

Getting the Price of Water Right

Peru's Water Tariffs and Source Water Protection

As global demand for food, energy and shelter put unprecedented pressure on our water resources, protecting water supplies at their source is increasingly critical to ensure the water security of cities. By protecting and restoring forests, grasslands and wetlands, and by reducing agricultural runoff that runs to rivers and streams, cities benefit from having nature retain freshwater, filter pollutants and reduce erosion. These practices increase the capacity and performance of built infrastructure, saving cities money and helping them achieve water security. Funding for watershed conservation may come from a variety of sources but legislation, as that reflected in the new water tariff structure for Lima (Peru), provides the substantial, long-term guaranteed financing needed for source water protection.

Loss of Ecosystem Services

In less than twenty years, population growth, economic development and urbanization are estimated to increase global water demand over fifty percent. By 2030 energy demand will grow by over forty percent while food production may grow by over seventy percent. This will place additional stress on water resources, many of which are already beyond sustainable levels. The services provided by natural ecosystems have been ignored and lost to the point that there is now a growing awareness for the need to recover and maintain them. As the pressure from demographic and economic drivers grows, so does the need for healthy ecosystems and their services. At the same time, the increasing demand for water, food and energy are encroaching and destroying those very same ecosystems.

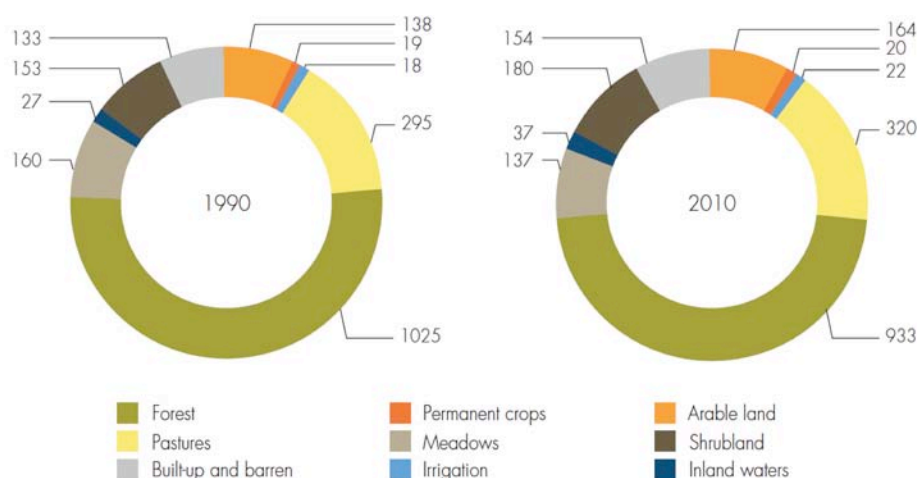


Figure 1. Land uses in Latin America and the Caribbean (LAC) in 1990 and 2010 (in million hectares). LAC has experienced significant changes over the last decades as a result of its great economic acceleration and the strong development of its agricultural sector. Much of these land uses have grown at the expense of replacing natural meadows and even more notably, natural forests. (from Willaarts et al. 2014¹)

The Latin America Context

Latin America faces unique challenges. Its urban population tripled over the last forty years to become the most urbanized region of the developing world, now at over eighty percent. Agriculture and cattle ranching continue replacing vast areas of ecosystems, directly and indirectly impacting water quality and availability. Between 2000 and 2005, sixty four percent of global deforestation occurred in Latin America in conversions to agricultural lands and cattle pastures. The contamination of surface and ground water is a main concern of such expansion in the region. Deforested lands are also expected to decrease rainfall across the Amazon basin through reduced evapotranspiration, producing significant costs to farmers and reducing hydro-electric output. With thirty one percent of the world's freshwater resources, Latin America will see pressure to expand agricultural production as other key food-producing regions of the world deplete their groundwater supplies. Changes in rainfall may lead to seventy percent of Latin America's population living in

¹ Willaarts, B.A., Salmoral, G., Farinaci, J., Sanz-Sanchez, M.J. (2014), Trends in land use and ecosystem services, In: Willaarts, B.A., Garrido, A., Llamas, M.R. (Eds.), *Water for Food and Wellbeing in Latin America and the Caribbean. Social and Environmental Implications for a Globalized Economy*. Routledge, Oxon and New York, pp. 55-80.



