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Entropy, recycling and macroeconomics of water resources

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We propose a macroeconomic model for water quantity and quality supply multipliers derived by water recycling (Karakatsanis et al. 2013). Macroeconomic models that incorporate natural resource conservation have become increasingly important (European Commission et al. 2012). In addition, as an estimated 80% of globally used freshwater is not reused (United Nations 2012), under increasing population trends, water recycling becomes a solution of high priority. Recycling of water resources creates two major conservation effects: (1) conservation of water in reservoirs and aquifers and (2) conservation of ecosystem carrying capacity due to wastewater flux reduction. Statistical distribution properties of the recycling efficiencies –on both water quantity and quality- for each sector are of vital economic importance. Uncertainty and complexity of water reuse in sectors are statistically quantified by entropy. High entropy of recycling efficiency values signifies greater efficiency dispersion; which –in turn- may indicate the need for additional infrastructure for the statistical distribution's both shifting and concentration towards higher efficiencies that lead to higher supply multipliers.

Keywords: Entropy, water recycling, water supply multipliers, conservation, recycling efficiencies, macroeconomics

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