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Drum Seeder Technology is Made Easy Paddy Cultivation and it is a Boon to Farmers of North Coastal Zone of Andhra Pradesh

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ABSTRACT

In srikakulam district of andhra pradesh, paddy is major important crop during kharif cultivated in an area of 2,01,148 ha out of total cropped area of 2,66,433 ha with productivity of 4587 kg/ha. In the district, traditional method of paddy cultivation, adoption of more seed rate, late transplanting with over aged seedlings, close spacing coupled with scarcity of labour and escalation in labor wages, reduction in labor efficiency are leading to lower yields and low net returns, besides that farmers are distressed to cultivate paddy. Farmers are searching for new and easy technology to cultivate the paddy. With the feedback from farmers scientists from DAATT Centre also searched for easy and best technology. Finally we identified the paddy drum seeder technology in consultation with Indian Institute of Rice Research, Rajendranagar, Hyderabad scientists, which is very easy and less labour involved. Drum seeder technology is boon to farmers to save money and time and receive crop harvest 7-10 days earlier than normal transplanted field. DAATT Centre, Srikakulam District of ANGRAU, in collaboration with Department of Agriculture, Srikakulam District has introduced 'Paddy Drum Seeder Technology' through organizing On-Farm Demonstrations (OFDs) since Kharif, 2011. With help of NABARD "Project on Direct Sowing of Paddy with 8 Row Paddy Drum Seeder" supported under Farmers' Technology Transfer Fund (FTTF) for three years, 2011-12, 2012-13 & 2013-14. On Farm Demonstrations were conducted in 5 locations during Kharif season on paddy drum seeder cultivation in Srikakulam District. In general Soils of Srikakulam District are low in organic carbon, low to medium in Phosphorus, medium to high in potassium. Yield in paddy drum seeder technology recorded 12.49% yield over normal method of paddy cultivation during Kharif season. The results from the study showed that the farmers realized the 40.42% increase in net income due to increased grain yield by 12.49% with reduction of cost of cultivation by 14.23%, it could be attributed to reduction in manual labour, it could be attributed to reduction in manual labour of 15 man labour and 32 women labour and also increase in yield attributes and yield and also increase in yield attributes and yield.

Keywords

Paddy drum seeder,
Cono Weeder, OFT,
Yield, B:C Ratio.

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Introduction

Rice area has been decreasing in state like Andhra Pradesh, although overall productivity is increasing, there is a decrease in compound growth rate in rice productivity at national level (Krishnaiah 1999). There is no scope for expansion of area for rice cultivation. Rice yields are plateau in the irrigated ecosystem and the rainfed system with low productivity of 2.5 to 3.5t/ha.

Since the frontier of horizontal expansion of rice area has already been closed, it has become imperative to increase rice production per unit area per unit time to feed the teeming millions in the new millennium. India has to produce 135-145 million tones by 2020 A.D. to feed the additional 350million people. To do so, the productivity should be raised to 3.2t/ha by 2020AD from the present level of 2.05t/ha.(The Hindu Survey of Indian Agriculture). To achieve this task we have to increase the productivity of rice with planning and strategy. To meet this challenge national resource base should be used in the best possible way to increase and sustain productivity. All inputs should be used judiciously to achieve higher inputs use efficiency simultaneously reducing the cost of cultivation.

The problem and challenges facing rice cultivation at present are quite different from the past, that have been effectively tackled during the previous years. To combat the situation in recent years, rice farmers are blessed with advanced technology and knowledge of paddy drum seeder technology to achieve potential benefits through increased yields with reduced cost of cultivation.

In Srikakulam District of Andhra Pradesh, paddy is predominant crop during kharif cultivated in an area of 2,01,148 ha out of total cropped area of 2,66,433 ha with productivity

of 4587 kg/ha. Total irrigated area is 1,89,648 ha and main irrigation sources are channels, tanks and bore wells. In the district traditional method of paddy cultivation involving adoption of more seed rate, late planting with over aged seedlings and close spacing coupled with scarcity of labour and escalation in labour wages are leading to lower yields and low net returns.

