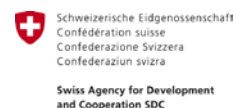


INVESTMENTS IN WATERSHED SERVICES FOR MOYOBAMBA ON SUB-WATERSHEDS OF THE ALTO MAYO, DEPARTMENT OF SAN MARTÍN, PERU

October 2013



With Support from:



About Peru's Incubadora de Mecanismos de Retribución por Servicios Ecosistémicos (Ecosystem Services Incubator)

Recognizing the need to provide national leadership, capacity-building, and coordination to the many local and regional mechanisms facilitating investments in ecosystem services throughout Peru, the Ministry of Environment of Peru (MINAM) partnered with Forest Trends to establish the Peru Ecosystem Services Incubator in 2012. The Incubator aims to enhance investments in nature by society through providing technical, financial, and economic expertise; building capacity; and contributing to the development of national policy. To do this, the Incubator works with a range of non-governmental organizations, development agencies, national authorities, and local and regional governments throughout the country who have worked for years to advance investments in ecosystems. Guided by the national prioritization of improving integrated water management, investment mechanisms linked to watershed services are the first focus of the Incubator.

The following institutions play critical roles in the design and implementation of the Incubator:

Ministry of Environment of Peru (MINAM)

MINAM's mission is to preserve the quality of the environment and ensure that present and future generations will be able to enjoy their right to a healthy environment for the development of life. As the host and leader of the Incubator, MINAM is responsible for the planning, execution, tracking, and monitoring of activities in the technical, economic, and financial arenas.

Forest Trends and EcoDecisión

Forest Trends works to maintain, restore, and enhance forests and connected natural ecosystems, which provide life-sustaining processes, by promoting incentives stemming from a broad range of ecosystem services and products. Forest Trends is a founding partner of the Incubator and serves as a technical, economic, and financial advisor. Forest Trends fulfills this role in a strategic alliance with EcoDecisión, a social enterprise specializing in ecosystem services and funding for nature conservation.

Consortium for the Sustainable Development of the Andean Ecoregion (CONDESAN)

CONDESAN is a nonprofit organization aimed at strengthening rational and sustainable management of natural resources and promoting productive and institutional innovations that overcome poverty, exclusion, and inequality. CONDESAN provides technical, economic, and financial advice and provides support to enable the implementation, monitoring, and evaluation of the Incubator's activities.

Swiss Agency for Development and Cooperation (SDC)

An organization that invests in the fight against poverty in developing countries, SDC has contributed significantly to economic integration and poverty reduction in Peru by working with the Peruvian government, civil society organizations, and the private sector. As part of its efforts to provide greater access to basic water and sanitation services, SDC is providing significant support for the Incubator's activities, through a global project with Forest Trends aimed at scaling up investments in watershed services to address the global water crisis.

This project has been developed by the *Comité Gestor del Mecanismo de Compensación por Servicios Ecosistémicos de Moyobamba*, which is an association of public, private, and non-profit institutions that includes:

Moyobamba Water Company (EPS), Provincial Municipality of Moyobamba, Regional Government of San Martín (GORESAM) and the Alto Mayo Special Project (PEAM), National Water Authority (ANA), and National Superintendent for Drinking Water and Sanitation Service (SUNASS)

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1. Project Characteristics

This project is the first Investments in Watershed Services (IWS) experience in Peru to secure funds from water users. It aims to ensure the conservation and restoration of two subwatersheds¹ within the much larger Alto Mayo watershed that feeds the city of Moyobamba’s drinking water system. Using multi-stakeholder participation the project has generated positive incentives for the protection and sustainable use of watershed services.

