

The prioritisation of invasive alien plant control projects using a multi-criteria decision model informed by stakeholder input and spatial data

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ABSTRACT:

Invasions by alien plants are a significant threat to the biodiversity and functioning of ecosystems and the services they provide. The South African Working for Water program was established to address this problem. It needs to formulate objective and transparent priorities for clearing in the face of multiple and sometimes conflicting demands. This study used the analytic hierarchy process (a multi-criteria decision support technique) to develop and rank criteria for prioritising alien plant control operations in the Western Cape, South Africa. Stakeholder workshops were held to identify a goal and criteria and to conduct pair-wise comparisons to weight the criteria with respect to invasive alien plant control. The combination of stakeholder input (to develop decision models) with data-driven model solutions enabled us to include many alternatives (water catchments), that would otherwise not have been feasible. The most important criteria included the capacity to maintain gains made through control operations, the potential to enhance water resources and conserve biodiversity, and threats from priority invasive alien plant species. We selected spatial datasets and used them to generate weights that could be used to objectively compare alternatives with respect to agreed criteria. The analysis showed that there are many high priority catchments which are not receiving any funding and low priority catchments which are receiving substantial allocations. Clearly, there is a need for realigning priorities, including directing sufficient funds to the highest priority catchments to provide effective control. This approach provided a tractable, consensus-based solution that can be used to direct clearing operations.