Srikakulam district is the one of the rice growing districts in Andhra Pradesh. Farmers grow rice in 2.0 lakh ha during Kharif and 6000 ha during Rabi. Cost of cultivation is rising year by year due many reasons i.e social reasons, situational factors and input cost. At present cost of cultivation per acre is between Rs12500/- to Rs 15000/-. This is mainly due increase in labour wages and scarcity of labour in villages for agricultural operations, and increase in price of fertilizers.

To overcome this, paddy drum seeder technology is boon to farmers to save money and time and receive quality crop harvest at 7-10 days earlier than normal transplanted field. Paddy drum seeder technology holds special significance in the present day production system with regard to saving labour component by 30-50% and increase the productivity by 20-30% (Annual Reports of Indian Institute of Rice Research, 2003, Rajendranagar, Hyderabad).

Paddy drum seeder technology, a new way of cultivation is gaining more attention of the farmers in Srikakulam District. But the paddy drum seeder technology has its own implications to adopt such as right choice of field, irrigation facilities, varieties, land preparation, weed management and machinery available.

The prime concern of any programme related to agriculture is to enhance productivity and with reduced cost. In order to reduce the cost

of cultivation DAATTC Srikakulam took initiatives in collaboration with NABARD to promote direct seeding of paddy with drum seeder in Srikakulam district.

Objectives

To introduce and test the feasibility of paddy drum seeder technology in the Srikakulam District through On Farm Trials(OFTs), Method demonstrations and Group discussions.

To record the yield in paddy drum seeder technology in comparison with normal method to convince the farmer. To analyze the economics of paddy cultivation in Srikakulam District.

Materials and Methods

Scientists in DAATT Centre, Srikakulam District of ANGRAU in collaboration with Department of Agriculture, Srikakulam District and with funding from NABARD under supported under Farmers' Technology Transfer Fund (FTTF), has introduced paddy drum seeder technology with comparing normal method of cultivation through organizing On-Farm Trials (OFTs) since Kharif, 2011 in 5 locations.

Details and advantages of Direct Paddy Seeder technology

Direct Paddy Drum Seeder(Fig.1) is small equipment for sowing germinated paddy seed directly in wetland field is fabricated and it is used for demonstration. There is no need for transplantation.

It is a manually pulled implement. It covers 8 rows of 20cm row-to-row spacing at a time. It is made up of plastic materials. Cono weeder (Fig.2) is used for intercultivation to incorporate weed in between rows apart of 20cm.

Salient Features

Labour cost is reduced drastically
Cost of cultivation is reduced because, cost on nursery raising, nursery pulling and transplanting can be saved

Uniformity in seed sowing and Plant population

Continuous drilling of seeds is eliminated.

Reduction in seed rate and thinning cost. Crop matures 7-10 days earlier than the transplanted paddy Light in weight and easy to handle. An area of 1 hectare per day can be shown

Saving in seed requirements: 12-18 kg per acre is sufficient depending on variety

Farmer fields are selected with proper drainage facility and regulation of water, to conduct On Farm Trials (OFTs). The varieties cultivated in paddy drum seeder technology were MTU-1001, MTU-1010, MTU-7029, MTU-1075 and BPT-5204.

Since planting of crop in both Drum seeder technology and Normal method data pertaining to crop stand with number of tillers per hill, number of tillers per square meter, incidence of pests and diseases if any at regular intervals followed by yield contributing parameters like effective tillers, panicles per hill & square meter, length and texture of panicle, number of grains per panicle and 1000 grain weight are recorded. Yield per 5x5m² was collected and calculated per hectare area. Means of yield attributes, yield and cost of cultivation were arrived for yield in both drum seeder technology and normal transplanting methods. Percentage yield increase over normal method was calculated and comparative analysis of cost benefit ratio per hectare was arrived and presented in the tables.

Results and Discussion

In Srikakulam District since Kharif-2011 the On-Farm Demonstrations on Drum seeder technology is conducted for three Kharif seasons in innovative farmers fields and yield attributes and yield are depicted in following tables.

Crop duration

The duration of the crop (Table.1)is recorded, it was observed that there is reduction of duration to reach the harvesting of rice crop was observed. The reduction of crop duration is 14 days was observed when compared to normal transplantation method of rice cultivation.

