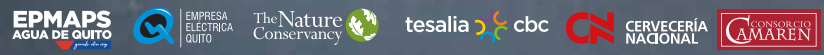




The Path of Water FONAG: projects and lessons

The Path of Water

FONAG: projects and lessons





ISBN: 978-9942-8807-0-3



The Path of Water

FONAG: projects and lessons

Credits

The Path of Water - FONAG: work and lessons

Water Protection Fund - FONAG 2019

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Fondo para la Protección del Agua, mercantile Trust with contributions from: Empresa Pública Metropolitana de Agua Potable y Saneamiento – EPMAPS, Empresa Eléctrica Quito – EEQ, The Nature Conservancy TNC, Cervecería Nacional, Tesalia CBC and Consorcio Camaren.

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Acronyms

AACC: Adaptation of Agriculture and water use in agriculture to climate change in the Andes

BID: Inter-American Development Bank

SDC: Swiss Agency for Development and Cooperation

CREA: Responsible Water Consumption

DMQ: Quito Metropolitan District

EEQ: Quito Electrical Company

EMAAP-Q: Municipal Drinking Water Water and Sewerage Company of Quito

EPMAPS: Public Metropolitan Drinking Water and Sanitation Company

ESPE: University of the Armed Forces

FONAG: Water Protection Fund

FFLA: Latin American Future Foundation

FMPLPT: Tungurahua Paramos Fund and Fight Against Poverty

GCF: Green Climate Fund

GEF: Global Environment Fund

GIZ: German Federal Enterprise for International Cooperation

INABIO: National Biodiversity Institute

InWEnT: Capacity Building International, Germany

INAMHI: National Meteorology and Hydrology Institute

IRD: Research Institute for Development

MAE: Ministry of Environment

MIC: Integrated Management of Catchments, Agriculture and Sustainable Use of Natural Resources in Andean Countries

NGO: Non-governmental organization

PANE: State Natural Heritage Areas

PEA: Environmental Education Program

UNDP: United Nations Development Program

PROAmazonía: Integral Amazon Forest Conservation and Sustainable Production Program

PRAA: Andean Regional Climate Change Adaptation / Impact adaptation of rapid glacier retreat in the tropical Andes Project

REA: Environmental Education Network of the Quito Metropolitan District

ROI: Return on investment

SEDC: Raw Hydroclimatic Data Standardization System

SENAGUA: National Water Secretariat

SIAF: FONAG's Activities Information System

SIRH: Water Resources Information and Monitoring System

SUBIR: Sustainable Use for Biological Resources

TNC: The Nature Conservancy

USAID: United States Agency for International Development

USFS: United States Forest Service

USFQ: San Francisco de Quito University



Introduction

After eighteen years since the creation of the Water Protection Fund - FONAG, it is timely to make a compilation that creates an accurate recount of the Fund's structure, operation and experience. It is important to highlight the road traveled, main achievements, lessons learned and challenges facing the future. Additionally, progress in the implementation of the 2016-2020 Strategic Plan will be presented.

FONAG was created at a time when the link between nature conservation and water availability was not obvious. The Fund is established the same year as ecosystem services acquired new relevance in environmental management. In conservation and academic circles, discussion begins around the benefits of nature as vital components to human well-being. The concept of "green or natural infrastructure" was in its early stages and gradually it was understood that natural processes could be used for functions such as water management and the creation of healthier environments. Today, working on water sources has become a pillar of water management and "Water Funds" are considered an innovative tool that unites various efforts by several stakeholders for an integrated water resources management directly from its source.

As a result of a joint effort by organizations to work on the water sources that supply the Quito Metropolitan District, constituent entities make regular contributions that have generated a solid and transparent financial structure for budgetary provision in the implementation of annual plans and their strategic plan. FONAG has established partnerships with key entities that, without being constituents, have found in the Fund an important partner to achieve common organizational objectives.

The consolidation of FONAG has been a continuous learning process for its protagonists, and needs to be shared as part of their organizational growth, and so new initiatives can take these lessons as an example.

Bert De Bièvre
Technical Secretary



In the beginning

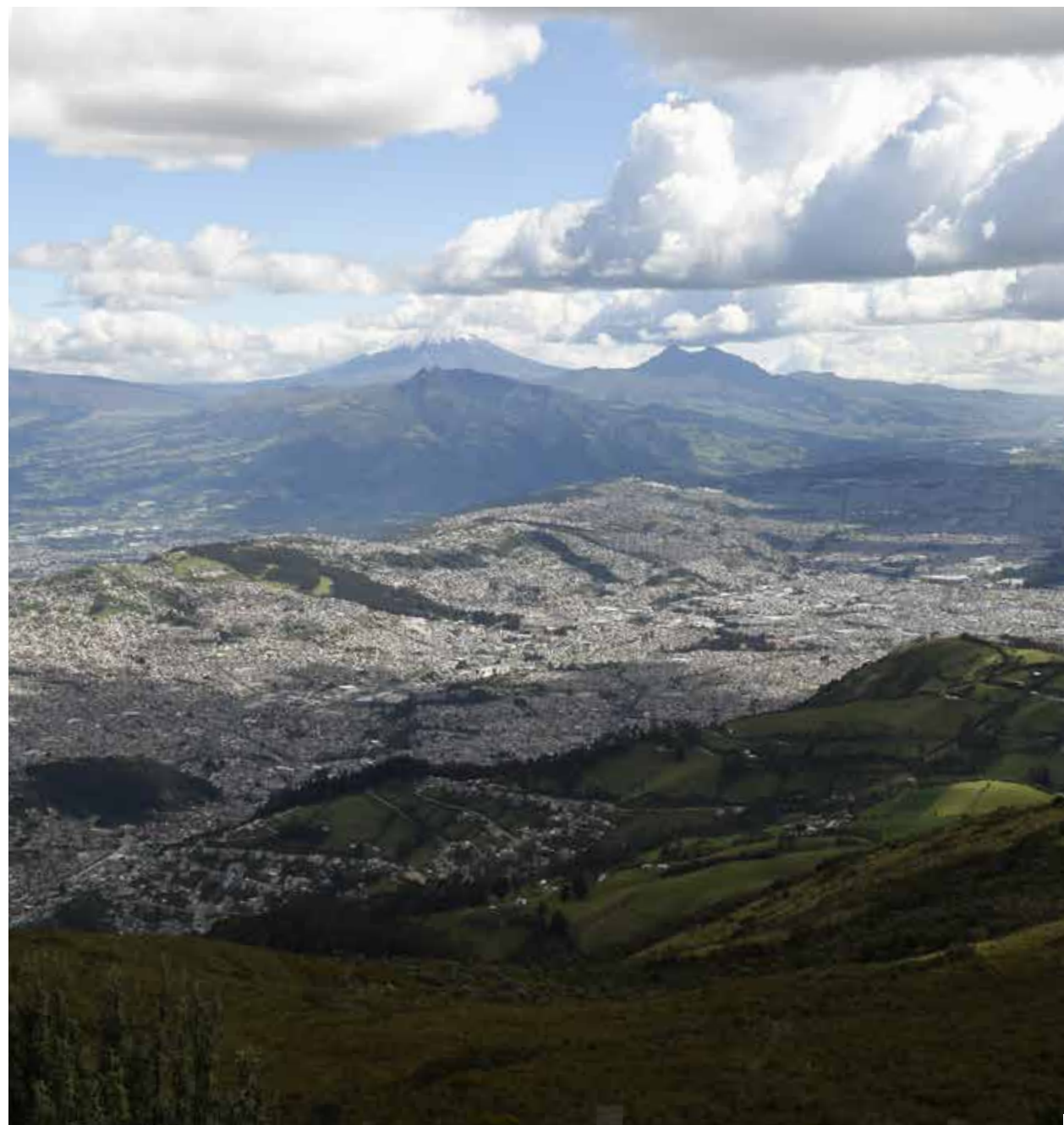
Water availability for the Quito Metropolitan District (DMQ) has been widely analyzed and discussed. The city of Quito is the second largest in Ecuador, and is situated at high altitude in the upper Guayllabamba River catchment, which faces problems that derive from population growth, urban expansion and increased pressure due to indiscriminate use of natural resources.¹

The DMQ's location allows access to high quality water coming almost exclusively from the paramos (high altitude tropical grasslands) that surround the city. Accelerated population growth has caused the need to look for new water sources in ever more remote areas, including transfers from Amazonian headwater catchments. Paramos are considered to be regulatory systems of the hydrological cycle due to their interaction of low temperature climatic conditions and high altitude, as well as to their vegetation and soil structure.

Since 1995, various international cooperation programs determined, through studies, the importance of managing protected areas for the city's water supply.² As part of this analysis, it was estimated that 80% of the water supplied to the city came from catchments within or in buffer zones of protected areas, such as the Antisana Ecological Reserve, the Cayambe Coca National Park and the Cotopaxi National Park. These areas face various threats related to land use changes such as grazing, deficient agricultural practices, road building, insufficient funding for management, among others.

¹ FONAG, FFLA, Document (sf). Participatory Appraisal of the Upper Guayllabamba River Catchment.

² Among the implemented programs during this period are: Sustainable Uses for Biological Resources (SUBIR I and II) and Condor Bioreserve which included work done in four protected areas: Antisana Ecological Reserve, Cayambe Coca Ecological Reserve, Cotopaxi National Park and the Sumaco Biosphere Reserve), financed by the United States Agency for International Development (USAID) and implemented at an inter-organizational level by The Nature Conservancy (TNC) and Antisana Foundation.



Within the framework of the "Condor Bioreserve" Project, management plans were developed for the Antisana Ecological Reserve and the Cayambe Coca National Park, in which actions such as the following were included: assessment of river catchments, land acquisition or compensation measures, sustainable production systems, and actions to improve or protect hydrological functions; however, no proper funding was available in order to initiate these plans. This is how the construction of a funding mechanism was proposed in order to preserve the Condor Biological Reserve and, in particular, the Antisana Ecological Reserve and the Cayambe-Coca National Park, with water as their focal point.³

**FONAG is born as a
conservation strategy focused on water.**



The new mechanism was built on the premise that river catchments surrounding the city provide important water services and its beneficiaries should contribute for the continued provision of these services. The following criteria were used for the design process: involvement of public and private organizations; more organizations should not be created in order to avoid excessive process bureaucratization; guarantee and promote the participation of multiple interested stakeholders; become legally feasible and politically viable; and promote the conservation of catchments in the long term.

Initially, the implementation of a consumption fee was proposed in order to finance conservation projects and manage catchments. This fee would be based on a solid economic appraisal of the resource and contributions would create a trust fund that would guarantee financial stability. This would generate income through interest earned on investment. Aside from contributions charged to water users, the fund would eventually be able to request additional support from national and international organizations.⁴ Studies conducted by the Antisana Foundation and German Cooperation⁵ estimated that each family could make monthly contributions of USD\$0,04 for the protection of the upper areas of Papallacta, Oyacachi and Chalpi, and of USD\$0,07 for the protection of Mica.

Once the main uses of water were analyzed and relevant stakeholders were determined, it was established that the Municipal Drinking Water and Sewerage Company of Quito⁶ (EMAAP-Q) would be a key institution to involve from the beginning, being an important user, and based on the premise that their participation would encourage other public entities to adhere to the initiative. The company in turn had specific actions for the protection of river catchments and did not have the organizational capacity to implement a project of this scale.

³ Pagiola, Stefano, Joshua Bishop and Natasha Landell-Mills. 2002. Selling Forest Environmental Services: Market-based Mechanisms for Conservation. Earth Scan, London.

⁴ Echavarría, Marta. FONAG: The Waterbased finance mechanism of the Condor Bioreserve in Ecuador.

⁵ GTZ and now GIZ

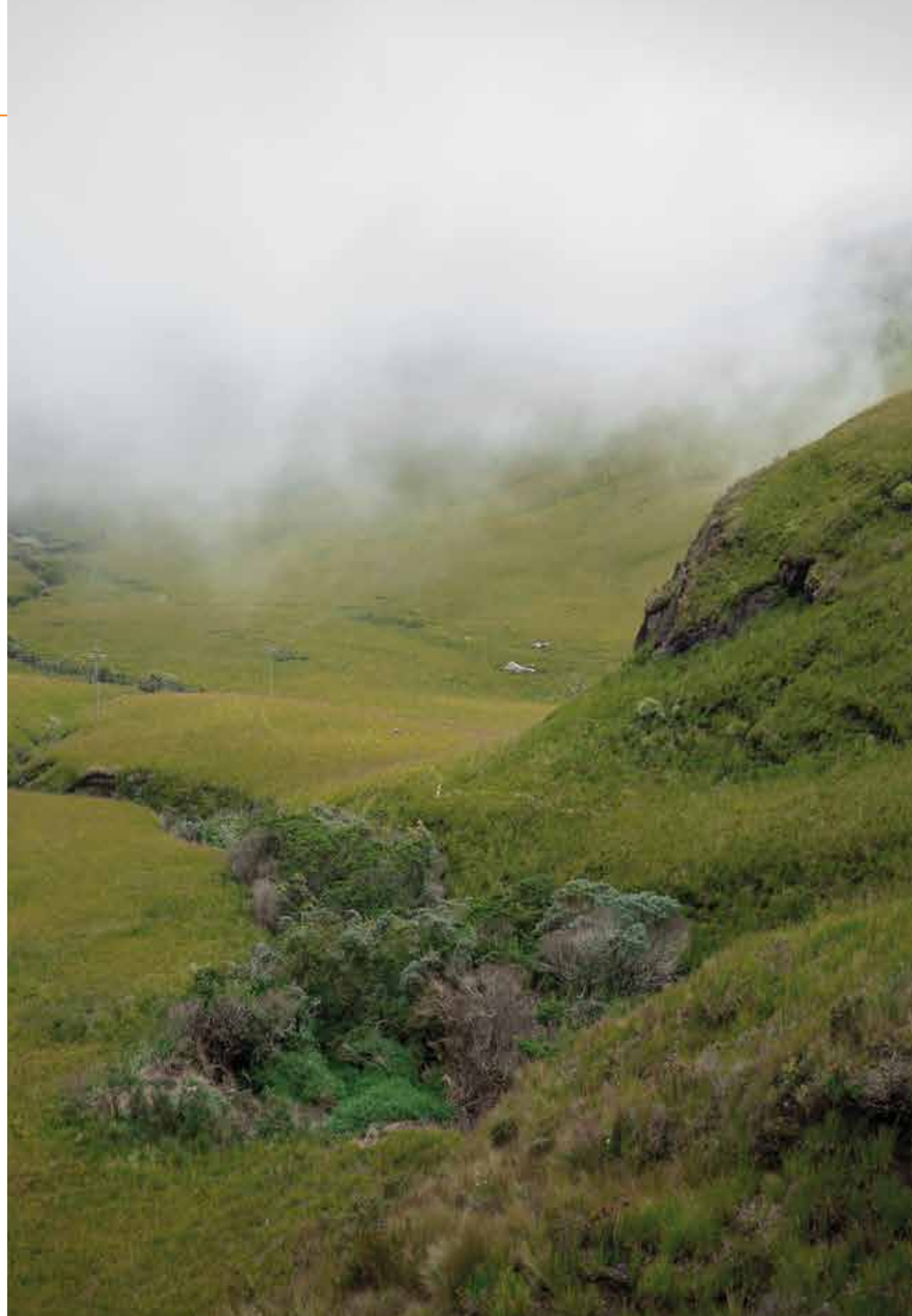
⁶ Now called Public Metropolitan Drinking Water and Sanitation Company (EPMAPS)

In 1997, the Antisana Foundation and The Nature Conservancy (TNC) proposed EMAAP-Q to create a joint fund that included voluntary participation of water users. The Quito Electrical Company (EEQ) was added under these same parameters.

These three entities, with the Antisana Foundation and TNC as executors of projects and the United States Agency for International Development (USAID) as funder, actively promoted the initiative. It was necessary to involve the mayor of the city in order to have political endorsement for the initiative, since he was chairing the board of EMAAP-Q and EEQ. Efforts were made for its dissemination and feedback through boards of directors and groups of decision makers. From the beginning, political support, technical leadership and negotiation were of utmost importance during the approval process. This had the objective of ensuring continuity in measures and decisions through different administrations, with different perspectives. A major challenge to overcome was the consolidation of funding by public institutions that by law could not invest in private financial mechanisms. This impediment changed as of 1999, when legal bodies were modified and entities such as EMAAP-Q and EEQ were allowed to allocate resources to an autonomous financial mechanism as a private trust. The initiative was formally launched in 1998. However, political instability in Ecuador at the time, as well as other factors, delayed its official conformation until 2000.

