Adoption Level of Drum Seeder Technology in Rice cultivation

P.Venkata Rao, S.Neelaveni, P.B Pradeep Kumar & P.Punna Rao[1]

Abstract

This study was conducted with an objective of studying the adoption level of drum seeder technology in north coastal zone of Andhra Pradesh. Ex-post facto research design was used with a sample size of 100 farmers adopting drum seeder technology in rice cultivation. Majority of the farmers had medium level of adoption. The correlation analysis revealed that extension contact, achievement motivation, innovativeness, information seeking behavior, education, irrigation facility and risk taking ability were significantly related to the adoption of drum seeder technology. Practice wise analysis revealed that 41.00 per cent of the farmers had partial adoption and 35 per cent had full adoption. There were 24.00 per cent of the farmers who did not adopt certain drum seeder technology practices.

Sustainable development in rural areas is possible through the means of sustainable livelihoods particularly agriculture and allied activities. The major component of agriculture in Andhra Pradesh particularly the North Coastal zone is rice cultivation (63 per cent of total cultivated area). Transplanting is the most common and conventional method of crop establishment under low land and rain fed situations, which is highly labour intensive with high operational cost. Late sowing with over aged seedlings is another common phenomena in north coastal districts of AP. In recent years nearly 20,000 ha rice cultivation is under direct sowing method through broadcasting which causes uneven plant stand with high weed infestation causing low yields. There is a dire need of an alternative method for rice cultivation to cope with the vulnerability in cost of cultivation including scarcity of labour. Direct sowing of rice with sprouted seed in puddled fields by using an eight row drum seeder at 20cm row spacing is an alternate method of rice cultivation which reduces the cost of cultivation and is a good method under late sowing conditions. The drum seeder technology as an alternate method was proven through Front Line Demonstrations conducted by the District Agricultural Advisory and Transfer of Technology Centers (DAATTC) of Srikakulam, Vizianagaram and Vishakhapatnam districts with an increase in yield by 9.32 per cent and Cost-Benefit ratio of 1:2.25 against 1:1.62 (control).

[1] Agriculture College, ANGRAU, Naira-532185

In this context the present study was conducted with an objective of studying the adoption level of drum seeder technology in rice cultivation in North Coastal Zone of Andhra Pradesh and to know the constraints in adoption of the technology.

Materials and Methods

The study was conducted with ex-post facto research design to study the level of adoption of drum seeder technology. Five mandals namely Etcherla, Santhabommali of Srikakulam, Gantyada and Mentada of Vizianagaram and Anakapalle mandal of Vishakhapatnam districts of north coastal zone of A.P. and four villages from each mandal were selected purposively where the drum seeder rice cultivation is being practiced by farmers. Five farmers in each village practicing drum seeder rice cultivation continuously for 3 years were purposively selected. Thus the total number of respondents for the study was 100.

An interview schedule was developed for the study in consultation with the experts in research as well as in extension on attributes and practical components of drum seeder technology in rice cultivation to know the adoption level and to elicit constraints in drum seeder technology. Full Adoption is operationalised as practicing recommended package of practices. Partial adoption is operationalised as practicing a certain part of the recommended practice or that is deviated from the particular recommended package of practice. Non adoption is operationalised as not practicing particular recommended package of practice. Responses of the farmers were collected on a three point continuum i.e. fully adopted, partially adopted and not adopted by assigning scores of 3,2 and 1 respectively against recommended packages of practices of drum seeder technology and the total score was considered for the level of adoption based on mean and standard deviation. The statistical tools viz., Arithmetic Mean, Percentage, Standard Deviation and correlation analysis were used.

Results and Discussion

Fifty eight per cent of the farmers had medium level of adoption of drum seeder technology in rice cultivation followed by high (28%) and low (14%). The percentage of high level of adoption might be due to the recent inception (2006-07) of this technology. The medium level of adoption might be due to dissemination of technology in medium range. Farmer to farmer extension needs to be improved to increase adoption rate.

Table 1 reveals that extension contact, achievement motivation, innovativeness, information seeking behavior, education, risk taking ability and irrigation were significantly related to the adoption of drum seeder technology at 5% level of probability. The extension agency is one of the best, reliable and accessible sources of

information and contact with them helps to be in touch with the latest agricultural technologies. Farmers with more achievement motivation had a strong desire to have higher yields and low cost of cultivation. Innovativeness is associated with the individual's earliness in use of new practices. Irrigation with drainage facilities is another important factor in adoption of drum seeder technology. Education is significantly related as it is proportionately related to knowledge gain and adoption of new useful technologies. Respondents had risk taking ability to get windfall profits.

Table 1. Relationship between selected profile characteristics of the farmers and their adoption

No.	Profile characteristic	Correlation Coefficient
X1	Age	**0.258**
X2	Education	**0.612***
X3	Farming experience	**0.356**
X4	Farm size	**0.087**
X5	Irrigation	**0.659***
X6	Information seeking behavior	**0.562***
X7	Extension contact	**0.708***
X8	Innovativeness	**0.625***
X9	Risk taking ability	**0.567***
X10	Achievement motivation	**0.704***

*significant at 0.05 level of probability

Ten adoption practices were selected for assessing the adoption level. Practice wise analysis revealed partial adoption of drum seeder technology by 41% of the farmers followed by 35 per cent who had full adoption and 24.00 per cent of the farmers who had not adopted certain drum seeder technology practices in rice cultivation. The results regarding practice wise adoption of the respondents are furnished in table 2.

Table 2 depicts that 57 per cent of the respondents partially adopted the practice of perfect leveling and settling of field, which results in poor germination due to being covered with mud in more depth. Leveling of the field helps in proper water management and sowing after settling of puddled mud gives good germination.

