DAnCE4Water's BPM: A planning algorithm for decentralised water management options

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ABSTRACT

With global change bringing about greater challenges for the resilient planning and management of urban water infrastructure, research has been invested in the development of a strategic planning tool, DAnCE4Water. The tool models how urban and societal changes impact on the development of centralised and decentralised (distributed) water infrastructure. An algorithm for rigorous assessment of suitable decentralised stormwater management options in the model is presented and tested on a local Melbourne catchment. Following detailed spatial representation algorithms (defined by planning rules), the model assesses a great number of stormwater options to meet water quality targets at a variety of spatial scales. A multi-criteria assessment algorithm is used to find top ranking solutions. A toolbox of five stormwater technologies (infiltration systems, surface wetlands, bioretention systems, ponds and swales) is featured. Parameters that set the algorithm's flexibility to develop possible management options are assessed and evaluated. Results are expressed in terms of 'utilisation', which characterises the frequency of use of different technologies across the top-ranking options (bioretention being the most versatile). Initial results highlight the importance of selecting a suitable spatial resolution and providing the model with enough flexibility for coming up with different technology combinations. Future work will address further systems in a broader variety of land uses and more dynamic context.

KEYWORDS

DAnCE4Water, stormwater management, strategic planning, Water Sensitive Urban Design (WSUD)