The initiative was formally launched in 1998. However, political instability in Ecuador at the time, as well as other factors, delayed its official conformation until 2000.

The formation of FONAG took place during complex political and economic time. Ecuador had three Presidents, the city had three mayors and the water company three managers. In addition, the national currency, Sucre, was changed to the American dollar.



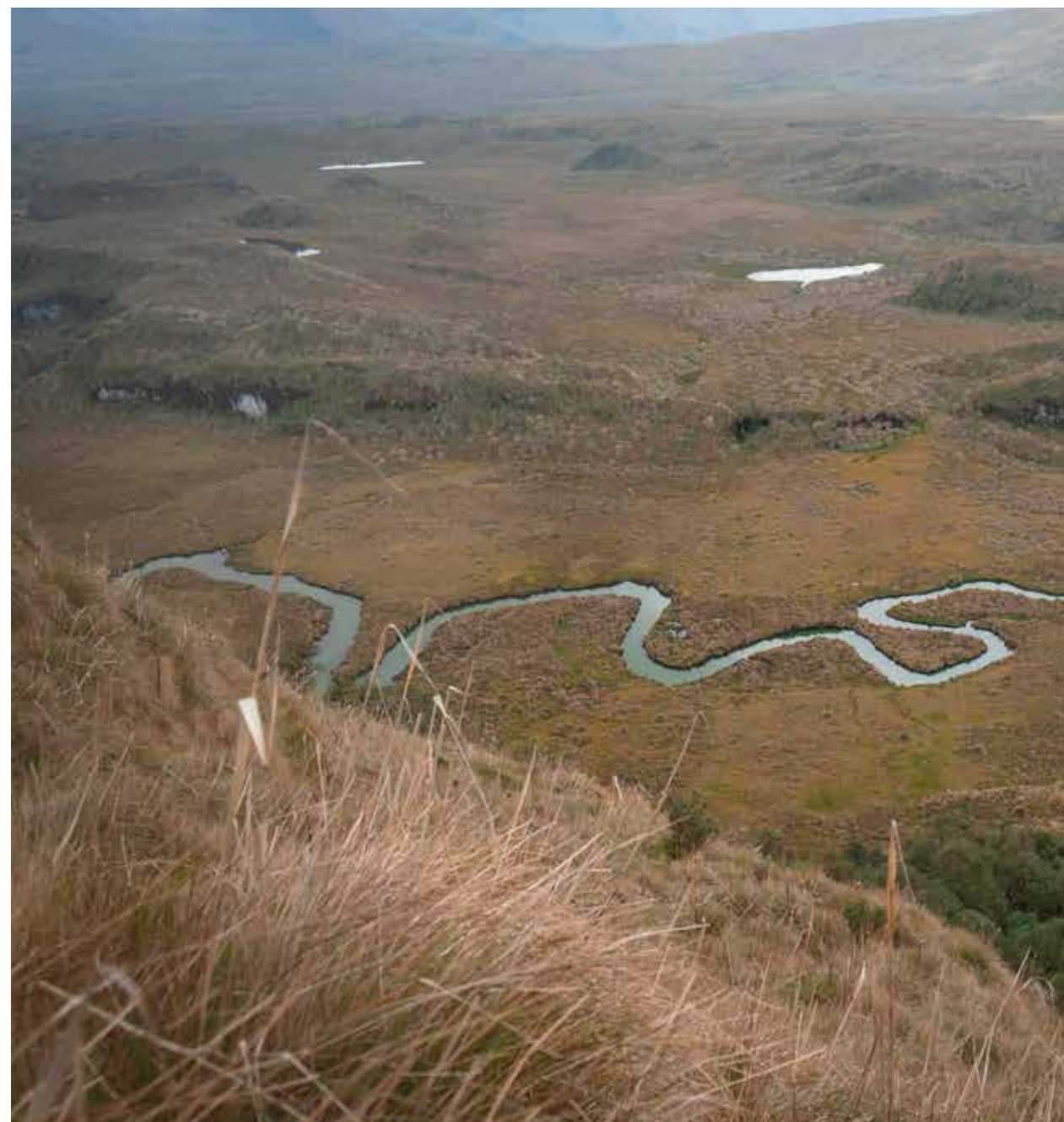
Consolidation of the Fund

FONAG is born on January 25th of the year 2000, under the dispositions of a privately managed mercantile trust.⁷ Legally referred to as "Environmental Trust Fund for the Protection of Catchments and Water FONAG"⁸ it has its own estate, independent from original and adherent constituents. Original constituents were the Public Metropolitan Drinking Water and Sanitation Company, and The Nature Conservancy, who made an initial contribution of USD 20.000 and USD 1.000 respectively. Through contracts of adhesion, the Quito Electricity Company (2001), Cervecería Nacional CN S.A (2003), the Swiss Agency for Development and Cooperation (SDC)⁹ (2005), and The Tesalia Springs Company S.A. (2007) have been incorporated as adhering constituents.

The Water Protection Fund -FONAG- conserves and restores water sources for the Metropolitan District of Quito.

The contributions made by each organization vary according to the commitments each agreed upon in their contracts. EPMAPS committed "1% of the funds raised from the items under drinking water and sewerage in the consumption spreadsheets paid by users in the immediately preceding month", this commitment was strengthened with Metropolitan Ordinance No.199 and No. 213 (2007), which ratifies the 1% contribution and establishes that this value will increase by 0,25% yearly as of the second year since the approval of the ordinance over the next four years, until it reaches 2%. The EEQ, Cervecería Nacional and The Tesalia Springs Company S.A. committed to an annual contribution of USD45.000, USD6.000 and USD7.000 respectively, while TNC and SDC each made a contribution to the fund of USD 1.000 and USD 20.000, respectively.

The purpose of FONAG is "to contribute to the conservation and maintenance of water catchments that supply the DMQ, through revenues generated by the trust's autonomous estate for projects directed to that purpose".



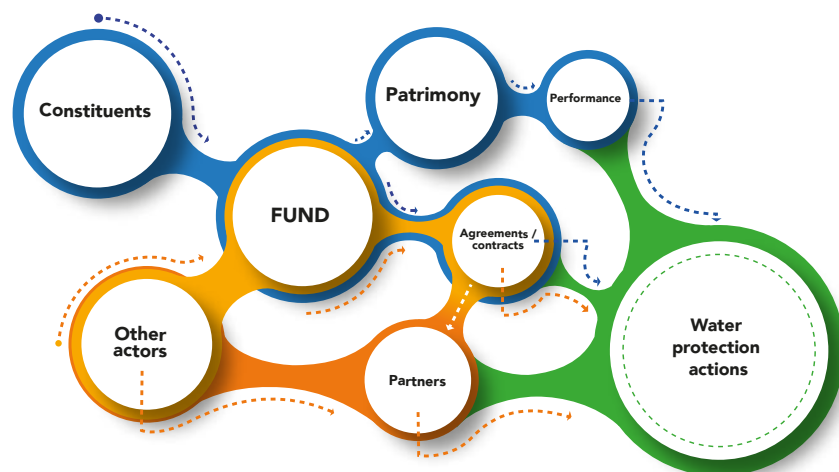
⁷ A Trust is a contract in which one or more persons (trustor/s or settlor/s) transfer property, amounts of money or rights, present or future, that they own to another person (trustee, which can be a natural or legal person) to manage or invest these assets to their own benefit or to benefit a third party, called a beneficiary, and transfer said property, upon the completion of a term or condition, to the trustee, which can be the trustor, the beneficiary or another person.

⁸ By notarized deed, as established in the Securities Market Act and its Regulations.

⁹ After the SDC left, they delegated their role as adhering constituents to the CAMAREN Consortium.

In its early stages, FONAG was constituted as an endowment fund —100% of its income was destined to capitalization and only financial returns were invested in programs. This meant that during its initial years, the Fund did not have the resources to implement actions, and could not continue until they had enough return to finance them. As of 2011, a second reform to the deed of trust established that in addition to returns, up to 30% of what was effectively contributed annually by EPMAPS, TNC and EEQ may be spent —amounts that would be included in the annual budget.

In addition to originally pledged contributions, various constituents have made extraordinary contributions that are now part of FONAG's estate. The EEQ provided resources for purchasing the Campo Alegre property and TNC contributed the Paluguillo property.



Water users can be linked to FONAG as adhering constituents or by signing agreements or contracts.

In addition to the trust's performance, FONAG can sign agreements and contracts with partner organizations that share common objectives. Throughout the history of FONAG, a number of inter-institutional cooperation agreements have been signed with actors from the private sector, donors and international cooperation. Some contracts have been signed with the constituents themselves, for they see a strategically in FONAG through which they can develop specific activities, and these agreements are in addition to their commitments as constituents. The leveraging of funds has come to triple FONAG's internal resources and has included the implementation of projects funded by USAID, IRD, GIZ, BID, Green Climate Fund, among others.

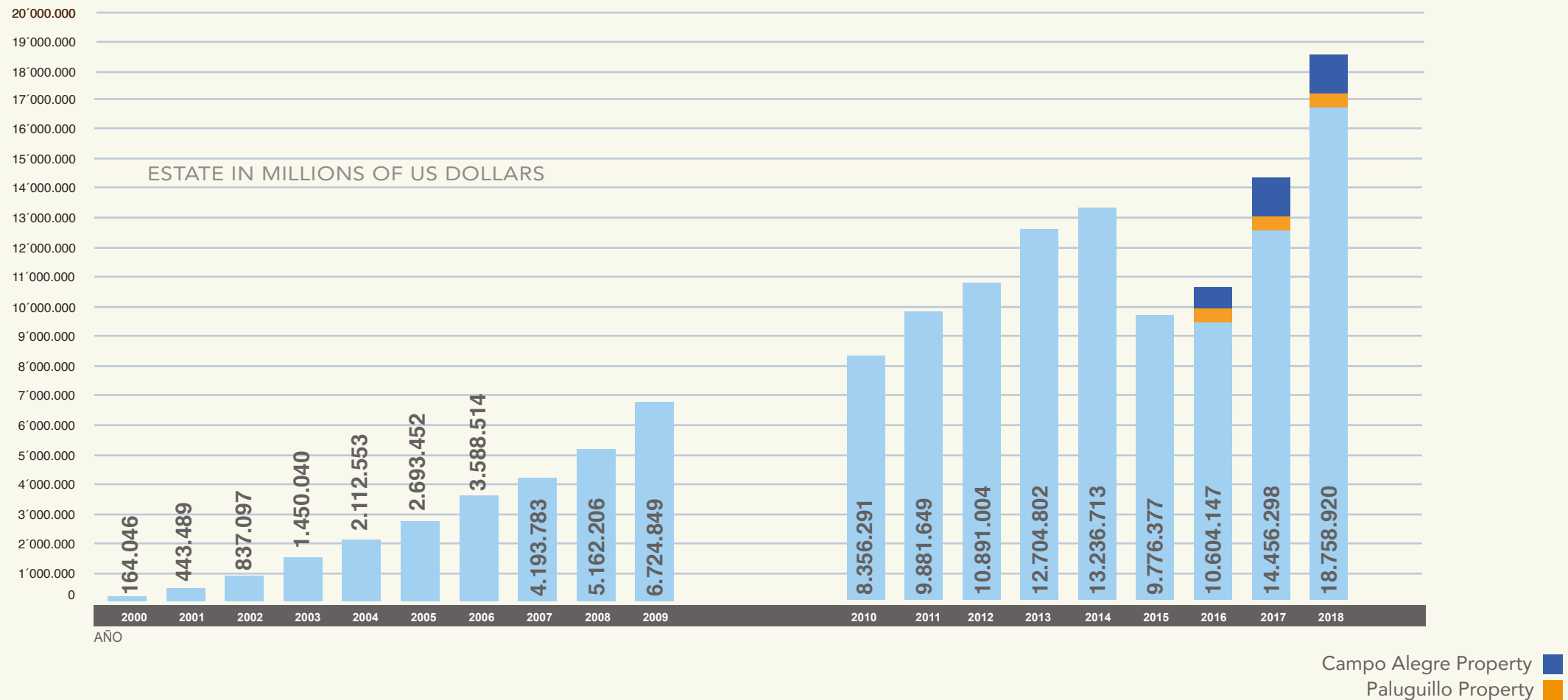


FONAG's estate is made up mostly of public funds from contributions made by EPMAPS (87%) and EEQ (9%).

As of December 2018, FONAG had a 18.7 million-dollar estate; financial return plus proceeds from agreements, generates an annual budget greater than 2 million dollars.

ACCUMULATED CONTRIBUTIONS TO THE FONAG TRUST

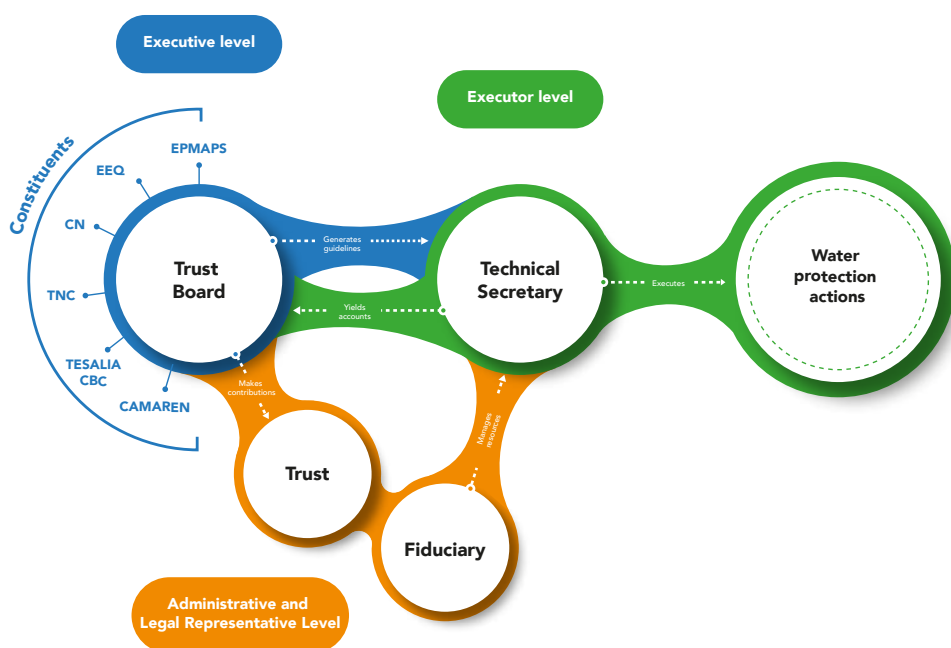
FROM JANUARY 2000 TO DECEMBER 2018



FONAG's estate has gradually increased over time. However, in 2015, and in accordance to that established in the trust's contract, part of the estate was destined to emergency actions due to the eruption threat of the Cotopaxi volcano.

FONAG has the Trust Board of Directors as its highest decision-making entity, which is formed by original and adhered constituents. Among its functions is to define the policies and principles to be followed by the Technical Secretariat. Similarly, this entity should be aware of the annual assessment, implementation and budget reports submitted by the executor level - Technical Secretariat. In the beginning, a technical advisory committee was designated, consisting of each entity's technical representatives, in order to support work done by the Technical Secretariat, however, nowadays this committee no longer operates due to FONAG'S strengthening.

The Board is managed with equity and equality, both when it comes to participation, as well as decision-making. However, the chair of the Board is reserved for the majority partner, EPMAPS. The Board meets on a regular basis every three months, and extraordinarily when it is required.



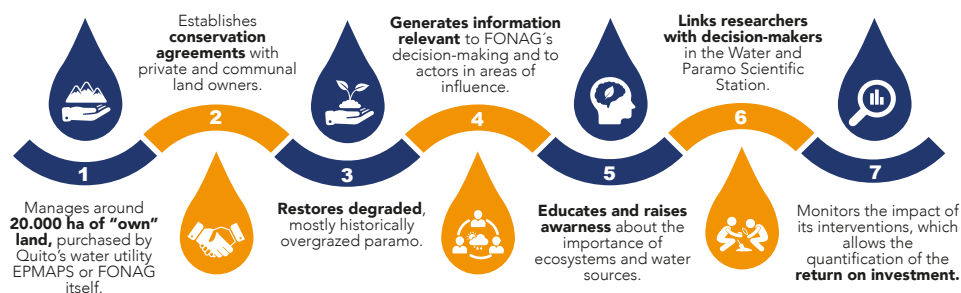
The structure of FONAG consists of three levels: (1) Directive - Trust Board of Directors, (2) Management and legal representative - Private trust and (3) Executor- Technical Secretariat.



