

A CONTRIBUTION TO THE SUSTAINABLE USE OF WATER IN RICE PRODUCTION IN THE MEDITERRANEAN REGION: THE LOWER MONDEGO CASE STUDY (PORTUGAL)

M. Isabel P. de Lima^{1,2,*}, Romeu G. Jorge^{1,2}, João L. M. P. de Lima^{1,2}, José M. Abreu¹ and José P. L. de Almeida^{1,2}

¹ University of Coimbra, Department of Civil Engineering, 3030-788 Coimbra, Portugal

² University of Coimbra, MARE-Marine and Environmental Sciences Centre, Department of Civil Engineering, 3030-788 Coimbra, Portugal

* email: iplima@uc.pt

1. Introduction

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 uncertain. 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.

Here we describe a case study from the Lower Mondego Irrigation District, in Portugal, that is developed under the umbrella of the MEDWATERICE projec. This 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 (Fig. 1).



Fig. 1 – Location of the MEDWATERICE participants in the Mediterranean basin (red arrows). Blue circles indicate regional case studies.

2. Methodology

The methodology adopted in this project involves experimental field work 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 tested are identified by a participatory action research approach through the establishment of Stakeholder Panels (SHPs) in each country, which include regional authorities, water managers, farmers' associations and consultants, and private companies involved in the rice production chain (Fig. 2).

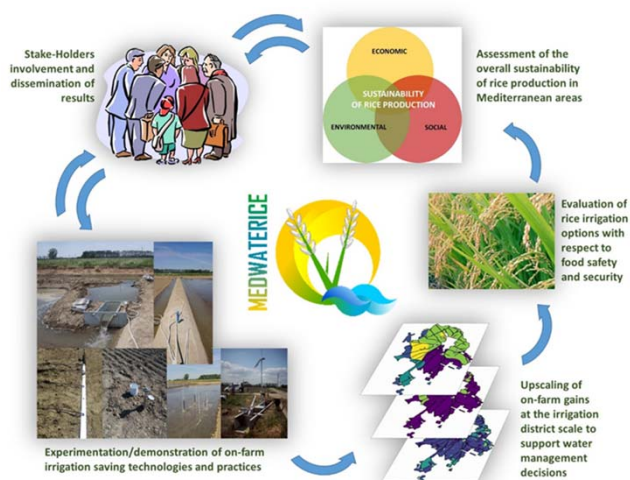


Fig. 2 – Project MEDWATERICE approach.

3. Case Study in the Lower Mondego Valley

The Lower Mondego Irrigation District is located in the most downstream section of the river Mondego catchment, and comprehends an irrigated agricultural area of around 15 000 ha (Fig. 3a); 60% of this area is dedicated to rice. Other important crops in the area are corn and beans. The dominant rice 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. In this area, the project established two experimental sites: Bico da Barca (Fig. 3b) and Quinta do Canal (Fig. 3a).

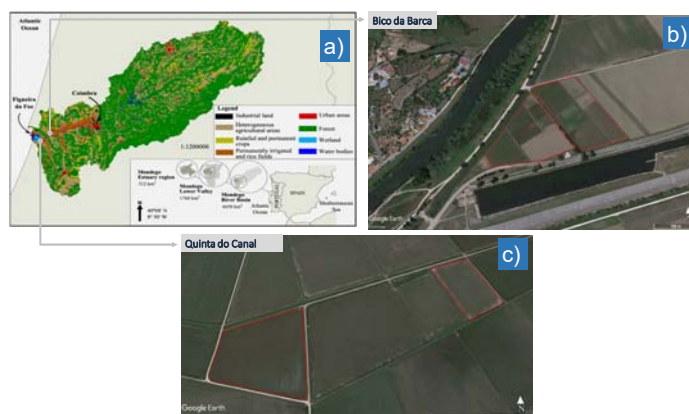


Fig. 3 – (a) Location of Lower Mondego Irrigation District; (b) Field area Bico da Barca (c) Field area Quinta do Canal.

Aiming at the overall sustainability of rice production in the area, field work is carried out that comprehends the monitoring and assessment of environmental, irrigation, and crop evolution and production conditions. This is complemented with the assessment of impacts of water-saving practices at the irrigation district scale, while dedicating special attention to:

1. Limitations in the irrigation water availability, e.g. due to water source scarcity;
2. Constraints of the conveyance hydraulic system;
3. Water management problems at distribution and on-farm levels;
4. Environmental risks related to soil salinization and pollution with nitrates.

4. Future Work

The study uses a multi-scale (farm and irrigation district scales), multi-disciplinary (water consumption, product quality, environmental quality and socio-economic sustainability) and multi-actors approach (Fig. 4). It pursues outcomes that may contribute to the sustainable use of water and keep rice productivity and quality high.



Fig. 4 – Use of multi-scale and multi-disciplinary approach within the MEDWATERICE Project.

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