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Updating Water Demand Models for Systems with Alternative Resources

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ABSTRACT

Demand prediction for water distribution systems is essential to successfully approach suitable decisions on network operation and management. This makes possible to meet flow and pressure objectives in the supply of clean water [1]. In places fostering the use of alternative supply sources as a complementary part for water distribution, demand models should consider the impact of those additional water inlets to modify the short-term system operations [2,3]. This paper proposes to investigate the use of rainwater harvesting as a second supply source for a municipality scale. So, predictive demand models should be updated. Firstly, by differentiating water demand related to regular supply from real water consumption. This should be done by estimating capacities of individual catchments. Secondly, by considering that meteorological conditions have now an impact on both water demand behaviour and rainwater directly harvested. The working proposal investigates ways to plug-in meteorological information into water demand predictive models in order to fix them up. A major novelty of this approach is the use of a weather generator of synthetic data in combination with historical meteorological time series. This avoids typical issues related to missing data and provides robustness to the final water demand model. The methodology has been successfully tested in a district metered area belonging to the city of Guanajuato (Mexico) where rainwater harvesting has been recommended in recent years.

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