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Effects of Water-Saving Irrigation Practices on Soil Salinity in the Baix Ter Rice District

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Abstract.
Soil salinity in Mediterranean rice fields is traditionally managed via wet seeding, continuous flooding and runoff to leach salts. However, recurrent water scarcity has forced the adoption of water-saving practices, such as the combination of dry seeding, early irrigation cut-off, and elimination of runoff (DENR). While efficient, implementing DENR in areas like Baix Ter (Spain) can exacerbate salinity in salt-affected soils and reduce yields. The Baix Ter rice district was monitored under the PROMEDRICE project (2024–2025) during a water-scarcity period. DENR was applied in the whole district, although some salt-affected fields remained fallow in 2024. The district was divided into six hydrologic units based on soil maps and topography. Water usage was monitored in one comercial field per unit. Soil electrical conductivity (EC) was measured biannually at 13 sites, while sensors tracked apparent EC in three units. Results showed high spatial variability (EC from <2 to 16 dS m^{-1}), demonstrating that water-saving impacts on salinity dynamics are highly site-specific. Higher yields in 2025 compared to 2024 suggest that salinity and water stress limited productivity during severe water scarcity. These results underline the necessity of site-adapted salinity management when implementing water-saving irrigation in Mediterranean rice systems under increasing climate pressure.

Keywords: rice, water-saving, salinity, dry seeding, irrigation district