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On Farm Evaluation of Direct Sowing of Rice with Eight Row Drum Seeder

P. Ammaji*, Ch. Chiranjeevi and N. Praveen

District Agricultural Advisory and Transfer of Technology Centre, Ranga Reddy, Prof. Jaya Shankar Telangana State Agricultural University, Rajendra Nagar, Hyderabad, Telangana State, India

**Corresponding author*

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A B S T R A C T

Rice is the major food crop grown in an area of 14 lakh ha during *kharif*, with an average productivity of 3, 277 kg ha^{-1} in Telangana state. Shortage of agricultural labour coupled with high labour cost are making the rice cultivation non-profitable. Uncertain monsoonal rains, and low discharge rate of borewells leading to late transplantion of paddy with aged seedlings which in turn results in reduced yield and increased incidence of pests and diseases. Under these circumstances, field trials were conducted with an objective to reduce the cost of cultivation and increase the resource use efficiency sowing of paddy with 8 row drum seeder for 4 consecutive years during the *kharif* season from 2010 to 2013 in farmers field (On farm trials) in Telangana state. The data pertaining to yield and yield attributes were recorded. The results revealed that number of tillers per $m^{2,}$ number of productive tillers per $m^{2,}$ no of grains per panicle, test weight and grain are significantly more with drum seeding rice compared to transplanting. The cost benefit ratio was also found to be high with direct sowing with drum seeder compared to transplanting during all the four years. The weed population and weed density, though more in drum seeder rice than the transplanted rice, the problem was effectively managed with the pre and post emergence herbicides. On an average, the drum seeder sown crop come to harvesting 10 days earlier than the transplanted rice in all the locations during all the four seasons. Based on the results of the on farm trials and the feedback received from the farmers it was concluded that direct sowing of paddy with 8 row drum seeder was found to be a viable option for the farmers to go for paddy cultivation in the event of uncertain monsoon, increased cost of cultivation and labour shortage besides resource optimization in Telangana state.

Introduction

Rice (*Oryza sativa*) is one of the most important food crops and staple food for more than half of the world population (Singh *et al.*, 2012). It is a water intensive crop. Looming water crisis and escalating labour costs have forced to search for the alternative crop establishments from traditional transplanting.

The difficulties faced in raising the nursery, late onset as well as uncertainty in receipt of rains coupled with high labour costs and off –

farm migration of agricultural labour necessitated the farmers of Ranga Reddy (Dist.), Telangana state to search for alternative methods of rice establishment. Keeping the problems faced by the farmers, DAATT Centre, Ranga Reddy has popularized the direct sowing of paddy with 8 row drum seeder owing to its advantages as stated by Singh *et al.*, (2007) like faster/ easier sowing, reduced labour costs, less drudgery, more efficient use of water higher tolerance to water deficits and often higher yields in well managed situations, compared to traditional transplanting.

Materials and Methods

On farm demonstrations were conducted in Ranga Reddy district during *Kharif* season from 2010 to 2013 for four consecutive years. The soils of the demonstrations plots were low in available nitrogen, medium to high in available phosphorus and medium in available potassium. The demonstration consists of two treatments (T_1)-direct sowing with drum seeder and (T_2)-Transplanting (farmers practice).

The popular varieties of rice in this zone like Tellahamsa, MTU-1010 and BPT-5204 were used for the trials in all the locations with a plot size of one acre. For drum seeding, paddy seed was soaked in water for 24 hours and then incubated for 12 hours to allow sprouting. The pre germinated seeds are sown with 8 row drum seeder on a perfectly puddled and leveled field. The seeds are sown at a spacing of 20 X 10 cms with 3-4 seeds per hill.

The observations on yield and yield attributes viz., No. tillers per m^2, No. of productive tillers per m^2, No. of grains per panicle, 1000 grain weight and yield were recorded. The data was subjected to analysis by using with paired t- test since the two treatments are organized in the same farmer's field by adopting the standard statistical procedures laid down by Panse and Sukhatme (1985).

The gross returns from each treatment during all the four years of the study was worked out with the then existing prices of paddy. Benefit cost ratio (BCR) for all the treatments was worked out on the basis of net returns in terms of rupees after deducting the cost of cultivation from gross returns.

Results and Discussion

Tiller production: In all these demonstrations, over all the years and locations the t values indicated that, drum seeding has resulted in significantly higher number of tillers per m2 compared to transplanting. Whereas, with regards to number of effective tillers m^2 no significant difference was observed during 2010 and 2011. While during the subsequent years direct seeding has produced significantly more number of effective tillers per m^2 (Table-3 and 4).

The increase in number of tillers as well as effective tillers might be due to the better root proliferation and growth which might have reflected in increasing the tiller number and effective tillers. These results are in conformity with the findings of Rana *et al.*, (2014) who observed maximum number of tillers in drum seeding.

