

# **OPTIMIZATION OF RAINWATER HARVESTING WITH A TWO-STAGE STOCHASTIC APPROACH**

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## **ABSTRACT**

Rainwater is becoming an increasingly valuable asset, especially in regions where water from the distribution system is becoming more expensive. In this case, the use of treated, expensive water to demands that don't require potable standards is an unnecessary environmental and economic burden. The design of rainwater collection tanks is well explored in the literature, mostly based on simulation approaches using either time series of rainfall data or average values to determine the tank size. Larger and smaller tanks will deliver different results in terms of cost and reliability, and the optimal tank size should take into account the stochastic nature of the rainfall in the region. This paper presents a two-stage stochastic quadratic programming approach to optimize the tank size and minimize the expected total cost of installing the tank and supplying water to the household, based on uncertain rainfall.

**PALAVRA-CHAVE:** rainwater harvesting, optimization, stochastic