Project at a Glance

Location	Lower Alto Mayo watershed, Department of San Martin, Peru; specifically, the Mishquiyacu-Rumiyacu and Almendra subwatersheds and the city of Moyobamba, the Departmental capital.
Project type	Watershed services: Reduced sediment load, improved water quality, increased water quantity throughout the year, conservation of natural ecosystems and improved land and water management practices through incentives.
Size of watershed & project area	<ul style="list-style-type: none"> • <u>Alto Mayo watershed</u>: 7818 km² • <u>Project area</u>: two subwatersheds (897 ha) within 2400 ha of protected areas
Key institutional partners	Moyobamba water company (EPS), Ministry of the Environment (MINAM), Alto Mayo Special Project (PEAM), Regional Government of San Martin (GORESAM), National Water Authority (ANA), National Superintendent for Drinking Water and Sanitation Service (SUNASS)
Water users	65,000 people in the city of Moyobamba
Watershed service providers	115 families living on two subwatersheds of the Alto Mayo
Project status	Project design 2004-2008; agreements reached in 2009; payments began in 2011
Project funding & payment mechanism	Project development funded by the German Society for International Cooperation (GIZ); compensation mechanism funded by GORESAM and water users who pay a “sustainable tax” in monthly water bills for conservation of the forests and improved land use practices on the micro-basins.
Level of investment	US\$ 48,000/year (equivalent to 1 New Peruvian Sol/user/month)
Scalability	Multi-stakeholder financial mechanism to resolve the problem of urban water insecurity.

Project History and Key Developing Institutions

Agriculture-driven deforestation has resulted in the loss of ecosystem integrity affecting both the quality and quantity of water available to downstream users of Moyobamba, a city on the eastern slope of the Andes. Recent studies that were carried out to gain understanding of hydrological, ecological, social and economic parameters of the Mishquiyacu-Rumiyacu and Almendra subwatersheds are listed below (León & Renner 2010), the results of which contributed towards project design and form the basis for determining the level of needed investment:

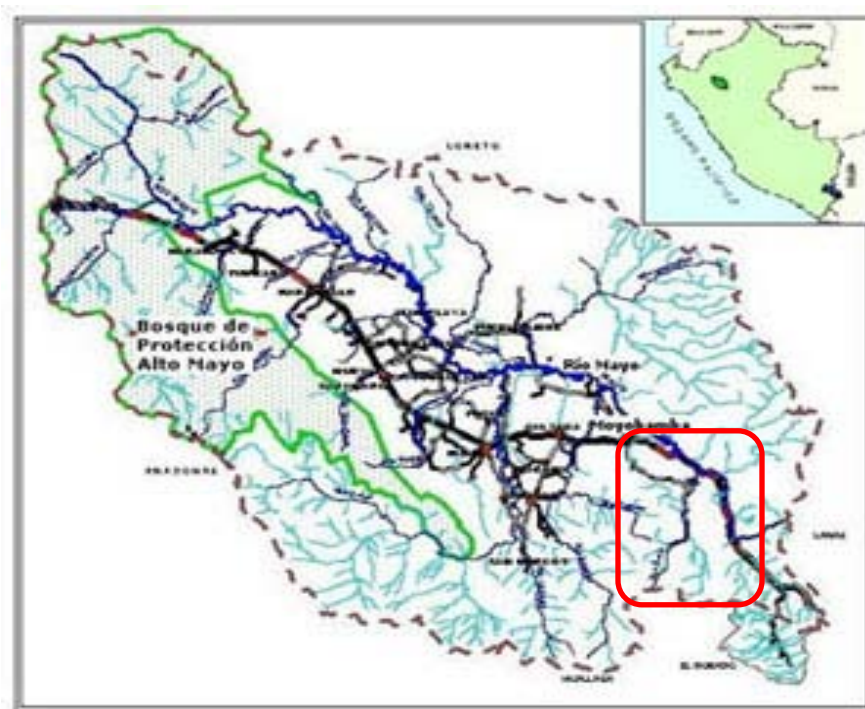
¹ Subwatershed refers to the catchment area of a smaller river or stream tributary.

- Hydrological modeling based on the Soil and Water Assessment Tool (SWAT) to estimate water supply and sedimentation rates (EPS 2006);
- Calculations of the socio-economic and environmental costs and benefits associated with different land uses as perceived on site by farmers and off site by downstream communities, using the economic, social and environmental assessment model of soil use (ECOSAUT);
- Demand-based assessment for water for household purposes and irrigation; and
- Assessment of EPS water treatment costs that yielded the result that this operational cost had more than tripled between 2001 and 2004 due to high sediment loads.

