



## **Assessing the Risk of Aquifer Salinization in a Large-Scale Coastal Irrigation Scheme in Southern Italy**

Daniele Zaccaria (1), Giuseppe Passarella (2), Daniela D'Agostino (3), Raffaele Giordano (2), Samuel Sandoval-Solis (1), Sabino Maggi (2), Delia Bruno (2), and Laura Foglia (1)

(1) Department of Land, Air and Water Resources - University of California, Davis, CA - USA (dzaccaria@ucdavis.edu), (2) Water Research Institute - National Research Council (CNR-IRSA), Bari, Italy, (3) CIHEAM-Mediterranean Agronomic Institute of Bari, Division of Land and Water Resources Management, Valenzano, Bari, Italy

A research study was conducted on a coastal irrigated agricultural area of southern Italy to assess the risks of aquifer degradation likely resulting from the intensive groundwater pumping from individual farm wells and reduced aquifer recharge. Information were collected both from farmers and delivery system's operators during a survey conducted in 2012 revealing that farmers depend mainly on groundwater with the aim to achieve flexible irrigation management as opposed to the rigid rotational delivery service of surface water supply provided by the local water management agency. The study area is intensively farmed by small land-holding growers with high-value micro-irrigated horticultural crops. Our team appraised the soil and aquifer degradation hazards using a simplified procedure for environmental risk assessment that allowed identifying the risk-generating processes, evaluating the magnitude of impacts, and estimating the overall risks significance. We also collected the stakeholders' perceptions on agricultural water management and use through field interviews, whereas parallel investigations revealed significant aquifer salinity increase during the recent years. As a final step, some preliminary risk mitigation options were appraised by exploring the growers' response to possible changes of irrigation deliveries by the water management agency. The present study integrated multi-annual observations, data interpretation, and modelling efforts, which jointly enabled the analysis of complex water management scenarios and the development of informed decisions.

**Keywords:** Environmental risk assessment, Fuzzy cognitive maps, Groundwater degradation, Seawater intrusion