



RESOURCE

Designing water demand management schemes using a socio-technical modelling approach

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Description / Abstract

Although it is now widely acknowledged that urban water systems (UWSs) are complex socio-technical systems and that a shift towards a socio-technical approach is critical in achieving sustainable urban water management, still, more often than not, UWSs are designed using a segmented modelling approach. As such, either the analysis focuses on the description of the purely technical sub-system, without explicitly taking into account the system's dynamic socio-economic processes, or a more interdisciplinary approach is followed, but delivered through relatively coarse models, which often fail to provide a thorough representation of the urban water cycle and hence cannot deliver accurate estimations of the hydrosystem's responses. In this work we propose an integrated modelling approach for the study of the complete socio-technical UWS that also takes into account socio-economic and climatic variability. We have developed an integrated model, which is used to investigate the diffusion of household water conservation technologies and its effects on the UWS, under different socio-economic and climatic scenarios. The integrated model is formed by coupling a System Dynamics model that simulates the water technology adoption process, and the Urban Water Optioneering Tool (UWOT) for the detailed simulation of the urban water cycle. The model and approach are tested and demonstrated in an urban redevelopment area in Athens, Greece under different socio-economic scenarios and policy interventions. It is suggested that the proposed approach can establish quantifiable links between socio-economic change and UWS responses and therefore assist decision makers in designing more effective and resilient long-term strategies for water conservation.

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