

## **DROUGHT PROOFING CITIES: DESALINATION VS RAINWATER**

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This paper is an initial exploration to determine if rainwater tanks could feasibly compete with desalination as a drought proofing measure for a city of significant size, such as Sydney.

The assessment between the two approaches to drought proofing will be based on comparing the real cost per kilolitre of water derived from desalination and rainwater harvesting, particularly in some of the key assumptions associated with the operation of these systems. In the case of desalination, the analysis raises the question of its role as a supplementary source of water to the main water source, challenging the assumption that once a plant is built it will be running constantly. Often, consideration of cost, greenhouse gas production and energy supply issues may lead to desalination plants only used during severe drought conditions. Using long term simulation techniques with historical rainfall data, it is possible to simulate (retrospectively) the operation of a desalination plant for delivering supplementary water. The life=cycle cost of a desalination plant under this operating scenario can be compared to the benefits that could be gained from spending the equivalent amount of money on rainwater tanks.

The question of source reliability will also be addressed in comparing the two schemes. The major concern about rainwater tanks for drought response is the yield they would provide during drought conditions. Hence this paper will explore the yield that rainwater tanks will deliver during drought conditions in the supply catchment using historical data. Importantly the characteristics of rainfall in the city of Sydney during drought conditions in the water supply catchment will be discussed and the resilience or drought proofing of a rainwater scheme based around the notion of 'a city as a water supply catchment' will be discussed. The delay to the drawdown, and thus drought proofing, of Sydney's existing water supply catchment from harvesting rainwater in the city will be discussed. An important consideration is what rainwater tanks would be plumbed into with respect to quality and how this may change over time as drought conditions develop and worsen.

A number of economic models as to how this could be achieved will also be discussed including some interesting new models currently being implemented by CSIRO and the US EPA.

Finally a discussion of climate change will be raised with respect to both desalination and the combination of rainwater tanks with other demand management and water conservation approaches will be discussed.