



## **Remote-sensing modelling of soil salinity in heterogeneous urban vegetation**

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The potential risk of salt leaching through wastewater irrigation is of concern for most local governments and city councils. Despite the necessity of salinity monitoring and management in urban green spaces, most attention has been on agricultural fields. This study was defined to investigate the capability and feasibility of monitoring and predicting soil salinity using near sensing and remote sensing approaches. The innovation of the study lies in the fact that it is one of the first research studies to investigate soil salinity in heterogeneous urban vegetation with two approaches, i.e. near sensing salinity mapping using EM38 surveys, and remote sensing using high resolution multispectral image of WorldView3. In the first approach, the most appropriate interpolation technique for a heterogeneous urban landscape was also investigated. In the second approach, a suitable satellite to work best in urban areas was selected and then possible band combinations that form salinity indices were tested. Veale Gardens within the Adelaide Parklands was selected as the experimental site. The results of the near sensing investigation were validated by testing soil salinity samples in the laboratory ( $p < 0.005$ ;  $R^2 = 0.634$ ). A significant positive correlation was found between near sensing and soil laboratory tests. Also, the outcomes of the remote sensing and near sensing approaches were compared to examine whether remotely sensed salinity indicators could map and predict the spatial variation of soil salinity through a potential statistical model. Statistical analysis was undertaken using the Stata 13 statistical package on over 52,000 points. Several regression models were fitted to the data and the mixed effect modelling was selected the most appropriate one as it takes to account the systematic observation-specific unobserved heterogeneity. Based on the Akaike Information Criterion (AIC) and the Bayesian Information Criterion (BIC), SAVI was the only salinity index that could be considered as a predictor for soil salinity but further investigation is needed. However, near sensing was found as a rapid, practical and realistically accurate approach for salinity mapping of heterogeneous urban vegetation.