fund in Southern Ecuador. These initiatives would maintain their local identity and have a better opportunity to sustainably continue activities in the long-term.

The project worked in collaboration with the water and hydroelectric companies in multi-year or annual plans of complementary investment in protected areas of water interest sites.

In addition, the Project worked in collaboration with the Water and Hydroelectric Companies in multi-year and annual plans

of complementary investment in protected areas or water interest sites. This generated credibility and legitimacy in favor of the Water Funds, since in some cases there was an initial resistance to the idea that the Fund could "substitute" some local government functions. For example, important alliances were created such as: FONAG and EPMAPS for the Antisana conservation actions; FOPAR and EMAPAR in the creation of the Sub-Council on Underground Waters; and the Municipality of Loja and FORAGUA to reduce costs by 30 percent in the acquisition of chemicals for water purification thanks to the improved management of the micro-watersheds.

As an example, in terms of financial schemes, the patrimonial trust allows the Tungurahua Fund to accumulate a capital of more than one million dollars. The Fund uses financial yields from this capital for investment in productive projects which are complemented by the contribution of the Provincial Government for a current investment of USD$1,220,800 annually. In the case of FONAG, its capital assets reach USD$12,000,000 and it generates annual returns between USD$500,000 to USD$800,000.

In the case of FONAG, its capital assets reach USD$ 12 million dollars and it generates anual returns between $500,000 to 800,000.

FONAPA has decided to reform its legal contract to incorporate new constituents in order to broaden participation of local governments that belong to the Paute watershed.

Lagoons and wetlands are part of the paramo ecoystem

Water funds: Water governance and local contexts

The definition of roles of Water Funds has been framed in the local political context and within existing (or absent) local water governance schemes. When strong institutions exist the Fund assumes a role as exclusively a financial mechanism to implement actions that competent public bodies and communities identify. This is the case of Tungurahua and its Water Fund which already existed prior to the project implementation. In Tungurahua there was a participatory process led by the Prefect on the management of the water resources in the province. In this sense, the Project saved time and effort in convoking stakeholders or convincing and bargaining through participatory processes; the process was already there, and the project supported that the Water Fund acted as the long term financial mechanism. Its role would be purely of financer and the roles of executors were assigned to the actors of the watershed, specifically the communities that owned high grasslands. In the case of FONAG its constitution deed allows both roles: financer and executor.

The formation of the Water Funds' directories has a public-private composition: private beverage enterprises, public companies, mostly water, sanitation and electricity, and the municipalities and prefectures participate. The percentage of public or private participation varies according to the level of contribution to the trust. The trend in Water Funds has been to broaden the participation of the public sector, especially of local authorities with an annual contribution to the Fund; which is directly invested in watershed management

lscapes are another environmental service provided by Paramos.

plans. In order to be more sustainable, Water Funds tend to diversify their income: on one hand, the financial returns on the trust and on the other hand, the current annual revenue of contributions from local governments.

In terms of the legal context, COOTAD provides that the provincial and parochial levels of Government are responsible for watershed management. However, while governments are responsible for watershed management, they are not provided State funding to be able to fulfill this role. Because of this, Water Funds took over this role and positioned themselves as long-term financial mechanisms to handle these responsibilities. After the approval of the COOTAD there is a growing interest and demand from parishes, municipalities and prefectures to be part of the Fund. This promotes one of the IWRM principles which is to encourage cross-sectoral, complementary roles at different levels of public administration in water management. The case of FORAGUA is innovative since its Board of Directors is composed of eleven municipalities that decided to support the Fund and capitalize it because of the products and technical assistance they receive that strengthen their own environmental management units.

In terms of strengthening Water Funds, the Project provided: funding to set up teams in Technical Secretariats; furniture and equipment; trainings on administrative and financial processes; and personalized mentoring by FONAG of staff in Water Funds for accounting, financial and administrative records. This includes support for the development of all instruments such as operating manuals, forms, regulations, and basic institutional and planning policies like strategic plans. It is important to note that there were transition periods due to the electoral cycle that led to the removal and change of technical secretaries. This

was the case with all Funds except with Tungurahua, whose prefect was re-elected for a second and third term. It was particularly challenging for the project during the transition period from one local government leader to another. The Project ceased to support Funds in 2012 because FONAG's Board of Directors decided to refocus all institutional efforts on the Guayllabamba Basin only. This decision also coincided with the change of FONAG's management administration. Because of this change, the process of strengthening other Water Funds could not be concluded or extended. Some funds such as FONAPA, FORAGUA and the Tungurahua Fund managed to consolidate and continued implementing activities; in other cases, the early ending of the technical assistance and support left FONES, PROCUENCAS and FOPAR still with several challenges in their institutional processes.

