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Developing Irrigation Management at District Scale Based on Water Monitoring: Study on Lis Valley, Portugal

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Abstract: Irrigation districts play a decisive role in Portuguese agriculture and require the adaptation to the new water management paradigm through a change in technology and practices compatible with farmers' technical know-how and economic sustainability. Therefore, improvement of water management, focusing on water savings and increasing farmers' income, is a priority. In this perspective, an applied research study is being carried out on the gravity-fed Lis Valley Irrigation District to assess the performance of collective water supply, effectiveness of water pumping, and safety of crop production due to the practice of reuse of drainage water. The water balance method was applied at irrigation supply sectors, including gravity and Pumping Irrigation Allocation. The average 2018 irrigation water allocated was 7400 m³/ha, being 9.3% by pumping recharge, with a global efficiency of about 67%. The water quality analysis allowed identifying some risk situations regarding salinization and microbiological issues, justifying action to solve or mitigate the problems, especially at the level of the farmers' fields, according to the crops and the irrigation systems. Results point to priority actions to consolidate improved water management: better maintenance and conservation of infrastructure of hydraulic infrastructures to reduce water losses and better flow control; implementation of optimal operational plans, to adjust the water demand with distribution; improvement of the on-farm systems with better water application control and maintenance procedures; and improvement of the control of water quality on the water reuse from drainage ditches. The technological innovation is an element of the modernization of irrigation districts that justifies the development of multiple efforts and synergies among stakeholders, namely farmers, water users association, and researchers.

Keywords: public irrigation systems; water quality in agriculture; rural development; Operational Groups; EPI-AGRI; Lis Valley; Portugal; gravity-flow irrigation district; irrigation modernization