Lima, Peru

Moving towards an integrated model for efficient water management in Lima

To address the vulnerability of its water supply to the present-and-future effects of pollution and climate change, Lima Metropolitan Area is strengthening its water governance through the creation of the interregional Water Resource Council for the Chillón, Rímac and Lurín river basins. The Council will form a single, participatory water management authority to investigate, implement, and finance integrated solutions for the three watersheds.

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Water management concerns in Lima

Future climate change scenarios (which indicate a decrease in river flows) suggest that the water supply in Lima is highly vulnerable. These concerns are exacerbated by the fact that the river flows that serve *Lima Metropolitana* are already highly polluted. Designing and implementing solutions to these problems requires strengthening water governance, having an environmental authority to lead the process, and allocating financial resources for the implementation of effective solutions.

With low annual rainfall, the urban water supply in the Lima-Callao Metropolitan Region is dependent on three surface and groundwater basins - the Rimac, Lurin and Chillon – whose flow is estimated to decrease by up to 30 cubic meters per second every year due to climate change. This flow will not be sufficient to meet the demand for various agricultural and non-agricultural water uses, and will likely lead to the the exploitation of aquifers. Further, the quality of the water has already been compromised by high heavy-metal contamination and microbiological load in the three streams, as well as by the dumps and connectors on its banks.

Lima Metropolitan Area not only hopes to both maintain sufficient water distribution and significantly improve the quality of its water supply, but recognizes that this requires the strengthening of water governance in the city through a process that will require the participation of all stakeholders.

As in many South American cities, water management depends on various public actors and departments which operate within different levels of government in Lima. The regulation and authorization for the use of surface and groundwater, as well as the control of riverbanks, is within the purview of the National Water Authority. The supply of potable water and the collection, treatment, and disposal of wastewater depends on the public company of the national government - SEDAPAL. The Metropolitan Municipality of Lima has no oversight of these operations and does not participate in the decision-making process for the actions executed by either organization. Similarly, the remediation of byproducts from surface mining is the responsibility of the national Ministry of Mines and Energy. The Municipality is, however, active in tackling climate change, as well as environmental control and inspection of solid waste from construction. The latter are the shared responsibility of the national Ministry of Housing, Construction and Sanitation, and of the Metropolitan Municipality of Lima (which receives support from towns within the metropolitan area).

Facts & Figures

Population / Land area
8.8 million / 2.819 km² (2014)

Muncipal budget
$450 million USD (2014)

GDP per capita:
$17,852.69 USD (2014)

Local economy
Industry, Trade and Finance

URBAN LEDS
URBAN LOW EMISSION DEVELOPMENT STRATEGIES

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A new support tool: the calculation of the water footprint

Through the Cities Footprint Project (Huellas de Ciudades), the City of Lima calculated its water-demand footprint for the first time. The results for 2012 indicate that the total direct footprint of Metropolitan Lima is 6.398.458.039 cubic meters (m^3). This figure is composed of 99% gray water (fresh water used to dilute pollution), 1% blue water (irrigation water used), and less than 1% green water (rain water used).

The breakdown-by-department for the total Hydro Direct Footprint of Metropolitan Lima reveals that water use is highest in the residential sector (95%), followed by the commercial sector (4%), and finally by the industrial and public sectors (0.3%). It is important to clarify that the data from the industrial sector is incomplete in regard to issues such as water sales to industry or the quality of effluent water. This incomplete data exposes a supervisory challenge for Lima's water management.

The regular water-demand footprint will allow Lima to direct its public policies toward the decrease in consumption in the most significant areas of water use.

Even though the Metropolitan Municipality of Lima has no jurisdiction over potable water and sanitation, it has been able to engage with these resource areas by creating tools and instruments which **promote efficient water management** by focusing on supply and demand for water resources. As a result of these tools, a diagnosis of the water footprint of the city has been carried out, and a series of measures for the efficient use of water have been proposed.

In order to strengthen water governance, the Metropolitan Municipality of Lima, along with the Regional Governments of Lima and Callao, presented the National Water Authority with a proposal to create the Water Resources Council of the Chillón - Rimac - Lurín Interregional Basin. This initiative, fully funded by the regional governments of Lima and Callao, and Lima's City Hall, will be the first in Peru to integrate three regional governments and three basins.

The comprehensive water management concept has been integrated with the territorial planning tools used by the City. The 2035 Metropolitan Urban Development Plan, which maintains a territorial and environmental perspective, includes specific proposals for intervention in urban land. It also sets standards as well as promotes, guides and recommends actions and measures that contribute to achieving both equity and sustainability in the targeted land area. The Plan includes actions for the conservation and enhancement of rivers, and contains a number of projects to improve their environmental quality and restore their utility for the public.

Photo: Lima Metropolitan Municipality

From traditional management to integration and governance

The management of water in Lima

More than 1,000 stakeholders - representing agriculture, industry, mining, energy, recreation, aquaculture and communities - make use of the surface water and groundwater of the three basins.

