

Performance Evaluation of Rice Cultivation Methods under Different Varieties and Irrigation Regimes on Water Productivity

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Abstract

Major constraint in rice production in India is the lack of suitable crop management practices and availability of irrigation facilities. To produce 1 kg of grain, farmers have to put 2 to 3 times more water in rice fields than in those growing other cereals. There is a challenge to develop novel technologies and production systems that can produce more rice with less use of water. Previous research work suggested that growing rice with aerobic (ABC) or system of rice intensification (SRI) methods can save significant amounts of water over conventional rice cultivation (CRC). However, a considerable amount of water is still used by ABC and SRI methods. In order to quantify the water use efficiency under these three rice cultivation methods, a field experiment was conducted at Research Farm of Indian Agricultural Research Institute during 2012 to assess the performance of 2 rice varieties (*i.e.* 'PRH 10' and 'Pusa 1460') under full and deficit irrigation water regimes, in a split plot design with 3 replications. Results showed that highest grain yield of rice (*i.e.* 5.93 t/ha in PRH-10 and 3.67 t/ha in Pusa-1460) was obtained with SRI method, which was significantly higher than other two methods, *i.e.* ABC and CRC. Moreover, the grain yield in CRC method for both varieties was significantly higher than the ABC method of cultivation. The variety 'PRH 10' (aromatic hybrid variety) produced 50% higher grain yield over 'Pusa 1460' (basmati variety). Deficit irrigation caused a significant reduction (*i.e.* 10%) in grain yield of rice over full irrigation, amongst all the 3 methods and 2 varieties. In general, the

water productivity of rice was highest with ABC, followed by SRI and CRC methods. The water productivity was significantly higher in 'PRH 10' (*i.e.* 4.22 kg/ha.mm) than 'Pusa 1460' (*i.e.* 2.66 kg/ha.mm) variety. Also, the water productivity was higher in deficit irrigation as compared to full irrigation. Moreover, the experiment is being continued during *kharif* 2013 to ascertain these findings.