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Assessment of Drum Seeder : An Improved Technology in Rice Production System

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ABSTRACT

The present investigation was conducted in order to reduce labour as well as input cost for rice cultivation of rice growing farmers in Chhattisgarh State of India. Eight row rice drum seeder was introduced and evaluated on farmers field at Krishi Vigyan Kendra Dantewada first time in year 2014. The seeder consists of eight seed drum made up of fiber which required only one operator to do the seeding of pre germinated seeds. This improved technology recorded higher yield of 3.675 t/ha compared to 2.940 t/ha in farmers local practices. In spite of increased in yield, the improved technology gave higher net return, benefit/cost ratio and reduction in cultivation costs than farmers practices.

Key words: *Direct sowing, Drum seeder, Yield, B : C Ratio, Extension activities.*

INTRODUCTION

Rice (*Oryza sativa* L.) is the most consumed cereal grain in the world, constituting the dietary staple food for more than half of its human population. India, the second largest producer after China, has an area of over 43.95 million hectares under rice with production and yield of 106.29 million tones and 2424 kg per hectare of rice respectively in 2013-14[1]. The labour involved in cultivation of rice raising, uprooting, cleaning, transport and transplanting of seedlings is 100-110 man-days/ha. This labour requirement is very intense at the time of transplanting season. Wet paddy seeding can reduce the labour requirement during transplanting season. The direct wet rice seeding also reduces the water requirements of crop and it saves at least 10-15 days in the crop growth period. Therefore, direct wet seeding of pre-germinated seed would be very useful for the small rice farmers in eastern and southern Indian especially in area of rain fed rice ecosystem. The wet seeding technology is very simple and can be adopted by the farmers easily. The pre-germinated seeds are prepared by soaking the paddy seeds for 24 hours in water and after soaking they are incubated for 12 hours till 1 to 2 mm size sprouts are visible. The wet seedbed is prepared by shallow pudding with tractor cage wheel in fully saturated soil and allowed 12 hours with a thin layer of water is good for sowing the pre-germinated rice seed preferably under anaerobic conditions.

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Shrivastava and Panwar[4] and Devnani[3] reported the use of seeder as superior to broad casting method of raising the rice crop. As rice is mostly raised in the high rainfall areas, the weeds are the main problem that affects the establishment of plants. Thus control of weeds to make use of mechanical weeders, the line sowing of rice seeds will be most desirable compared to broad casting of seeds. Hence in light of the above, the present investigation "Assessment of drum seeder: an improved technology in rice production system in puddle soil" for its not only productivity but also profitability in rice cultivation was planned and carried out first time in nexal affected area Dantewada district of Chhattisgarh State of India.

MATERIALS AND METHOD

Drum seeder consists of four cylindrical seed drums made of plastic, ground wheels, floats and handle. The seed drum having volume 250 mm x 180 mm with 40 cm length. Nine numbers of seed metering hole (funnel shaped) of 8 mm diameter were provided along the circumference of the drum at both the ends with row to row spacing of 20 cm. In direct seeding method of rice cultivation, need for a nursery and task such as pulling, transporting and transplanting seedlings are avoided as the pre germinated seeds are directly sown. Using a drum seeder in a well puddle and level wet field. The seeds are dropped in rows @ 20 cm row to row spacing and the seed rate is about 37.5 kg per hectare of Shamleshari variety of rice was taken in the experimentation. Drum seeder is light in weight, easy to operate and more area can be covered by a single man **(Fig 1).** Advantages of drum seeder is uniformity in seed sowing, reducing thinning cost, hill dropping of the seed can be achieved with this improved system of planting **(Fig 2)**.

RESULT AND DISCUSSION

Yield and Economics:

Trails on direct sowing of rice were conducted at fifteen locations in five different villages of South Bastar Dantewada district of Chattishgarh during kharif 2014-15. The results revealed that the average yield of direct sown rice was 3.675 t/ha as compared to farmers practices i.e. 2.940 t/ha. On anverage thers was an increase in yield 20 % in direct sowing. The total cost of operation of sowing Rs 600 per heactare was lower in direct sown rice compared to broadcated method by Rs 1250 per heactare. Further it could be noted that the net returns were higher in direct sown rice Rs 25054 than broad casted rice (Rs 14210). The net income increased by Rs 10844 per heactare in direct sown rice.It was mainly due to the reduction in cost of sowing operation, cost of cultivation and increased gross income yiled. It was also observed that the cost-benefit ration was higher in direct sowing (2.31) which is significantly higher than in conventional method(1.67).

Direct sowing by drum seeder in rows facilitated to take up organic fertilizer application, plant protection measures and weed control in an efficient manner. In adition crop duration is reduced around one weak in direct sown ricewhich facilitated to raise other crop. Wang and Sun[5] noticed that duration can be shotened by 7-15 dyas in direct seeded rice compared to tranplanted rice, futher Chandrasekhararao *et al*[2]., observed that duration can be reduced to 8-10 days. The farmers in OFTs had realised that direct sowing by drum seeder is only a viable option to reduce cost of cultivation of rice and increase net return due to less seed rate, less labour requirements at the time of sowing and no need of nursery raising etc.

Table 1: Parameters recorded under on farm trails of eight row drum seeder for direct seeding of rice

Treatments		Yield (t/ha)	Cost of operation (Rs/ha)	% increase in yield	Net return (Rs/ha)	B:C Ratio
Farmer Practice (T1)	Using Broadcasted Method	2.940	1250	-	14210	1.67
Assessed Rec Practice (T2)	Using Improved Drum Seeder	3.675	600	20.00	25054	2.31

Fig. 1: Direct sowing of rice by drum seeder

Fig. 2: Rice crop sown by drum seeder

Extension activities

Extension activities like training programmes, group discussions, exposure visits, field days, kisan melas, review meetings, newspapers coverage and TV talk and popular article etc., were conducted by KVK in collaboration with state agriculture department, farmer's clubs and mass media to popularize the drum seeder technology **(Fig 3)**. A total number of 4 off campus and 3 in campus training programmes were also conducted for several farmers. Due to concerted effort by KVK, this technology was spread to other block as well as other nexal affected district of Chhattisgarh.

Fig. 3: Photographs of Extension Activities for popularize the drum seeder technology

CONCLUSION

Farmers readily accepted this technology as seeing believes. It involves less cost of cultivation than traditional method. Mainly it reduces labour during peak periods i.e. transplanting, moreover it is technically viable and economically feasible and it is easy to practice without affecting the crop yields. As the crop duration is reduced by around 7-10 days it facilitated in raising the second crop on conserved soil moisture without any moisture stress. The weed problem of the crop growth can be managed by using mechanical weeder i.e. Ambika Paddy Weeder in line sowing keeping row spacing 20 cm and plant to plant spacing can also be increased by blocking the holes on the drum as per requirement. Direct seeding in rice using drum seeders is a technology viable and economically feasible technology that could be adopted by even small and marginal farmers also.

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