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Potential of Rice Fields as Green Filters in the Mediterranean Region

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Abstract. Under certain conditions, rice plots function as efficient nature-based filtration systems that improve water quality. In irrigated flood-irrigated fields, suspended sediments in the applied water settle within the plots, resulting in cleaner drainage discharge. Additionally, these systems can sequester nutrients and mitigate the presence of pesticides and herbicides.

This study evaluated the water depuration capacity of flood-irrigated rice fields in two Spanish irrigation districts: the Lower Guadalquivir Marshes and Baix Ter. Methodologies were tailored to each region's specific characteristics. In the Lower Guadalquivir, we conducted paired measurements of suspended solids, nutrients and active ingredients, in both irrigation inflows and drainage outflows. In Baix Ter, we established a nitrogen balance across various environmental compartments to assess the impact of fertilization.

Results from the Lower Guadalquivir demonstrate a significant reduction in suspended solid concentrations in drainage water. In Baix Ter, findings indicate that standard nitrogen fertilization rates do not lead to increased nitrate levels in monitored groundwater. These findings highlight the potential for rice plots to serve as "green filters."

The broader applicability of these systems across other Mediterranean environments targeted by PRIMA funded Promedrice project is presented and discussed.

Keywords: rice, green filter, water quality, flooding.