water-stressed areas by 2025 causing migrations and land change that put further stress on water infrastructure. This same infrastructure will also have its functions and operations affected by climate change. How urban areas manage their water supplies is a key determinant of their economic future and the well-being of its residents. For Lima, a mega-city in the desert, the situation is dire. The Pacific Basin in which it is located holds over two thirds of the country's population but only two percent of its water resources. In addition to a lack of proper infrastructure, the city's surface water supplies are increasingly facing pollution and its ground water reserves are overexploited and growing scarce. As is the case for most cities in the region, source water protection (**and funding to make it happen**) in Lima is vital to increase water quality and quantity, or at the very least, prevent further deterioration of its watersheds.

Source Water Protection and Natural Infrastructure

Securing upstream water resources is necessary to ensure water for urban populations, but watersheds are vulnerable to deterioration from development, conversion, poor land management, and increasingly from water withdrawals and diversions. Building and operating grey infrastructure to replicate lost services from ecosystems may be more costly and less resilient than protecting and maintaining those ecosystems in the first place. Natural infrastructure also reduces risks from extreme events, which are increasing as a result of climate change. Forests are an example of habitats and ecosystems that can provide resilience. Protecting and restoring habitat is an important and cost-effective adaptation strategy for reducing and mitigating the impacts of climate change on communities and natural resources such as water.

Ecosystems are infrastructure; they generate important economic services as they maintain the quantity and quality of water supplies and help mitigate or avert water-related disasters (Figure 2). These services are reflected in water treatment costs of water supply companies; the lifespan of reservoirs which support water supply and power generation; the mitigation of floods that have great impact on the poorer people of big cities; and the water risks faced by the industrial sector which depends on water as a key industrial resource.

Benefit → Practice ↓	Improved Overall Water Quality	Reduced Nutrient Loading	Reduced Sedimentation/ Turbidity	Increased Water Supply	Lower Flood and Drought Risk	Habitat and Aesthetic Co-benefits
Wetland Conservation	●	●	●	▲	●	●
Forest Conservation	●	●	●	▲	●	●
Green Agricultural Practices	●	●	●	▲	▲	▲
Green Storm Water Management	●	●	●	▲	●	▲
● = Yes ▲ = Under certain circumstances						

Figure 2. This table illustrates various green infrastructure watershed management options for preserving water supply and quality, reducing flood and drought risk, and come with additional co-benefits. (from Talberth et al. 2012²)

To secure enough clean, reliable water to meet human needs without destroying lakes, rivers and aquifers will require fundamental changes in how we manage freshwater. **If cities and industry want to maintain the benefits and savings that ecosystem services provide, it is in their interest to invest in watershed protection.** Water security starts with securing the watershed; that is, by conserving and investing in the natural infrastructure that supplies water—aquifer recharge areas, watersheds, rivers, lakes and their riparian zones.

The region's institutions and water management practices are inadequate to deal with the growing challenge. Water policies and regulations across sectors are usually at odds with one another and water policy lacks coordination between the local and the national levels. Most regulatory frameworks are insufficient to address existing challenges around water. The OECD found that despite the

² Talberth, J., Gray, E., Branosky, E., Gartner, T. (2012), *Insights from the Field: Forests for Water*, World Resources Institute, Washington, D.C.

efforts to foster integrated water policies, Latin America's countries still report significant challenges in coordinating water policy action across ministries and between levels of government³.

The Proactive Approach by Peru

Water tariffs are designed to recover the costs for providing water and sanitation services; this is how utilities ensure proper service delivery and maintenance of existing infrastructure. Cost recovery is done by pricing services and transferring it to users through tariffs. Normally water rates do not include all costs and even rarely include the environmental costs of conserving the watersheds that regulate supply and water quality (Figure 3) to ensure supplies remain sustainable. In June 2015, Peruvian water regulator SUNASS (*Superintendencia Nacional de Servicios de Saneamiento*) developed and approved an innovative new tariff structure for Lima, creating a reserve fund for watershed conservation, restoration and management.

SUNASS is responsible for determining the water and sanitation tariffs and performance goals for the fifty Service Providing Entities (SPE) that exist in Peru. In accordance with the country's legal framework, Peruvian SPEs submit an Optimized Master Plan (OMP) every five years, describing their planned investments over a 30 year-term, as well as their rate increase requests for the next five years. OMPs typically justify rate increases as a response to higher operational capacity needs stemming from increases in population and productive activities.

