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A practical step towards sustainability: decentralised wastewater management in Oman

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ABSTRACT

Oman has undergone major transformations during the past few decades, which have resulted in growing water scarcity and an increase in the domestic wastewater production. To align with UN Sustainable Development Goal (SDG) number 6: "Ensure availability and sustainable management of water and sanitation for all", the government spending on wastewater services dramatically increased over the past two decades aiming to extend sanitation services all over Oman. However, the expansion of the wastewater infrastructure will have to address the conditions of rural and suburban settlements in order to reduce network and pumping requirements and the risk of technical failure to the minimum and to ensure cost efficiency. To achieve this goal, a pilot project has been set up to develop an integrated system solution for decentralised wastewater management in Oman. The main objective of the project is to establish a research, demonstration and training facility aiming at developing, promoting and facilitating the implementation of sustainable and effective sewage and reuse management solutions for suburban and rural communities in Oman. The procedure applied for designing the facility was comprised of two parts; the comparative analysis, which gathers forms and ranks information into a knowledge basis, on which the designer can make a decision and the engineering design process. With the geographic information system (GIS)-based assessment tool assessment of local lowest-cost wastewater solutions (ALLOWS) the project compares different scenarios for regional wastewater management options. ALLOWS features two main components: (1) Spatial analysis, and (2) cost assessment using net present value calculation for different scenarios for a lifetime of 80 years. In a case study, different sanitation scenarios were developed for Al Mizarih village, near Qurayyat, Oman. This preliminary assessment indicates that under current conditions a solution on household level is the most cost-effective option. However, semi- and decentralised scenarios gain in cost-effectiveness, when future population growth and settlement patterns are anticipated in the analysis.

Keywords: GIS-based assessment, ALLOWS, rural, sewage, suburban, wastewater management

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