



PERCEPTION OF THE FARMERS ON THE USE OF DRUMSEEDER IN CHITTOOR DISTRICT OF ANDHRA PRADESH

P. BALA HUSSAIN REDDY*, S. SREENIVASULU, K. DATTADRI, P.V.K. SASIDHAR AND P.V. SATYAGOPAL

Krishi Vigyan Kendra, Acharya N.G. Ranga Agricultural University Kalikiri

ABSTRACT

Direct seeding in Rice using drumseeder was introduced by Krishi Vigyan Kendra during 2006 in Chittoor district of Andhra Pradesh to address problems like shortage of labour, increased cost of cultivation and to augment the productivity with judicious use of resources. The area under drumseeder method escalated to 4621.2 ha by the year 2012 from just 0.2 ha in 2006. A study was conducted in Chittoor district in 2014 to understand the perception of farmers about drumseeder method with a sample size of 160 respondents who practiced it. They perceived that drumseeder method is farmer friendly, technically and economically feasible to all categories of farmers and can be taken up in any season. They expressed that the cost of cultivation is very much reduced in addition to saving in resources like human labour, water and inorganic fertilizers. The respondents gave some suggestions for upscaling drumseeder method among the farming community. The 'master trainer' concept helped in large scale dissemination and adoption of drumseeder technology in the district and supplemented the efforts of extension agencies. Hence this method may be popularised in feasible areas through capacity building programmes and providing incentives for the farmers.

KEYWORDS: Direct seeding, Rice, Drumseeder, Traditional transplanting, Productivity, Resources

Prologue

In global scenario, rice is the most common staple food for about 3 billion people and receives an estimated 24-30 percent of the world's developed freshwater resources (Satyanarayana *et al.* 2007; Sudeep 2010). The world's population is increasing and there has been more concern towards food security but is challenged by increasing food demand with declining water availability (Farooq *et al.*, 2009; Sudeep 2010). To meet the demand of growing population, the production of rice needs to be multiplied to a great extent. According to Zheng *et al.*, (2004) farmers have to grow 50 percent more rice in 2025 in order to assure food security in rice-consuming countries.

According to the Directorate of Economics and Statistics, India, the area under rice cultivation in the country which was 44.67 million ha in 2001-02 declined to 43.95 million ha in 2013-14. In Andhra Pradesh state, the area under rice was 4.243million ha during 2000-01 and it gradually shrunk to 4.096 million ha by 2011-12.

The trend of area under rice cultivation in Chittoor district of Andhra Pradesh is not different from that of the country and Andhra Pradesh as it is declined to 51106

ha in 2011-12 from 104400 ha in 1998-99 to 75218 ha in 2010-11 (Directorate of Economics and Statistics, India). In the recent years, rice farming has become non-remunerative due to increased cost of cultivation, low market prices and diminished farm profits. The major reason for increased cost of cultivation in rice is increased cost of transplanting and weeding operations. The shortage of farm labour supply in irrigated areas, particularly in the peak season and the raise in wage rates significantly affected farming activities particularly during transplanting, weeding and harvesting operations.

During *rabi* 2006, Krishi Vigyan Kendra, Chittoor for the first time introduced direct seeding method in rice using a fibre bodied eight rowed drumseeder developed by Tamil Nadu Agricultural University (TNAU). After the success of the assessment trial in a farmer named Nageswarrao's field at Madibaka village, Yerpedu mandal of Chittoor district, RASS-KVK popularised the technology through capacity building programmes, front line demonstrations, field days, exposure visits, mass media, and publication of literature and digitalization of the technology. Direct seeding is helpful due to less labour and time requirement, low cost of cultivation due to

*Corresponding author, E-mail: pbhreddy@gmail.com

skipping of nursery raising and transplanting, maintaining recommended plant population and also due to early crop maturity by 7 -12 days (Subbaiah *et al.*, 2002; Gill, 2008; Manjunatha 2009). The area under drumseeder method improved gradually over the years.

Perception of farmers towards direct seeding technology

The decision of use of technologies is dependent on how farmers perceive of technology. According to Van de Ban and Hawkin (1988), perception is the process by which we receive information or stimuli from our environment and transform it into psychological awareness., the predominant role of technology is facilitating major improvement in agriculture productivity (Truong Thi Ngoc Chi, 2002 and Koppel (1978). Therefore, it is important to know how farmers perceived technologies for better understanding of their choice in adoption or not.

A study was conducted in Chittoor district of Andhra Pradesh to understand the response of farmers in terms of production aspects, perceptions of farmers on the drumseeder technology in rice, source of information about the technology and their suggestions for upscaling of the technology.