Success Story
The Tungurahua Fund Is A Social Demand

Between 2008 and 2013, the Tungurahua Water Fund invested $1.5 million in ten community high grassland management plans implemented by indigenous populations living in the upper watershed. This boosted the economy of 5,600 families and improved ecological flows in a quarter of the province's surface required to conserve ecosystems linked to water management. The Fund, through community conservation agreements, changed the management status of these areas. There are now 50,000 hectares of high grasslands dedicated for conservation purposes. The Fund financed alternative production models to benefit local communities and local communities are committed to protecting these areas from major threats such as extensive cattle ranching, forest fires, overexploitation of tourism resources, among others.

Boletín #2, Año 5, Marzo 2010.

Hillary Clinton desta

"The Secretary of the State of the
water and take early corrective act

This call was made during her parti
Clinton qualified the water issue as
carries out on behalf of the water s
in Ecuador as one of the solutions t

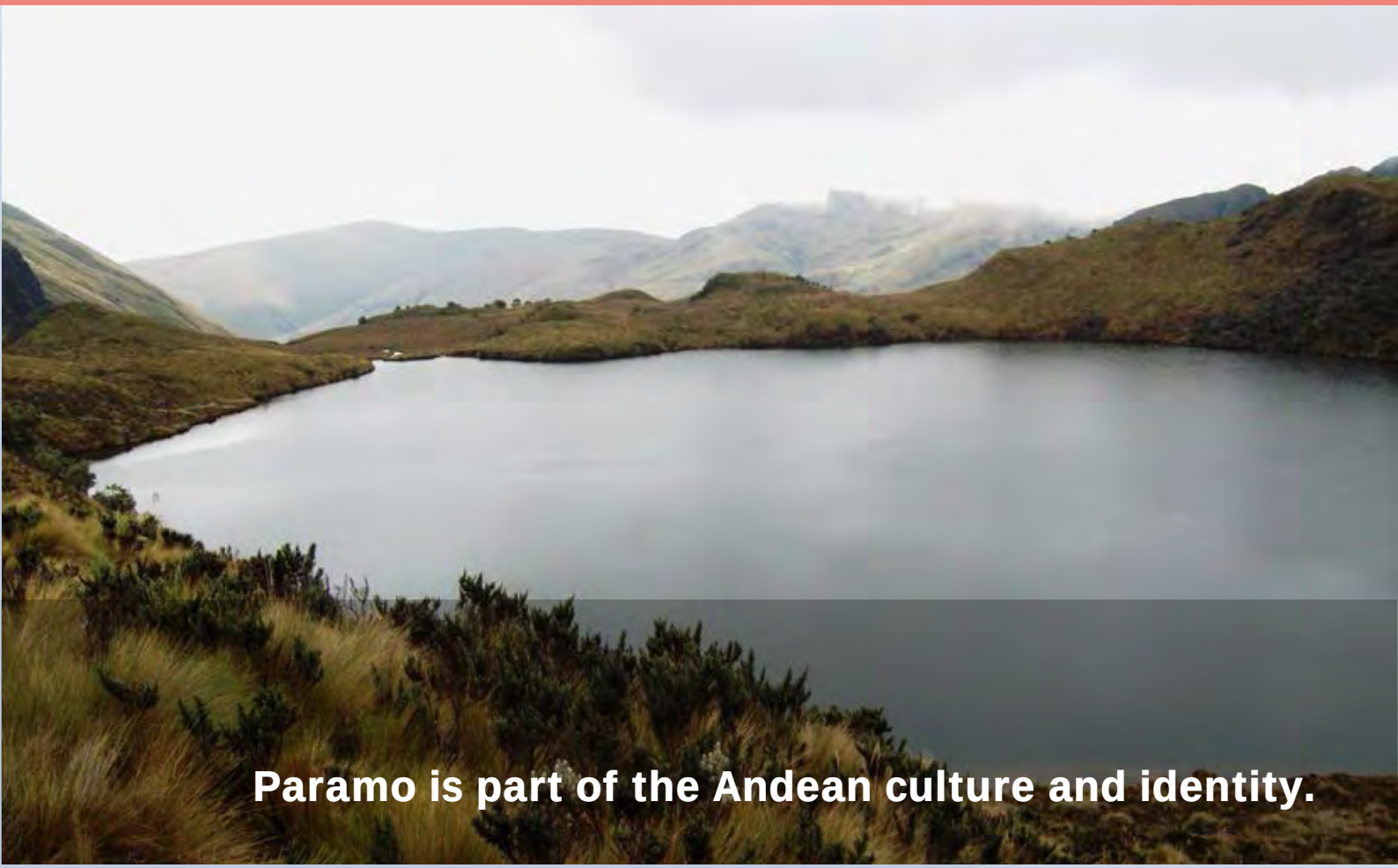
ca labor del Fideicomiso de Quito para el agua

