Description / Abstract

This paper reports research estimating the costs of replacing the groundwater that the metropolitan areas of Mexico City, Toluca, and Cuernavaca, in Central Mexico, pump from 10 over-exploited aquifers with 6 supply alternatives of surface water. These aquifers provide about 70% of the water required by more than 28 million people, and their recharge zones in forested areas are increasingly threatened by economic activities. By designing a constrained optimization program that minimizes investment and operation costs, we found that replacing groundwater extraction involves the construction of all six alternatives at an estimated cost of US$25 billion at present values (US$0.6 m⁻³ over a 26-year period). We designed and analyzed a scenario to combine measures to reduce water leaks in Mexico City; a positive balance was found: every dollar invested in leak control reduces replacement costs by between US$1.9 and US$8.4. Therefore, our results suggest the prioritization of leak control measures in order to reduce extraction from over-exploited aquifers. Local authorities should be warned about the economics of losing ecosystem services that are crucial to sustaining the population and the economic activities in the region of study.

Publication year
2017

Country
Mexico

Region
Americas

Publisher
Water

Keywords
replacement cost method Cost-based Approach
Economic Value of Water

D1.02

Source URL: https://iwrmactionhub.org/resource/valuation-hidden-water-ecosystem-services-replacement-cost-aquifer-system-central-mexico