No. of grains panicle^{-1}

The t-values in Table 1-4 indicated that there is significant variation among the two establishment methods wherein drum seeding was found to be superior to transplanting in all the locations over all the seasons except during 2011 where the two methods of sowing were at par.

Table.1 Yield attributes and yield of drum seeder and transplanted rice in different locations during 2010

Name of the village Location	No. of Tillers		No. of effective tillers		N. of grains/panicle		Test Weight (g)		Grain yield Kg ha^{-1}	
	Drum seeding	**Transplanting**	**Drum seeding**	**Transplanting**	**Drum seeding**	**Transplanting**	**Drum seeding**	**Transplanting**	**Drum seeding**	**Transplanting**
Kurumidda	328	301	221	203	148	138	18.961	18.532	5625	5224
Puppalguda	341	292	236	198	162	132	20.122	17.212	6213	5128
M.P Paleguda	336	294	214	207	152	149	19.685	19.842	5848	5715
Nuthanka	341	284	231	201	158	137	19.124	18.956	6122	5615
Kummera	334	315	208	216	156	141	20.224	19.812	5785	5908
Mean	336	297	222	205	155	139	19.623	18.87	5918	5518
t value (5%)	5.55**		2.07^{NS}		3.42**		1.36^{NS}		1.97^{NS}	

Table.2 Yield attributes and yield of drum seeder and transplanted rice in different locations during 2011

Name of the village Location	No. of Tillers		No. of effective tillers		N. of grains/panicle		Test Weight (g)		Grain yield Kg ha^{-1}	
	Drum seeding	**Transplanting**	**Drum seeding**	**Transplanting**	**Drum seeding**	**Transplanting**	**Drum seeding**	**Transplanting**	**Drum seeding**	**Transplanting**
Gollapalli	341	294	236	215	159	149	19.652	18.85	6120	5484
Medipalli	336	285	226	208	145	144	19.115	18.225	5845	5220
Mamarpalli	348	296	215	231	143	150	19.212	19.624	5938	5554
Ethbarpalli	358	281	245	209	163	130	20.816	18.025	6225	5287
Tolkatta	346	267	233	212	157	134	20.357	19.254	5984	5010
Mean	345	284	231	215	153	141	19.83	18.79	6022	5311
t value (5%)	8.84 **		1.86 ^{NS}		1.65^{NS}		2.01 ^{NS}		6.48**	

Table.3 Yield attributes and yield of drum seeder and transplanted rice in different locations during 2012

Name of the village Location	No. of Tillers		No. of effective tillers		N. of grains/panicle		Test Weight (g)		Grain yield Kg ha^{-1}	
	Drum seeding	**Transplanting**	**Drum seeding**	**Transplanting**	**Drum seeding**	**Transplanting**	**Drum seeding**	**Transplanting**	**Drum seeding**	**Transplanting**
Proddutur	348	269	235	211	157	132	19.212	18.165	6124	5140
Haridaspalli	325	272	229	221	145	144	18.216	19.215	5987	5640
Yadgirpalli	351	284	244	218	166	138	20.112	19.65	6251	5215
Doma	325	288	230	220	158	148	18.327	18.955	5940	5148
Dirisimpalli	336	277	227	216	161	157	20.224	18.218	6150	5424
Mean	337	278	233	217	157	143	19.218	18.840	6090	5313
t Value (5%)	8.41**		4.15**		2.48**		0.68**		6.36**	

Table.4 Yield attributes and yield of drum seeder and transplanted rice in different locations during 2013

Name of the village Location	No. of Tillers		No. of effective tillers		N. of grains/panicle		Test Weight (g)		Grain yield Kg ha^{-1}	
		Transplanting	**Drum seeding**	**Transplanting**	**Drum seeding**	**Transplanting**	**Drum seeding**	**Transplanting**	**Drum seeding**	**Transplanting**
Jaganguda	331	289	237	219	158	144	20.212	18.958	6010	5660
Bommarasipet	346	310	241	229	160	156	19.634	19.95	6122	5735
Khanapur	352	315	248	231	169	158	20.211	19.252	6245	5915
Ibrahimpatnam	338	291	244	214	164	151	19.11	18.632	5990	5750
M. Gouralli	348	298	247	221	166	147	19.247	18.812	6060	5846
Mean	343	300	243	222	163	151	19.682	19.120	6085	5781
t value (5%)	15.52**		6.33**		5.0**		2.10^{NS}		9.19**	

Table.5 Gross returns, net returns and Cost benefit ratio as affected by different planting methods from 2010-2013 (Average of 5 locations)

Name of the parameters	2010		2011		2012		2013	
	DSR	**Transplanting**	**DSR**	**Transplanting**	**DSR**	**Transplanting**	**DSR**	**Transplanting**
Grain yield (Average of 5 locations)	5918	5518	6022	5311	6090	5313	6085	5781
Total cost of cultivation (Rs ha^{-1})	40250	45650	43800	49680	44150	54000	47500	57780
Gross income (Rs ha^{-1})	60955	56835	66844	58952	76125	68006	82147	78043
Net income (Rs $ha^{-1)}$	20705	11185	23044	9272	31975	14006	34647	20263
CB Ratio	1.51	1.24	1.52	1.18	1.72	1.25	1.72	1.35