United States of America, Hillary Clinton, convened the world to tackle the problem of tions in order to deal with serious problems of global concern. "

icipation in the World Water Day Forum organized by the National Geographic Society. Mrs. a test in preventive diplomacy and shared the five flouws of action that the U.S1 Government ource. The Secretary of State highlighted the Quito Water Fund model supported by USAID o the problem.

Chapter 4

Lessons learned and challenges for the future



Paramo is part of the Andean culture and identity.

Past and present

The creation process for Water Funds in Ecuador occurred rapidly and, in some cases, managed to consolidate its financial and operating mechanisms thanks to the contribution of USAID. However, it is important to mention that the institutional process has evolved beyond this Project. A short timeline (2007 to 2014) demonstrates the impact of USAID's contribution:

In the PAST there was no long-term financial mechanism for the protection of water sources and conservation; NOW there are four institutionalized mechanisms in Ecuador for conservation and integrated water resources management.

In the past there was no long-term financial mechanism for the protection of water sources in Ecuador.

In the PAST, there was no funding for the conservation of watersheds; NOW an allocation of USD$7,178,205 is provided by several public and private users for conservation of ecosystems that regulate and store water.

In the PAST the management of hydrological interest areas was insufficient or weak; NOW there is capacity and processes ins-

talled for improved management of areas that provide water to local populations.

In the PAST the figure of Water Funds wasn't positioned as an alternative to promote IWRM; NOW there have been more than ten replications of the model in Latin America and the Caribbean.

In the PAST each social actor monitored hydrology of watersheds according to their institutional needs; NOW they have become constituents of a trust, are an active part of the Board of Directors, and participate in the same dialogue with water companies, hydroelectric projects, communities, and other water users with a common goal.

In the PAST there was no geo-referenced monitoring system on the status of critical ecosystems and their micro-watersheds; NOW there is software, trained personnel, and institutionalized impact reports of the actions of the Fund in land use management and conservation of the water interest areas.

In the PAST there was no working partnership with the Ministry of the Environment, SENAGUA and INAMHI on IWRM; NOW these organizations have cooperation agreements and joint work agendas for hydro-meteorological information, water balances, etc.

In the PAST there were no easement or conservation agreements, and improved management in the areas of water interest with local communities; NOW there are conservation agreements in force in all watersheds where the Project implemented actions.

In the PAST the population of the cities of Quito, Ambato, Riobamba, Cuenca, and Loja had no public awareness of the importance of the high grasslands for the provision of water; NOW a "water culture" is being consolidated through environmental education, awareness-raising and outreach activities involving public and private sectors, as well as the public in general.

Nowdays water funds model had been replicated in more than ten countries in Latin America and the Caribbean.

In the PAST environmental education was not included in the formal elementary and high school curricula; NOW there are official curricula and agreements created by the Ministry of Education between Water Funds and Municipal Education Directorates to incorporate the methodologies developed by the Project in the annual budgets of these institutions.

Meteorological Station in Loma Urco, Los Ilinizas

Lessons learned and challenges for water funds

Water Funds are relatively new institutional figures in the country, nevertheless they have already received public recognition because of the gap they have filled in environmental management issues in Ecuador and the solutions they provided with respect to the lack of long-term financing for conservation of water sources and biodiversity.

