

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

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Abstract

A high proportion of rice farming irrigation in the Central Region of Uruguay is done with water stored in dams. Maximizing water productivity is important as savings in water inputs would reduce pumping irrigation costs, increase rice area planted and allows to allocate water to irrigate other crops in a rotation. The aim of the experiment is to determine irrigation management practices and systematization field layout techniques that increase Water Productivity, contemplating the economic and environmental sustainability of rice farming systems in Uruguay. A split plot experimental design trial was conducted in the Experimental Unit located in Tacuarembó (32.11S, 55.10W). This paper includes results of the joint analysis of three seasons (2012-2013-2014). Treatments included two types of systematization with different vertical interval between levees (big plots): I. Conventional (VI-8 cm) and II. Alternative (VI-4 cm), 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 10 cm is maintained after flooding throughout all the crop cycle. In IP and I the water layer is re-established when the soil is still saturated. Rainfall was above the historical average throughout the crop cycle, 738 mm. Crop was direct drilled on 10th October with 160 kg seed/ha with cultivar INIA Olimar (Indica). Basal fertilization was 160 kg ha⁻¹ of 19-19-19 (NPK) and Urea was 100 kg ha⁻¹ fractionated at tillering and panicle initiation. Intermittent irrigation (IP and I) in low-infiltration rate soils (planosols) allowed for significant water savings input (35% or 2798 m³ water ha⁻¹) without reducing rice grain yield (average = 7713 kg rice ha⁻¹) but affecting negatively industrial quality compared to Continuous irrigation (C) (P<0.05). Water productivity considering only irrigated water were: 0.99(c), 1.31(b), 2.00(a) kg grain m³ water⁻¹ for C, IP and I respectively (P< 0.05). There was no significant effect of systematization in any of the parameters evaluated (P< 0.05).

Keywords: water productivity, irrigation management, systematization, rice