

Water Productivity, Irrigation Management and Systematization for Rice Farming Systems in North Region of Uruguay

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Abstract

Rice farming systems in the North Region of Uruguay are mainly irrigated from water stored in dams. Increases in Water productivity would contribute to augment annually rice planted area, allows the allocation of water to irrigate other crops in a rotation and could contribute to reduce pumping irrigation costs. The aim of the experiments is to determine irrigation management practices and field layout techniques that increase water productivity contemplating economic and environmental sustainability of rice farming systems in Uruguay. In this paper the results of the joint analysis of three seasons experiments conducted in the Experimental Unit Paso Farías, Artigas (30.30S, 57.06W) are presented (2012-2013-2014). Treatments (split plot experimental design) included two types of systematization with different vertical interval between levees (big plots): I. Conventional (VI-8cm) and II. Alternative (VI-4cm), and three irrigation management practices (small plots): 1. Continuous (C), 2. Intermittent until panicle initiation (IP), and 3. Intermittent during all crop cycle (I). In C a water layer of 10cm is maintained after flooding throughout all the crop cycle. In IP and I the water layer is allowed to decrease and is re-established when the soil is still saturated. Crop was direct drilled on 21st October (average) with 160 kg seed/ha with cultivar INIA Olimar (Indica). Basal fertilization was 100 kg ha⁻¹ of 18-46-0 (NPK), and urea was 100 kg ha⁻¹ fractionated at tillering and panicle initiation. Rainfall was on average 733 mm year⁻¹ from October to March. Intermittent irrigation led to a significant savings in water inputs (38 % or 5567 m³ water ha⁻¹) and a significant increase in water productivity, affecting negatively industrial quality and grain yield (950 kg rice ha⁻¹ less) ($P < 0.05$). Water productivity considering only irrigated water were: 0.57(c), 0.73(b) and 0.88(a) (kg grain m³ water⁻¹) for C, IP and I respectively ($P < 0.05$). Regarding Systematization, there was no significant differences in any of the parameters evaluated between treatments ($P < 0.05$).

Keywords: water productivity, irrigation management, systematization, rice