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Management practices for enhancing resource use efficiency under direct seeded rice - A review

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Abstract

The transplanted puddled rice (TPR) is a water, labour and energy intensive practice, and also emits vast amount of green-house gasses (GHG), particularly methane. The water guzzling nature of TPR and escalating labour prices drives towards the search for alternative methods of rice production. Among different methods of rice cultivation, direct-seeded rice (DSR) received much attention in this way; however, major constraints in DSR are identified as poor crop establishment, weed infestation, nematode occurrence and imbalanced nutrient and faulty water management practices. This paper summarizes the improved production technologies for DSR viz. precision levelling, early-maturing varieties, seed priming, effective water, nutrient and weed management. It is evident from the review that grain yield, water productivity and net income could be enhanced by laser land levelling as compared to traditional levelling. Alternate wetting and drying method of irrigation in DSR resulted in less water requirement without any yield penalty. Application of Pendimethalin @1 kg a.i./ha as pre-emergence followed by post-emergence application of bispyribac sodium @ 25g a.i./ha recorded higher grain yield and better weed control efficiency. Use of *Trichoderma viride* @ 2.5 kg/ha was found effective to control nematode infestation in DSR. Moreover, compared to TPR, DSR had less methane emission and global warming potential. Thus, DSR is a feasible alternative to TPR with a good potential to save water, reduce labour requirement, and to mitigate the climatic risks in Indian agriculture.

Keywords: Alternate wetting and drying, Brown manuring, DSR, Green-house gases, IWM, Laser land levelling, Nutrient management and Seed priming