

Soil Salinity Assessment Using Electromagnetic Induction

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Electromagnetic induction meter fitted with GPS unit

BACKGROUND

Salinity is a major problem affecting farm profitability, water quality and availability in arid regions such as the Far West Texas. Understanding salinity distribution within irrigated area over time is necessary for developing effective salinity management practices. Conventional methods of assessing soil salinity at a detailed spatial resolution are expensive and time consuming. Electromagnetic induction (EMI) technique can determine soil salinity distribution in irrigated areas rapidly and in a non-invasive way. Advantages of this method are (i) high mobility, (ii) non-invasive way of salinity assessment and (iii) short time required to carryout the salinity assessment. However, EMI technique's accuracy is influenced by site specific factors such as soil clay content. This project evaluates the accuracy and factors affecting the accuracy of EMI technique to delineate salt distribution in the affected fields. The results of this project can help farmers to reduce salinity management costs by target application of amendments to salinity hotspots within the affected field.

OBJECTIVES

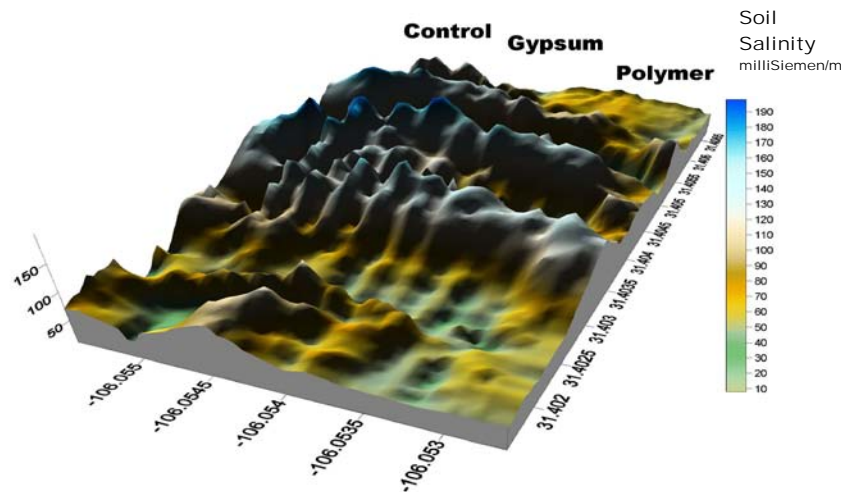
- Evaluate the EMI technique for providing rapid and accurate assessment results of soil salinity and sodicity
- Determine soil factors that affect accuracy of EMI technique to facilitate technology transfer to other regions.
- Identify hot spots within an affected area to develop effective salinity management options, reduce costs, and increase farm profits.

FINDINGS AND BENEFITS

Initial results indicate that the EMI readings were strongly influenced by soil properties such as clay, moisture at the time of survey, salinity and sodicity. The EMI data had high coefficient of determinations with saturated paste salinity (ECe) and sodicity (SAR). Results of the project indicated that EMI technique can provide a rapid, inexpensive and accurate salinity/sodicity distribution data within an affected irrigated field. This information is the necessary first step to develop appropriate

practices to manage affected areas for improved soil conditions and crop yield. Project results can reduce cost of reclamation by targeting salinity hotspots within irrigated fields. Research results can also be used to evaluate effectiveness of current salinity management practices and develop efficient management practices that can improve soil quality and increase crop yields.

Soil Salinity (0-75 cm) Assessed by EMI Technique



Example of salinity distribution in a Pecan field obtained in El Paso County using EMI technique.