The Project identified several lessons learned and generated overall conclusions during its implementation. These include:

- A key in terms of ensuring the institutional sustainability of Water Funds in Ecuador was the **approval of a legal instrument** such as an Ordinance establishing the annual amount of contribution by the municipality. In the majority of cases this ordinance was successful. However, it was not necessarily a guarantee, as new Mayors were unaware of the Ordinance. An additional challenge was to get the authorities to issue an administrative provision to automatically discount mandatory contributions from Central Bank accounts. This significantly improved the level of compliance by local governments and did not depend on the will of the acting political authorities. The local culture of "doing politics" on many occasions placed the Water Funds' Boards of Directors as political platforms and on several occasions, the agreements achieved were reviewed by the new authorities. On the other hand, there was the case of the Tungurahua Water Fund which had the Ordinan-

ce approved but established a "voluntary contribution" from Constituents of the Fund. This has worked for the Tungurahua Fund which has capitalized more than one million dollars in contributions. A legal document does not necessarily guarantee effective engagement of contributor institutions; in many cases **strong political leadership and a transparent participatory planning scheme in the territory** may constitute sufficient pressure and demand for accountability.

- A major challenge to designing a sustainable financial mechanism that supports the organization is **to identify the economic basis of the population and key actors that sustain the Fund**. In the case of the Espíndola Fund, for example, the city has 1,500 water users, which did not justify an exclusive Water Fund. One possibility was involving the major productive sectors through an awareness campaign about higher costs and lower production yields given the conditions of hydrological stress and/or vulnerability to climate change versus the possibility of having a fund that would invest in programs for the regulation of hydrological flows and recovery of vegetation for the generation of microclimates that enhances productivity. In other cases, the financial returns of the trust capitalized by

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Cerro Puntas Municipal Protected Area

the contributors did not cover minimum operating costs. Partnerships and decision-making at the local level amongst actors that belong to a same watershed was key as well as their shared desire for technical assistance and investment programmed by a Water Fund. In the case of the Funds of PROCUENCAS and ESPÍNDOLA, these were incorporated in the actions of the Regional Water Fund FORAGUA which allowed them to contribute to its capital and receive permanent technical assistance in their territories.

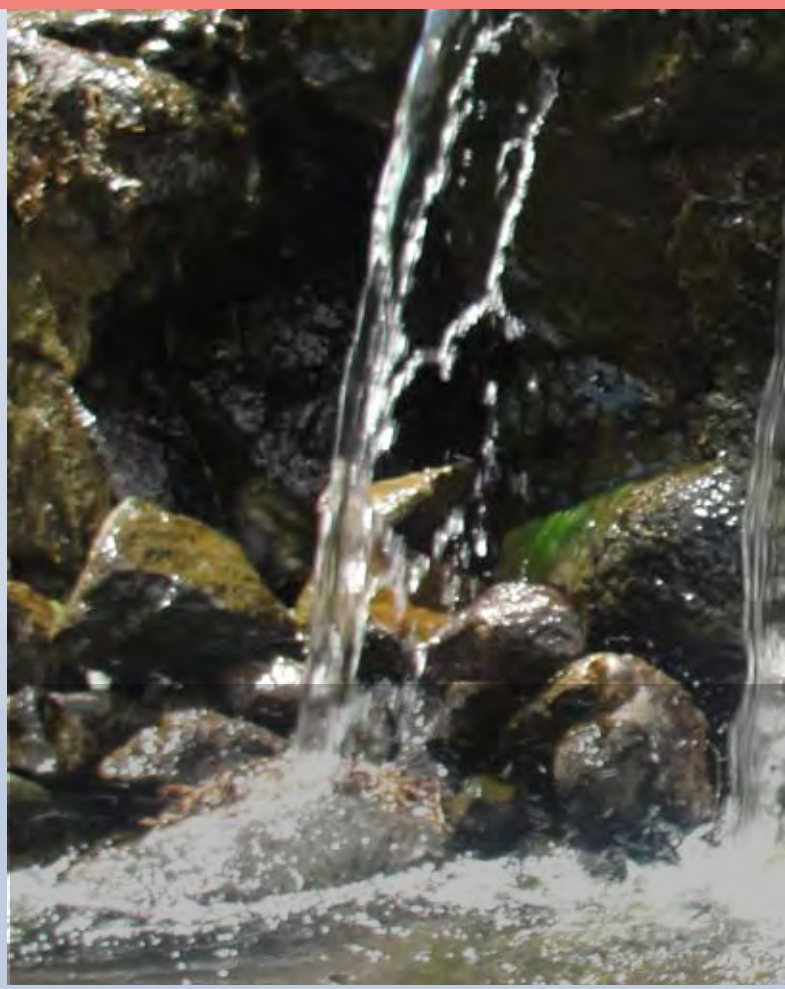
- Technical Secretariats have focused much energy on the design of a fundraising strategy for co-financing activities; this becomes, for the case of the Tungurahua, a proportion of USD$2 for every dollar in the trust. In the case of FONAG this meant at a certain point USD$4 for each dollar of the trust. In addition, Water Funds are limited in their capacity to physically cover and provide technical assistance to local governments when contributions do not cover the annual costs of a small technical team. It is important for the Funds **to develop skills and specific capabilities in co-financing**, whether from the private sector or the international donor community. Another option is to generate a more complex structure of income, like FORAGUA did with its combined financing structure which includes the initial contributions of founder constituents of USD$530,000 that generates financial annual yields, plus the annual contributions from eleven municipalities for USD$350,000 that is invested the same year in watershed management actions.

