

'Direct-Planting System' – Energy Saving High Output Rice Establishment Technique for lowland



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Background

Rice establishments are done predominantly as transplanting and as well direct seeding in lowlands, throughout the world

Transplanting is laborious yet, posses many advantages over direct seeding

On the other hand, direct seeding is gaining momentum, owing to non-availability of laborers and increasing labour wages

Crowded plant density with uneven distribution and unmanageable weed growths are the main impediment in direct wet seeding to have limited area compared to transplanting. Improvements in transplanting technique are going on Mechanical transplanter can reduce the drudgery of transplanting but still refinement is needed

Improvements in manual planting, like 'SRI' encourages tiller production, with more number of filled grains per panicle yet, the drudgery on labour remain unanswered

Objective

A sound technique simple to practice by all farmers and yet solid enough to provide maximum rice productivity with definite saving on labors

Methodology

Field experiments were conducted at wetlands of Tamil Nadu Agricultural University, Coimbatore, India:

To test verify the idea conceived for a new method of stand establishment viz., direct-planting system (DPS)

To find out optimum seed rate (30, 45 or 60 kg ha⁻¹) for DPS and observed for plant stand, tillering, yield attributes and grain yield in dry season (June to Sep 2005)

To comparing this technique with drum seeding and rice-green manure dual cropping through drum seeder, in winter season (Aug 2005-Jan 2006)

DPS

Sprouted seeds are broadcast in puddled leveled well water managed lowland.

Ten to 12 days after swing (DAS), rotary weeder is used to thin the plant stand, like incorporating the weeds, in swath of rows (20 to 25cm apart)



After covering the entire field in one direction, the process is repeated on the opposite direction with the same width of swath, thus allowing those plants in the middle of the four intersects of rows and column (rotary weeder untouched area) to grow. Four days later (14-16 DAS) the rotary thinning is repeated again in order to restrict the plants in the undisturbed area to become smaller to retain one or two plants.



After the second thinning, the plant stand looks as single seedling square planted rice. This process is hereafter referred as 'direct-planting system' for easy understanding.

Further practices follow as transplanted rice.

Manuring of N & K starts just at the second rotary thinning, this ensures thorough incorporation of applied manures.

Phosphorus is applied as basal before leveling and sowing.

Results

The results showed that uniform broadcasting of 30 kg ha⁻¹ was sufficient enough to establish single plant at 20 x 20 or 25 x 25cm or any other wider spacing

Direct planting system exhibited superiority in plant stand, tillering, panicle weight, number of filled grains per panicle and grain yield compared to drum seeding at 25cm solid row or dual establishment of rice and green manure through rice cum green manure drum seeder and incorporating the green manure at 28DAS

Increase in productive tillers, panicle weight and filled grain panicle-1 compared with drum seeding was 15.1%, 38.8% and 30.0% respectively

Table. Comparison of human labor (as man days) need for DPS with Conventional and SRI technique (Estimated based on averages observed at TNAU, Wetlands)

Field operation	DPS	SRI	Con.
I - Operations common for all the three			
o Main field preparation (besides tractor & animal power)	6	6	6
o Manures application	7	7	7
o Harvesting	30	30	30
Total	43	43	43
II. Operations with variation			
o Nursery, sowing, pulling out seedlings	0	15	24
o Transplanting or broadcasting	1	30	22
o Rotary/ Cono weeder usage	20	16	0
o Manual weeding	5	5	20
Total	26 (40%)	66	66
Grand total	69 (63%)	109	109

Besides the new technique is capable of out yielding all other techniques since, there is no transplanting shock as encountered in other methods and further the tillering starts at the earliest

Further Research

Use on two or three row light weight rotary weeder to further minimize the labor requirement for crop establishment

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