The main demand on the water within the basins is residential - supplying the needs of the population. In the Province of Lima, the company that provides sanitation, potable water, drainage, and wastewater treatment services is the potable water and sanitation service company of Lima – SEDAPAL. SEDAPAL, which operates under the Ministry of Housing, Construction and Sanitation, serves 51 districts, and is responsible for the Province of Lima, the Constitutional Province of Callao, and part of the Huarochirí Province.

The diverse variety of stakeholders has resulted in an increasingly complex process for participatory management of water in the City. For instance, not all agricultural users are documented members of the User's Board of the three rivers; yet some are part of committees or commissions which are not integrated to the respective boards. This confusion, and lack of formal association membership, also applies to several non-agricultural users, including stakeholders involved in energy, industry, and mining.

The turning point of governance: the creation of the Basin Council

In 2009, a national Hydrologic Resources Law (Law #29338) was passed, replacing legislation that had been enacted since 1969. Law #29338 emphasizes that water is the property of the nation, and that human consumption is the top priority for use. It also notes that agricultural demand for water should no longer be prioritized at the expense of other sectors. The enactment of the law reflected the necessity for active and ongoing participation from members from the National Water Resources Management System in the planning and coordination of the sustainable use of water resources. For Lima, the Water Basins Resource Management Plan is focused on making the spirit of Law #29338 a reality.

Because a participatory process is used to involve the stakeholders of the interregional Lima basin, 19 representatives were designated and elected to the Council of the Interregional Water Basins de Chillón, Rimac, and Lurin. The Council is composed of the Administrative Authority of Água Cañete Fortaleza, land users, non-land users, regional and local governments, universities, professional schools, and laborers.

In total, 30 meetings took place in the three basins - Chillón, Rimac, and Lurin - accounting for interaction with 70 percent of the identified stakeholders. The process of facilitating these meetings and forming the Council is the result of cooperative work between the Regional Government of Lima, Callao Regional Government, and the Municipality of Metropolitan Lima (MML). It has been collectively decided that the MML will initially preside over the Council, which was scheduled to be formalized after approval by the Ministry of Agriculture in late 2015.

The Urban-LEDS Project

An Urban Low Emissions Development Strategy (Urban LEDS) defines a pathway to transition a city to a low emission, green and inclusive urban economy, through its integration into existing city development plans and processes.

The Urban-LEDS project (March 2012 - March 2016), funded by the European Union, was jointly implemented by UN-Habitat and ICLEI. It supported local governments in emerging economy countries (Brazil, India, Indonesia, South Africa) and in Europe to transition to urban low emission development using ICLEI's GreenClimateCities methodology, comprehensive process guidance, to integrate low emission strategies into all sectors of urban planning and development.

The water sector is part of this exploration of low emission development.