This project which aims to protect, restore and use water sources sustainably, has been developed over the last eight years (since 2004) through the combined efforts of the public Moyobamba water company (EPS), Regional Government of San Martín (GORESAM) through the Alto Mayo Special Project (PEAM) which involves the Municipal Government of Moyobamba and District Government of Nueva Cajamarca, National University of San Martín and Public Technological Institute of Alto Mayo, Water Authority (ANA), National Superintendent of Water and Sanitation (SUNASS) and Peru’s Ministry of the Environment (MINAM). The project was supported financially by the German Society for International Cooperation (GIZ) and the Consortium for Sustainable Development of the Andean Ecoregion (CONDESAN) through the Challenge Program on Water and Food. This project description provides the context for the interaction with the IWS Incubator of Peru, led by MINAM and Forest Trends, with financing from the Swiss Agency for Development and Cooperation (SDC), towards scaling up investments in watershed services in the country.

Project Location and Description of the Problem

The Alto Mayo watershed, covering 7818 square kilometers² (Map 1), is located in the Department of San Martín in the tropical Andes-Amazon transition zone of northern Peru. These forests of the upper Amazon are known to be among the most biodiverse in the world and are home to many emblematic and threatened species including the Spectacled Bear, the Yellow-tailed Woolly Monkey and the Andean Cock-of-the-Rock.



The city of Moyobamba is located in the central-eastern portion of the watershed and the project’s subwatersheds (red outline) are on the right (downstream) side of the Mayo River as it runs east towards the Amazon Basin.

Source: CONDESAN-GTZ 2005

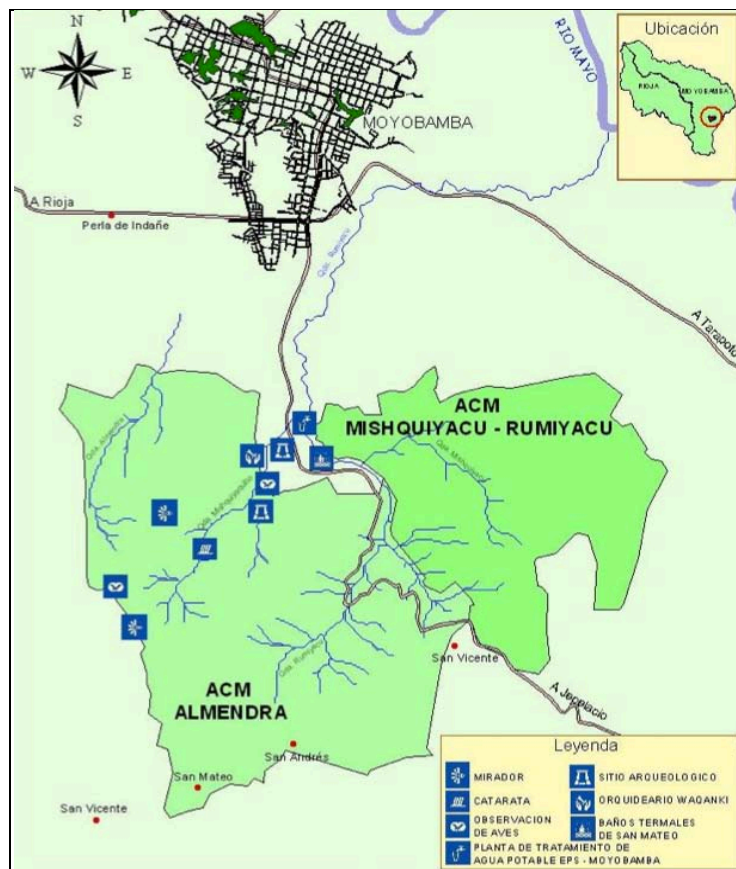
Map 1. Rivers of the Alto Mayo Watershed

² Prem 2007.

