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A contribution to the sustainable use of water in rice production in the Mediterranean region: the Lower Mondego case study (Portugal)

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The water use in agriculture has been the focus of special attention, particularly in regions where the pressure on water resources has increased and the prospect of climate change suggests that the temporal and spatial distribution of rainfall will likely become more uncertainty. In particular, there are concerns in relation to the use of water to irrigate crops that demand relatively higher quantities of water, such as rice, which is traditionally grown under continuous flooding. It therefore requires much more irrigation water than non-ponded crops. On the other hand, rice is strategic for food security in some countries, and human water consumption in the whole Mediterranean is steadily increasing.

The work reported was conducted in the framework of an international project (MEDWATERICE, www.medwaterice.org), which started in 2019 and aims to explore the opportunity to apply water-saving, alternative, rice irrigation methods. The project is focused on improving the sustainable use of water in Mediterranean rice-based agro-ecosystems, and involves several rice-producing countries in the Mediterranean basin. The MEDWATERICE consortium includes universities, research centres and private companies operating in the Mediterranean area (Italy, Spain, Portugal, Egypt, Turkey, Israel). The methodology adopted in this project involves experimental fields for testing different alternative rice production practices that adopt innovative irrigation technologies, as well as selected rice varieties and the most appropriate agronomic practices, tailored to local conditions. The alternatives to be tested will be identified by a participatory action research approach through the establishment of Stakeholder Panels (SHPs) in each country, which will include regional authorities, water managers, farmers' associations and consultants, and private companies involved in the rice production chain. The participation of SHPs in the project is expected to improve the transfer of project's results to the agricultural sector and decision makers.

In particular, the situation corresponding to the case study of the Lower Mondego (Portugal), which is part of this project, is described. The Lower Mondego, which corresponds to the most downstream section of the river Mondego catchment, comprehends an agricultural area of around 15 000 ha. The main agricultural production is rice, which occupies about 60% of this

region; this crop has a very significant social and economic value in the region; despite the small area under rice production, the number of farmers involved is large. Other important crops are corn and beans (18,1% of the area). The study will use a multi-scale approach (farm and irrigation district scales), multi-disciplinary (water consumption, product quality, environmental quality and economic and social sustainability), and multi-actors (SHPs will guarantee that interests of all actors involved in the water management of paddy areas and in the rice production chain will be considered within the project).