



Soil salinity prediction using electromagnetic induction method in gypsiferous soil

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In arid and semiarid regions, secondary soil salinization is considered a main danger to the sustainability of irrigated land and agricultural production. Thus, accurate and rapid estimation of soil salinity should be readily available to farmers during crop development to increase productivity and to contribute to sustainable land planning aimed at mitigating soil degradation. Measurement of electrical conductivity in saturated paste extracts (EC_e) is a standard method for which other salinity estimation methods are referenced. In the present study, we investigated the possibilities to use the EM38 to predict field EC_e in a saline gypsiferous soil of the Saharian-climate Fatnassa oasis (Tunisia) under shallow and saline groundwater. On the 114 ha oasis, an experimental network system of 27 agricultural plots was chosen for monitoring soil properties (EC_a -EM38, soil particle size, gypsum content, soil moisture, and EC_e) and groundwater (depth, D_{gw} , electrical conductivity, and EC_{gw}). Samples were taken during 4 years (2001 to 2004) at experimental plots and soil profiles were sampled at 0.2 m depth intervals to 1.2 m for physical and chemical analysis. The results showed that significant $\ln EC_e$ -EM relationships could be developed. However, results also indicated that for better accuracy of soil salinity prediction using the EM38, it is advisable to perform calibrations for each measurement period.