



## Ancestral technology, cheese and water for Lima

This is a story that inspires us; the rural community of Huamantanga decided to recover an ancient technology for harvesting water called “mamanteo”. This has resulted in a water sources conservation process used as a basis for improving its agricultural production, as well as availability of water for the city of Lima.

The village of Huamantanga, which pertains to the district of the same name in the province of Canta in the Lima region, is located in the upper part of the Chillón river basin. The Chillón River is one of the sources of water for the city of Lima.

Huamantanga, which means the “place where the falcons roost”, is a district with a long history. In its territory, one can see the influence of pre-Inca and Inca cultures, as well as the subsequent Spanish colony, in a culture of water where this valuable resource has always been associated with a divinity. During the pre-Inca and Inca times, sources of water were associated with *huancas* or sacred stones through which people connected with nature in spiritual ceremonies in which the entire population participated. In Huamantanga, “mamanteo” systems that preserve the *huancas* can currently be found.

During the colonial era, *huancas* were replaced by the Cross. To this day, the people of Huamantanga erect crosses in gratitude for life-giving water. Each cross is cared for by a local resident who is responsible for its maintenance throughout the year. In this manner, there is continuous vigilance

of water sources. Every year, the people of Huamantanga hold a water festival during which they do maintenance work on their irrigation infrastructure and their sources of water. Up until some years ago, they maintained “mamanteo” systems; this has been discontinued, but we hope it will be resumed soon.



Photo No. 01: Cross safeguarding the mamanteos of the community of Huamantanga.

**Photo No. 2:** The photo shows an infiltration point, a small lake to where water is channeled from intermittent streams that feed into springs used by the population downstream.



“Mamanteo”, also known as “amuna”, is an ancestral technology for infiltrating and harvesting water. It consists of channeling water from streams to previously identified high infiltration points, for the purpose of infiltrating water into the soil and subsoil in the rainy season. In this manner, it is stored and feeds springs in the dry season. In Huamantanga there are more than 30 mamanteo systems in the upper part of its territory (where its water sources are located).

In Huamantanga, communal land is allocated among members of the community for their use as occupants. The main economic activities in Huamantanga are agriculture and livestock raising. The crops grown are primarily potatoes, fava beans and forage for milk production, while the main product for commercialization is cheese, which is sold in markets on the north side of the city of Lima.

For some time, Huamantanga has been caught in a vicious circle in which its residents’ need to improve their incomes has led to intensified grazing in ecosystems that provide water (the upper part of its territory). Consequently, the availability of water for irrigation has decreased and the availability of grasses has diminished as well, meaning that families have increasingly smaller incomes. This has increased pressure on ecosystems, and so the problem has worsened, falling into a downward spiral.



**Photo No. 3:** Launch of the rehabilitation of a mamanteo system in Huamantanga



**Photo No. 4: Area set aside for conservation of grasses**

Reversing this situation first requires improving the availability of irrigation water in sources used by the community. For this purpose, it will be necessary to improve the health of the ecosystems that provide water. Greater availability of water will generate greater confidence for investment in agricultural technification. More and better cheeses will be produced and, with adequate organization, they will gain entry to better markets. In summary, the vicious circle needs to be turned into a virtuous circle in which the welfare of ecosystems brings about the welfare of its inhabitants.

This is something the rural community of Huamantanga has begun working on with support from the Alternativa NGO and the Lima Water Fund - Aquafondo. They decided to recover a “mamanteo” system, which is an ancestral technology for increasing soil water-holding capacity and harvesting water. According to the farmers, mamanteo has increased the availability of water in one of the community’s springs downslope. This has motivated the community to continue working on the conservation of water sources. This year, the decision was made to close off a grazing area in order to recover the vegetation cover (native grasses), thereby fostering better water regulation in the basin, which is reflected in greater availability of water for the dry season (July – October).

This is a decision we applaud because it is a concrete, effective measure for recovering and maintaining water sources. It is aimed at reversing a negative situation in order to begin a sustainable process that is fundamental in a context of climate change. For this reason, CONDESAN, with support from Stanford University’s Natural Capital Project and Aquafondo, is implementing a hydrological monitoring system for the purpose of quantifying the hydrological benefit of the recovery of the vegetation cover (native grasses) in the area closed off to grazing.

With this monitoring system, we hope to show the hydrological benefits of conservation for the community, as well as for the Chillón basin.



**Photo No. 5: The photo shows the 4 rain gauges installed in two microbasins monitored. The parameter monitored is precipitation with a 5-minute data-taking frequency.**

**Photo No. 6: The photo shows two mixed v-notch (triangular) - rectangular sharp-crested weirs built in each of the microbasins monitored. The parameter monitored is water level with a 5-minute data-taking frequency.**



The monitoring system implemented in Huamantanga is for the purpose of assessing the hydrological benefit of conservation of grasses. The methodology used is promoted by the iMHEA (<http://imhea.condesan.org/>), in which two basins very close to each other are selected. One of them serves as a control or reference basin and the other is where the action implemented, in this case the recovery of degraded grasses, is assessed.

The monitoring system seeks a detailed understanding of the relationship between rainfall and flow in each of these basins and, by means of comparing the hydrological behavior of the basins, to determine the hydrological benefit obtained from the conservation of grasses. This requires producing continuous information using data taken frequently (every 5 minutes). This is made possible by the use of automatic equipment, which can be found on the market in different brands and models.

## **Water for Lima**

In order to build a safe building, solid foundations are needed. The same goes for healthy basins, but unlike a building, a basin's solid foundations are built starting at the head of the basin. The actions being implemented by the community of Huamantanga will undoubtedly bring benefits to the basin as a whole, among them better water regulation in the basin that will also benefit residents of the lower part; that is, farmers in the Chillón Valley and residents of the north side of the city of Lima.

However, the impact that can be expected from this specific action in a small part of the basin is almost insignificant, due to which it is necessary to expand the intervention area of this type of conservation actions. For this purpose, mechanisms for sharing water benefits (<http://mcb.condesan.org/>) among those who use the water in the lower part of the basin — farmers in the valley and residents of the city of Lima, for example — with those who decide to preserve the ecosystems that provide the water are necessary.

These mechanisms are increasingly playing a more important role in integrated water resource management. Therefore, the state is promoting their implementation (see new laws in this regard)<sup>1</sup>. Here, reference is made to Law No. 30045, Law on Modernization of Sanitation Services, which states that the SUNASS, in coordination with drinking water service provider entities (EPS), must include environmental compensation mechanisms aimed at promoting efficiency in water use and waste water treatment in its rates.

Within the framework of this law, Lima's water company Sedapal and the management of the Chillón, Rímac and Lurín basins should prioritize effective actions in which to invest. In this regard, the experience in Huamantanga will provide fundamental information, based on which more effective mechanisms can be designed.



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Law No. 30215, Law on Compensation Mechanisms for Ecosystem Services, and Law No. 30045, Law on the Modernization of Sanitation Services