For the Trust's administration, a contract with a private fiduciary was signed, which is responsible for the collection and management of financial resources, and also serves as legal representative.

The operational level is exercised by a Technical Secretariat, which is responsible for executing strategies and programs, implementing the Board's decisions, and consolidating the Fund's institutionalization. In practice, the Technical Secretariat is an autonomous and independent entity, with a staff of 54 people—between paramo rangers, environmental technicians, hydrologists, educators, administrators, researchers—with the ability to develop operational plans, perform actions, monitor progress, and be accountable to the Board on the execution of their activities.

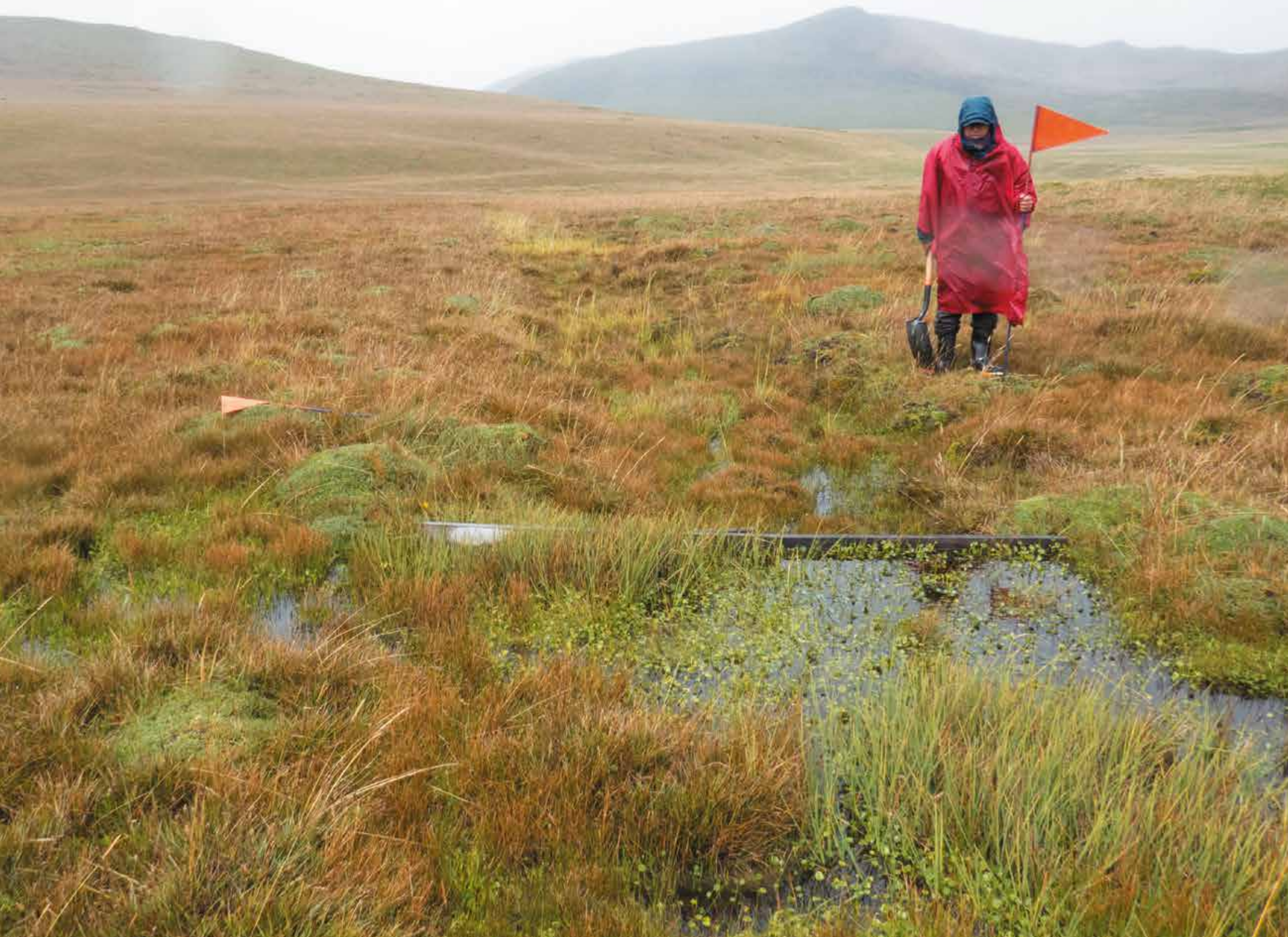
FONAG's Technical Secretariat performs actions based on a solid scientific ground, strategic partnerships, and on-site activities that seek to ensure that the executed interventions have the greatest impact and cost/benefit ratio possible. Strategies include: awareness building and education of key stakeholders; technical, environmental and social information generation; plant cover and soil restoration; and the conservation of wetlands, paramos, forests and shrubs.



Main lines of action that are currently being developed.

The learning process is permanent, so as to face challenges and threats affecting paramos, such as: fires, livestock breeding, expansion of the agricultural frontier, urban expansion, among others. Among the activities portfolio that generate direct positive impact in the state of paramos and forests, is strategic land acquisition, wetlands restoration, restoration of extremely degraded areas, conversion of exotic to native forests, impact and evidence monitoring.





FONAG in the field

The geographical area in which FONAG performs its actions covers the upper Guayllabamba River catchment and hydrographic units, western and eastern, located in the Pichincha and Napo provinces, from where water is supplied to the Quito Metropolitan District. It is a surface of approximately 6.847 km², which represents 2,4% of Ecuador's continental surface. This area is divided into two hydrographic systems: 84% corresponds to the Pacific basin and 16% to the Amazonian or the Atlantic basin.¹⁰

FONAG has organized its work in nine areas:

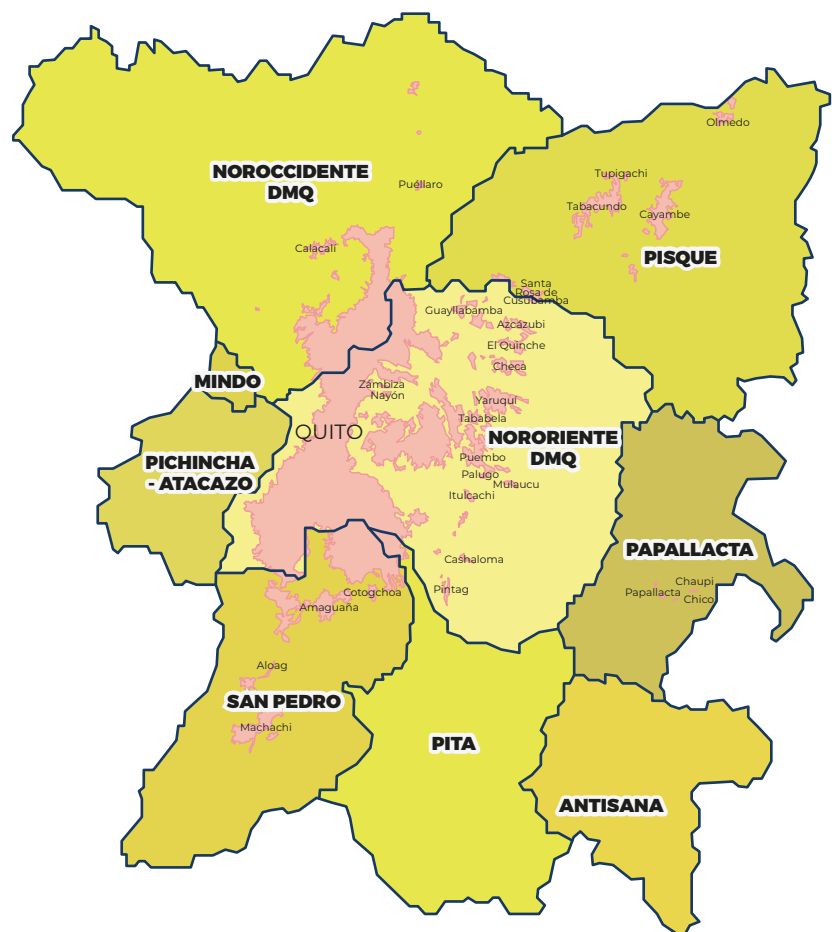
Pisque, Papallacta, Antisana, Pita, San Pedro, Pichincha-Atacazo, Northeast and northwest of the DMQ.

The first few years, FONAG concentrated its activities in San Pedro and Pita then gradually extended its intervention, especially in the eastern mountain range, with activities in Antisana and Papallacta. The year 2016 marks a milestone in the western mountain range as activities started in Cinto and Atacazo (Pichincha/Atacazo Axis), and in 2018, first approaches are made with stakeholders in the Pisque axis.



¹⁰ More information available on www.fonag.org.ec

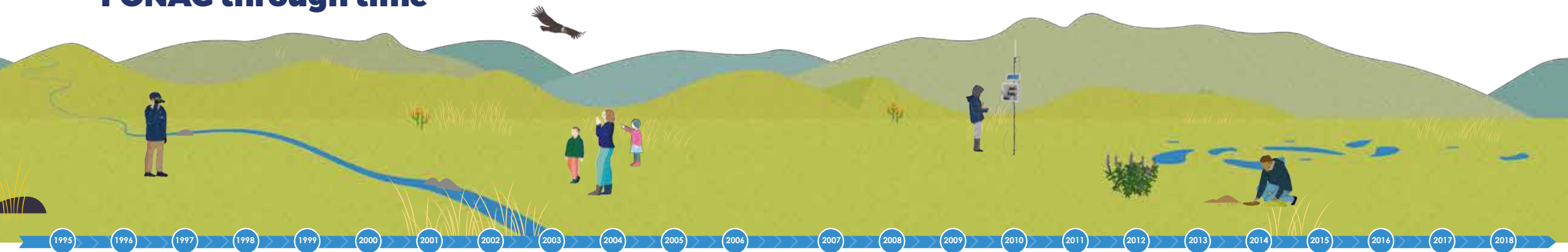
FONAG has identified that the surface of natural ecosystems considered to be priority sources of water totals around 236.600 hectares, of which 81.500 hectares are under a protection category in the National Protected Areas System of Ecuador. The remaining 155.100 hectares, of EPMAPS's interest, are distributed in the various work axes and it is expected that in 63 years the entire area can be covered with conservation actions.



Work axes
Populated centers



FONAG through time



Consolidation and structure



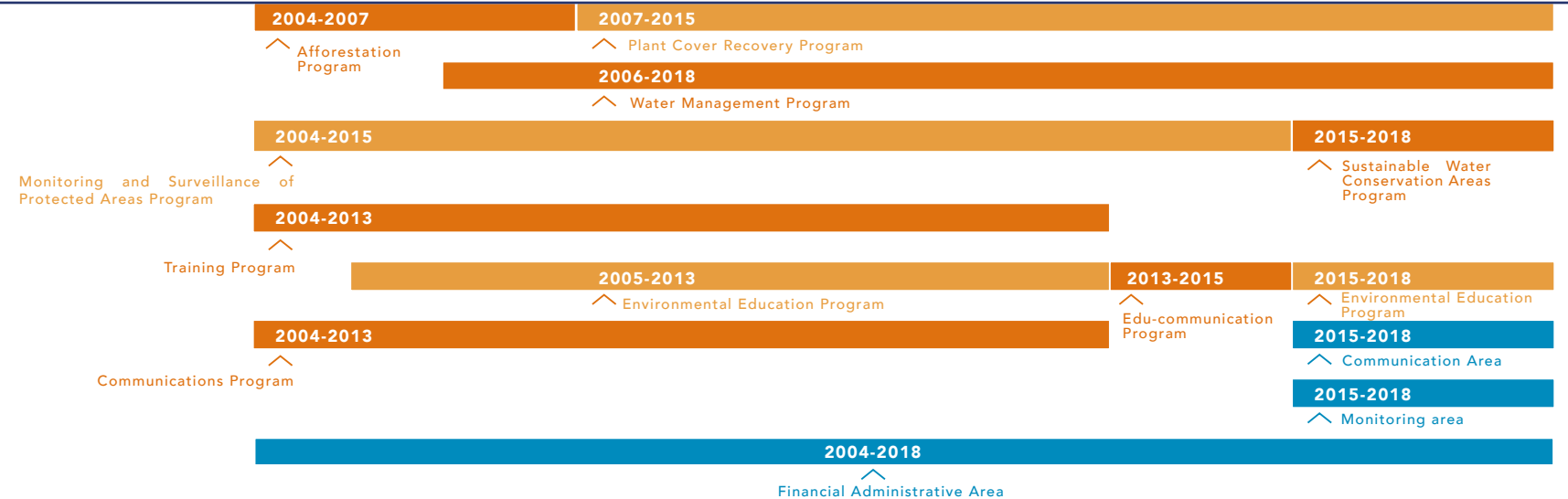
Funding



Actions



Programs



A path is built

FONAG was conceived as an entity that finances actions to be executed by local organizations. The first call for proposals was made in 2002, which was awarded and implemented in 2003 by a local NGO. The Fund initially received comments for their limited and uneven investment compared to the contributions received. From that experience, the need to increase operational capacity was determined, for which in 2004 the first Technical Secretariat was formed. It included a specialist in management and administration of river catchments and a financial specialist. During that year, calls were made for afforestation projects, with a response from civil society that exceeded expectations, which resulted in an intense administrative workload for an emerging Technical Secretariat with still-limited management capabilities.

An agreement was reached with the Life for Quito Corporation also during 2004, which made it possible to fund afforestation and reforestation actions with equal parts investment for both institutions. The circumstances of presenting to public opinion as a new entity, determined the need to establish two additional units within the institution, which were the communication and afforestation areas.

During the same year, access is granted to resources from international cooperation, through technical assistance provided by GIZ, for strengthening capacities for technicians in river catchments and climate change management. The Training Program was created to this end, and FONAG was Ecuador's representative, for 9 years, of the following regional programs: Integrated River Catchment Management, Agriculture and Sustainable Use of Natural Resources in Andean Countries (MIC), and Agriculture and Agricultural Water Harnessing Adaptation to Climate Change in the Andes (AACC) with InWEnt's support.¹¹

In these processes, more than 15 pilot river catchments in Bolivia, Ecuador, Colombia and Peru participated. These programs facilitated the integration of educational tools and methodologies for capacity building, thus achieving great synergy between the participating catchments. Additionally, they got participants to become local promoters, through their organizations, with the appropriate skills and motivation to contribute to the transformation of their environments. The capacity strengthening program reached 1.634 people in Ecuador



Since it was a new mechanism, it was necessary to position FONAG as a referent for Integrated Water Resources Management, thus the Communication Program was the first to be conformed.

¹¹ Internationale Weiterbildung und Entwicklung gGmbH

From 2006, the execution of actions by the Technical Secretariat was combined with funding activities that would be developed by local organizations. This change in the conception of FONAG implied a gradual growth of the organization, until building an expanded technical team, organized according to programs. The programs' logic, maintained to this day, was to consolidate a structure that would allow the execution of long-term interventions; it is for this reason that they were given the name of "permanent" programs. Initially these programs were: Afforestation and reforestation, Protected Areas, Communication and Environmental Education. Additional to the programs, FONAG also implemented projects—with a beginning and an ending—for specific actions.

Since the creation of FONAG, activities were implemented according to an annual operating plan, approved by the Trust Board of Directors. This document details all the activities that would be developed during the year, including amounts and partners.



From 2007, as part of the fulfillment of its mandate and as prescribed in ordinance No.199, FONAG undertook a transformation process in the development management and organization process of the Guayllabamba river catchment. This process was performed through two major projects (1) Legislation to ensure the long-term provision of water to the city of Quito and (2) Integrated water resources management in the catchment. The first component was developed in collaboration with the Latin American Future Foundation and sought to consolidate a river catchment management organization that would allow the establishment of shared responsibilities to benefit the environment and the population's quality of life. The second component contemplated implementing tools that would allow the study of the water system's real behavior in the upper Guayllabamba river catchment. In turn, the information gathered should serve as a base to generate agile decision-making and support systems for the promotion of water culture.

