DIGITAL SOIL MAPPING OF AVAILABLE WATER CONTENT IN THE LOWER MACQUARIE VALLEY, AUSTRALIA

John Triantafilis, The University of New South Wales
Liam Gooley, The University of New South Wales

Two thirds of all irrigated agriculture in Australia is undertaken within the Murray-Darling Basin. However climate change predictions for this region suggest rainfall will decrease. In addition, environmental concerns and new industries are competing for water resources. In order to maintain profitability, more will need to be done by irrigators with less water. In this regard, irrigators need to be aware of the spatial distribution of the available water content (AWC) in the root-zone (i.e. 0.0-0.90 m). Owing to the expense of traditional soil survey methods, digital soil mapping techniques are being used with increasing frequency to map soil properties. This includes, soil properties related to AWC such as clay content and mineralogy. This paper aims to present the development of a digital soil map of the AWC at the district level. This is achieved by determining AWC by the difference between the permanent wilting point (PWP) and field capacity (FC) which were measured in the laboratory using a pressure plate apparatus. The PWP and FC was coupled with ancillary information including; gamma ray spectrometry (i.e. dose rate, Potassium (K-%), Uranium (eU-ppm), Thorium (eTh-ppm)), electromagnetic induction data (i.e. EM38 and EM34) and two trend surface parameters using various multiple linear regression models (e.g. stepwise). Using this information we develop a hierarchical spatial regression (HSR) model to predict AWC in the irrigation areas of Warren and Trangie. The reliability of the models were compared using prediction precision (RMSE – root mean square error) and bias (ME–mean error). It was found that using EM38-v, EM34-10, eU, and eTh provided the best results (r^2=0.55). The DSM maps are consistent with the known pedoderms and soil types and provide a basis for irrigation management and future research.