- Other past and future challenges with Water Funds in the Ecuadorian case has been the review of the endowment contract every institutional cycle due to changes in the political and macroeconomic context of the country. This entails public policy and legal regulation reforms as well as changes in the possible investment scenarios. This is a joint role that should be assumed by the Board of Directors and the Technical Secretariat. For example, during the life of the Project, the conditions in the country changed multiple times. In 2007, the water national legal framework did not have watershed management competencies defined in the territory, something that changed with the issuance of the COOTAD. The presence of the Government was weak on environmental management issues but it was strengthened after 2008 with the creation national water authority. In 2007, investments could be done in private financial products with a greater margin of profit but a couple of years later and due to mismanagement of certain petroleum trusts in the country, the Government decided to issue regulations that limited investment only in public financial products, thus leaving private funds with a lower level of profit and lower confidence. As a lesson learned, it is important to mention that the Funds must have the needed flexibility to adapt to changing realities according to the country's requirements; and secondly, that trust contracts must be sufficiently inclusive of any conditions so that they are sustainable over time. That is, they should be very well thought so that further on do not require modifications that were not included from the beginning.

Technical Secretariats have focused much energy on the design of a fundraising strategy for co-financing activities.

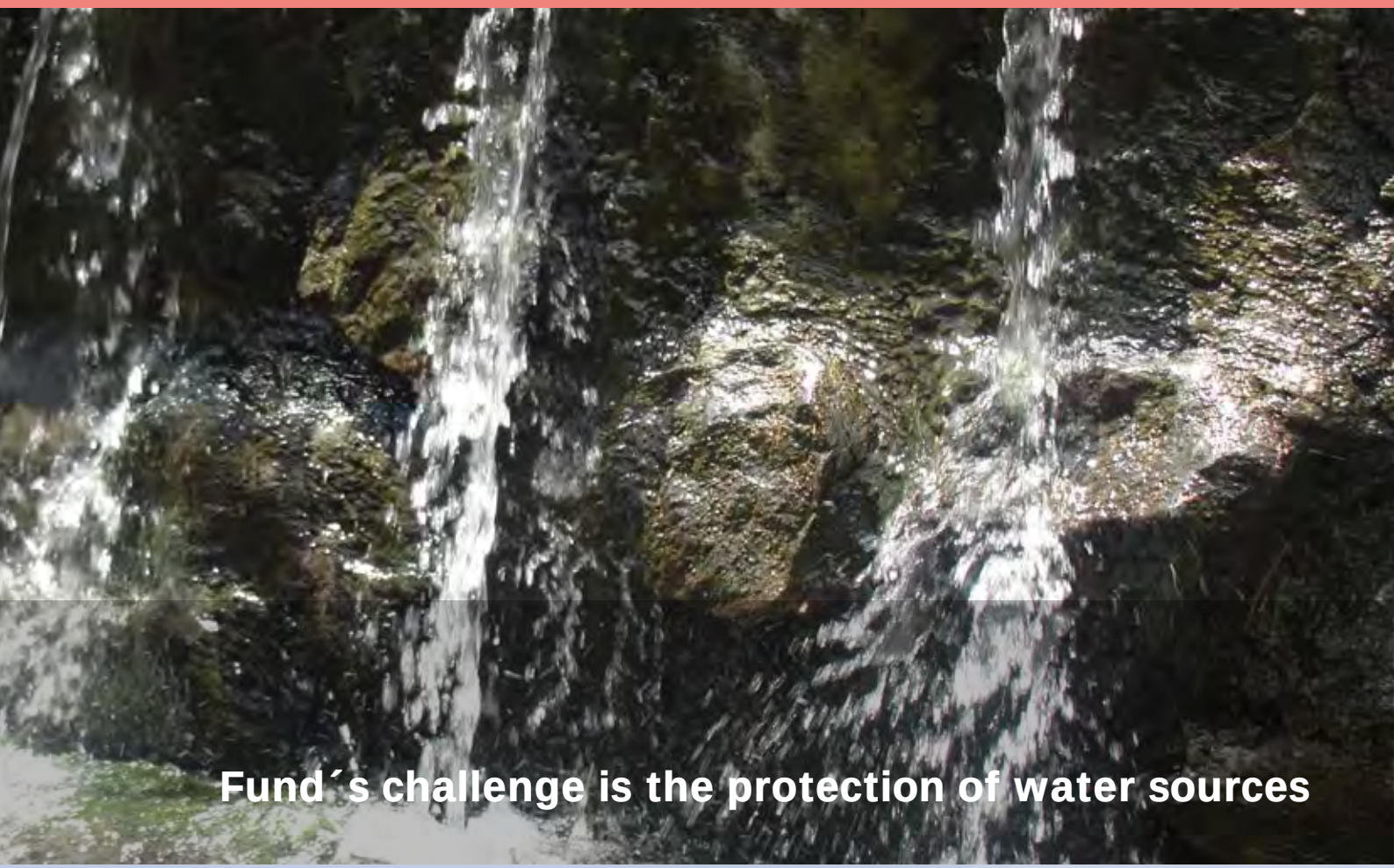