In 2007, a Cooperation Agreement is signed with USAID for the project "Protecting water sources to conserve biodiversity: Financial Mechanisms for Catchments Protection in Ecuador" with an investment of \$3.6 million dollars and a duration of 8 years. The project strengthened FONAG's work, with two main components: 1) Institutional strengthening through the development of internal capabilities and on-site conservation activities; and 2) the replication of the FONAG management model in other parts of Ecuador. According to the final project report, significant achievements were accomplished, including: four Water Funds created and strengthened, capable of operating within Ecuador; more than 500 thousand hectares with conservation actions and improved management, as well as more than 42 thousand people benefited from all areas of the project's intervention.¹² Another achievement accomplished by this cooperation was to position FONAG as an innovative management model that has been replicated throughout Latin America and the Caribbean. As part of strengthening the Water Funds, an inter-organizational integration space was created between various stakeholders who had previously worked independently. In addition, a relationship with other agencies from the United States Government was achieved, such as the Peace Corps and the United States Forest Service (USFS), who offered to collaborate and share knowledge between local technicians and U.S. experts in water resources management. Several expert visits to FONAG's intervention areas were defined, as well as on-site training of technicians in work areas in the United States. To present day, this relationship with the U.S. Forest Service remains in place for exchanges and technical training.

FONAG's Technical Secretariat has a program structure which is responsible for implementing actions in river catchments.

By the end of 2012, FONAG had six permanent programs and a Technical Secretariat of about 41 people. FONAG, being the first Water Fund in the world, had to face several challenges in its early years.

In this regard, it was appropriate to create partnerships to support this first phase of the Fund. International cooperation was key to supporting and strengthening FONAG, both in technical aspects, as well as in institutional processes. There were small contributions of USD10,000, and others that exceeded USD1 million—the amount was not relevant, it was the permanent support with the contribution of technology, tools, expertise and knowledge. This cooperation allowed FONAG to emerge as a successful model that in the beginning was replicated in Ecuador, and then at a regional level.

In 2012, the direction of the Technical Secretariat changes, for which a new structure for FONAG is proposed, that despite maintaining the permanent programs, decides to change approaches and unify strategies. One of the most significant changes was the unification of the Communication program with Environmental Education, as expressed in the Program's name Edu-communication, in order to give it a river-catchment approach rather than that of specific interventions.

This was a period of adjustment and adaptation in which several international cooperation projects concluded. Political action to incorporate FONAG to the set of public policies from the Quito Metropolitan District was planned. Partnerships were established with other local stakeholders such as the Secretariat of Environment of the DMQ, as well as encouraging the participation of the Fund's constituents in its Board of Directors. During this process, different agreements were achieved which, although they did not reach the amounts of the early years, they allowed to continue FONAG's actions with the implementation of their programs.

In mid-2015, the direction of FONAG changes again, proposing the diversification of the interventions portfolio to seek more cost effective actions, with a technical proposal for institutional activities. The implementation of a new internal governance system —between the Technical Secretariat and their constituents— seeks to have clear roles and actions in the Fund, achieving synergy among the constituents' efforts, mainly from EPMAPS, to achieve common goals



¹² El área de intervención del Proyecto incluía cuatro Fondos de Agua además del FONAG: FONAPA, FORAGUA, FOPAR, FMPLPT

In 2017, FONAG acquires the "Jatunhuayco" property, thus incorporating a new "land acquisition" strategy as a cost-effective measure. Additionally, it acquires the Campo Alegre property, thanks to an extraordinary contribution by EEQ to the Fund, and receives the contribution of the Paluguillo property by TNC. The management of these areas adds to the Antisana-Contadero and Mudadero property owned by EPMAPS - Quito Water, already administered by FONAG since 2011, thus forming three areas managed by FONAG in priority areas for water provision to the DMQ.

FONAG administers about 20.000 hectares in priority areas for water provision to the DMQ, distributed in three Water Conservation Areas: Antisana, Alto Pita and Paluguillo.



Similarly, in 2017, a cooperation agreement with the Ministry of Environment and the United Nations Development Program (UNDP) was signed for the implementation of the "Promoting planning and financial tools for the reduction of emissions from deforestation in Ecuador" Project under the "Integral Amazon Forest Conservation and Sustainable Production Program- PROAmazonía", which is aimed at addressing the relationship between forests and sustainable agricultural production focused on reducing emissions with forest conservation, and has funding from Global Environment Facility (GEF) and Green Climate Fund (GCF). FONAG implements actions exclusively in the Amazonian catchment in Oyacachi, Antisana and Cuyuja.

FONAG's current intervention begins from a hydro-social diagnosis¹³, which seeks to identify a territory's problems in order to build appropriate strategies for a particular location with the aid of the stakeholders involved. The strategies and proposals that will be implemented in a catchment river at a given time are designed according to the diagnostic results. This is a long process that has achieved comprehensiveness in FONAG's interventions and above all, it has promoted the participation of constituents and other stakeholders.

These changes were reflected in the elaboration of a 2016-2020 Strategic Plan, designed as a road map to fulfill the organization's purposes. The plan collected comments by the technical and administrative staff and considered the Fund's trajectory as a key axis. The approved plan has 3 strategic objectives, 10 strategies and 18 action lines, being the No. 1 objective the Fund's fundamental purpose, and Strategic Objectives No. 2 and No. 3 as support to achieve their organizational mission.

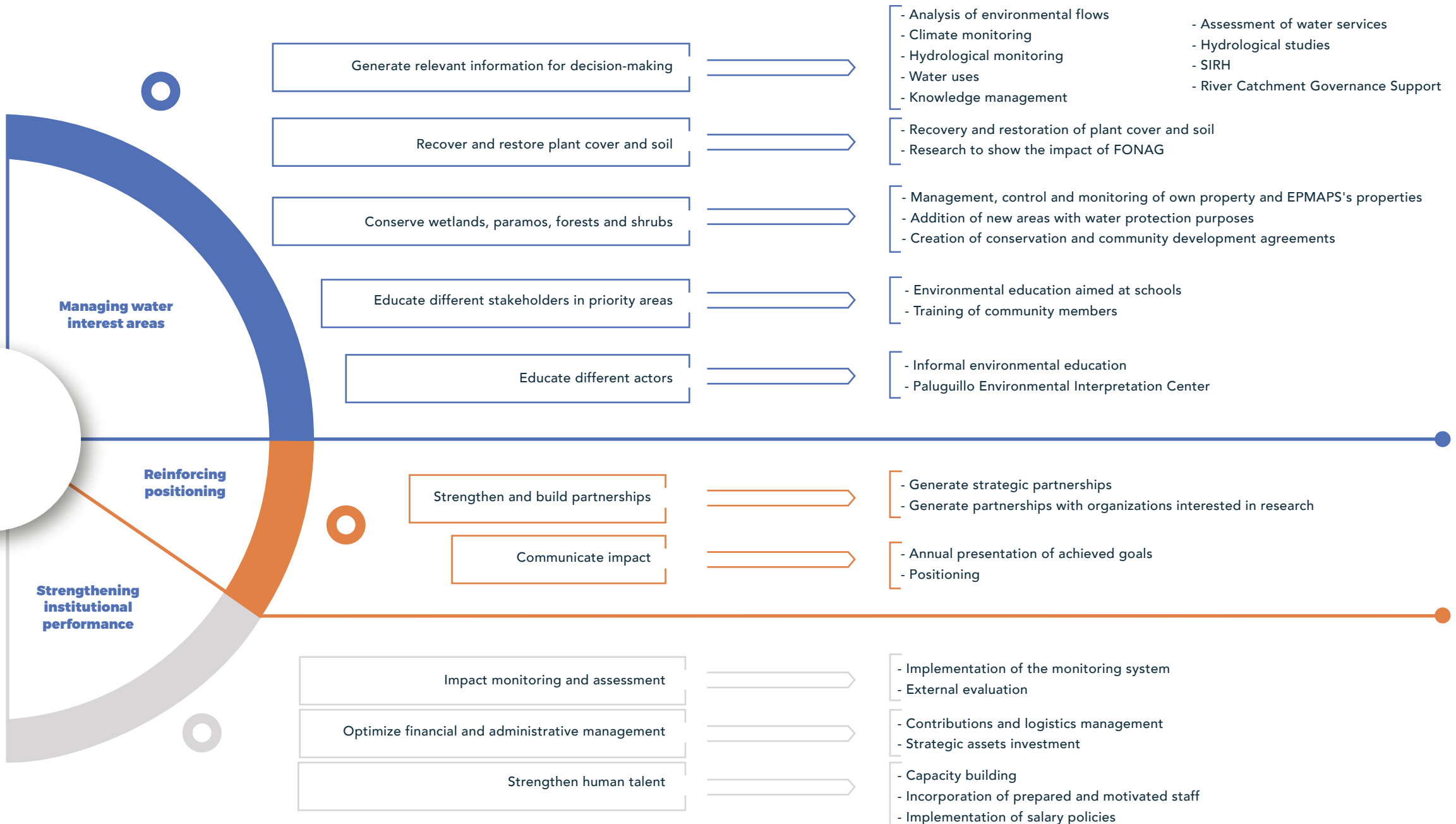
FONAG has set as its vision for 2020 to be an innovative and transparent facilitator and technical reference in the protection of domestic water sources for the DMQ.

For the plan's implementation, the organizational structure of programs is maintained, taking into account that each one leads one of the strategies from objective No. 1. The Water Management program is the leader of the 'generating relevant information for decision-making' Strategy, the Sustainable Water Conservation Areas program leads the 'conserving wetlands, paramos, forests and bushes' Strategy, and the Environmental Education Program leads the 'raise awareness and educate different stakeholders' Strategy.

For the development of strategic objectives 2 and 3, FONAG has communication, research, administration / financial and monitoring areas.

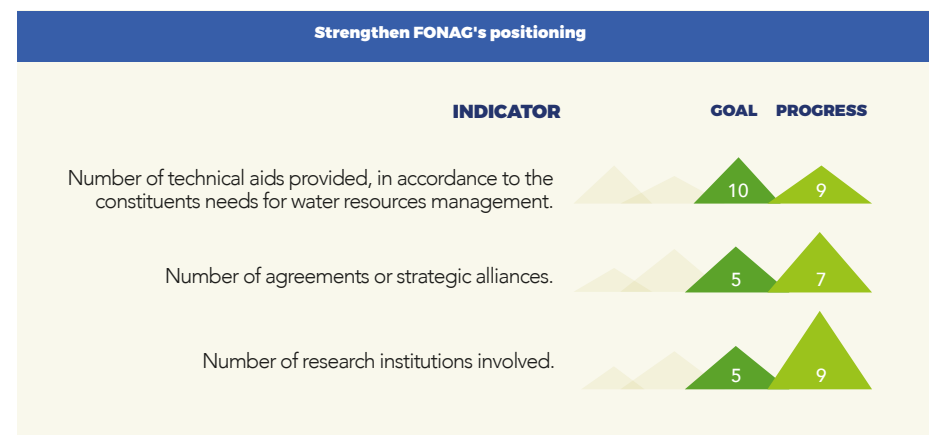
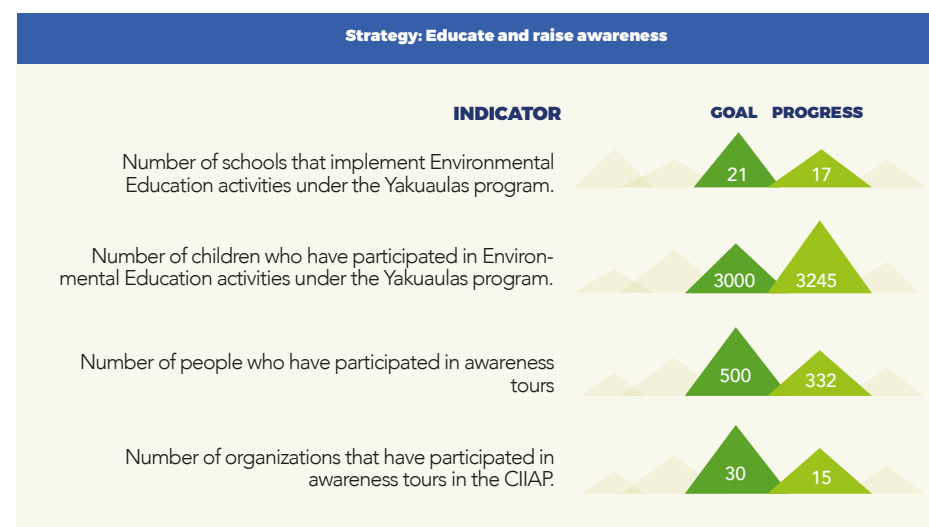
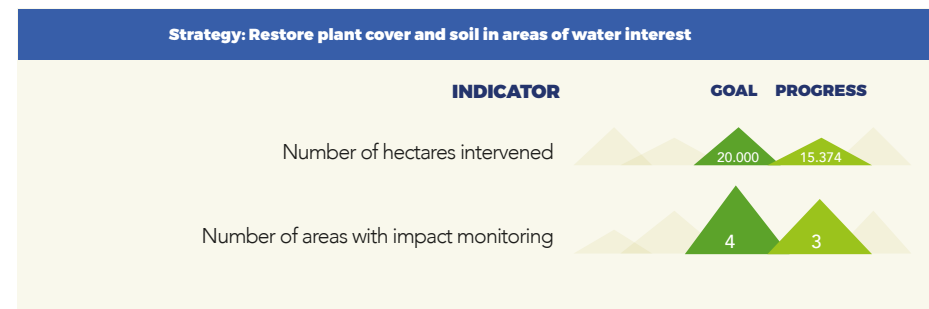
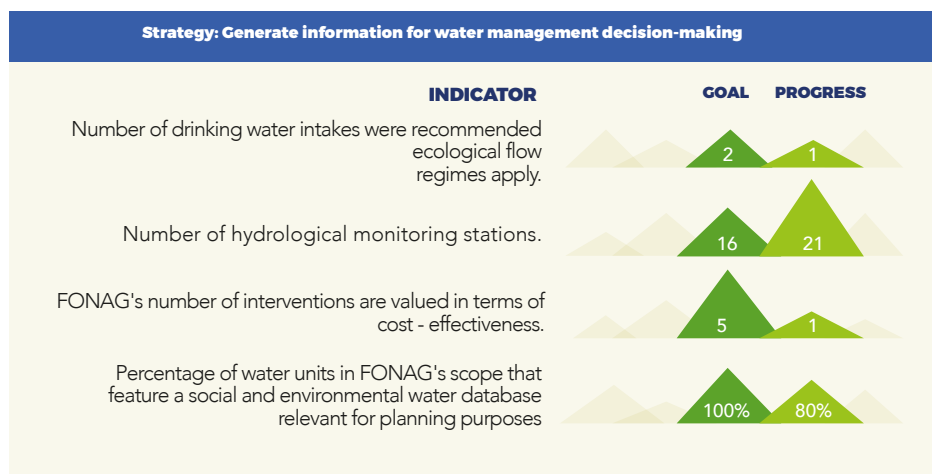
¹³ Hydrosocial diagnosis is an analysis of the socio-environmental problem that has water as its behavioral axis.

2016-2020 Strategic Plan



Strategic Plan Progress

FONAG performs tracking and monitoring of its actions. The predominant results as of December 2018, in relation to the goals that were proposed in 2016 until 2020, are as follows:





Strategy:

Generate information for water management decision-making

The generation of information is one of the fundamental pillars of FONAG since its inception. This component ensures that the generated information will result in appropriate water management decision-making. It is an effort at multiple scales. On the one hand, it guides FONAG's actions by analyzing data to define priority areas for intervention and to outline specific actions in the territory that conform to the reality of each place. On the other hand, it contributes relevant information that influences river catchment management. From the beginning, this strategy was led by the Water Management program, where the objective was to promote processes for an integrated administration and management of water resources, thus promoting participation opportunities and developing reliable technical information.

FONAG recognizes that generating technical information is a process that requires joint effort from various organizations, so from the beginning, it sought to create strategic partnerships with organizations that support this challenge, among which the following can be mentioned: EPMAPS - Quito Water, IRD, BID, UICN, FFLA, EPN, Imperial College London, AFD, USAID, SENAGUA, INAMHI, Environment Secretariat, among others.

Generating information is relevant as long as the results can be displayed and disseminated, for that reason, FONAG has two information platforms: FONAG's Activities Information System (SIAF) and the Water Resources Information and Monitoring System (SIRH), a storage and hydro-meteorological data processing system called Raw Hydroclimatic Data Standardization System (SEDC) and a digital repository.



