UNIVERSITY OF HOHENHEIM

Institute of Agricultural Sciences in the Tropics (Hans-Ruthenberg-Institute) (490)

Soil resistivity measurements to evaluate subsoil salinity in rice production systems of the Vietnam Mekong Delta

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Introduction

Rice is a major crop in the Vietnam Mekong Delta (VMD), contributing more than half the rice production of the whole country. Due to climate change induced sea level rise, salt intrusion increasingly threatens rice production in the VMD. In the process of developing climate change adapted management strategies for rice production systems of the Mekong, we employed a **geo-electrical method to evaluate sub-soil salinity**

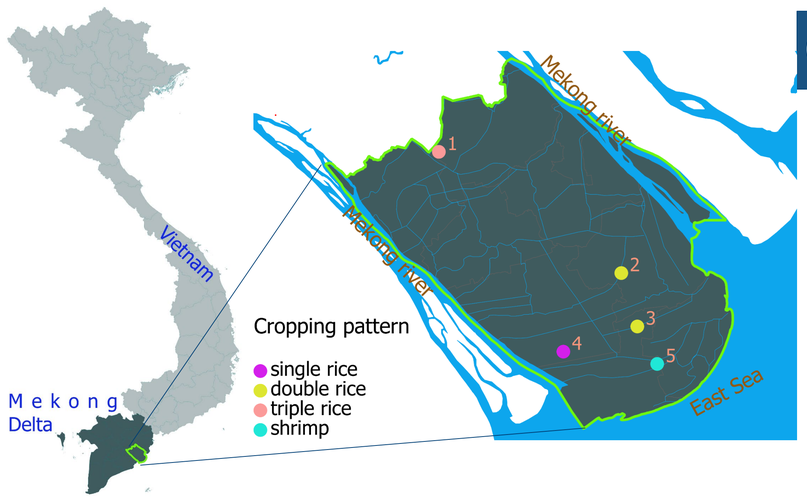
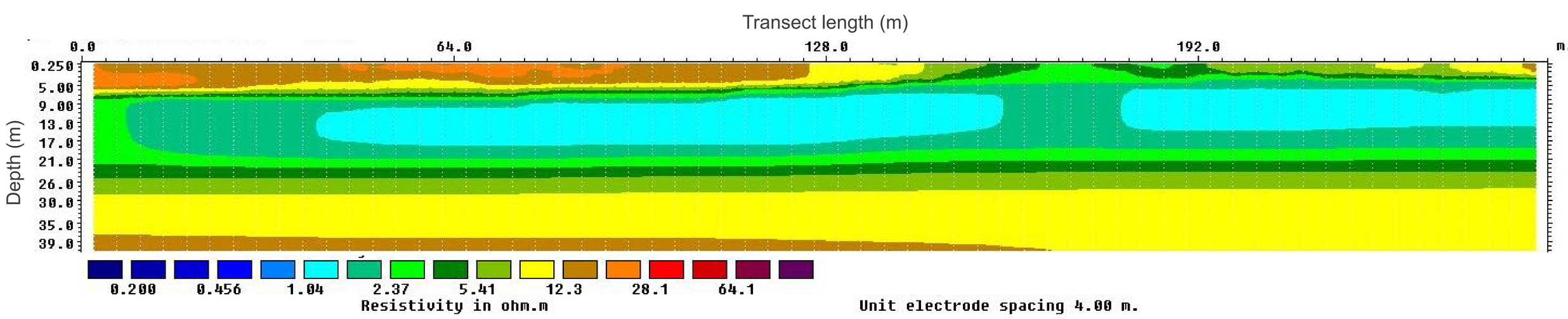


Figure 1. Map of Vietnam. Case study is in Tra Vinh province in the Mekong Delta. Measurements were done at 5 locations with different cropping patterns

Conclusions

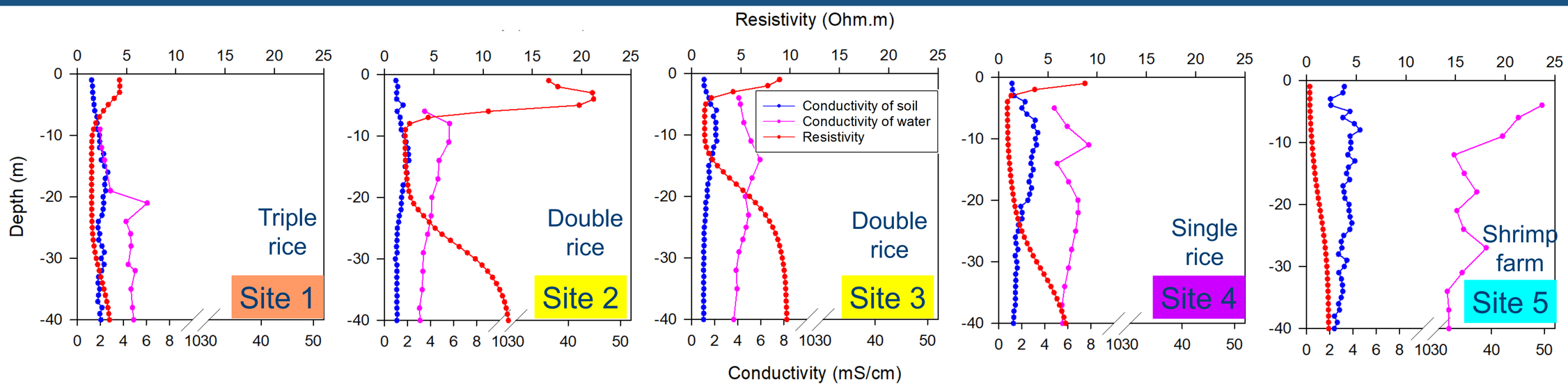
- The geo-electrical evaluation allows detecting saline water tables under the rice fields
- Saline water tables are linked to rice production system and proximity to the sea
- If the rice production system affects the saline water table or *vice versa*, is subject of ongoing research

Results of geo-electrical resistivity measurement



- Soil resistivity measured by ARES II at site 2 illustrates high resistivity on the surface and bottom of profile
- Green to blue colour represents high moisture content of the sub-soil

Geo-electric data calibrated by drilling samples



- Decreasing distance toward the sea, salt water tables are closer to the surface
- Conductivity of soils and water saturation in soils are strongly related to the resistivity measured by ARES II
- Resistivity of soil saturated with salt water varies from 0.2 – 10 Ohm.m
- Soil texture and moisture content are important factors effecting soil resistivity

Notes on Materials and Methods

ARES II (GF Instruments) device was employed for soil salinity exploration at rice production systems down to the depth of 40m by applying 4m electrode spacing. After the field measurement, the resistivity results were interpreted and visualized by inversion software Res2DInv from Aarhus Geosoftware.

To calibrate the results from ARES II, bore holes were drilled at five case study sites. Soil and water samples from the bores were collected at 1m intervals to a depth of 40m. Soil properties and electrical conductivity of water and soil were determined. Conductivity of soil and water samples were measured by using EC meter HI8733 (HANA Instruments).