METHODOLOGY

The present study is conducted purposively in the eastern part of Chittoor district where large area under drumseeder method is practiced. Among the five agricultural divisions in eastern part of the district, one mandal from each division viz., Renigunta from Tirupati division, Yerpedu from Sri Kalahasthi division, Karvetinagaram from Nagiri division, R.C.Puram from Puttur division and Varadaiahpalem from Satyavedu division are selected for the study as shown in Fig 1. One village from each mandal is selected randomly where drumseeder is practiced. Care is taken to select those respondents from these five villages who practiced this method atleast once. The study is conducted during the year 2014. The total number of respondents selected for the study is 160 and the data is collected though personal interview using a schedule. Descriptive statistics is used to summarize data in the forms of mean and percentage.

The components of the study include age of the respondents, experience in drumseeder method, continuance/discontinuance of the practice, perception of the respondents on the drumseeder method of rice

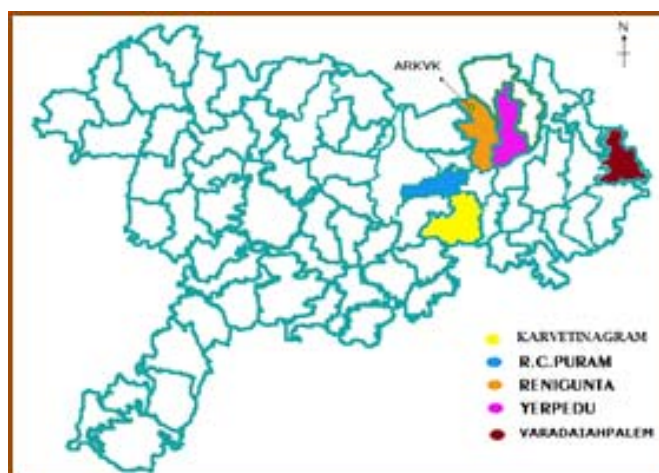


Fig. 1. Chittoor district map showing mandals where study was done

cultivation, suggestions for upscaling the drumseeder method, ranking of the rice cultivation methods and the source of the drumseeder technology to the respondents.

About 14 statements covering the all aspects of drumseeder method are prepared in consultation with the experts of Agronomy, Agricultural Extension of Acharya N G Ranga Agricultural University, line department officials, progressive farmers and Scientists of KVK. The results on the perceptions are presented in the form of frequencies and percentages.

Suggestions given by the respondents to upscale the drumseeder method are presented in the form of frequencies and percentage.

RESULTS AND DISCUSSION

A. Age of the respondents

The data placed in Table 1 reveals that majority of the respondents are middle aged (75.71%) followed by old aged (14.29%) and Young aged (10.00%). This trend indicates that the easiness of the technology might have attracted and facilitated the adoption of technology by middle aged farmers as they are more experienced.

B. Experience in drumseeder method of rice cultivation

The farmers were asked to inform their experience in terms of the number of years they were cultivating rice using drumseeder method. It is observed from the Table 2 that about 71.00 per cent of the respondents have 1-2 years of experience in rice cultivation using drumseeder, while 14.00 per cent of the respondents have 3-4 years

Table 1. Age of the respondents (N=160)

Category	Frequency	Percentage
Young (Mean – SD)	16	10
Middle aged (Mean ± SD)	121	75.71
Old (Mean – SD)	23	14.29
Total	160	100

Mean = 40.2; S.D = 10.23

Table 2. Experience of respondents in direct seeding method using drumseeder (N=160)

Category	Frequency	Percentage
1 – 2 years	114	71
3 – 4 years	22	14
More than 5 years	24	15
Total	160	100

Mean = 2.5; S.D = 1.53

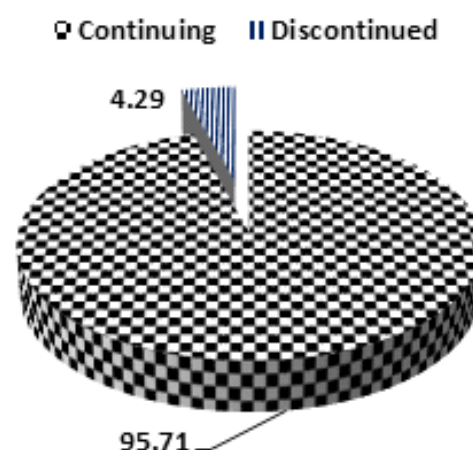
experience, and 15.00 per cent have more than five years experience in this method of rice cultivation. The data reveals that the respondents are very much satisfied with the technology and they are continuing the practice.