Hydrological monitoring, Cinto river catchment

Systems contributing to water management

FONAG's Activities Information System (SIAF)¹⁴ allows tracking of the execution of the each program's strategic objectives in order to provide necessary information for decision-making to the different actors involved.

The Water Resources Information and Monitoring System (SIRH)¹⁵ offers accessible documentary and geographic information on the state of water resources and their relationship to factors such as climate change.

The Raw Hydroclimatic Data Standardization System (SEDC)¹⁶ manages, controls, integrates, standardizes and operates FONAG's Hydro-meteorological Network and allows integration with data from other organizations. Currently it manages and integrates the FONAG-EPMAPS's hydro-meteorological monitoring networks.

Since 2007, FONAG has a climate-monitoring network, and since 2012, a hydrological monitoring network that has filled an information gap for water sources management.

In the early management years, given the need to understand the behavior of each catchment's hydrological cycle, four meteorological stations were installed. This was the beginning of the creation of a climate-monitoring network and later, in 2012, began the process of consolidating a hydrological monitoring network with the installation of the first station. From this date, FONAG automated several processes for data management and the stations that later derived in the creation of the SEDC. Since 2017, jointly with EPMAPS, it works on strengthening and integrating the hydro-meteorological monitoring networks thus achieving the goal of having a single integrated network that guarantees quality, continuity and shared use of the compiled data, and therefore, reducing the uncertainty of hydrological behavior for water planning.

¹⁴ <http://www.fonag.org.ec/portalSIAF/>

¹⁵ <http://infoagua-guayllabamba.ec/>

¹⁶ <http://sedc.fonag.org.ec>

FONAG has over 10 years of excellent-quality data series that are available in the SEDC.

As of 2018, FONAG manages 24 stations: 19 meteorological and 5 hydrological that process information in real time. The information generated by FONAG's hydro-meteorological network represents a significant contribution to a series of climate and hydrological characterization studies carried out in collaboration with national and international universities and allied organizations. Among the most important studies, the following can be mentioned: Quantification of water benefits generated by FONAG's interventions, Precipitation space-time variation, Optimization design of the climate monitoring network throughout the entire FONAG-EPMAPS area of intervention, Space-time variation of flows and identification of hydrological alteration indexes, among others.



Hydrometeorological Monitoring Station, ACH Alto Pita



Workshop with water Boards on the socialization of the Water Resources Law

As part of this strategy, FONAG has entered the discussion on several priority topics for water management. Since 2007, it has contributed to the catchment's governance, which began with a program for strengthening participation platforms and ensuring water provision to Quito in the long run. This was done in collaboration with the Latin American Future Foundation (FLA). This effort involved the development of baseline studies: a) analysis of institutional, legal, and policy frameworks b) diagnosis of stakeholders, relationships and conflict; creation and strengthening of spaces for dialog and consensus at river-catchment level and at three pilot sub-catchments level (San Pedro, Pisque and Chiche), thus being able to get to know local dynamics. This in turn meant soon accreditation of the Assembly at a River Catchment Council. In 2013, workshops were held and there was active participation in the development of article proposals for a new Water Law. The obtained technical results were presented and the creation of management organisms was recommended with competences and levels of functionality.

In parallel, the process for the elaboration of the upper Guayllabamba River catchment Management Plan was carried out, which began in 2008 and lasted for two years, and even though it was not implemented, it is an important reference and analysis document of the catchment's situation. The Plan included a compilation of the catchment's base studies, performance and sustainability of a management agency organizational analysis and an Action Plan, with programs and activities for each strategic line. During this process, they also had the support of the French Institute of Research (IRD), which worked for four years in the development of water balance models for the Guayllabamba river catchment.

FONAG is considered a technical reference that supports governance in the upper Guayllabamba River catchment.

In 2014, the Water Resources, Uses and Harnessing Law takes effect, changing the role FONAG had so far. Since 2017, FONAG, as a technical entity, continues actively participating in the consolidation of the Guayllabamba River Catchment Council, by providing information to assist in updating the River Catchment Management Plan, that is how, as of 2018, it supported two investigations related to the catchment's governance.

Another issue addressed is ecological flows, which refer to the flows' quantity, quality and regime needed to maintain aquatic ecosystems, and with them, their environmental functions. FONAG, from 2005 to present day, has participated in the development of various research studies and now, as a result of these investigations, several documents have been generated, such as: Estimation of viable habitats for aquatic invertebrates through the modeling of their hydraulic preferences in EPMAPS's drinking water abstractions from the Papallacta rivers system in the upper Oyacachi and Papallacta catchment (2011)¹⁷, Macro-invertebrates identification guides (2011), Planning for physical, chemical and ecological characterization based on hydraulic and hydrological characteristics of the Aglla, Pita, Oyacachi and Chalpi Grande river sections (2016)¹⁸, On-site survey and physical, chemical and biological laboratory test results (2016), Strategy for the implementation of ecological flows¹⁹, Ecological flows calculation methodologies for their implementation under the current water resources laws in Ecuador (2018), among others. Currently, a study is being conducted for flow optimization during abstractions that supply the Papallacta Integrated System, within the Chalpi Flow Project.

¹⁷ Available in: <http://web.ambiente.gob.ec/documents/10179/185916/ArticuloTecnico+Qs+ecologicos.pdf/04ccf487-194c-4e41-8a80-c74736bb7e7e;jsessionid=thw15h76u-BVIS513VXmkVsqq?version=1.0>

¹⁸ Available in: <http://www.fonag.org.ec/web/imagenes/paginas/fondoeditorial/08.pdf>

¹⁹ Available in: http://infoagua-guayllabamba.ec/repositorio/web/files/InformeAcciones_y_MecanismosParalImplementaciónEstrategiasCaudalesEcologicos.pdf

Research of environmental flows has boosted inter-organizational work with government organizations, NGOs, scholars and civil society. This has given FONAG the opportunity to apply the generated knowledge in the definition of public guidelines for ecological flow compliance immersed in authorization processes for water uses and harnessing, especially with SENAGUA, with whom a specific agreement was signed in 2017 to strengthen the ecological flows calculation methodology.

With regard to water uses, FONAG collaborated in strategic partnership with the National Water Secretariat (SENAGUA) in 2010 to standardize data quality from over 100 hydro-meteorological stations and to develop computer models that could project the necessary supply and demand for the river catchment, based on probable climate change vulnerability scenarios. Information on the use of about 7.500 water concessions was validated, and technical information recorded in each authorization's files was purged on-site. Efforts by SENAGUA-FONAG were able to update around 3.200 records —43% of all existing authorizations in the upper Guayllabamba river catchment. As of 2016, SENAGUA was still in the process of officially incorporating this information to the National Water Data Base.

Under the SENAGUA-FONAG agreement, signed on May 22, 2017, it was agreed that FONAG would support SENAGUA in the dissemination of the existing regulatory framework and would also contribute in purging the database of at least one water unit of common interest; part of this analysis includes a technical report to be considered as a pilot for water uses and harnessing authorization granting. This agreement allows FONAG to access a cleansed and updated database of authorizations and water uses, as well as other relevant information for the quantification of water availability within FONAG's area of intervention.

Additionally, the water footprint replenishment process was initiated in 2017, through inter-organizational cooperation between the Quito Metropolitan District Environment Secretariat and FONAG. The Water Footprint Replenishment scheme is aimed at the business, commercial and/or service sectors, both public and private, as a voluntary alternative to replenish their water footprint, through the investment in stocks for water resources conservation. As a means of promotion, FONAG unveiled its first portfolio of interventions with water footprint replenishment potential to the business sector, in which intervention areas and activities carried out by FONAG are presented, and are considered to be an alternative to foster collaborative work for the mitigation process of risks, impacts and pressure on sources that supply the DMQ population.



Meteorological monitoring

Lessons learned

Generating information requires being at the forefront of technological change. Having automated processes and real-time data is critical to the generation of valuable and firsthand information.

The availability of reliable information supports the construction of processes that lead to responsible management of an area of intervention. Having a unique hydro-meteorological monitoring network, administered under standard protocols and parameters facilitates handling such information and makes it possible to share it, as well as supplying it from different organizations. This allows the extension of data coverage.

In order to establish a strong organizational structure it is essential to have a qualified technical team with experience in processing information, and that can also train and transmit to others the developed methodologies and processes.

It is necessary to create spaces for the dissemination of the generated information. Information platforms are an excellent opportunity to promote the use of information.

Inter-organizational alliances are extremely relevant because they broaden the participation spectrum of actors and beneficiaries. In turn, it enables the exchange of institutional expertise, avoids duplication of efforts and promotes shared responsibility.

Generate information for decision-making

We monitor and generate **key information** in climate, hydrology, and river catchment management.



○ **Program**

Water management program 2006 -2018

○ **Monitoring**

Climate monitoring network 2006 -2018

Hydrological monitoring network 2012-2018

Research, methodology and monitoring of ecological flows 2006-2018

○ **Knowledge management**

Development and application of hydrological models 2008-2018

Cathment governance support 2006-2018

Application of ecological flows calculation methodology > 2017-2018

Replenishment of water footprint > 2017-2018

Return on investment studies > 2017-2018

○ **Organization and information dissemination tools**

Monitoring Information System and Water Resources (SIRH) 2006 -2018

FONAG's Activities Information System (SIAF) 2014-2018

Raw Hydroclimatic Data Standardization System (SEDC) 2015-2018

Digital repository 2015-2018

Strategy:

Recovering plant cover and soil in areas of water interest

FONAG has always considered the preservation of the quality of natural resources and to recover degraded ecosystems, always focusing on the recovery of ecological function in these water-source sites: paramos, wetlands and mountain forests. Paramo ecosystems have unique characteristics among which are the ability to intercept, store and regulate surface and underground water flows, as well as their ability to store carbon in their soil. However, changing the use of the land for activities such as agriculture, livestock breeding and forest fires, alters hydrological behavior, and therefore, its water retention and regulation capacity. For this reason, active and passive restoration actions have been proposed. Passive restoration refers to the removal or isolation of the straining factor that alters the ecosystem and that does not allow it to regenerate naturally; while active restoration, in addition to eliminating straining factors, includes necessary biophysical actions depending on the existing state of degradation. Both types of restoration mainly contribute to plant cover retrieval as well as to the improvement of soil structure and its close relationship with water.

The first actions to restore plant cover were executed in 2003, year in which the Afforestation and Reforestation Program was consolidated. This program's actions were based on previous studies performed on reference conditions of the Pita, San Pedro and Machángara rivers, as well as considering forest zoning of the Hoya of Quito and multi-temporal evaluation of forest plant cover in the upper Guayllabamba river catchment. This work arises from a strategic alliance between the Life for Quito Corporation, who supported planting, while FONAG funded and carried out maintenance as well as follow-up tasks.

FONAG seeks to recover ecological water function in paramos and mountain forests that provide water to the DMQ, for which it performs actions for active and passive restoration.



The scope in these early years focused on active restoration, with afforestation and reforestation actions with native and exotic species in degraded areas, private or communal.²⁰ Actions were developed under two modalities. The first was community forestry with a duration of four years—one for planting and three for maintenance—in which communities engaged directly in protecting river catchments and associated ecosystems (paramos and forests). At the same time, through a socio-economic component, awareness was raised among locals on water slope protection, and alternative productive activities were supported in order to reduce pressure on resources and generate additional sources of income.²¹ Based on an analysis of each community's requirements and incentives, in this modality, organic gardens, vegetable planting, sewing workshops, pasture improvement, processing of medicinal herbs and dairy processing was developed, as well as training in nutritional, health and literacy subjects, among others.²² The second modality consisted of planting native and exotic forest species (eg. *Polylepis incana*, *Polylepis reticulata* and *Polylepis racemosa*) through contracts with local organizations and specialists.

Since 2008, the initiative decided to expand its form of intervention by incorporating passive restoration actions. This is how since that year, a strategy is developed under the Plant Cover Recovery Program, as it currently remains. Passive interventions include actions such as the installation and maintenance of fences (sometimes electric with solar panels), and strategies for eliminating straining factors are maintained in areas in need of restoration. The challenge was to ensure that actions were implemented in priority areas.



Restoration of ACH Antisana's sandy area



Puglllohuma wetland monitoring
ACH Antisana

Both interventions, passive and active, have evolved over the years. In 2013, the first cell-type planting design was established, consisting of an arrangement in patches of vegetation, trying to replicate the natural structure of the original vegetation. Preliminary results show a favorable visual impact, however, concrete results must still be defined in the future. In 2014, work began with shrub and tree species, a process that besides being an organizational challenge, required nurseries to acquire the ability to provide new species. Planting and replanting actions are still performed, however, as of 2011, the selection of species is done more carefully²³ because the use of species that are native and specific to each site to be intervened is promoted. In addition, improvements have been made in interventions such as the implementation of windbreaks in order to increase productivity. Experimentation began, also during 2014, with *Lupinus pubescens* in areas devoid of vegetation, meaning sandy areas, achieving positive results regarding the incorporation of organic material and the generation of micro-climates, that in turn achieve natural regeneration processes with the appearance of mainly herbaceous species.

In 2016, FONAG with the support of San Francisco de Quito University (USFQ) and funding by TNC, a new intervention began in restoration: the recovery of wetlands with a series of baseline studies of the Puglllohuma wetland, located in the Antisana Water Conservation Area, a wetland heavily degraded due to a series of artificial drains constructed during the Hacienda era for grazing purposes. The restoration of wetlands began in 2017 with the blockage of drains, and to present day, ongoing monitoring continues.

²⁰ Lloret, P. 2009. A trust as a financial tool for water conservation and care, which is the case of the Quito, Ecuador water fund. Available in http://www.fao.org/ag/wfe2005/docs/Fonag_Ecuador_es.pdf

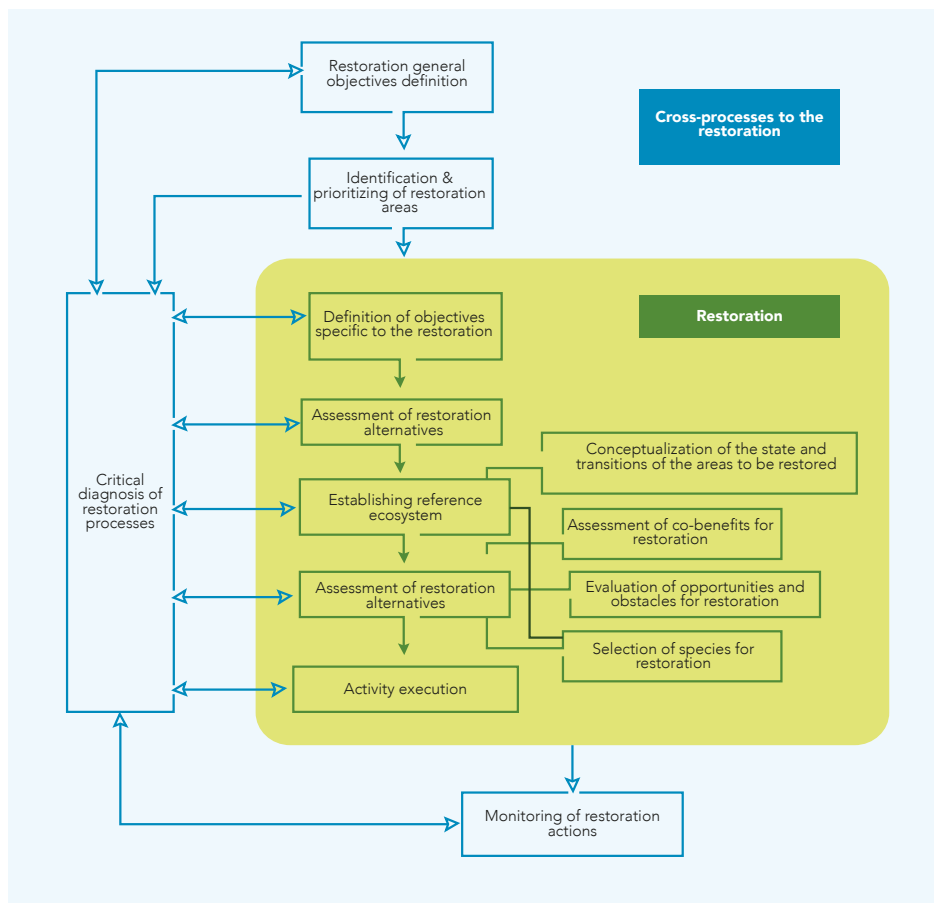
²¹ Fermi, V. 2009. Characterization of the payment mechanism for Environmental Services implemented by FONAG in its afforestation and reforestation community projects. FONAG. Quito, EC. 43p.