The main concerns on the watershed relate to diffuse water pollution and high sedimentation. Over the last 25 years, an influx of immigrant farming families has converted high diversity pre-montane forests to agricultural and grazing lands and these activities are responsible for most forest clearing and agrochemical use in the Alto Mayo Valley, with livestock and coffee waste contributing to water pollution. Over the last ten years, the Alto Mayo region has become renowned for its Arabica coffee production that requires large quantities of water and produces a pulp byproduct that, if unmanaged, contaminates soils and water.

The project area of approximately 2400 hectares encompasses the two subwatersheds of the Rumiyacu-Mishquiyacu and Almendra rivers (897 ha) and surrounding forest in the Province of Moyobamba (MINAM 2010a); these drainages supply water to the city of Moyobamba. Due to their importance for water provision, these river basins were declared Municipal Conservation Areas in 2004 (Map 2). At that time, there were no management plans for the upper and middle Alto Mayo watersheds, but the loss of forest cover, the diminishing water supply, and increased sediment load made it clear that land use and management changes were needed for the conservation, regeneration and restoration of the watershed's ecosystems.

About 180 families live in three towns within the Rumiyacu-Mishquiyacu and Almendra Conservation Areas where property rights are unclear. Though settlers do not hold legal title to their plots, they mark the borders and they work the land, but the lack of definition on property rights tends to create and exacerbate land conflicts. Farming plots tend to be relatively small as 79% are ≤ 4 ha (MINAM 2010a). Most of these families are poor farmers who practice traditional highland slash-and-burn to clear areas for their crops that causes erosion, sedimentation and loss of forest cover and biodiversity.



Source: PES Steering Committee Moyobamba 2009

Map 2. Municipal Conservation Areas Mishquiyacu-Rumiyacu and Almendra

Water Users

The water users are the approximately 40,000 inhabitants³ of the cities of Moyobamba. These are the people who benefit from watershed services protected and provided by the project and who pay a monthly fee for the provision of a reliable and acceptable quantity and quality of water.

Present Water Supply and Demand

The present demand for water in Moyobamba is 130 liters/second (L/s). Moyobamba EPS data from February 2011 indicate that the Mishquiyacu-Rumiyacu subwatershed supplied water to Moyobamba at a rate of 50 L/s and the Almendra supplied 15 L/s (MINAM 2012); together, that is 65 L/s or only half of Moyobamba's water needs. To fill the current gap between water supply and demand, two new catchment possibilities exist, Juangillo (10 L/s) and Chiyayacu (30 L/s), but in any case, the Mishquiyacu-Rumiyacu remains the principal water provider for Moyobamba (MINAM 2012). Furthermore, the option to source water elsewhere (or, for that matter, to build a second water treatment plant) is believed to greatly exceed the costs of the IWS (IIED 2012).

2. The Watershed Service

The Moyobamba water company (EPS Moyobamba), which is responsible for the city's water supply, needs to improve water quality, reduce sedimentation and regulate domestic water use for a rapidly growing populace and find a way to absorb increasing costs for water treatment. The EPS is financially limited in that it is not allowed to set its own prices for providing water and investment is restricted to infrastructure maintenance and improvement (as per its Master Plan). The IWS initiative, therefore, provides an alternative mechanism for raising necessary capital to finance diverse activities to protect and improve watershed services.

As the first experience in investments in watershed services in Peru, a survey was conducted on water users' willingness-to-pay that found that 82% of the people interviewed were in favor of paying for watershed conservation (Nowack 2005 in Renner 2010). Subsequently, during a public meeting in 2009, the residents of the Moyobamba urban area agreed to pay an additional fee in their water bill to be attributed to conservation of the watershed (León & Renner 2010).

Watershed Service Providers

Service providers are the 124 farming families living on the upper and middle subwatersheds of the project area. Most of their land parcels are still untitled. Currently, 60 of these families are receiving compensation through the implementation of 21 area-appropriate improved management practices.

