ABSTRACT

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A field experiment was conducted to evaluate the performance of three different methods of crop establishment, viz., System of Rice Intensification with transplantation of young seedlings (TP/SRI), direct-seeded rice with SRI management (DS/SRI), and farmer practiced transplanted rice (TPR) in Phulbari V.D.C. of Chitwan during the rice season of 2010. Three varieties differing in maturity time, viz., Sabitri (140-145 days), Loktantra (130-135 days) and Radha-4 (120-125 days) were tested using 3×3 Split Plot Design, making altogether nine treatments having individual plot size of $12m^2$with four replications. All the plots received the same level of fertilizers through the combination of sources: organic (10 t/ha) and inorganic (100:30:30 kg NPK/ha). The result showed significant effects of the method of crop establishment on overall crop performance. TP/SRI treatments matured significantly earlier (123.2 days), followed by DS/SRI (126.8 days), which were, respectively 10 and 6 days earlier (by 9-10%) than TPR (132.9 days), and the shortening of the time was consistently distributed from PI to physiological maturity. TP/SRI plots had significantly taller plant, higher leaf area index (LAI), and total dry matter per square meter, followed by DS/SRI, whereas the least values of these parameters were in TPR. Similarly, effective tillers per square meter in TP/SRI (256.9) were the highest and differed significantly from the rest of the treatments. Panicle length, panicle weight, and number of grains per panicle were statistically at par with DS/SRI, but significantly higher than the TPR.TP/SRI method produced a significantly higher grain yield (6.95t/ha) as compared to DS/SRI (6.2 t/ha), which were 51% and 48% higher, respectively, than that of TPR (4.18 t/ha). The data also showed that TP/SRI methods

required 3,113 m^3/ha of irrigation water which was significantly lower than both DS/SRI (3,525 m^3/ha) and TPR (4,383 m^3/ha), which were less by 29 % and 20 %, respectively, as compared to TPR. Total water requirement was least in DS/SRI (13,600 m^3/ ha) which was at par with TP/SRI (13,630 m^3/ha) and was less by 17 % than that of TPR (16,260 m^3/ha). Similarly, water productivity was maximum in TP/SRI (0.51 kg/m^3), followed by DS/SRI (0.46 kg/m^3), and TPR (0.26 kg/m^3). The cost of cultivation was found to be similar for all the methods; TPR (Rs.61,420 ha^{-1}) , TP/SRI (Rs.65,100 ha^{-1}) and DS/SRI (Rs.61,100 ha^{-1}). Net return and benefit-cost ratio were significantly different among the treatments, however, with the highest values in TP/SRI (Rs.110, 100 ha^{-1} and 2.70) followed by DS/SRI (Rs.93,420 ha^{-1} and 2.53) and TPR (Rs.45,810 ha^{-1} and 1.74). Data also indicated that all the varieties had better response to TP/SRI and DS/SRI methods of crop cultivation as compared to TPR regarding the overall crop performance and economic benefits. The interaction of TP/SRI with variety Radha-4 was found statistically superior to all other treatments in terms of maturity days (111days), yield (7.38 t/ha), water productivity (0.59 kg/m^3), net benefit (Rs. 118,830 ha^{-1}), and benefit-cost ratio (2.83). Thus TP/SRI seems to be a suitable methodology to solve the water scarcity in rice farming and food security problems.

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