²² FONAG. 2008b. Technical report Plant Cover Recovery Program 2008. Quito, EC. 23p.

²³ Based on studies conducted in 2011, the use *Polylepis racemosa* was stopped.

Also during this year, FONAG established basic protocol to be considered before intervening in a place and a reflection process on the origin of seedlings used for restoration. It is for this reason that as of 2018, different processes were proposed, including training of 30 nurserymen on how to use seeds for paramo species production and their importance for ecosystem restoration. From there, the idea was born to create a seed bank in coordination with the University of the Armed Forces (ESPE) and the National Institute of Biodiversity (INABIO), who seeks on the long term to maintain genetic variability of the paramo species for restoration purposes.

FONAG performs active interventions with innovative designs in which the enrichment of degraded areas is encouraged with the use of trees, shrubs and herbaceous native species.



Methodological scheme for restoration in the intervention sites.



Seed management workshop for paramos ecological restoration

Traditional afforestation and reforestation actions were left behind; currently, active interventions have innovative designs including enriching degraded sites through the use of tree and shrub native woody species, scattering seed bombs of herbaceous and shrub species, incorporating carpets of herbaceous species and restoring wetlands. In addition, passive restoration is maintained in order to isolate tensioning factors to the ecosystem.

Since its inception, the strategy to restore and recover is based on two pillars: monitoring and knowledge management. Permanently, monitoring and evaluation activities are carried out through visits to restored sites for at least four years after the intervention. Since 2006, there are monitoring parcels of land, and as of 2017, permanent sampling land parcels that have a monitoring protocol were installed²⁴ for characterization, diagnosing of the current state, and monitoring of the implemented restoration processes. Knowledge management has been a key factor for developing this strategy. Thus, in order to validate actions carried out and to guide the future, scientific research, systematization of executed projects, technical publications and field experimentation are developed.



Puglllohuma wetland in restoration process

Lessons learned

Afforestation and reforestation are not synonymous to ecological paramo restoration. It is necessary to understand the landscape and dynamics of the existing species in order to take action in that ecosystem.

Afforestation and reforestation are high visibility activities, so they are usually the first choice when intervening a degraded area. However, it is not always the best alternative to achieve better water ecosystem functionality.

Knowledge about mountain ecosystems is still under construction; several studies on the state of degradation of water sources have been made for prioritizing areas of intervention, however, it is necessary to incorporate this information as part of the everyday decision-making process.

Restoration with native species requires nurseries to be involved in and trained for working with new species, which are usually of less commercial value and of which there is not much knowledge available. Capacity building of nurseries is essential.

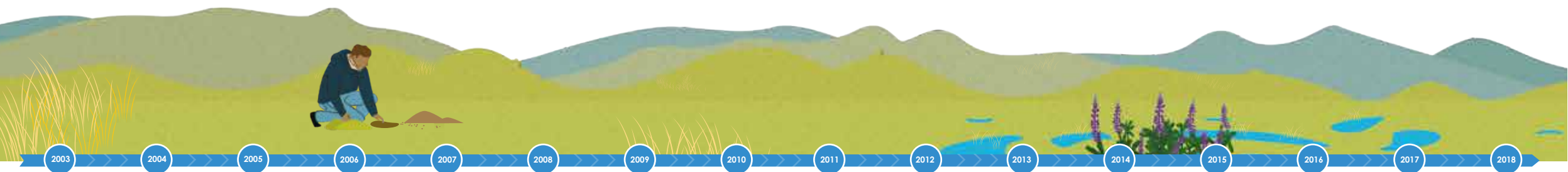
Achieving partnerships and the involvement of community and private actors is crucial in the restoration process. Long-term processes can be achieved if work is done collectively to reduce tensioning factors and to provide alternatives for the actors involved.

²⁴ Protocol document available on:

<http://www.fonag.org.ec/web/wp-content/uploads/2018/05/Anexo-2.-Protocolo-de-monitoreo-PRCV-2018.pdf>

Restore plant cover and soil

We work to recover **water sources ecosystems** that are degraded.



Program

Afforestation and Reforestation Program 2003 -2008

Plant Cover Recovery Program 2008-2018

Species

Planting with native and exotic species. Woody tree species. 2003 -2011

Planting with native species. Woody tree species 2011-2014

Cell-type planting with native species: Woody tree and shrub species, and herbs. 2014-2018

Type of intervention

Passive restoration: 2008 -2018

Fence building for the elimination of tensioning factors impacting paramo ecosystems.

Restoration of sandy areas. Use of *Lupinus sp.* > 2004 -2017

Biophysical recovery, Construction of gabions in level curves to avoid sediments falling in sandy areas. > 2015 -2018

Design innovation in degraded areas restoration that cover more intervened areas at a lower cost. > 2015 -2018

Restoration of Wetlands > 2016 -2018

Production of native plants from each site to be restored with the collaboration of nurseries and scholars. > 2017 -2018

Monitoring

General monitoring of restoration actions 2003-2015

2016-2018

Monitoring Protocol of permanent land parcels in areas intervened by FONAG

Hydrological monitoring as part of FONAG's impact monitoring 2013-2018

Wetland monitoring 2016-2018

Strategy:

Conserve areas of water interest and mitigate threats

For FONAG, a water conservation area is a territory identified as critical to the conservation of the higher Andean ecosystems where water for the DMQ comes from. In these areas, very complex ecological processes converge, as well as various social and organizational actors. FONAG works integrally on these areas with clear handling and management guidelines so that pressure sources are reduced, degraded areas are recovered and monitoring, control and management systems are improved. Strategies depend on the diagnosis made and its location focuses on two elements: management and handling of own water conservation areas, which, as its name implies, seeks the preservation and restoration of key ecosystems and to prioritize – actions in areas of water interest where the goal is to reach agreements and consensus to improve site management in places that supply the DMQ.

With regard to managing and handling water conservation areas, the Surveillance and Monitoring of Protected Areas Program was created in 2004, which was initially focused on supporting the management of the National Protected Areas System (SNAP) by building on preliminary studies, which indicated that seven out of ten liters of water consumed in the city of Quito come from the Cayambe Coca National Park, the Ilinizas and Antisana Ecological Reserves, and the Cotopaxi National Park. Support consisted of hiring community park rangers who joined the MAE's team of park rangers and who responded to guidelines from those responsible for each of the protected areas. The first community park ranger was from Oyacachi, a community located in the Cayambe Coca Ecological Reserve; subsequently, two more park rangers were hired for the Cotopaxi National Park, and after signing an inter-organizational cooperation agreement with the Ministry of Environment (MAE) in 2006, a brigade of twelve community park rangers was formed in the four protected areas.

Park rangers, chosen in community assemblies, were the link between FONAG, MAE and the communities. This work platform enabled a direct and ongoing coordination with those responsible for protected areas, park rangers and communities for water resources protection activities.



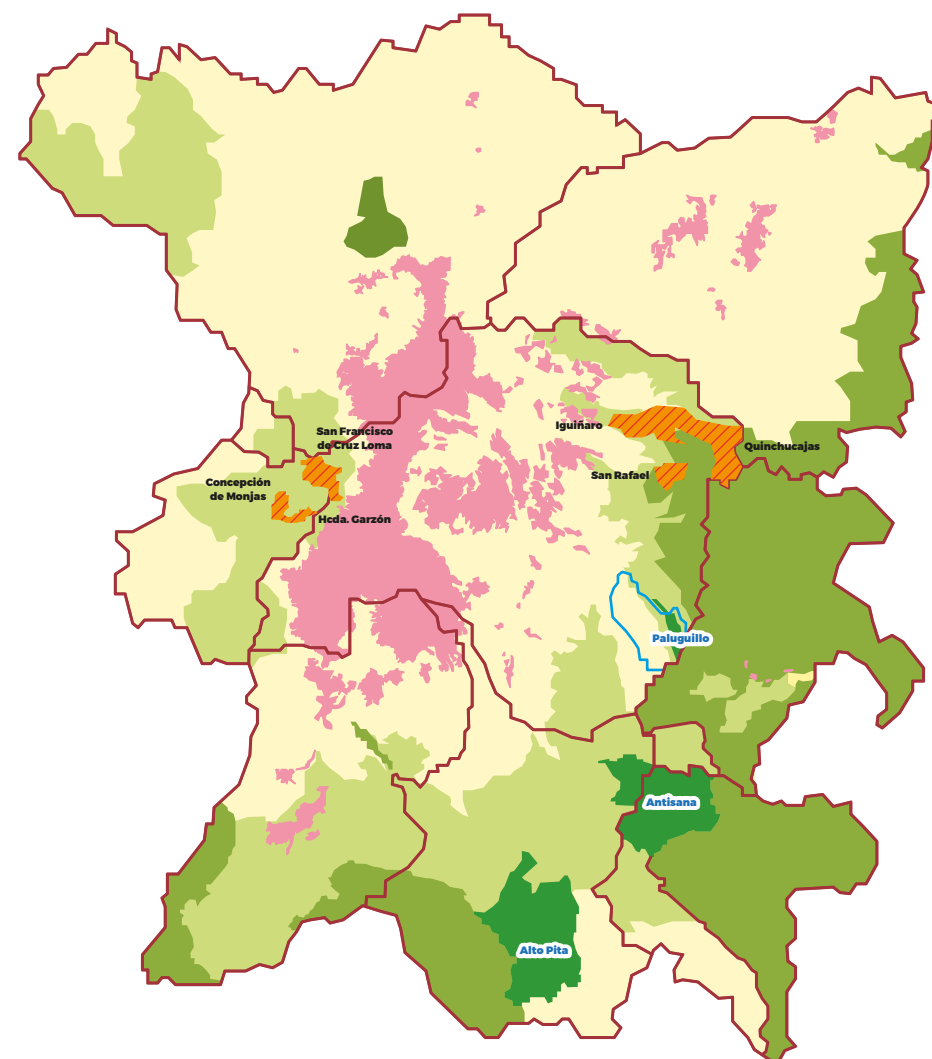
Vermifilter workshop in Chilcapamba, Urauco

In 2010, EPMAPS initiated an acquisition process of private land in priority areas for water supply. The first property was Mudadero, with an area of 7.389 ha, adjacent to the Cotopaxi National Park, part of the (ACH) Alto Pita Water Conservation Area; their micro-catchments contribute to the Pita-Puengasí System that supplies the city center of Quito. The next properties were Antisana and Contadero, adjacent to the Antisana Ecological Reserve, with areas of 7.121 ha and 428 ha, respectively, and their catchments contribute to the Mica-South of Quito System; these properties are known as ACH Antisana. Management of these lands was delegated to FONAG since 2011.

In 2011, as part of a restructuring process of SNAP led by MAE, the agreement with the Ministry for supporting protected areas of the national system management was terminated, so all park rangers were relocated to work in water Conservation Areas managed by FONAG and in areas of water interest such as Muertepungo and Oyacachi under the name of 'paramo rangers'. From 2012, key actions were initiated to consolidate ACH Antisana and ACH Alto Pita.

As of 2015, with FONAG's new structure, the strategy is led by the Sustainable Water Conservation Areas Program, which replaced the Surveillance and Monitoring on Protected Areas Program.

In 2016, as a contribution by TNC, the Paluguillo property became part of the Trust's estate. The property is located adjacent to the Antisana Ecological Reserve and the Cayambe Coca National Park protected areas, northeast of the DMQ. In early 2018, SENAGUA was asked to issue a Resolution so part of the Paluguillo property (773 hectares) and 3.487 hectares of adjacent private property were established as Water Protection Areas. After complying with the provisions of the law, and in a joint effort with the landowner, SENAGUA and FONAG declare the Ponce Paluguillo area to be the first Water Protection Area in December of the same year, by Ministerial Agreement.



- FONAG's scope
- Populated areas
- Ponce - Paluguillo water protection area
- Water conservation areas
- Formal conservation agreements
- Areas of Interest
- PANE

One of FONAG's properties was declared the first Water Protection Area, by ministerial agreement.



The paramo rangers' skills and knowledge contribute significantly in maintaining ecosystems and reducing their tensions and threats. Hiring neighboring communities' paramo rangers is a priority since it enables an approach to local environmental and social reality. Currently, the paramo rangers team consists of 2 women and 18 men.

FONAG has a team of qualified paramo rangers committed to managing water protection areas.

The first property acquisition by FONAG was consolidated in 2017, with the acquisition of a part of the Pullurima Hacienda called Jatunhuayco, so its hectares were integrated into ACH Antisana. The same year, an extraordinary contribution to FONAG by EEQ, was consolidated with the acquisition of the Campo Alegre property of 2.716,07 hectares, which in conjunction with EPMAPS' Mudadero property, make up ACH Alto Pita. At the moment, all ACH total at about 20.000 ha that protect the availability of drinking water of at least 60% of the DMQ's population.

The Alto Pita, Antisana and Paluguillo Water Conservation Areas are administered through management plans in which guidelines are established to lead actions within these areas according to management objectives, and adapted to changes in context. Management plans are made with a five-year time horizon.

Management of these areas is a major challenge for FONAG since it requires ongoing effort, periodic review of management strategies, organizational structure and a management model. A team of Paramo Rangers performs control and monitoring actions, and since they are located in SNAP buffer zones, actions are coordinated with the MAE.

The challenge when managing the ACHs is to reduce the intensity and frequency of the main sources of pressure affecting each of them. This includes actions such as lowering livestock, fire control, communal cleaning (mingas), introduced species monitoring, tourist pressure reduction, among others.



FONAG Paramo Rangers

From 2006 to date, capacity building has been essential in achieving this strategy. The Environmental Managers Training Program for Paramo Rangers has established a qualified team committed to facing challenges of everyday life at the ACHs. In addition, paramo rangers of the Protected Areas National System (SNAP) have been trained —key people in partner and constituent entities, among others. Training processes include theoretical and practical activities —they promote experience exchange, personal and interpersonal work, and boost research processes with material prepared for the educational process.



Training on environmental monitoring for FONAG paramo rangers

The DMQ's water sources, in a large percentage, are in communal and private property, which requires a joint effort to achieve agreements and arrangements that allow them to be administered in a way that does not affect resource availability. Thus, water protection agreements arise. The agreements in practice represent actions to care for the population's water sources and are key to the territory —they derive from the urban-rural shared responsibility of protecting water, and their goal is to generate commonalities regarding perspective, alternatives and actions for the reduction of pressures affecting water availability, access and governance, acting on the conflicts generated by historical processes of rural-urban exclusion. These agreements are generated by understanding relationships and processes through which cities ensure their access to water²⁵ and opportunities to improve living conditions for rural communities and populations within FONAG's influence.

The premise of local sustainability and protection agreements is: "water as a human right, our common heritage which can teach us how to live together".²⁶

The consolidation of sustainability agreements had its own process that began in 2006, with a proposal named "In Search of community strengthening", which presented the inclusion of communities in the decision-making process for project implementation in their localities. This inclusion promoted active participation of communities and their endorsement thereof for program implementation, which were designed and executed with accompanying FONAG paramo rangers. Communities performed a counterpart, participating in decisions and being responsible for coordinating implemented projects, as well as fulfilling objectives focusing on protecting the environment and especially protecting water, which was the project's determining factor. Under this scheme, different productive ecological projects were executed involving tourism activities, community nurseries, and organic agriculture —many of these with the commitment to lower livestock, among others. These agreements were achieved through signing an agreement between the Head of the Protected Area, the Technical Secretary and the Leader of the community for funding, disbursement and implementation. The conservation agreements, under this figure, continued until 2015.