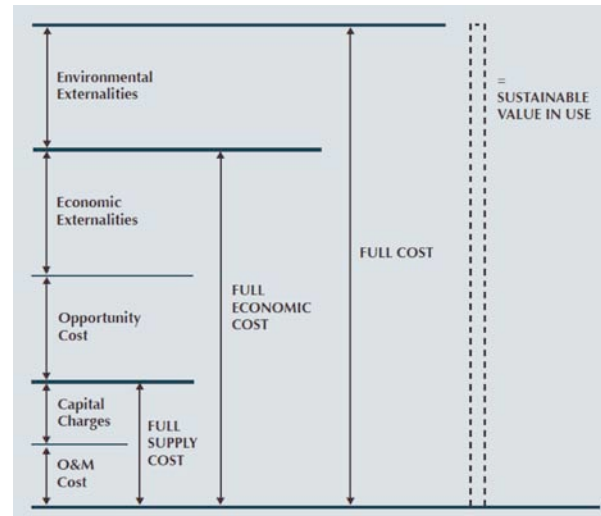


Figure 3. General Principles for Cost of Water. (adapted from Rogers et al. 1998⁴)

To address these increased needs, investment plans have relied solely on "gray infrastructure" projects. Peru's legislation establishes a first-of-its-kind funding for source water protection throughout the country. SUNASS's recognition that investing in the conservation of hydrologic ecosystem services is essential for sustainable water resources represents a fundamental change. **SUNASS requires OMPs to earmark one percent of revenue to invest in natural infrastructure and, in the case of Lima, three and a half percent (average) for disaster mitigation and climate change adaptation.** For Lima, this represents an estimated US \$25 and US \$92 million respectively over the next five years⁵.

The Legal Framework

Peru's Water Resource law recognizes water's sociocultural, economic and environmental values. Three recent laws are key to provide the funding for source water protection from water tariffs:

- **The 2013 Sanitation Services Modernization law** requires SUNASS, together with each SPE, to establish environmental compensation mechanisms and watershed management in their OMPs. Based on these OMPs, SUNASS approves the definitive tariff study in which tariffs are set, tariff increases are justified and investment portfolios are defined.
- **The 2014 Mechanisms for Ecosystem Services Compensation (MRSE by its acronym in Spanish) law** aims for these instruments/mechanisms to channel financial resources to be invested in the conservation, recovery and sustainable use of sources of ecosystem services through agreements between parties. The adoption of this law provides an endorsement and formal recognition of MRSE, promotes the involvement of public and private sector in the conservation of the sources of ecosystem services, and stipulates that the actions of those who retain these services can be paid. Finally, it recognizes MRSE as a management tool that seeks to ensure the permanence of the benefits generated by ecosystems.
- **The 2015 modification of the Sanitation Services Modernization law** allows the private sector to administer the reserve funds and thus increase flexibility towards implementing and executing the kind of projects associated to the two reserve funds approved for SEDAPAL.

Although in Lima, where the country's largest SPE, SEDAPAL, serves over 10 million people, the earmark of one and three and a half percent of revenue represents a significant amount to invest in source water protection over a five-year period, SUNASS can increase this earmark within the current tariff's five-year period if the viable projects exceed the current amount. The challenge now is to find a suitable and efficient vehicle to invest the earmarked resources in projects that maximize the return in terms of hydrological services. For Lima and its over 10 million residents, this is especially critical considering that the city's SPE does not have prior experience designing and implementing natural infrastructure projects.

The Aquafondo Water Fund

The Nature Conservancy (TNC) has been working in partnership with SUNASS on the new tariff structure by using a costing methodology. This first of its kind methodology includes environmental criteria in calculating the water tariff and leverages the