- A challenge in a Water Fund design stage was **to correctly delimit the geographical area of intervention**. In some cases a city was defined as the territorial target without taking into account that while the city generates a water demand, it does not necessarily mean that the water that people use comes from that same territory. Often the places where water sources are located belong to different political and administrative divisions. Therefore, it is key to use an **integrated water resources management and social basin approach**. This poses an additional challenge because municipal budgets may not be invested in another municipality. Also there are no binding instruments of public planning between local governments to assign financing for cross-border activities. Thus it is recommended **to promote the association of several local governments in figures of consortium or associations**; so that in the best of cases, its institutional actions respond to a watershed and microwatershed management approach.

- In some cases Boards of Directors are structured predominantly by all local governments in the region that are interested in a fair distribution of the investments in their respective territories. In other cases it is a combination of public companies (usually water and electricity), the private sector (mainly bottling companies); the non-governmental sector, and communities or associations of producers. An ongoing challenge is to generate a process of orientation and a permanent reminder of the role of the Board of Directors; its functions and its institutional commitment beyond political election cycles. A lesson learned is **to achieve a good level of empowerment in the management of each constituent in the Fund** and this is achieved through identifying common interests and building bilateral work agendas where the constituents are committed and see a value added and legitimacy in the role of the Fund.



The presence of the Government was weak on environmental management issues but it was strengthened after 2008 with the creation of the national water authority.