Processes for Consultation and Participation

The Alto Mayo pilot project has held extensive consultation meetings over the course of project development at the community and leadership levels and with special consideration to gender issues. Environmental education and outreach to affected communities and urban areas was carried out and a steering committee was established in 2010 with women continuing to have a strong presence on the committee and in special interest groups. This steering committee is essential to the success of the mechanism; it includes representatives of regional and local government institutions, civil society including NGOs, a small agricultural association of people living in the micro-basins, academics, journalists, special interest groups of the city of Moyobamba and the Catholic Church (León & Renner 2010, MINAM 2010b). The Steering Committee carries out the following six principal tasks:

- Develop action plans for the IWS mechanism and for making it sustainable;
- Communicate to stakeholders about the IWS mechanism;
- Resolve conflicts in the project area as they relate to agreements for the IWS mechanism;
- Generate new projects and seek public and private investment to increase funding for the IWS mechanism;
- Oversee fund spending; and
- Monitor indicators for water quality and project governance.

³ Population estimate from Peru's National Statistic and Information Institute (INEI 2010).

3. Identification and Engagement of Investors

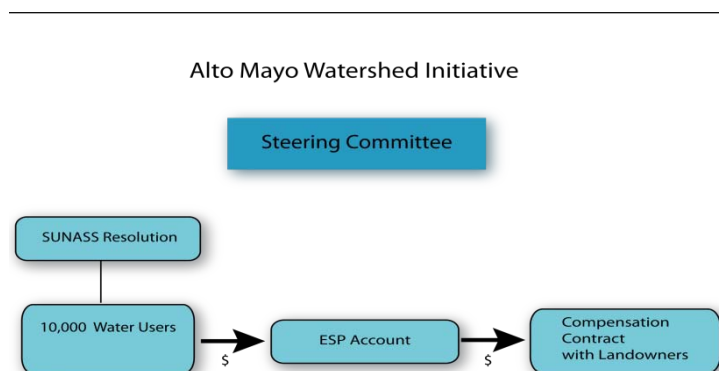
Investors in this project are the direct water users and the regional and local governments through public finance projects. A public investment project of the Regional Government of San Martín (the Alto Mayo Special Project – PEAM) has assumed part of the relatively high transaction costs (est. US\$800 per hectare) to switch from slash-and-burn agricultural clearing practices to agroforestry systems (León & Renner 2010). To give continuity to the effort, a new project with the EPS has been submitted and approved through the SNIP (public finance system) and is scheduled to run during 2013-2015.

Current Investment

The current level of annual project investment is the amount that users are paying for household drinking water. This investment is the sum of individual payments of 1 Peruvian Sol × 12 months × 10,000 water connections = 120,000 Peruvian Soles/year (exchange rate US\$1 = 2.50 Peruvian Sol) for an **annual investment of US\$48,000**. The project's transaction costs are being covered through the PEAM that has thus far invested 500,000 Soles (or US\$200,000). Thus, water users' payments equivalent to US\$48,000 has leveraged US\$200,000 in public support, for a private/public investment ratio of 1:4.

Institutional Structure and Use of Proceeds

The financial structure of the Alto Mayo Watershed Initiative, a water company account that is overseen by the regional Steering Committee, is shown in the project governance flow diagram below. Under the official SUNASS resolution, approximately 10,000 water users contribute monthly to the ESP account that finances interventions for improved farming practices and alternative production activities. As a result, 115 families on the Mishquiyacu-Rumiyacu and Almendra subwatersheds have been receiving compensation since August 2011.



4. Project Preparation and Monitoring

Studies were made to determine the most appropriate water and land management for the subwatersheds. The results clearly indicated the need to improve agricultural practices and control agricultural expansion to reduce deforestation and water contamination. Consequently, 21 specific types of interventions were suggested and supported by watershed service providers. These include income-producing alternatives for local families such as agroforestry systems and bee-keeping in place of slash-and-burn farming to promote regeneration of natural vegetation; tree nurseries for economically-important fruit, timber and shade species to incorporate in agroforestry systems; organic fertilizer produced from coffee byproducts; small animal husbandry (e.g., raising guinea pigs for local markets); composting toilets; efficient wood burning stoves; and marketing support for value-added products such as honey and coffee (León & Renner 2010). These projects, developed within the context of the IWS and described in Table 1, are being implemented as alternatives to unsustainable forest uses.