Yield Attributes

All yield attributes, during all the years were

recorded better in Drum seeder technology than normal method(Table.1). During all kharif seasons in all the locations with different varieties recorded the number of productive tillers per/Sq.mt, and number of grains per panicle are 267 and 233 respectively are more than normal practice 220 and 202(MSSRF,2002).

Yield

Grain yield (Table.1)increase was achieved to a tune of 12.49% in drum seeder method (6275 kg ha^{-1}) over normal method of cultivation (55786 kg ha^{-1}). Higher yield in drum seeder technology is contributed by more number of productive tillers by supported by profuse root system resulted in more number of panicles.(Taddy,2004).

Fig.1 Drum seeder

Fig.2 Cono weeder

Flow Chart Of Handed Over Of Paddy Drum Seeder Technology To The Farmers

Table.1 Mean data on Yield and Yield attributes of On-Farm Demonstrations on paddy drum seeder technology conducted from Kharif-2011 to kharif,2013

Season	No.of Locations	Duration		No.of Productive tillers/Sq.mt		No.of grains/panicle		Yield Kg/ha		Percentage Increase over Check
		Demo	Check	Demo	Check	Demo	Check	Demo	Check	
Kharif-2011	5	128	138	265	224	221	198	6318	5893	7.22
Kharif-2012	5	131	143	274	222	247	207	6274	5579	12.46
Kharif-2013	5	124	145	262	214	232	202	6232	5263	18.41
	5	128	142	267	220	233	202	6275	5578	12.49

Table.2 Mean of comparative analysis of cost of cultivation including labour per hectare of paddy

Sl.No	Practice	Paddy drum seeder technology		Conventional transplantation method	
		No.of labour	Cost in Rs.	No.of labour	Cost in Rs.
1.	Land preparation for nursery	0	0	Ploughing charges	1875
	Land preparation of main field	8M& Puddling charges	5600	8M& Puddling charges	5600
2.	Nursery Management	0	0	5M&5F	1750
3.	Transplanting	0	0	20M & 25F	7750
4.	Manures & Fertilizers	15M	8670	15M	7260
5.	Weeding & Herbicide Inter-cultivation	5M& 10F	3000	25F	3750
6.	Plant protection & Chemicals	2M&2F	2000	4M&4F	2000
7.	Irrigation management	10M	2000	8M	1600
8.	Harvesting	40F	6000	30F	4500
9.	Threshing, Winnowing and bagging	25M& 25F	12600	20M& 20F	10500
	Total	65M& 77F	39870	80M& 109F	46585

M-Male F-Female

Table.3 Economics of the Paddy Drum seeder technology vs Normal transplantation method of Kharif,2011 to 2013 seasons

Sl.No	Particulars	Demonstration	Check	Difference	Percentage increase or decrease
1	Grain Yield Kg/ha	6275	5578	697	12.49
2	Straw Yield Kg/ha	7530	6696	834	12.45
3	Grain Value (Rs.13/kg)	81575	66936	14639	21.87
4	Straw Value (Rs.0.5/kg)	3765	3348	417	12.45
5	Gross income Rs./ha	85340	75862	9478	12.49
6	Total cost of cultivation Rs./ha	39870	46585	-6715	-14.41
7	Net income Rs./ha`	45470	29277	16193	61.62
8	C:B ratio	2.14	1.62	0.52	32.09

Labour involvement in Rice cultivation

There is reduction in labour utilization (Table 2) is observed in drum seeder technology i.e., 15 man labour and 32 women labour when compared to normal method of transplanting method.

Additional grain yield and straw yield (Table.3) of 697Kg ha^{-1} and 834 Kg ha^{-1} recorded in drum seed technology compared with normal practice of transplantation, this could be due to uniform plant population, good tillering capacity. Additional net income of Rs.16193 ha^{-1} received in drum seeder technology with reduction of cost of cultivation of Rs.6715 ha^{-1} realized over normal transplanting.

The results from the study showed that the farmers realized the 61.62% increase in net income due to increased grain yield by 12.49% with reduction of cost of cultivation by 14.41%, it could be attributed to reduction in manual labour of 15 man labour and 32 women labour and also increase in yield attributes and yield (Paladugu *et al.*,2004).

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