New water from fog catching

Lima, Peru

water scarcity impact

Reduced withdrawal	●
Reduced consumption	
Improved water quality	
Increased productivity	
Net basin benefit	●

volumetric impact

300 m^3/yr

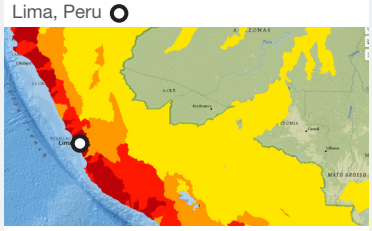
capital cost

$12 900

Estimated Unit Cost of Water

250 ¢/m^3

Water Stress
Lima, Peru



Arid & low water use
Low (<10%)
Low to med (10-20%)
Med to high (20-40%)
High (40-80%)
Extremely high (>80%)
No data available

Water Stress Map:
F. Gassert, P. Reig, T. Shiao, M. Luck and M. Landis, 2015. "Aqueduct Global Maps 2.1."

Confidence level
Low Medium High

Water Scarcity Impact Key
Main Minor

Credits
We wish to acknowledge the input and the support of Ms Anne Lummerich and Dr Kai Tiedemann from Alimón e.V. in the preparation of this case study.

Project Overview

Lima has a long history of serious deficit between water supply and demand, resulting from inadequate water management, rapid population expansion, low rates of rainfall, soil and riverbed erosion and groundwater depletion. Some newly-established communities of Lima, at the outskirts of the city often do not have access to public water supply and rely on delivery trucks which sell water usually for up to ten times the standard municipal rates.

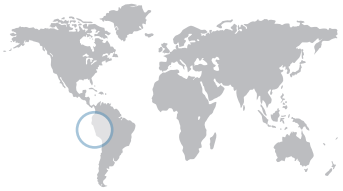
Lima gets an average of just over 25mm of rainfall per year. However, from June to November much of the city is covered in thick sea mist that does not precipitate. The Green Desert project aimed to harness the potential of the mist to bring additional source of water for the communities living in the outskirts of Lima. The project was delivered in the Bellavista community in Villa del Triunfo settlement after consideration of the geographical suitability of the location and the community eagerness to participate.

Key Elements

- Producing water for domestic use from the sea fog by installing a fog catching system.
- Planting of approximately 1 000 trees for slope stabilisation and natural fog collection.
- Capital cost of $10 000 funded by the Global Exploration Fund and private donors.

Key Outcomes

- Between 200-300m^3 of water captured annually by the five fog-catchers.
- Water collected from 25 of the planted trees was estimated at approximately 50m^3 per year for the fog period.
- Improved quality of water for satisfying regular household needs.
- The project was successfully replicated in two nearby communities.



Lima, Peru

Intervention Features

- Fog collection
- Irrigation systems
- Stakeholder engagement

Project Levers

The project was implemented in two separate stages. The first stage involved the installation of fog catchers and the plantation of trees, which were to be irrigated by the water collected from the fog. The second stage included the development of a water collection system underneath the trees, small garden allotments and a water filtration system.

(1) Community Involvement

The community of Villa del Triunfo was engaged from the start of the project and their active participation was crucial for the project's success. Over the initial set up of the project, the community provided over 600 hours of voluntary work from up to 150 volunteers.

(2) Construction of Fog Collecting System

Five fog-catchers were installed above the settlement. The fog carried by the wind condenses on the collectors net and droplets are collected by pipe installation underneath. Water storage tanks with capacity 100m^3 were built to provide water supply for periods without fog.

(3) Planting Trees

Over 1 000 trees were planted, selecting species adapted to the adverse climate and whose canopy could potentially serve as a natural fog collector. After one year, pilot water collection system was built to convey excess water from underneath 25 of the trees to the storage tanks. A sand filtration system was installed to purify excess collected water for domestic use.

(4) Rent from Garden Plots for maintenance

Water collected from the trees and from the fog catchers is used to irrigate new garden plots. The owners of the plots give portion of their income as a rent to a common account set aside for maintenance of the fog catchers.

Outcomes and Challenges

Environmental Benefits

Through the fog-catching method, water otherwise unavailable for use is being introduced in the catchment and less water is abstracted from the dwindling aquifers of Lima. The planted trees, by self-irrigating, help the restoration of the natural water cycle in the region. In addition, the trees help the stabilising the hill slopes and reduce soil erosion.

Community Benefits & Sustainable Maintenance

The water captured by the fog-collectors has reduced the local community's dependency on water delivery vendors and improved the living conditions in the settlement. A new committee has been founded to manage the maintenance of the fog-catching system and allocate the garden plots to impoverished women from the community.

Project replication

Following the success of the project in the Bellavista community, two neighbouring communities have since replicated the project for half the initial cost. Similar projects have been conducted in Chile, Nepal, Eritrea, Morocco, Guatemala and Ethiopia.

Finding Suitable Locations

The success of fog-catching is dependent on having the right geographical and meteorological conditions. It is applicable in coastal areas with an altitude of 400 to 700m above sea level or mountain areas of altitude of 1800m above sea level. In areas like Peruvian coast, it can provide a cheaper alternative to building desalination capacities.

Above: Standard fog-collectors (© Anne Lummerich)