Table 1. Examples of the projects developed to increase family income while improving the quality and quantity of water in the Mishquiyacu-Rumiyacu and Almendra subwatersheds.

Name of Project	Objectives
Payment for environmental services in the Rumiyacu-Mishquiyacu, Almendra, Avisado and Yuracyacu subwatersheds	Establish agreements between watershed service providers and water users through a fund that (1) will compensate farmers for implementing agroforestry systems with shade trees and living fences and/or activities to protect the environment and (2) will collect payments from water users for domestic, irrigation and other purposes, for sustainable financing.
Bee-keeping as a production alternative for forest conservation in the subwatersheds in the context of the Moyobamba Compensation Mechanism for Ecosystem Services	Addition of a bee-keeping component for honey production to agro-ecological farms under the compensation mechanism to improve income for farmers.
Raising guinea pigs as an alternative production project	Small animal husbandry – guinea pigs as a food source and product for local markets.
Improved management of post-harvest coffee and disposal of coffee byproducts	Management of coffee processing waste and byproduct.
Installation of tree nurseries for shade species for coffee plantations	Tree nurseries for shade species and economically important plants and trees.

Project monitoring

Indicators for monitoring the success of the project are being developed and include (a) water quality indicators (e.g. pH, turbidity and chemical analyses), (b) water quantity indicators to determine availability throughout the year, and (c) the level of successful project governance.

5. Next Steps for Defining the IWS Scenario

The MINAM Incubator aims to ensure that all projects address each of these four different facets of project development: hydrological, institutional, social and economic at different stages of design and implementation.

Based on the Project Advisory Team document “Pago por Servicios Ambientales en las micro-cuencas Rumiyacu-Mishquiyacu, Almendra y las sub-cuencas Avisado y Yuracyacu,” the following list of items (or procedural steps) indicates those that need to be completed and are the basis for Incubator intervention.

- Items are in process or have been completed
- Items are required as next steps in the process

Service providers

- Identification of water service providers and clarification of the project concept;
- Formal inscription of water service providers in the IWS project fund;
- Development of the contract between provider and the project fund;
- Certification of the service and compliance with the terms of the contract;
- Development and implementation of a project monitoring and evaluation plan.

IWS Fund

- ✓ Creation of a steering committee;
- ✓ Agreement about the roles, structure and function of the project fund;
- ✓ Establish payment rates according to selected practices that ensure environmental services;
- Development of a well-structured finance plan;
- Implement the IWS project fund for water and forest conservation.

Water users

- ✓ Clarify the project concept to users of drinking and irrigation water;
- Create a commission of water users;
- Obtain financial support from public and private entities to strengthen the project fund.

6. Conclusions

It is essential to recognize the critical roles of governments, businesses and civil society organizations to engage watershed communities in compensation and incentive based programs to support watershed stewardship and strengthen local governance. A multi-sector financial mechanism is replicable and may create ways to get around seemingly intractable limitations. This IWS has, for example, provided a way to raise funds from the water users to improve watershed services in the face of restrictions placed on the public water company to set its own prices and invest in diverse activities outside its master plan.

The land use and management changes described herein are expected to catalyze a process of environmental restoration on the two subwatersheds over the medium term (five-ten years), regulate water provision and improve water quality, all of which will directly benefit the people of Moyobamba. Environmental restoration is also expected to reduce sedimentation and, in turn, the costs of water treatment for the EPS that is both a water user and a service provider. Other watershed services that will be positively affected by these IWS actions include biodiversity conservation, slope stabilization and erosion control, the aesthetic value of the landscape, and carbon sequestration through an increase in forest cover. From the social perspective, it is expected that a switch to more environmentally-friendly agriculture practices will bring higher economic returns to mid-watershed farmers through access to niche eco-markets such as bird-friendly certified coffee.

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