Minimum support price of Paddy for 100 kg is Rs 1030/ -in the year 2010 Rs. 1110/- in 2012 and Rs. 1280/- in 2012 and Rs.1350/- during 2013. Source: WWW. rkmp.co.in

This might be due to the production of healthy panicles with more number of grains per panicle as there is no transplantation shock for the seedlings and hence the better growth might be resulted in more number of grains per panicle in direct seeded rice compared to transplanting Yang *et al.*, (1998) and Nourbakhshian (2000) also reported similar results and the present findings are in accordance with these reports.

Test weight/ 1000 grain weight

Test weight was not significantly affected by the two methods of establishments over all the locations in all the years except during 2011, where drum seeding has recorded higher test weight than transplanting. Similar results were hither to reported by Awan *et al.*, (2007).

Grain yield

Significantly higher grain yield was produced in all the locations with drum seeding over all the four consecutive year of demonstration except during 2010. Among the four years the highest grain yield of 6245 kg ha^{-1} was recorded with drum seeding during 2013 at Khanapur. The per cent increase in grain yield of paddy due to direct sowing is 7, 11, 12 and 5 per cent during 2010, 2011, 2012 and 2013, respectively. The higher yields in drum seeding compared to transplanting might be due to the better growth parameters and yield attributes which might have reflected in increased yield. Hither to Ganajaxi (2000), Singh *et al.*, (2011) and Rana *et al.*, (2014) reported increase in grain yield due to direct sowing.

Economic analysis

The gross returns, net returns and benefit cost ratio was high with drum seeding (Table-5). This is due to higher yields coupled with no labour utilization for the field operations like raising and pulling the nursery and transplanting. These results are in accordance with the findings of Rashid *et al.*, (2009).

It can be concluded from the four years results that the direct sowing of paddy with 8 row drum seeder is a viable option for the farmers as it not only reduces the cost of cultivation but also increases the yields. However, an effective weed management practices with pre and post emergence herbicides is necessary since, the direct seeded rice culture is subjected to greater weed competition than the transplanted rice.

References

Awan, T. H., Ali, I., Safder, M. E., Ashraf, M. M., and Yaqub, M. 2007. Economic effect of different plant establishment techniques on rice *Oryza sativa* production. Journal of Agricultural Research. 45(1): 73-80.

Ganajaxi, Angadi, V. V., Rajkumar, S 2000. Studies to develop appropriate techniques for growing direct seeded rice (Special vol-I) on rice research and management in India. Advances in Agricultural Research 13: 197-200.

Nourbakhshian, S..J 2000. Funcction comparision of rice varieties in direct seeded and transplanting methods. Iran Agricultural journal. 2(4): 25-32.

Panse, V. G. and Sukhatme, P. V. 1985. *Statistical methods for agricultural workers* IV ed. Indian Council of Agricultural Research, New Delhi pp: 359.

Rana, Md. Abdullah, Md., Afruz Zahan, Neyeem Ahmed, Md. Abdul Jalil Mridha, Md. 2014. Effect of planting methods on the yield and yield attributes of short duration Aman rice. American journal of plant sciences 5: 251-255.

Rashid, M. H., Alam, M. M., Khan, M. A. H and Ladha, J. K. 2009. Productivity and resource use of direct-(drum) seeded and transplanted rice in puddled soilsin rice- rice and rice-wheat ecosystems. Field crops Research 113 (3) 274-281.

Singh, N.K., Singh, U. P., Sutaliya, J. M., Parihar, C. M., and Jat, S. L. 2012. Performance of direct seeded rice under different integrated weed management and crop establishment practices in Indo- gangetic plains of India. 3rd international agronomy congress on Agricultural diversification, climate change, Management and lively hood held at New Delhi, India on November 26-30 2012.

Singh, P. K., Singh, R. N., Singh, R. K. 2011. Assessment of drum seeder on direct seeded rice (*Oryza sativa*) under puddled condition. Journal of Interacademica.15 (3)487-488.

Singh, S., Ladha, J. K., Guptha, R. K., Lav Bhushan, Rao, A. N., Siva Prasad, B and Singh, P.P. 2007. Evaluation of mulching, inter cropping with susbenia and herbicide use for weed management in dry seeded rice (*Oryza sativa* L.) Crop protection 26: 518-524.

Yang, S. U., Sang, Y.,Sung, T. P., Byong, T. C., Son, Y., Yeo, S. U., Park, S. T., and Chun, B. T.1998. Physiological and yield response of rice cultivars in direct seeded and transplanted rice cultivation. RDA Jouranl of Crop Science. 40 (2): 109-111.

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