²⁵ (Vos, Escandón, & Dijk, 2014)

²⁶ (Water International, 2014)



In 2011, FONAG worked with the Environment Secretariat of the DMQ in developing a base technical instrument and, subsequently, supported the declaration of the Cerro Puntas Wetlands Protection Area. This was the beginning of work in Areas of Water Interest, which sought to identify and support management of territorial units that are important to the availability of water in the DMQ. In 2015, three new areas were identified: Cinto, Atacazo and Upper San Pedro, these areas are sources of drinking water and are outside of the ACHs. In late 2015 and early 2016, the diagnosis and action plan for Cinto was developed, in which, for the first time, the Hydro-social Diagnosis²⁷ methodology is applied, which aims to characterize and propose participatory actions that enable an involvement that is informed and adapted to environmental, social, productive and political reality in the contributing water catchments. In practice, it identifies tensioning factors affecting water, defines strategies, and proposes specific actions and intervention times that are specific to each location. With the same methodology, at the end of 2017, actions began initiated in Atacazo and in 2018, in Upper and Mid San Pedro were initiated.²⁸

Intervention in Areas of Water Interest is based on trust, willingness and commitment to conservation given by communal and private owners. In many cases, it promotes sustainable land use zoning, where areas of water sources, areas of plant cover restoration and productive areas are identified, which allows actors in the territory to ensure water sources for the present and the future, as well as for

different uses and users. Currently, some of the established agreements with communities are aimed at capacity building, implementation of productive activities, access to safe water, improved pasture management and organic agriculture. There are also agreements aimed at preserving community-owned areas that are important sources of water for the communities and for the DMQ. In the Cinto area, agreements have been established with private landowners for the implementation of a drinking water system with dual purpose: agro-ecological management of the property and enclosure of the riverside.

Lessons learned

In FONAG's area of intervention there are several property regimes: public, private and communal, so a different strategy for each situation should be devised. Strategies may range from acquiring private land, to communal and private agreements, to coordinated and/or co-managed public land.

There are important areas in the river catchments that supply water to the DMQ, where different conditions converge to make its acquisition an interesting and cost-effective alternative, such as: that these areas are crucial water sources and its conservation state is vulnerable; that there is willingness by the private owners to sell, among others.

It is important to know the territory in order to manage it properly. To achieve this, it has been necessary to develop and implement methodologies that allow designing specific solutions for each location. A hydro-social diagnosis has proven to be a key tool since it proposes detailed interventions tailored to each context.

The creation of a committed paramo-rangers team is important to be able to administer and manage areas. The education and training they have received over the years has allowed paramo rangers to be prepared and committed to the protection of water sources.

²⁷ Methodology designed by the consulting team and that is now adopted by FONAG.

²⁸ Escandón, Pérez, Intriago, Aguirre - 2016

Conserve areas of water interest

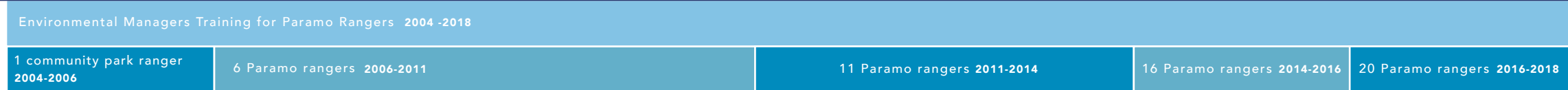
We create **conservation alliances** based on trust, will and commitment.



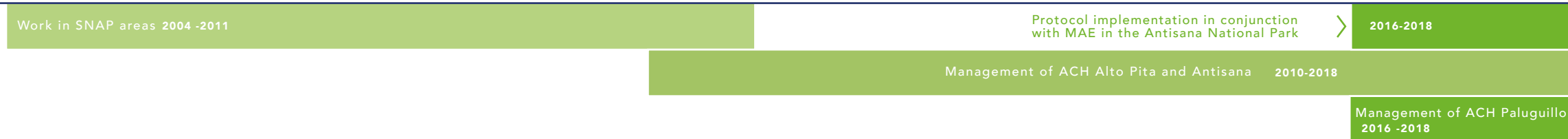
Program



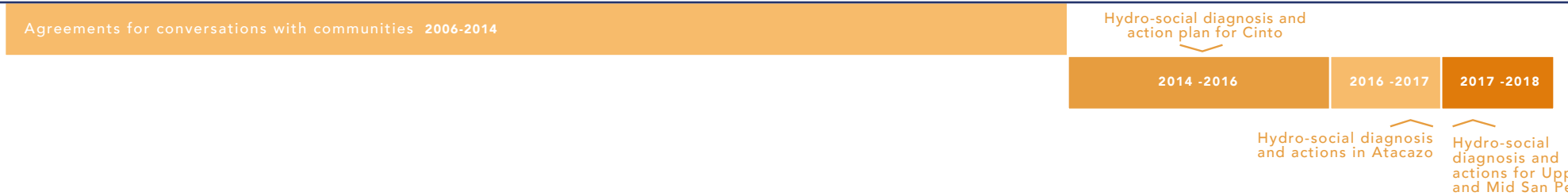
Paramo rangers



Water Conservation Areas



Agreements



Strategy:

Educate and raise awareness

FONAG believes that environmental education is a long term process that requires the application of methodologies and procedures specific to each target group.

FONAG's strategy to educate and raise awareness is implemented by the Environmental Education Program (PEA) since 2005. Since the early stages of the program, it was understood that environmental behaviors result from the interaction of knowledge, emotions, attitudes and beliefs about the environment. Culture has also an influence, as well as how easy or difficult finding solutions to problems becomes. This is intertwined with appropriate skills and opportunities in order to act.

Initially, the strategy was addressed to the school sector, to work with children in sixth grade of primary school (10-12 years old), for whom three modalities were applied. The first modality was called 'Cachaco', and consisted of a visit to the Cachaco Ecological Park as a space of awareness that was focused on urban schools in southern Quito and the Valley of Los Chillos. The second modality was 'Móvil', consisting of nine visits to rural schools during the school year in areas of water interest, one day a month for four hours. Finally, the 'Camps' modality was aimed at public and private schools in urban areas that lasted for 2 days. The selected methodologies at this stage were in value training, pedagogical mediation, and part of the Tribes methodology.²⁹ In addition, the following methodological steps were applied: feeling, sharing, analyzing, learning, applying and committing. Commitment was achieved with the appointment of each child as "Water Guardian".



Quinchuajas children learning about paramo soil

²⁹ More information on the methodology and scope of the modalities is available at: Learning Rivers, 10 years of Environmental Education.

Education and awareness actions have established close relationships with the community and created opportunities for the dissemination of FONAG's management, its objectives, work and importance in intervention areas.

In 2012, the need to expand the target group and include youth and adults was identified. Thus starts the Responsible Water Consumption (CREA) modality, held in partnership with EPMAPS - Quito Water in the Nayan parish. This modality raised the challenge of adapting methodologies and approaches, which also involved training the team of educators to take on this new challenge. During that year, the 'Yakuñan' modality is born: a tour of a water conservation area with a duration of six hours intended to visualize the long road that water has to travel to reach Quito's citizens homes.



Water Day Celebration 2018



Water representation by Oyacachi girl

After a planning process (2013- 2015)³⁰ that had the objective of obtaining greater impact and results, the creation of a baseline was defined to collect the perceptions and knowledge of communities, and to work in sustained processes in territories of water interest with key actors or decision-makers. Both CREA's experience as well as the planning process, drifted in this method of working with communities, which allowed to gain experience in working with adults. This modality used a popular education approach and the experiential methodology or model.

³⁰ During this period, the Environmental Education Program was merged with the Communications Program, resulting in the Edu-communication Program. In 2016, they are separated again to strengthen the educational area and the Environmental Education Program's own activities, without this meaning that there is no synergy with the communications area and with other FONAG programs.

From 2016, it was decided that Emotional and Values Education, Constructivism and Popular Education would be the theoretical approaches for intervention modalities, and that the methodologies to be used would be: pedagogical mediation, experiential model, Tribes and play, verbal and non-verbal communication, as well as experimenting in nature. This involved a renewal in the curriculum design and content, in addition to providing a sustained evaluation process according to the participants' particular characteristics.

It takes more than knowledge to take up the challenge of educating and raising awareness. A commitment to environmental education, with the organization's purpose and with the participants of each process is necessary.



Quinchuajas children in the Photography Workshop, art caravans 2018

During the same year, other modalities for the various groups were proposed. The 'Yakuaulas' modality is focused on teachers and other key actors in environmental education such as paramo rangers, environmental authority and water technicians. Yakuaulas consists of a series of intensive courses— a combination of experience tours with reinforcement and follow-up workshops— for 5 years (2016-2020), which seek to influence long-term education of children in the intervention areas of FONAG. Some of the topics covered are: paramos, forests, impacts and solutions, rivers and ravines, among others; without neglecting training in pedagogical issues, including constructivism, and education in values and emotions.

Currently, in order to establish education and awareness activities the "EMOPEDAR" process is carried out, which is constructed in the following way:

- (1) Educational and environmental approach,**
- (2) Methodologies,**
- (3) Organizational Purpose and project objective,**
- (4) Educational project,**
- (5) Initial and final evaluations,**
- (6) Curriculum planning or curriculum design,**
- (7) Activities,**
- (8) Restructuring according to results.**

Training community members seeks to strengthen the knowledge, attitudes and pro-environmental practices of these communities. This method contributes to the integrity of FONAG's intervention in key areas with actions for strengthening local capacities in order to promote the conservation and restoration of areas of water interest. This modality derives from each site's diagnosis and specific needs, guided by the Sustainable Water Conservation Areas Program, after which specific topics are designed. However, there are topics such as the introduction to the importance of paramos ecosystems with which all sites begin.

In work done in 'Móvil', it was identified that art is an excellent educational tool to strengthen knowledge about water sources, paramos and to generate emotions for their conservation. That is when the Art Caravans were launched in schools whose teachers are part of the Yakuaulas process. Each school chooses 10 children to participate in art and environment training that includes a tour of a nearby paramo, and participatory construction of a work of art. The results are presented in a cultural event in the community and in another hosting community. Besides, it features the presentation of professional artists to complement the event. In this modality, there have been puppet shows, theater, music, dance, among others.

The 'Paráguamos' are tours linked to the Paluguillo Interpretation and Environmental Research Center (CIIAP), which seek that visitors contribute to knowledge, recognition, appreciation and conservation of the paramos through sensory, participatory, meaningful and active experiences. CIIAP receives visitors sporadically and children from schools located in areas of water interest come to visit it, as well as artists who train children in the Art Caravans project, teachers, education authorities or authorities from various ministries and members from the media.

Additionally, through the PEA, FONAG is part of the Environmental Education Network committee of the Quito Metropolitan District (REA-Quito), which aims to promote and coordinate environmental education in this geographical area.



Art Caravan in Oyacachi

Lessons learned

In order to engage in lasting education and awareness processes that involve knowledge appropriation, it is important to have a solid theoretical management, and a thorough understanding of pedagogical approaches and methods, that enable process validation and to carry out appropriate adjustments to achieve the set goals.

Education processes and environmental awareness cannot ignore the combination of ecological and educational issues, values and emotions treatment, as well as cultural issues. Education in values and emotions makes a significant difference because they make the learning process a space of open dialogue that generates emotional connections, which in turn strengthens the obtained results by appealing to the participants' attitudes and beliefs.

Popular education approaches and constructivism have enabled the promotion of dialogue and active learning; the problematization of reality; critical analysis; and the search for possibilities and solutions; as well as to focus these issues to be pertinent and relevant to participants.

A sustained evaluation process allows first-hand information to be available on the development and performance of target groups and the quality of implemented actions. It is impossible to propose a static structure in the learning process, it is important to make adjustments based on the evaluation results that allow content reviewing, recreating activities and generating changes when necessary.

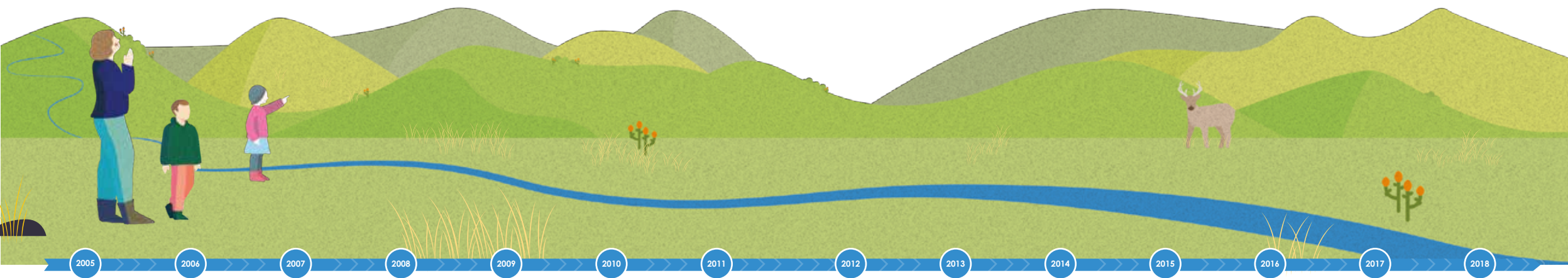
Art has proven to be a very friendly way to share the importance of the conservation and care of paramos, since it serves as inspiration and motivation to participants, to members of the FONAG Environmental Education Program and to many artists and teachers who accompany these processes.

It is also important to determine the number and complexity of issues, since in some cases thought patterns are deeply rooted and it becomes complex to deconstruct them in a short period of time; therefore, it is best to choose a few topics, treat them with greater depth, and focus strictly on the objectives.

Constant training for the team of educators is a fundamental part. A cohesive and trained team of educators is an organizational strength

Educate and raise awareness.

We build **lessons about nature** to transform our relationship with water sources.



Program



Awareness Modalities



Education Modalities



Audiences



Networks



Strategy: Strengthen FONAG's positioning

The mission of FONAG³¹ requires the involvement of various actors and organizations; thus in the 2016-2020 Strategic Plan, underpin efforts were considered key to consolidate, strengthen and create new alliances with public and private organizations that share an interest in managing water resources.

This strategy seeks to position the organization through different communication actions that demonstrate the technical and managerial work performed for the administration and conservation of water supplies for Quito.

Research station In 2016, in close coordination with EPMAPS - Quito Water, the Water and Paramo Scientific Station was launched, which aims to coordinate the development of research projects and knowledge generation on paramos and water. Besides, it promotes the application of its results in the decision-making process for integrated water resources management. Research processes are all done in the Antisana, Alto Pita and Paluguillo Water Conservation Areas, on topics such as: restoration of plant cover, hydrology, hydro-geology, paramo ecology, climate change, management of reservoirs, geology, seismology, vulcanology, socioeconomic and environmental analysis, historical analysis, ecological and environmental economics, and renewable energy.

Communication Established as a program in 2004, initially the goal was introducing a new financial mechanism for water management. Over the years, different communication products have been developed, such as technical publications, radio spots, radio programs, children's magazines, posters, newsletters, the newspaper 'Agua a Fondo', among others. Communication actions have focused, on the one hand, in disseminating a message on the conservation of water and its sources, and on the other hand, in positioning the organization. In spite of all the efforts made at the time, FONAG is mainly known by the organizations it works with, and by rural areas where it performs actions, so making more people aware of their actions is a challenge for the future.

Currently, communication is an area considered as a transverse axis that contributes to the comprehensiveness of the actions taken by FONAG.



