# Development of Methodology for Existing Rainwater Harvesting Assessment in (semi-)Arid Regions

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Abstract

Arid and semiarid regions face water scarcity and climatic uncertainty. Rainwater harvesting (RWH) has been used for generations to cope with these challenges. Numerous methods have been applied to select suitable sites for RWH. However limited attention has been given to evaluation of RWH structure perfor mance. In this study, a comprehensive methodology to evaluate and optimize the performance of existing RWH techniques in (semi-)arid regions was developed and tested. Engineering, biophysical, and socioeconomic aspects were integrated by using analytical hierarchy process (AHP) supported by geographic information system (GIS). Sixteen RWH locations (subcatchments) in the Oum Zessar water shed in Tunisia were examined. Based on the criteria selected, some 88% of the sites scored between 2 and 3 (low to moderate) on a 1–5 suitability scale; 6% scored higher than 3, and 6% received suitability scores less than 2. Improving RWH design by raising spillway heights by 50% increased overall suitability, with 69% of the sites scoring between 3 and 4 after such optimization. Our highly flexible, widely applicable methodology proved effective, easy to use and low cost. Its further application is recommended to support designers and decision-makers in assessing and optimizing the performance of both existing and new RWH systems.