Water management practices for enhancing productivity in rice

TECHNOLOGY BRIEF

The system of rice intensification (SRI) reportedly enhances yield with less water requirement. This claim was investigated to determine the effects of alternative cultivation methods and water regimes on crop growth and physiological performance.

SRI methods gave significant changes in plants' phenotype in terms of root growth and tillering, with improved xylem exudation and photosynthetic rates during the grain-filling stage compared to conventional transplanting system (CTS). This resulted in significant increases in panicle length, more grains and more filled grains panicle^{-1}, greater 1,000-grain weight, and higher grain yield under SRI management. Overall, averaged across the five water regimes during vegetative stage of crop growth evaluated, SRI practice produced 49% higher grain yield with 14% less water than under CTS; under SRI, water productivity increased by 73%, from 3.3 to 5.7 kg ha-mm^{-1}. The highest CTS grain yield and water productivity were with the 1-day after disappearance (DAD) of ponded water (4.35 t ha^{-1} and 3.73 kg ha-mm^{-1}); SRI grain yield and water productivity were the greatest at 3-DAD (6.35 t ha^{-1} and 6.47 kg ha-mm^{-1}).

IMPACT / UTILITY

Water management technology has been standardized for SRI under sandy-loam soil using a medium-duration rice variety. Using 14% less water (less energy) and producing more will provide more income to the farmers and at the same time lesser burden to the groundwater and environment.

HIGHLIGHTS

- SRI methods produced 49-58% higher grain yield with 14-16% less water.
- Water productivity increased by 73% under SRI.
- With SRI management, grain yield and water productivity were the greatest at 3-DAD (6.35 t ha^{-1} and 6.47 kg ha-mm^{-1}).
- With conventional transplanting system, grain yield and water productivity were the greatest at 1-DAD (4.35 t ha^{-1} and 3.73 kg ha-mm^{-1}).

Project Details	Enhancing water productivity through integrated system of rice intensification (Project Code: WTCER/08/132) System of Rice Intensification: Studies on water management, micronutrient uptake and crop rotation (Project Code: DWM/12/156)
Publications	Thakur et al. (2014). *Paddy & Water Environment*, 12:413–424. https://doi.org/10.1007/s10333-013-0397-8 Thakur et al. (2018). *Agricultural Water Management*, 206:67-77. https://doi.org/10.1016/j.agwat.2018.04.027

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