³¹ 2016 - 2020 FONAG Strategic Plan



Strategy: **Strengthen institutional performance**

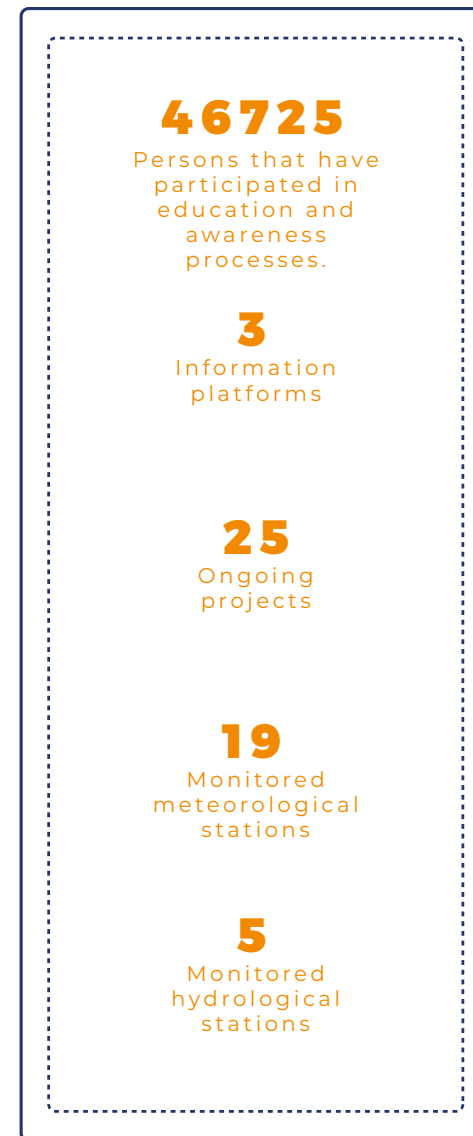
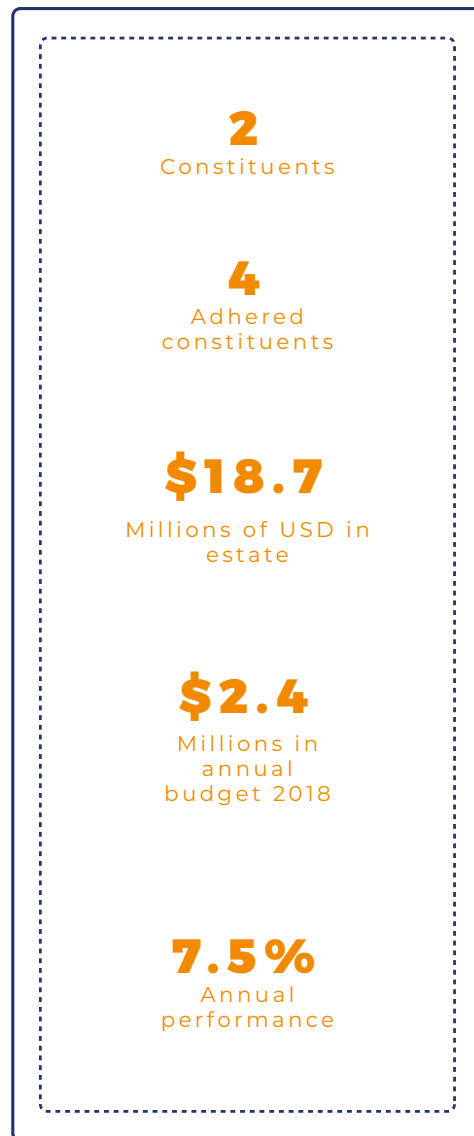
The success of actions implemented by FONAG lies in being a reliable technical secretariat, with a prepared and committed team. It is formed by a multidisciplinary team of biologists, sociologists, hydrologists, educators, communicators, paramo rangers, administrators, and financial personnel, among others.

The Technical Secretariat is led by its Secretary, who has direct support staff responsible for monitoring, communication and research. Additionally, each program is made up of a coordinator and their team. FONAG also has an administrative facility where all financial and administrative processes are performed in order to comply with all legal obligations.





FONAG in numbers



The impact of FONAG

In order to show results and impact of the actions, FONAG works on monitoring as a tool to verify its compliance with its mission statement to ensure that the water storing and regulating ecosystems improve their conservation state and constant water quantity and quality.

Monitoring quantity refers to the constant regulation of water present in ecosystems, and focuses on detecting variations that may affect it; while quality monitoring analyzes water's physical-chemical characteristics to ensure regulatory compliance for human consumption.

FONAG has seen the need to establish at least three representative monitoring sites, which are places where activities have been carried out to generate changes in water quantity and quality. At the time, ACH Antisana and ACH Alto Pita had monitoring equipment, specifically in the Jatunhuaycu water unit in Antisana where they had meteorological stations and hydrological stations were installed for water quantity monitoring, and five points for water quality monitoring. Monitoring within the ACH Alto Pita considered pluviometric stations and hydro-meteorological stations for water quantity monitoring in two micro catchments and groundwater table monitoring in a wetland.

In the Jatunhuaycu water unit, monitoring is performed in order to understand how restoration/conservation actions influence water regulation. A comparative continuous monitoring is performed in three micro-catchments. Baseline monitoring was performed during 2014 and 2015 and, from 2016, restoration processes were executed, which are constantly monitored to determine impact on the ecosystem caused after applying these actions. Monitoring is complemented by detailed research of water dynamics in the soil and groundwater.



Hydrological monitoring, Jatunhuaycu
ACH Antisana

In Antisana, further monitoring is performed of the Pugllohuma wetland (4115 msnm), whose state responds to the history of intensive use of grazing in the area. The wetland was drained more than 100 years ago by landowners to cause systematic drying and extend grazing areas. Since late 2016, the groundwater table was periodically measured, plant cover was monitored and soil was studied to demonstrate the impact of draining in the wetland's hydrodynamics. In late 2017, wetland recovery started with a drainage blocking process to recover the wetland's water regulation.

In the Alto Pita Water Conservation Area there is recent history of heavy use, mainly by alpaca grazing. As a consequence of this practice, sites with fragmented grassland are observed as resulting from fires, drained wetlands, predominance of species typical of meadows, and grasslands turned into meadows.

In regards to water quality monitoring, there are two phases. The first was carried out in agreement with San Francisco de Quito University (USFQ) and consisted in establishing benchmarks in order to assess the effects of management activities. The physical-chemical structure, biological composition and ecological integrity of rivers and riverside areas of eight rivers within the managed zone of the Antisana Water Conservation Area (four rivers) and Alto Pita Water Conservation Area (four rivers), were compared with those of eight Control rivers (unmanaged) in adjacent lands to each of the ACHs (four rivers for each ACH). In addition, three rivers of the Jatunhuaycu micro-catchment were included. The monitoring periods were, 2015-2017 for Antisana and 2014-2016 for Alto Pita. Since the start of the second phase, in 2018, quality monitoring is being conducted in partnership with EPMAPS, considering previously analyzed parameters. Monitoring points are located so as to complement water quantity monitoring and FONAG's restoration/conservation actions.

Lessons learned

It is very important to identify sensitive and cost effective parameters so that monitoring is sustainable over time.

By measuring the impact of interventions in terms of water quality and quantity, as well as in ecological integrity, FONAG assumes a difficult challenge. At the moment, FONAG has established two sites to monitor its intervention.

Impact monitoring has several scales: short, medium and long term. This process has contributed to the understanding of paramo-ecosystem functioning. Monitoring performed by FONAG allows linking of universities, researchers and donors.

Impact monitoring is key to demonstrate the generated changes after conservation/restoration actions.

Quantifying the impact of wetland restoration actions shows changes in hydrological terms in a short period of time and also opens the possibility to demonstrate the importance of these ecosystems.

Actions taken for conservation, threat mitigation and recovery of degraded areas, according to monitoring conducted in the Antisana and Alto Pita Water Conservation Areas, are effective and are even producing positive changes in the structure and ecological integrity of land ecosystems not under FONAG's management.

The information generated during impact monitoring is a reliable aid that can be used in various higher-level investigations, and may even serve as input for the analysis of economic assessments such as studies of Return on Investment.



ACH Alto Pita

FONAG - an investment that delivers Return on Investment Study

The return on investment (ROI) is a financial indicator that measures the performance of one or more investments. This indicator determines the relationship between perceived net profit (earnings or obtained benefits) and the required investment in order to achieve those benefits. In the case of FONAG, the set of implemented and planned measures are a result of its constituents' economic participation, which means that the ROI for FONAG considers the relationship between profits received by all its constituents from the investments total made by all of them.

From 2017 to date, FONAG has worked on several ROI calculation exercises. One of the early examples, is the ROI calculation for the Cinto catchment, directed to constituent EPMAPS, due to the amount of available data of its operation and objectives. The results of this ROI show that there is a favorable return on investment in the group of interventions that FONAG plans and executes for EPMAPS - Quito Water, and that this return is greater when channeled through the financial mechanism, as is the case of the FONAG Trust. Participation of the different EPMAPS-Quito Water Management Departments and the information provided has been key to analyzing and monetizing water benefits (maintaining or improving water quality and quantity as a raw material for the production and supply of drinking water for the DMQ).

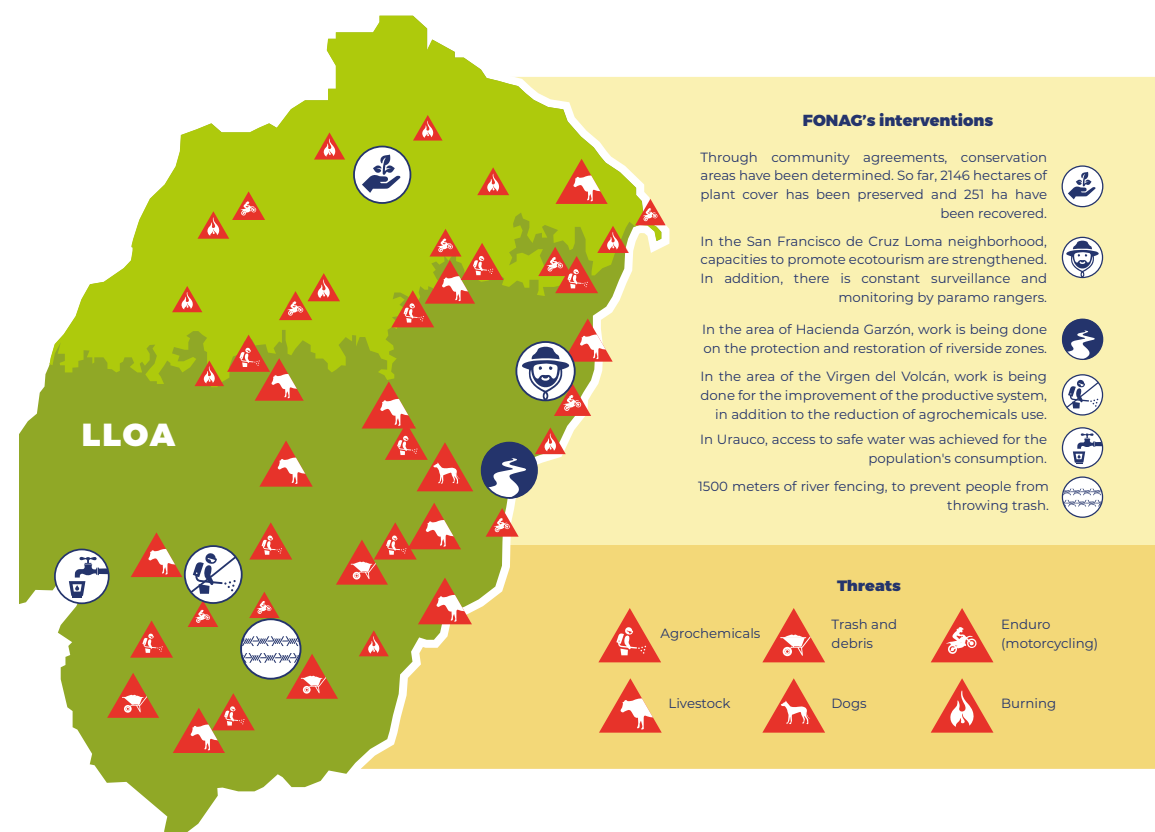
The first ROI study was a learning process that strengthened the internal and external capabilities of various professionals and organizational relations.

FONAG is generating a second ROI study for its entire area of intervention. The results of this study will be available in 2019.

Case study: Cinto River Catchment

"Quantifying the return on investment (ROI) of interventions executed by FONAG in the Cinto river catchment"

The Cinto River catchment contributes with more than half of the water of the West Central System, representing almost 8% of the DMQ's water supply. In the last 13 years, about 7000 hectares have changed from paramos to agricultural and pastoral areas, and suffer from constant pressures such as the use of agrochemicals, burning, garbage accumulation, among others. The quantification of the ROI in this catchment is a pilot study that began in 2016.



Results:

- A positive ROI was obtained. Water quality benefits are more sensitive than quantity benefits.
- Preliminary results showed that the return on investment in the Cinto catchment is USD \$2,15.



Lessons learned and challenges for the future

In its 18 years of existence, FONAG has built, through an adaptive, robust and powerful response, a confidence capital that is reflected in contributions to the Trust from its constituents, contributions from third parties and management delegation of areas of water interest.

The trust structure provides FONAG with two key elements for success: financial resources and time. Being an equity fund, FONAG has secured resources coming from its estate's performance. This makes it a strategic player in order to establish alliances and inter-organizational collaboration, as it has its own funding for the implementation of short- and long-term actions and expected to run for 80 years.

Generating organizational partnerships with public and private entities in water management as well as periodic contributions from public companies, especially EPMAPS - Quito Water, have made the current financial solvency of FONAG possible and are essential for the sustainability and operation of a water protection mechanism.

Building synergies primarily with constituents and with strategic partners who share FONAG's mission, has articulated and channeled various initiatives and efforts that each one performs around water.

FONAG's technical contributions to other actors working for ecosystem water sources conservation are essential in making joint decisions about this resource.

FONAG can make timely interventions in the paramos because it is based on solid knowledge of ecosystems and their dynamics in social and natural reality.

The strategy for FONAG's internal articulation of programs allows comprehensive work to be done in communities for the purpose of reducing threats affecting water sources.

The environmental and social diversity that characterizes water sources ecosystems determines different paths for their conservation and recovery. A broad portfolio of interventions is necessary in order to address water issues, since there is no single answer to mountain ecosystems management.



Ponce Paluguillo Water Protection Area declaration with participation of several organizations



Today, FONAG is recognized as a reference for water management as it is a pioneer in the implementation of such mechanism, replicated in more than 30 cities in Latin America.

The challenge is to continue promoting a better understanding of the importance of caring for water sources in the city of Quito. FONAG must strengthen its communication and dissemination strategies to have public support, which will in turn contribute with social legitimacy to the Fund and make it more sustainable over time.



FONAG mentions all those who have collaborated since its inception

FONAG 2018

Aigaje Aigaje Holger Arturo
 Aigaje Parion Manuel Oswaldo
 Amores Palma Marcelo Fernando
 Arauz Zambrano Leonardo Diego
 Armijos Jaramillo Alex Marcelo
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 Cadena De La Espriella Valeria Alegría
 Calle Ordoñez Tania Lorena
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 Mena Heredia Marco Antonio
 Moreno Yapo Luis Marcelo
 Nuñez Endara José Luis
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 Pazmiño Constante María Fernanda
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 Potosi Valdivieso Enma Odila
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 Totoy Granja Victor Manuel
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 Urcuango Pozo Jose Ricardo
 Ushiña Chuquimarca Galo Manuel
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Suntagsi Ganchala Klever Augusto, Tandayamo Imbaquingo Segundo Manuel,
 Toaquiza Guasumba Diana Alexandra, Torres Paguay Sandra Janeth,
 Torres Romero Sergio Fernando, Tupiza Cumbal Myriam Del Pilar,
 Valarezo Valdivieso Ana Valeria, Vega Chinguad Wilson Patricio,
 Yánez Flores Sara Gabriela.

Partners

Public Metropolitan Drinking Water and Sanitation Company

- Quito Water

The Nature Conservancy

Quito Electrical Company

Cervecería Nacional

Camaren Consortium

The Tesalia Springs Company

National Water Secretariat

Ministry of Environment

United Nations Development Program

Green Climate Fund

National Meteorology and Hydrology Institute

National Geological, Mining and Metallurgic Research Institute

Institute de Recherche pour le Developement

Environment Secretariat

Cornell University

Imperial College London

San Francisco de Quito University

National Polytechnic University

Equinox Technological University

Pontifical Catholic University of Ecuador

Ecuador Central University

Inter-American Development Bank

Swiss Agency for Development and Cooperation

University of the Armed Forces

Fund for Global Environment

GIZ

National Biodiversity Institute

Integral Amazon Forest Conservation and Sustainable

Production Program

United States Agency for International Development

Cayambe-Pedro Moncayo Education District

Tumbaco Education District

Chaco-Quijos Education District

Eloy Alfaro Education District

Centro Education District

Orellana Loreto Education District

Mejía Rumiñahui Education District

Los Chillos Education District

Captain Julian Quito General Primary Education School

Jorge Icaza General Primary Education School

Issacc J. Barrera General Primary Education School

Quis Quis General Primary Education School

San Ignacio de Loyola General Primary Education School

Azuay General Primary Education School

Pichincha Primary School

Manuel Villavicencio General Primary Education School

Ricardo Rodríguez General Primary Education School

Louis Godín Co-educational School

Pedro Bouguer Public School

Padre Rafael Ferrer School

Alfredo Escudero Primary School

María Guarderas Primary School

Pablo Muñoz School

Pedro Gosseal Primary School

Lloa Parrish Autonomous Government

Checa Parrish Autonomous Government

Oyacachi Parrish Autonomous Government

Oyacachi Community Town Hall

Oyacachi Water Board

Puichig Water Board

Improvement Committee of San Francisco de Cruzloma

Drinking Water Board of Contrahierba, Gargantilla-Iguinãro

San Rafael Community

Quinchuajas Community



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