- Another permanent challenge for the Funds is to **design a well-directed communication strategy for accountability reasons, which reports on the management of the Fund and positions the Fund with rural and**



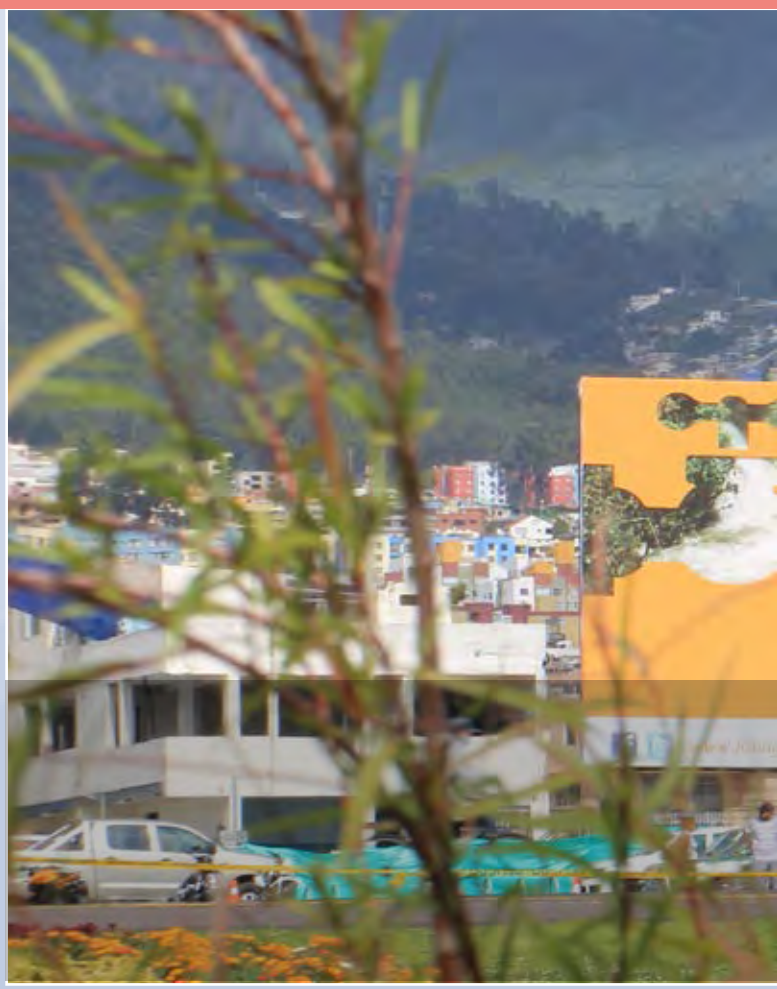
urban populations. The communication strategy supported by USAID had an emphasis on the development of media products that helped position FONAG with the general public. However there were recommendations proposed during the evaluation of the Project, about innovating the communication strategy to shift the emphasis from the development of media products to a definition of communication objectives and the selection of audiences to further provide greater institutional sustainability to FONAG with both urban and rural, public and private partners.

- Establish operational agreements and work agendas with Hydroelectric and Water Companies since the latter are the main parties interested in validating the management and the role of Water Funds. Master Plans for water supply and sanitation systems in medium-sized and large cities usually display and illustrate with great forcefulness the required investment figures to maintain the water flow required for population growth projections. Socialization actions and discussions with the population of these costs and the cost of "doing anything" can generate an opinion to support decision-makers to choose the most cost-effective option. It is important to clearly communicate the avoided costs and/or comparative benefits that would result by contributing to the management of a Water Fund versus other investment options such as major water infrastructure projects from neighboring provinces. Part of the communication strategy is to develop key messages based on comparative figures, such as: how much does it cost annually to remove sediments and

maintain catchment facilities; or, the annual cost for a water company of acquiring the chemicals for purification versus the costs of community programs for protection and restoration, reduction of the agricultural frontier, restoration of rivers and streams, livestock management, and more environmentally friendly production models in the upper basins.

- Another lesson learned and permanent challenge for Water Funds is to effectively **combine different methodological approaches for programs** in order to overcome the barriers to IWRM in the local context. The Project provided support so that Water Funds could replicate conservation programs such as environmental education, communication, restoration of vegetative cover, water management, and strengthening of protected areas. However these programs cannot be applied without an analysis of the local dynamics and reality. Most likely it requires a combination of adequate resources according to identified needs. This learning experience is important and has allowed FONAG to modify its planning based on territorial scoping and interventions that arises from the demand within a territory rather than from the offer of programs.

