

Drum Seeder: Sustainable Paddy Establishment Techniques for Profitability

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SUMMARY

In Indian context rice-wheat cropping system (RWCS) are predominant and staple food for Indian. Paddy establishment practices are the key concern for the sustainable and higher yield over the traditional practices. Drum seeder are the practice for establishing the paddy crop without the raising of nursery being ecofriendly resulting as saving resources and enhance the profitability in terms of yield and economics.

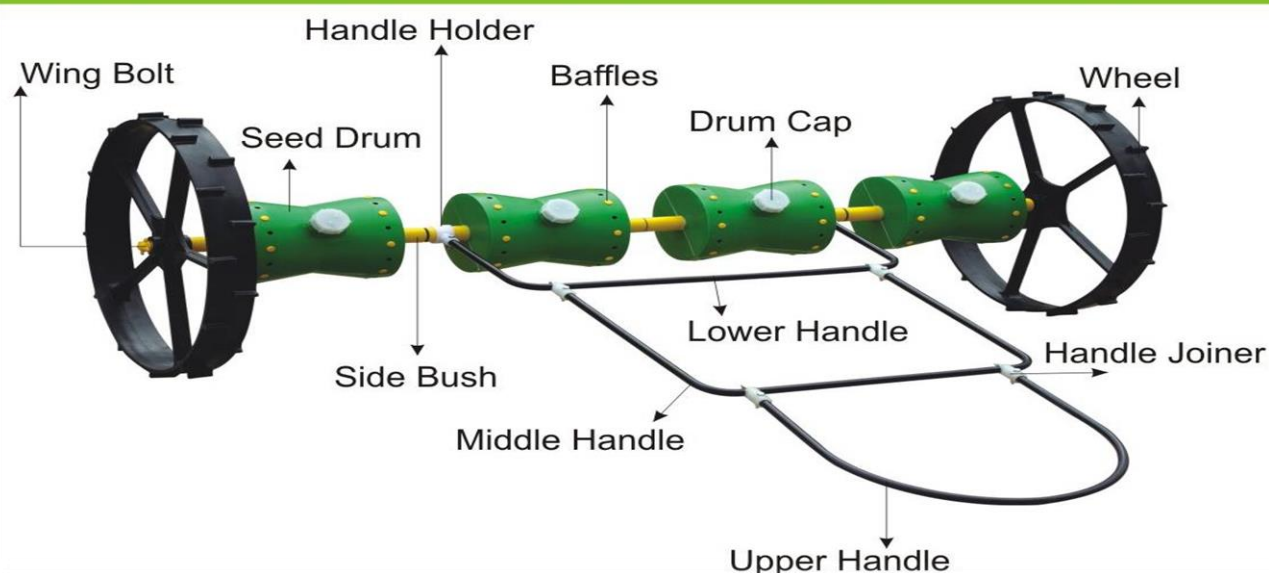
INTRODUCTION

In India Rice (*Oryza sativa*) is the most important cereal crop and being the staple food for millions of people. Globally, rice is cultivated in 110 countries, transplanting of rice seedling is widely accepted throughout the India. There are only transplanting accounts 30-40 percent of total energy and 30 percent of total labour requirement in paddy cultivation (farmech.gov.in). Transplanting of paddy incurred the higher cost of production due to the labour wages and also facing the shortage of manpower during the peak period of transplanting.

Drum Seeder

In Drum seeding technique, pre germinated seeds of paddy is direct sown in puddled and levelled field at 20 cm spacing of line to line (Vikaspedia.in). The direct wet rice seeding are helps in reducing the water requirements and saves at least 10- 15 days in the crop growth period (Tayade, 2017). There are 35 to 40 kg paddy seeds are required for one hectare. Soaking of seeds in water for overnight and allowed to sprout. The precaution should be should be taken that not to delay sowing as seeds with long shoot growth are not suitable for drum seeding. There should be air-dried sprouted seeds in shade briefly (<30 minutes) prior to sowing for easy dispensing through the holes in the drum seeder. Draining of excess water from puddled field and ensuring for the moisture of soil. Drums of drum seeder are filled with sprouted seeds (3/4th full) and pulled across the field and maintaining a steady speed for evenly sowing. Number of drums could vary between 4 and 8 with number of lines sown ranging from 8 to 16 in one pass. Irrigation water should not be applied for 2-3 days after sowing to allow rooting and anchoring to soil.

