

## COMPARATIVE EVALUATION OF MANAGEMENT AND COSTS IN DECENTRALIZED DOMESTIC WASTEWATER TREATMENT SYSTEMS

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### ABSTRACT

A comparative evaluation of the costs of wastewater treatment has been carried out in 6 different decentralized plants, located in the towns of Cliza, Ucureña, Tolata, Punata, Tarata and San Benito, in the Upper Valley of Cochabamba that serve populations of intermediate size (from 4 500 to 25 000 inhabitants). The annualized investment costs (CAPEX/useful life), the annualized cost of operation (OPEX) were estimated, and the management characteristics and efficiencies of the plants are described. The results of the CAPEX/useful life for the WWTPs of Cliza, Ucureña, Tolata, Punata, San Benito and Tarata were 44 566; 34 603; 22 414; 97 194; 25 412 and 36 399 USD/year, respectively. The OPEX for these WWTPs were 21 613; 28 625; 16 720; 19 841; 19 404 and 19 766 USD/year, respectively. Costs per cubic meter range from 0.13 to 0.48 USD/m<sup>3</sup>. It was observed that a lower cost per volume of treated water is related to a lower efficiency in the treatment system. On the other hand, it was found that the low percentages of contaminant removal are affected by the lack of proper operation and maintenance. Greater deficiencies in operation and maintenance occurred in the Tarata and San Benito WWTPs, managed by the municipality. The Punata WWTP, although it is adequately operated and maintained, presents relatively low efficiencies limited by technology. The Tolata, Ucureña and Cliza WWTPs managed by the Aguatuya Foundation under an international cooperation program showed better removal efficiencies.

**Keywords:** Wastewater, Annual Equivalent Cost, Treatment Efficiency, Investment Costs, Operation and Maintenance Costs.

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