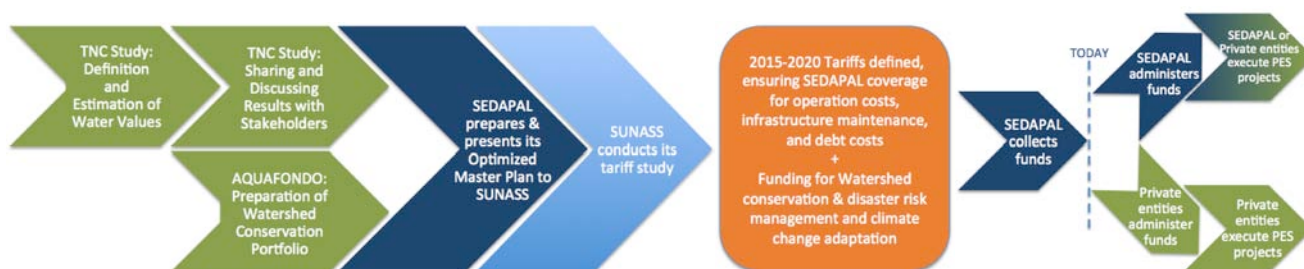
³ Akhmouch, A. (2012), *Water Governance in Latin America and the Caribbean: A Multi-Level Approach*, OECD.

⁴ Rogers, P., de Silva, R., Bhatia, R. (2002), *Water is an economic good: How to use prices to promote equity, efficiency, and sustainability*, Water Policy, 4 (1): 1-17.

⁵ Exchange rate: 3.42 Peruvian soles per US dollar.

country's ecosystem services regulatory framework. Establishing a critical path for implementing this new tariff structure based on enabling legal and political conditions was key to success. Equally important was the broadening of inter-agency collaboration and deepening the support for pivotal decision-makers.

The earmarks approved by SUNASS provide funding for Payment for Ecosystem Services (PES) projects that might be executed either by private entities or by SEDAPAL itself. In this context, Aquafondo, a water fund created to protect Lima's watersheds, came into play by mapping and developing a portfolio of projects that accounts for part of the fund that has been approved in order to comply with the MRSE law. Under the new tariff structure, Aquafondo may provide a suitable vehicle for implementing the newly available resources. Aquafondo in turn needs to build solid scientific monitoring and evaluation into projects it implements to provide the empirical evidence national authorities require to justify and modulate this new compensation scheme as a permanent component of Peru's water management system. TNC, Aquafondo and other stakeholders are working with SUNASS and SEDAPAL to identify the most efficient and effective way to identify and implement natural infrastructure projects in Lima's source watersheds. With SEDAPAL's lack of experience in natural infrastructure projects, Aquafondo serves as a strategic partner. To implement such projects requires not only technical abilities to design a conservation plan with high hydrological impact, but also the ability to develop relationships with communities that have a direct influence on the conservation areas.



For TNC and Aquafondo, Peru demonstrates the importance of articulating a comprehensive strategy with technical, legal, and political components, working closely with local partners – public and private – over a sufficient time period to get results. Water security is a challenge that requires collective action. Public policy is crucial to create the conditions for different stakeholders to take coordinated actions, in this case, towards the protection of water sources. In the case of Lima, the building of a virtuous system where water users finance the protection and restoration of water producing areas is under way. Aquafondo will play a crucial role in facilitating the communication between users and producers, identifying where it makes most hydrological, ecological and economic sense to act, and what activities are the most needed.

ADERASA and Watershed Conservation in Latin America

As part of TNC's goal to use nature to secure clean water supplies for Latin America's cities, one strategy involves getting the cost of water right. The focus of this strategy centers on incorporating watershed conservation costs into water tariffs. Including the cost of conservation into the tariff structure moves the use of water to more efficient and sustainable levels and ensures long-term funding for watershed conservation, restoration and management.

The TNC-SUNASS partnership is a result of a region-wide strategy to mainstream watershed conservation. TNC and ADERASA (Asociación de Entes Reguladores de Agua y Saneamiento de las Américas), the region's association of national water regulators, are collaborating on common interest areas related to water security, integrated water resources management, regulation of water and sanitation, as well as investment in green infrastructure. TNC and ADERASA's first joint action was the development of a methodology for calculating water tariffs that internalize the cost of conservation of water sources. Accordingly, SUNASS has approved an earmark of 1% of the SPE's monthly turnover that will finance PES projects. Moreover, TNC and ARESEP (Autoridad Reguladora de los Servicios Públicos) from Costa Rica began collaboration on developing the methodology for SPEs in that country. TNC is also pursuing a similar collaboration with AGESAN, the water regulator for Santa Catarina State in Brazil.

For more information about water funds and the role of natural infrastructure for source water protection in Peru, please contact Luis Alberto Gonzalez (lgonzalez@tnc.org) or Jeffrey Cowan (jcowan@tnc.org).



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