Most of the respondents (88%) fully adopted the practice of soaking treated seed for 24 hours. It might be due to high knowledge on the conditions required for germination and to establish the seedlings. Incubation of seed for 24 hours was followed by 60 percent of the respondents as they are well aware about this practice, which helps to get fast and synchronized germination.

Filling up of drums up to two-third portion was adopted by 38 per cent of the respondents to maintain proper dropping of seedlings and partially adopted by 56 per cent because of lack of knowledge, which results in uneven population stand.

Majority (52%) of the farmers were not adopting the tying of ropes for exact lining followed by partial adoption (26%) and full adoption (22%). Non adoption of this practice might be due to lack of awareness which impairs weed management due to difficulty in moving the cono weeder.

Formation of alley ways for every two drum seeder lines was followed in full by 38 per cent and partially (for every 3-4 drum seeder lines) by 57 per cent of respondents. It might be due to knowledge on its importance as a preventive cultural practice to combat incidence of Brown Plant Hopper, air flow and facility for application of fertilizers and pesticides.

Application of pre emergence herbicide was partially adopted by majority (58%) of respondents followed by non adoption (28%) and adoption (14%). It might be due to the apprehension of mortality of just emerged seedlings and lack of awareness on use of pre emergence herbicide.

Forty three per cent of the respondents partially adopted the application of post emergence herbicide followed by 32 per cent of respondents who did not adopt the application of post emergence herbicide due to lack of knowledge on post emergence herbicides. Twenty five per cent adopted because of possibility of use of cono-weeder between the rows to incorporate weeds in the field.

More than half (59%) of the respondents partially adopted the fertilizer management particularly split application of Nitrogen. It might be due to lack of knowledge on judicious use of fertilizers, non availability of fertilizer in time, farmers were not prepared for purchase of fertilizers at the time of sowing and unfavorable weather conditions.

Constraints analyses helps in formulating extension strategies for improving adoption of drum seeder technology in rice cultivation.

It can be perused from Table 3 that sudden occurrence of the rain causes runoff of sprouted seeds and uneven plant stand (100%). Low lying situation is not suitable for drum seeder rice cultivation (97%). These constraints may be reduced by forming the drainage channel around the bunds and four way channels from mid point. High weed infestation as drying and wetting condition and thin film of water at initial stages (91%) has to be addressed by popularization of use of pre-emergence as well as post emergence herbicides through organization of training programmes and method demonstrations.

Table 2. Practice wise analysis of Adoption of Drum Seeder Technology

N=100

S.No.	Items of recommended package of practices	Full adoption	Partial adoption	Non Adoption
		Percentage	Percentage	Percentage
1	Perfect leveling after puddling and setting of the field	25.00	57.00	18.00
2	Soaking of treated seed for 24 hours	88.00	12.00	0.00
3	Incubation of seed for 24 hours	60.00	32.00	8.00
4	Filling of drums upto 2/3rd portion	38.00	26.00	36.00
5	Tying of rope from east west for straight line while manually pulling drum seeder	22.00	26.00	52.00
6	Alley way formation for every two drum seeder lines	42.00	35.00	23.00
7	Application of pre emergence herbicide 2-4 days after sowing	14.00	58.00	28.00
8	Application of post emergence herbicide 15-20 days after sowing	25.00	43.00	32.00
9	Maintenance of thin film of water at early stages upto 20 days	16.00	62.00	23.00
10	Four splits N-Fertilizers every 15 to 20 days	20.00	59.00	21.00
	Average :	35.00	41.00	24.00

Maintenance of spacing, plant to plant (80%), dropping of more seeds at a point (71%) can be tackled by perfect leveling of field, filling of drums up to 2/3rd and closing of holes based on seed size of the variety. It can be improved by conducting more number of method demonstrations by the extension agencies.

Table 3. Constraints as perceived by the respondent farmers

N=100

S.No.	Constraint	Percentage
1	Not suitable for low lying (water stagnated) situation	97.00
2	Sudden occurrence of rain at the time of sowing	100.00
3	Bird damage at the time of sowing	80.00
4	Dropping of more number of sprouted seeds at a place through holes	71.00
5	Maintenance of spacing between plant to plant is difficult	80.00
6	Weed infestation is high	91.00
7	Irrigation management during initial stage is difficult	74.00
8	Non availability of drum seeders in the market	60.00
9	Non availability of cono-weeders in the market	72.00
10	Non availability of skilled labour	69.00

Bird damage at the time of sowing (80%), irrigation management at early stages (74%) due to lack of water control structures, non availability of cono weeders (72%), dropping of more seeds at a point (71%), non availability of skilled labour (69%) and non availability of drum seeder in the market (60%) were the major constraints in the adoption of drum seeder technology. Training may be arranged for the available labour to be used in pulling of drum seeder to improve labour efficiency and provide livelihood to labour.

The Department of Agriculture may arrange more subsidy and supply of Drum seeders and cono-weeders to increase the adoption of drum seeder technology. Most of the farmers are economically backward so special credit facilities may be arranged for high adoption of drum seeder technology. Frequent training programmes and on farm demonstrations may be organized. Experts should visit the farmers' fields frequently to find out the drawbacks and to suggest remedial measures. Irrigation facilities should be improved. Assistance should be given for digging wells and installing pump sets for controlled irrigation. Field drainage channels should be made along the field bunds.

Conclusion

There is need for wide spread use of the drum seeder technology through implementation of Front Line Demonstrations and training to the farmers by the extension wing of the Agricultural University and the Department of Agriculture. The Department of Agriculture may make arrangement for supply of sufficient number of drum seeders as well as cono weeders. The drum seeder technology will become a sustainable source of livelihood to the small and medium farmers to cope with the vulnerability in cost of cultivation including scarcity of labour, which provides sustainable livelihood to small and marginal farmers.

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