C. Continuation of the practice

It is observed from the Fig-2 that majority (95.7%) of the respondents are continuing the practice of direct seeding using drumseeder, while only a few of them (4.3%) have discontinued the practice. Factors that might have triggered the adoption of this practice continuously were technical feasibility, suitability to all types of soils, conduciveness to all categories of farmers and high net returns.

D. Perception of the respondents about the drumseeder method of rice cultivation

It is revealed from the Table – 3, that 100 per cent of the farmers felt that drumseeder method is an easy method of rice cultivation and it is suitable for any season round the year. All the respondents felt that the cost of cultivation is reduced in drumseeder method compared to traditional method as the requirement of labour is very much reduced. This might be due to skipping of operations like nursery

**Fig. 2. Continuation/discontinuation of the drumseeder method of rice cultivation**

rising, nursery pulling, transferring nursery to main field, manual transplanting in drumseeder method.

100 per cent of them felt that direct seeding in rice using drumseeder is feasible to all type of farmers compared to traditional and 'SRI' methods.

55.71 per cent of the respondents felt that weed management is difficult in drumseeder method, while 40 per cent felt that management of weeds is not a problem in this method of cultivation. A meagre 4.29 per cent of respondents could not decide and convincingly express the difficulty or easiness of the weed management practice. Since pre-germinated seeds are directly sown in drumseeder method, weeds emerge simultaneously with the main crop and compete for water and nutrients. Hence management of weeds using pre-emergence weedicides is compulsory in this method of cultivation. Exceptionally this may not be needed in the fields where weeds are not a big problem due to rigorous pre-crop land preparation activities prior to sowing the crop.

About 37.14 per cent of the respondents felt that the cost of weed management is high in direct seeded rice using drumseeder, while 61.43 per cent of the respondents didn't agree with this opinion. The probable reason might be continuous rains in the early days of sowing could have obstructed the application of pre-emergence weedicides or for any reason delay in timely application of weedicide reduced its effectiveness and hence engaged more labour for manual weeding.

With respect to water management practices, 35.71 per cent of respondents expressed that there is difficulty

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in management of irrigation water in drumseeder method, while 61.43 per cent stated that there is no difficulty in water management practice. A meagre 2.86 per cent are unable to express their view on this practice. Intermittent drying of the field upto panicle initiation stage is mandatory in drumseeder method and there after 2-5 cm water level is maintained in the field till 10 days before harvesting. In case of medium to heavy soils, this practice resulted in development of cracks resulting in inability to stand 2-5 cm of water level from panicle initiation stage. Moreover, farmers have to visit the field regularly to observe the moisture status and irrigate the field once in two days or three days depending on the texture of soil. Traditionally farmers are habituated to keep the field under water throughout the crop period and hence pay little attention in management of water.

About 67.14 percent of the respondents felt that irrigation water can be saved in drumseeder method compared to traditional rice cultivation method while 32.86 per cent didn't agree with this statement. Alternate wetting and drying the field upto panicle initiation stage and thereafter maintaining water level 2-5 cm till 10 days before harvesting is mandatory in drumseeder method and hence irrigating the field once for two days is sufficient, thereby saving power and water. Some farmers being afraid of the field cracks due to intermittent drying continued flooding the field from the day one to harvesting and hence they might have felt that there is no difference in water consumption between the drumseeder method and traditional method.

Cent per cent of the respondents expressed that the pest and disease infestation in drumseeder method is low compared to traditional method of rice cultivation. There is a spacing of 20 cms between rows and 5-8 cms between hills with rows have allowed plenty of sunshine and aeration to the plants and hence reduction in pest and disease infestation.

About 61.43 per cent of the respondents felt that fertilizer requirement is low in drumseeder method compared to traditional method while 38.57 per cent of respondents didn't agree with the statement. Running conoweeder between rows and usage of herbicides has reduced weed menace in the field thereby increasing the fertilizer use efficiency and hence the dosage of fertilizer requirement might have trimmed down. Few of the disagreed farmers have applied fertilizer doses similar to traditional system, while some have applied over and

above the traditional dose as they observed heavy tillering in the crop.

All the respondents (100%) felt that the duration of the crop irrespective of the variety is reduced from 7-10 days in drumseeder method of rice cultivation. This could probably be due to avoidance of transplanting shock as the seeds are directly sown in the main field without transplanting operation.