For more information, please visit: **http://urbanleds.iclei.org**

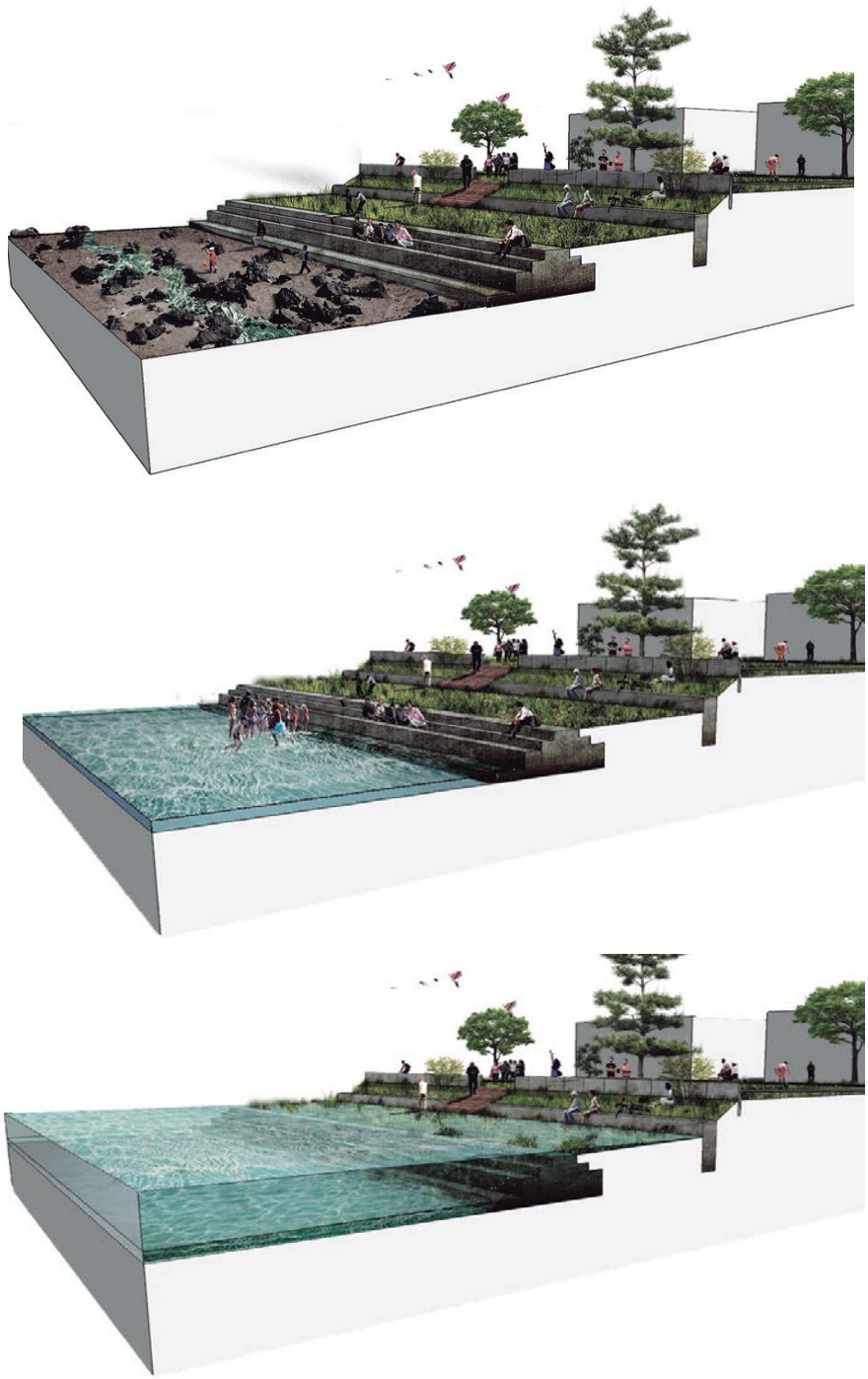
Photo: Lima Metropolitan Municipality

Ensuring the quantity and quality of water

To contribute to meeting the above challenges regarding the quality and quantity of water resources in the city, the MML implemented a series of initiatives between 2011 and 2014, including:

Changing water sources used for irrigation of green areas

In order to reduce the consumption of potable water to irrigate parks and gardens, the MML undertook the construction of five wastewater treatment plants in large zonal parks that it manages, as well as in new parks under development (Lloque Yupanqui, Flor de Amancaes, Sinchi Roca, Cahuide, and Santa Rosa). The treated water not only serves to irrigate the zonal parks, but also the verges and green areas of neighboring areas.



A 3D-visualization of the Riverside Parks project

Constructing the technical irrigation systems and treatment plants will require a total investment of $3.25 million USD. This is part of a larger improvement initiative for the creation of new parks that will require an investment of $84 million USD.

Environmental protection and improvement of riverbank

Seeking to protect and restore river banks from the effects of solid waste from construction, the Urban Development Plan and Lima Parks Service identified a number of project areas to pilot public spaces called Riverside Parks. These projects construct coastal defenses for the prevention and control of floods, recover the riparian area vegetation, and provide basic equipment for sport, recreation, and urban agriculture.

The Rimac River is Lima's main water source, and thus required considerable immediate attention. This was addressed within the Lima Urban Development Plan, with its Structuring Plan of Public Areas of the Rimac River that suggests maintaining and/or recovering and upgrading of 35 linear kilometers of riparian belt, from Chosica to Callao. At a macro scale, the structuring plan includes the enhancement of connectivity between the two banks of the river, as well as the restoration of existing urban agricultural production areas in Callao and Huachipa. At a smaller scale, the proposal includes the construction of coastal barriers in critical stretches of the river, as well as the creation of a linear corridor for public use. This corridor will

include a pedestrian promenade, areas with basic urban infrastructure for relaxation, a recreational bike path, and public spaces and parks for recreation and leisure.

The plan also includes the creation of different coastal parks, and one of these riverbank parks is part of the Via Parque Rímac (VPR) Project. The VPR Project will connect Ate to El Callao, allowing vehicle commuters to travel between the two locations within 20 minutes. The project also includes the construction of 11 viaducts and 9 kilometers of new roads, including a tunnel 2 kilometers below the Rimac River. Through these initiatives, 6 kilometers of the Rimac River will be recovered, thereby eliminating solid and hazardous waste and creating new green areas. The project also provides for the development of the 25-hectare Grande Cantagallo Park.

Other conceptualized riverbank parks are the 12-hectare Malecón Ecológico Chaclacayo Park which incorporates 4 kilometers of the Rimac River in the Chaclacayo district, the Lurin River Park in Pachacamac, and the Chuquitanta Park in the Chillón Basin.

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Municipalidad Metropolitana de Lima

Lessons learned and replicability

The integration of projects allows mutual benefits and reduced costs. The recovery and protection projects for river environments have the potential to change the long-term city landscape, so it is necessary to plan them in an integrated manner to fully take advantage of the connection opportunities.

Water management presents both challenges and opportunities. Managing water demand is an important source of opportunities to increase resource and system efficiency, and should be treated as a priority area of intervention. However, in order to achieve good management, it is necessary to involve and coordinate the interests of the various stakeholders involved in the process.

A good governance structure is essential for efficient water management. The Basin Council is being created to promote a feasible and joint agreement between all parties. The hope is that this will avoid conflicts in the future and can foster cooperation.

Connect sectoral approaches to strategic aims. It is valuable to embed such sectoral approaches in the urban master plan and the low emission development strategy - enabling a win-win approach.

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