- Several achievements and lessons learned could be obtained from the **impact monitoring system** of the conservation actions of Water Funds. For example, FONAG has conducted three exercises to measure the impact in terms of: (a) the ecological integrity and water quality of the rivers; (b) analysis of the socio-economic impact of investments; and (c) diagnosis of the ecological impact in terrestrial ecosystems. As a result of these studies it was determined that at those intervened sites there were positive conclusions about water quality, additional income, and recuperation of the vegetation cover in selected sites, compared with control sites where FONAG was not present.



- In terms of Project management, despite the fact that there were significant changes from the beginning with modifications to the original agreement, inclusion of new activities, redirection of approaches, it was positive that both FONAG and USAID had the flexibility to adapt to local needs and realities. When there were emerging opportunities to work, such as the support provided to SENAGUA, all necessary steps were taken to make this happen. Likewise, the Project took a priority approach to working with local organizations and strengthening their management.

oAwareness campaigns signage in Parque Bicentenario, Quito

What remains to be done?

The consolidation of Water Funds as recognized institutions between local actors and water users in a watershed still has a way to go. Some of the reflections that Water Funds are looking for as potential opportunities for the following years include:

Strengthen learning exchanges: The sponsoring of activities of a Water Funds Network in Ecuador will allow a flow of information and criteria of good practices among Secretaries and technical teams in Water Funds. To share experiences and lessons learned among the Funds, from operational issues, with relation to the trust, methodologies, program design, and alternative funding sources will be extremely useful. With this goal an informal Water Funds Network was established and an action plan was agreed upon which includes annual meetings, information exchange, technical resources to generate media products, and an agenda for institutional lobbying with national authorities.

Invest in the developmet of comunication strategies at the national level to consolidate financial long-term mechanisms for water resources conservation.

Invest in the development of communication strategies: At the national level,

to consolidate communications strategies that efficiently carry the message to authorities on the urgency to consolidate financial long-term mechanisms in Ecuador. This will ensure protection of water quantity and quality for human consumption and irrigation with emphasis on food sovereignty and to the smooth operation of hydroelectric projects in Ecuador.

Strengthen institutional capacities for monitoring, impact assessment and knowledge management: Both for results achievement and impact efficiency. This is the basis for knowledge management and at the same time the underpinning element to reorient the planning of actions and investments in watersheds. It seeks to institutionalize this process in such a way that it is part of the organizational culture.

Involve the private sector as constituent members and contributors of Water Funds: Given the importance of involving the private sector in water funds in Ecuador, it is necessary to have an expert in each Fund who would specialize in the development of joint agendas with the private sector. In other countries in Latin America, such as Colombia, for example, the agribusiness sector has a leadership participation in the constitution of Funds; the Cali Water Fund is led by the entire sugar-cane sector in the Cauca Valley.

Strengthen the diversification of income from the Water Funds: This is a permanent challenge for which several alternatives could be considered such as the design of "tailored programs" financed by water users; this is the case of FORARBOL in FORAGUA that has promoted a campaign to the general population to "adopt a tree". Other schemes seek to increase the number of constituents offering a transparent mechanism for investing in the protection of water sources and providing technical assistance, monitoring and fundraising for co-financing activities. Another strategy is to seek partnerships with the private sector for programmatic investment in the context of their social and corporate responsibility strategies. An innovative option in the context of the regulated and voluntary carbon market is to provide technical assistance to the private sector to lead a green certification program for municipal (water footprint, neutral carbon, etc.) investments in reforestation and/or passive restoration could be made.

Another alternative is to manage an information campaign showing the probable costs for the economy of the country, that would result in affecting the water flows of hydroelectric projects

Another alternative is to manage an information campaign concerning the costs that would result in affecting the water flows of hydroelectric projects in the country in terms of maintenance costs and/or profit rates not perceived because of mass movements or flow reduction. An alternative financing option at the national level, in joint design with CELEC, might be to generate an economic scheme for the protection of water sources that comes from asigning a percentage per kilowatt/hour produced and allocating it to the protection of water flows in the geographical areas and communities where these projects are located.

FONDO DE PARAMOS
TUNGURAHUA
LUCHA CONTRA LA POBREZA

FOPAR

FONAPA
Fondo del agua para la conservación de la cuenca del río Paute

FONAG
FONDO PARA LA PROTECCIÓN DEL AGUA

FONDO Pro-cuencas

FONES

FORAGUA
FONDO REGIONAL DEL AGUA