Cent per cent of the respondents felt that the cost of cultivation is reduced in drumseeder method and net returns are more in this method compared to all other methods of rice cultivation. Operationally, the direct seeding with drumseeder method differs from traditional transplanting method in its operations for nursery raising, pulling the nursery, bundling the nursery, seed rate, transplanting, weeding and irrigation. The rest of the operations like fertilization, plant protection, harvesting, threshing, and bagging remain the same in both cases. This means that the direct seeding method is profitable for farmers even if they get normal regular yields. Over a period of five years, 5 – 50% higher yield is recorded in drumseeder method when compared to traditional transplanting method. Hence net returns are higher in drumseeder method compared to any other method of rice cultivation.

E. Suggestions for scaling up the drumseeder method of rice cultivation

When the respondents were asked to give suggestions for upscaling the drumseeder method of rice cultivation, 81.43 per cent of them expressed that the farmers who adopt drumseeder method should be supported by the Government in the form of incentives viz., inputs, subsidies etc. About 78.57 per cent of the respondents expressed that drumseeders should be made available with the farmers round the year. The same proportion (78.57%) of the respondents felt that a concrete solution for weed menace is essential for large scale adoption of drumseeder methodology. About 77.14 per cent of the respondents expressed that power weeders for weeding operation in drumseeder method are to be encouraged and promoted in a very big way.

Epilogue and policy implications

The results of the study on perception of respondents practicing drumseeder method reveal that the drumseeder method is the best method in terms of technical and

Table 3. Perception of respondents about drumseeder method of rice cultivation

S. No.	Particulars	Agree		Don't Know		Disagree	
		Freq	%	Freq	%	Freq	%
1	Drumseeder is an easy method of rice cultivation	160	100	0	0	0	0
2	Rice cultivation using Drumseeder can be done in any season	160	100	0	0	0	0
3	Cost of rice cultivation is reduced in drumseeder method	160	100	0	0	0	0
4	Requirement of labour is very much reduced in drumseeder method	160	100	0	0	0	0
5	Drumseeder method is feasible to farmers compared to traditional method and SRI method	160	100	0	0	0	0
6	Weed management is difficult in Drumseeder method	89	55.71	7	4.29	64	40
7	Cost of weed management is high in drumseeder method	59	37.14	2	1.43	98	61.43
8	Water management is difficult in drumseeder method	57	35.71	5	2.86	98	61.43
9	Irrigation water can be saved in drumseeder method compared to traditional method	107	67.14	0	0	53	32.86
10	Pest infestation is low in drumseeder method compared to traditional method	160	100	0	0	0	0.00
11	Fertilizer requirement is low in drumseeder method compared to traditional method	98	61.43	0	0	62	38.57
12	Duration of crop is reduced by 7-10 days in drumseeder method	160	100	0	0	0	0.00
13	Cost of cultivation is reduced in drumseeder method	160	100	0	0	0	0.00
14	Net returns are more in drumseeder method	160	100	0	0	0	0.00

Table 4. Suggestions given by respondents for upscaling the drumseeder method of rice cultivation

S. No.	Suggestions	Percentage*
1.	Drumseeders should be available with the farmers round the year	78.57
2.	Farmers adopting drumseeder method should be given incentives (subsidies, free inputs etc.,)	81.43
3.	Complete solution for weed menace is required	78.57
4.	Power weeders for weeding should be encouraged	77.14

* multiple responses

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economic feasibility, low input requirement and reduced usage of hired labour and ultimately high net returns for the farmers. Most of the respondents are continuing and repeatedly practicing this method of rice cultivation. They expressed that drumseeder method is an easy method of cultivation and can be taken up in any season. The cost of cultivation is very much reduced compared to any other methods of rice cultivation as the labour requirement and drudgery is very much reduced. A few respondents felt that water and weed management is somewhat difficult and requires some skill on the part of farmer to do these operations efficiently. Low fertilizer requirement, low pest and disease infestation and low irrigation water requirement are the special features of this method of cultivation when compared to other methods of rice cultivation. Irrespective of the variety, the duration of the crop is reduced by 7-10 days in drumseeder method ensuring reduced irrigation water requirement, weed and pest problem and ultimately reduces physical and mental strain to the respondents.

The Policy makers and Researchers may consider the advantages of this method of cultivation and the speed of diffusion of this technology among the farming community. Groundwater is becoming more important within the rice sector as surface irrigation is facing a serious deceleration in spite of heavy investments in the sector. This drumseeder method has emerged as an alternative to traditional mode of flooded rice cultivation is showing great promise to address the problems of labour shortage, water scarcity, high energy usage and increased use of chemical fertilizers in field. Direct seeding using drumseeder is a viable option to reduce the exploitation of ground water resources for irrigation purpose and thus ensuring National Food Security mission through judicious use of natural resources.

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