



On Farm Evaluation of Mechanical Transplanting of Rice (*Oryza sativa* L) Against Traditional Method

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ABSTRACT

An on-farm trail was conducted in Krishna Western Delta of Guntur district in Andhra Pradesh during Kharif, 2009-10 to evaluate the performance of machine in reducing the manual labour for raising of nursery and transplanting of rice and the effect on crop growth and yield. A 50 per cent reduction in labour required for raising of nursery and transplanting was recorded in machine planting against manual planting. A 13 per cent increase in grain yield (7989 Kg/ha) and 22 per cent increase in straw yield (9167 kg/ha) was observed in machine planting than in manual planting, 7059 kg/ha and 7500 kg/ha respectively. The higher grain and straw yield in machine planting was due to increase in no. of hills, no. of effective tillers and total no. of tillers. The cost of cultivation was Rs.1250/ha less in machine planting. Due to increased grain and straw yield and decreased cost of cultivation, a higher cost benefit ratio of 1:2.47 was recorded in machine planting as against 1:2.11 in manual planting.

Key words : Machine planting, Rice.

Rice is the most important crop of Andhra Pradesh and was cultivated in 28.03 lakh ha during kharif and in 18.54 lakh ha during rabi in the year 2008-09 (<http://agri.ap.nic.in>). Rice is a labour intensive crop and requires a number of man days for various field operations from sowing to harvesting. Farmers are facing acute shortage of labour for agricultural operations due to migration of labour from rural to urban areas and this shortage resulted in increased cost of labour. Hence, there is a need for mechanization of farm operations to reduce the labour requirement in rice cultivation.

Use of various herbicides for weed management and combine harvester for harvesting, threshing and winnowing reduced the dependence on human labour to a certain extent in rice cultivation. However, raising of nursery and transplanting are still done mostly manually and not much work was done to evaluate machines available for raising of nursery and transplanting. Hence, the latest machinery for these operations was evaluated and results were presented in this paper.

MATERIAL AND METHODS

An on - farm trail was conducted on farmers' fields in two locations in Krishna Western Delta of Guntur district in Andhra Pradesh during Kharif, 2009-10 to evaluate the performance of machine transplanting against traditional method

in rice. The soils of the experimental fields were heavy black with a pH of 7.8, low in organic carbon, medium in available phosphorus and potash. Yanmar transplanter was used for raising of nursery and transplanting.

Transplanter

The machine consists of a seeding machine and a transplanter.

Seeding machine

The seeding machine is powered by 0.5 HP electric motor. It sows seed in trays measuring 58x28 cm filled with soil and also irrigates the seed bed in the trays. It can sow the seed in 350-400 trays /hr.

Transplanter

The transplanter is powered by a 20 HP rider type diesel engine. It plants eight rows at a time at an adjustable spacing of 30X13/14 /15/18/21 cm and can cover one acre area in 75-90 min. Rice nursery was raised with a seed rate of 37.5 kg/ha in 200 trays of 58X28 cm size. Seed was sown by seeding machine in trays filled with well pulverized soil enriched with farm yard manure. The nursery was irrigated daily and was transplanted 15 days after sowing.

Transplanting was done by transplanter with a thin film of (2-3cm) standing water after the field

Table 1. Yield parameters, yield and economics of rice as influenced by machine planting against manual planting (Average of two locations)

S. No.	Parameter	Machine Planting	Manual Planting	Percent increase/decrease
1.	Spacing	30X13 cm	25X20 cm	
2.	No. of hills/ m ²	25	20	+25
3.	No. of tillers/hill	28	19	+47
4.	No. of effective tillers/hill	16	13	+23
5.	Labour for nursery raising and			
6.	transplanting / ha	19	38	(-) 50
7.	No. of grains /panicle	158	181	-13
8.	Grain yield (kg/ha)	7969	7059	+13
9.	Straw yield (kg/ha)	9167	7500	+22
10.	Gross income (Rs/ha)			
11.	• Grain	95628	84708	
12.	• Straw	9167	7500	
13.	• Total	104795	92208	
	Cost of cultivation (Rs/ha)	42500	43750	
	Net income (Rs/ha)	62295	48458	+29
	Additional net income (Rs/ha)	13837		
	Benefit cost ratio	2.47	2.11	

(Out put Prices: grain @ Rs.1200/q and straw @ Rs.100/q)

was thoroughly puddled and leveled. The crop was transplanted at a spacing of 30X13 cm accommodating 25 hills/m² with 3-4 seedlings/hill. The crop was raised by following recommended package of practices.

RESULTS AND DISCUSSION

Labour requirement

Nineteen man days were required per hectare for raising of nursery and transplanting as against 38 in manual planting. The reduction of labour requirement due to machine use for nursery raising and transplanting in rice was 50 per cent. The reduction in labour requirement due to use of machine was also reported by Syedul Islam and Desha Ahamad (2000) and Chowdary (2003).

Grain yield

Higher grain yield was obtained in machine transplanted treatment (7969 kg/ha) which is 13 per cent higher than recorded in manual planting (7059 kg/ha). The higher grain yield in machine planting was associated with an average 25 hills/m² which is 25 per cent more than the 20 hills/m²

in manual planting (less when compared to the recommended 33 hills/m² which remains an extension gap). Average number of effective tillers (16/hill) was also higher in machine planting than in manual planting (13/hill) which can be attributed to the early age of seedlings planted (Table1). The increase in grain yield in machine planting was in agreement with the results reported earlier (Anonymous, 2010).

Straw yield

Increase in straw yield to the tune of 22 per cent was observed in machine planting (9167 kg/ha) than in manual planting (7500 kg/ha). The higher straw yield in machine planting was associated with 25 per cent more hills and 47 per cent more tillers. Increase in straw yield in machine planting was also reported earlier (Anonymous, 2010).

Economics

A net income of Rs.62295/ha was recorded in machine planting which is 29 per cent more compared to Rs.48458/ha in manual planting. The higher net income was due to reduced cost of

cultivation of Rs.1250/ha and an increased grain and straw yield of 910 kg/ha and 1667 kg/ha, respectively in machine planting.

The reduced cost of cultivation, increased grain as well as straw yield resulted in better cost benefit ratio of 1:2.47 in machine planting than 1:2.11 recorded in manual planting.

Machine planting hence is a viable alternative at times of scarce availability and higher cost of labour.

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