PARTS OF DIRECT PADDY SEEDER



However, heavy rainfall immediately after sowing is likely to wash away the newly sown seeds. As the seedlings grow, water level in the field can rise for better weed control. Intermittent irrigation is given till the panicle initiation stage. Where weed problem is severe, herbicide is applied within 1-2 days after seeding and if necessary, a second application is given 30-35 days later. Line sowing permits operation of modified conoweeder (width between wheels reduced to 15 cm instead of 25 cm) between the rows in the same direction adopted for drum seeding. Drum seeding in one ha area can be completed in 5 to 6 hours time by three persons compared to transplanting operation which requires about 30 to 40 man days. This technique can help in saving seed, water, labour requirement apart from improving productivity because of line sowing (spacing of 20 cm between rows) and early maturity of crop (by 7-10 days). Drum seeding reduces the cost of cultivation as it does away with the requirement for raising paddy nursery and transplanting thereafter. The technique fits into contingency planning as it provides flexibility in timing of sowing in lands prepared using irrigation water or immediately after receipt of monsoon rains with a crop variety of suitable duration to fit into the left over season (vikaspedia.in).

Impact of Drum Seeder for Sustainability

Yield and Yield Attributes

Drum seeder are reducing the cost of cultivation, proper establishment with uniform spacing helps to mechanisation of intercultural practices of weeding (cono weeder). The crop not facing the transplanting shock in drum seeder paddy results as better growth and development, higher number of tillers. Such results are also shown in the yield and yield attributes like panicle length (cm), number of filled grains per panicles. Finally higher crop yield over the farmer practice (Transplanted rice).

Table 1: Comparison of plant growth parameters for each replication for three treatments

Sr. No	Parameter	T ₁ (Paddy experimental plot with paddy drum seeder, cono-weeder, paddy thresher)	T ₂ (Dhaincha + T ₁)	T ₃ (T ₁ traditional farmer practice)
1	Plant height/cm	122.66	123.33	115.66
2	No. of tillers/m ²	640	593	528
3	Panicle length/cm	24	24.66	21.33
4	No. of Filled grains per Panicle (No.)	121	122	111
5	Grain Yield/kg ha ⁻¹	5270	5562	4762

(Rao *et al.*, 2014)

Table : Yield and economics of production of direct seeded paddy as compared to manual transplanting method (Average of three years)

Name of the village	Treatments	Number of Tillers per hill	Avg. yield (q/ha)	Cost of cultivation (Rs./ha)	Net return (Rs./ha)	B:C
Achyutpur	Direct seeded by drum seeder	18	43.5	22650	32925	2.4
	Manual transplanting	12	41.2	29650	21850	1.73
Rambhadeipur	Direct seeded by drum seeder	17	43.2	21850	32350	2.47
	Manual transplanting	13	41.8	28850	23400	1.81
Niladeipur	Direct seeded by	18	44.1	22500	32625	2.45

	drum seeder					
	Manual transplanting	12	41.5	29500	22375	1.75

(Mohanta *et al.*, 2019)

Economical Prospects

In Nacharam village in Khammam district farmers are used Drum seeded paddy for establishment and shown advantage in net income due to drum seeding ranged from Rs 13000-14000/ha in two different Kharif seasons and B : C ratio was higher (2.3 to 2.9) with drum seeding compared to transplanted paddy (1.5 to 2.0). Such type of finding is also reported from Farmers of Matsyapuri village, West Godavari district. There reduction in cost of cultivation was upto Rs 10000/ha by drum seeder compared to the transplanting method. Crop yield in direct sown paddy was 4% higher and benefit cost ratio was also higher (2.3) with less water compared to transplanting method (vikaspedia.in).

Environmental Prospects

Water is precious on our earth which is played the key role for the existence of life. There are various effort are placed to save the water and also rice takes huge amount of water for per kg dry matter production. In relation to saving of water drum seeder helps as reduction the number of irrigation (4 irrigation) over the transplanted (6 irrigation). there are also saving of resources as no need of nursery raising to establish the crop.

CONCLUSION

Rice is staple food and rank first in India, so need to produce sustainably which save the resources and give more production. There is huge water consumed for per unit of dry matter production over the other cereals crops. Drum seeder is viable paddy establishment techniques for the sustainability of crop production as saving of time, money and resources.

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