Paired-row planting and furrow irrigation to increase water use efficiency (WUE) of groundnut and potato in rice-based systems

TECHNOLOGY BRIEF

After rice harvest, most of the lands remain fallow due to water scarcity or limited availability of water for irrigation. Therefore, during the post-rainy season, it is important to select crops having low water requirements and also adopt a water-saving irrigation method. In this situation, paired-row planting for groundnut at 45 x 15 cm spacing (paired-row at 15-cm on raised beds with 45 cm furrow spacing); and paired-row planting of potato at 75 x 20 cm spacing (paired row at 25-cm on raised beds with 75-cm furrow spacing) saved irrigation water and increased crop water use efficiency (WUE) over flat-bed and normal planting for groundnut and potato, respectively.

Paired-row planting on raised beds showed pod yield advantage by 13-20% over flatbed planting of groundnut, irrigation water saving to the extent of 27-41%, and enhancement of crop WUE by 40-45%. The higher pod yield was attributed to greater interception of PAR by the crop canopy and better extraction of soil moisture by crop roots. Similarly, the paired-row planting technique in potato saved irrigation water by 18-20%, increased crop WUE by 18-20% over normal planting, without significant reduction in tuber yield.

IMPACT / UTILITY

This technology was demonstrated to selected farmers of different districts of Odisha through the Farmers' Training Program as well as the Trainers Training Program on scaling up of water productivity in agriculture. This has been adopted by a large number of farmers in rice-based systems for the cultivation of maize, sunflower, okra, tomato, chilli, and brinjal crops after the rice harvest.

HIGHLIGHTS

- Irrigation water applied through furrows facilitated wetting as well as air entry to the crop root zone. The improved planting technique has the potential advantage of saving irrigation water.
- In terms of economic impact, the maximum net economic return was obtained with paired-row planting of groundnut (45 x 15 cm) with the benefit-cost (B/C) ratio of 2.10.
- Similarly, paired-row planting of potato at 75 x 20 cm had resulted in a B/C ratio of 2.15 which was close to the B/C ratio of 2.13 obtained with normal planting at 50 x 15 cm.

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