

# The Use of Reservoirs to Improve the Quality of Urban Irrigation Water

Scarcity of water, pollution of rivers with untreated wastewater and the use of this water for production of food all generate serious health problems, especially for the poorest and most vulnerable sectors of the population. This is the case in Lima, the capital of Peru, where more than 8 million people live essentially in a desert. The Rimac River, which is the city's main source of surface water, is polluted by various activities carried out along its basin. Studies carried out by the International Potato Center (CIP) between 2005 and 2007 (Moscoso et al., 2007) confirmed that the irrigation water in the agricultural area of the Eastern Cone of Lima, where over 35 percent of the vegetables that are sold in Lima are produced, is heavily contaminated with parasites and faecal coliforms (the concentration of faecal coliforms is more than 5,000 times the level permitted for water meant to irrigate vegetables).

In this context, the CIP proposed the implementation of a (river) water treatment system based on the use of reservoirs in order to promote agricultural irrigation with good quality water and thereby guarantee the production of vegetables without any health risks to consumers. The earthen reservoirs are covered with a membrane, and are 11 by 15 meters wide, and have a capacity of 165 m<sup>3</sup>. The simple treatment process consists of keeping water in a reservoir for a period of seven to fourteen days. Under these conditions, the bacteria are not capable of living, and the parasites settle to the bottom and eventually die, leaving the water acceptable for irrigating produce. CIP research confirmed that storing river water for more than 10 days in the reservoirs can totally eliminate human parasites and reduce faecal coliforms to the levels stated in the national General Water Law for farmland irrigation. In addition, the treatment system is complemented with a technical irrigation system using "multi-floodgates", which enables a significant saving of water and easier irrigation.

In addition to improved quality of the irrigation water, the other advantages of these measures are:

- increased availability and more efficient use of water, which is enhanced by a technical irrigation system that reduces water usage by 50 percent compared to earlier methods;
- additional earnings from production of fish in the reservoirs;
- an increase in productivity and profitability of almost 50 percent in growing vegetables. This is due to the availability of nutrients in the reservoir water from the fish farming and a reduction in the growing period, which allows the farmers to get their crops to the market early.

This increased productivity easily compensates for the use of land for the reservoir and the investment made in installing it. This integrated production system provides a high-quality, low-cost protein source for the producers and for the very low-income families living in the neighbouring settlements.

*The Bonifacio family's farm is located at the end of an irrigation channel. Before the new system was installed the family was ready to give up farming and sell the land because they didn't receive any water any more. With a reservoir in place the family now plants vegetables again, and is guaranteed safe water for up to 15 days at a time, including when the normal water supply is interrupted due to maintenance work (which affects all farmers two times per year). The Jaulis family sells its produce to suppliers of supermarket chains and gets a higher price because of the improved quality of the products. These crops use less chemical fertilisers and pesticides, and this could lead to a recognition of and market for organic production. The Serna family has a reservoir of 2,400 m<sup>3</sup> in which it produces fish. The family is planning to install a recreational area with a restaurant, in order to take advantage of their new "lake".*

These and other success stories about the use of reservoirs to improve the quality of agricultural irrigation water have led to an alliance between the Urban Harvest Program of the International Potato Center (CIP), the Board of Users of the Rimac River, the Municipality of Lurigancho-Chosica and local farmers to promote this initiative in the rest of the watershed and in other valleys of Peru.

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## References

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