Original Research Article

Knowledge gap causing discontinuance of SRI – A Study in tribal region of Odisha

ABSTRACT

System of Rice Intensification (SRI) method is being ideally suited to the small farmers in India where rice productivity is comparatively low. But, it has been observed that the farmers are not enthusiastic to continue the practice in spite of all efforts made. Inadequate knowledge about the practices may by the reasons for the discontinuance of the method. A study was therefore, conducted with 96 farmers in the tribal region of Sundargarh district in Odisha to assess the knowledge deficiencies that causing discontinuance of SRI. The findings revealed that the farmers had inadequate knowledge on raising nursery bed at 80-100 cms height, putting single sprouted seed in line in nursery bed, sub-matting at two meters distance, putting seedlings in a thin metal sheet for easy transplanting, use of recommended quantity of well decomposed FYM/manure per hectare, green manuring and vermicomposting to supplement organic manure, minimum of four weeding at ten days interval, alternate drying and wetting of the main field, light irrigation during hair line cracks and keeping 2-3 cms standing water after flowering. Socio – economic attributes like family size, housing pattern, social participation, education, use of agricultural implements, extension contact and annual income had significant influence in increasing knowledge level of the respondents. It is therefore suggested that the respondents needs further exposure to have detail understanding about the benefits of all these practices so that they may continue SRI method of rice cultivation and increase rice production.

Key words: SRI, Knowledge, respondents, adoption, Tribal, Odisha, Rice, Paddy

Introduction

India is the second highest producer of rice after China covering around 45.5 million hectares having production of 105.31 million tons with productivity of only 2393 Kg per hectare. To ensure food security in the rice consuming countries of the world, rice production need to be increased around 50 percent by 2025. System of Rice Intensification (SRI) has more relative advantage of low cost and sustainable alternative towards food security (Johnson and Vijayaregavan, 2011). The method reduces the seed quantity, judicious use of irrigation water and give higher yield (Biswas and Nath, 2013). It attributed vigorous and healthy growth of rice plants alongwith more reproductive tillers and leaves ensuring greater resource utilization (Nissanka and Bandara, 2004). The method also improve the growth and function of rice plants root system as well as enhance the numbers and diversity of soil biota resulting plant healthy and productive. (Reddy and Shenoy, 2013). Hence, SRI method of rice cultivation is the sustainable alternative to conventional rice production system addressing food security and poverty (Johnson and Vijayaragavan, 2011).

System of Rice Intensification seems to be ideally suited to the small farmers in a country like India where rice productivity comparatively low. The department of Agriculture and Farmers Empowerment, Govt. of Odisha has made intensive efforts to promote SRI method of rice cultivation. It has been observed that the farmers are not enthusiastic to continue SRI method in spite of all the efforts and incentives provided. At the same time, gain in complete knowledge leads to complete adoption by the farmers using recommended practices (Dandotia et al, 2004). A study was therefore designed to assess the knowledge level of the growers on SRI method of rice cultivation and locate the deficiencies to take remedial measures for its continuance.

Materials and Methods

The study was conducted in the tribal dominated district of Maurbhanja in odisha during 2020. A sample respondent of 96 growers discontinuing SRI method were randomly selected from 10-gram panchayats covering five blocks in the district. The data was collected personally through a semi–structured schedule pretested earlier. Knowledge about nursery raising, main field preparation, transplanting, nutrient weed and water management were selected as the variables for the study. The data collected on the scale point of fully, partially and not known over the framed statements were analyzed with the score value of 3, 2 and 1 respectively. Statistical tools such as mean score, gap percentage and path analysis were employed to reveal the results.

Results and discussion

SRI require well prepared nursery bed as 8–12 days old seedlings are to be transplanted. The growers have to prepare well pulverized seed bed, showing sprouted seeds, water management and application of well decomposed cow dung etc. It is revealed (Table-1) that the respondents had better knowledge on maintaining well pulverized soil, proper levelling of bed, drainage channel on all sides, land requirement for raising seedling in transplanting of one hectare area, putting equal amount of well mixed farm yard manure and soil as well as preferable bed size of 1 x 10 meters.

Raising bed at 80-100 cms height makes the soil well drained and good establishment of seedlings. Putting single sprouted seeds in line at appropriate depth ensure good plant stand. Poor knowledge observed on these aspects may be the factors for poor plant stand in nursery resulting unsatisfactory yield.

Table-1: Knowledge gap on nursery raising (n=96)

Sl. No.	Knowledge	Mean Score	Gap %
1.	100 sq. meter space required for seedling of 1ha. Area	2.69	10.33
2.	Preferable bed size of 1 x 10 meters	2.52	16.00
3.	Raising bed at 80-100 cms height	2.25	25.00

4.	Putting equal amount of well mixed soil and FYM	2.67	11.00
5.	Drainage channel on all sides	3.00	0.00
6.	Well pulverized soil	3.00	0.00
7.	Leveling of bed	3.00	0.00
8.	Showing Sprouted seeds in line	2.28	24.00

(Maximum Obtainable Score-3)

Good puddling, proper levelling, well drainage, sub-plotting, drainage channel, marking at 25 x 25 distance and not keeping standing water are the recommendations in main field preparation. The respondents had good knowledge (Table-2) on proper levelling with good drainage facility, good puddling and levelling, drainage channels at both sides of sub-plotting, not keeping standing water during transplanting as well as marking at 25 x 25 cms for transplanting. It is recommended to make sub-plotting of the main field at 2 meters distance for better supervision, keeping moist of the soil by irrigating in the channel and better cultural management operations. Poor knowledge observed on these aspects may create inconveniences in weeding, fertilizer and plant protection measures. The respondents therefore need training for knowledge and skill competency on sub-plotting at two meter distance with drainage channel to make the plant healthy and productive.

Table-2: Knowledge gap on main field preparation (n=96)

Sl. No.	**Knowledge**	**Mean Score**	**Gap (%)**
1.	Proper leveling with good drainage facility	2.99	0.33
2.	Good puddling and leveling	2.98	0.67
3.	Sub-plotting at 2 meters distance	2.28	24.00
4.	Drainage channels on both sides of sub-plotting	2.95	1.67
5.	Marking at 25 x 25 cms for transplanting	2.68	10.67
6.	No standing water during transplanting	2.95	1.67

(Maximum Obtainable Score-3)

Young seedlings of 8-12 days are recommended for transplanting in SRI method. The seedlings are not to be damaged while uprooting or transplanting in the main field. Moreover, the seeds should remain intact with the seedling and transplanted at shallow depth. The seedlings are to be taken with a thin metal sheet for easy detachment and transplanting which was not

being adopted indicating poor knowledge of the respondents. However, the respondents had better knowledge on not washing the seedlings after uprooting, not removing seeds from seedlings, transplanting of 8-12 days seedlings and planting one seedlings per hill.

Table-3: Knowledge gap on transplanting (n=96)

Sl. No.	Knowledge	Mean Score	Gap (%)
1.	Transplanting 8-12 days seedlings	2.86	4.67
2.	Putting seedlings in a thin metal sheet for transplanting	1.51	49.67
3.	Planting one seedling per hill	2.70	10.00
4.	Not removing seeds from the seedlings	2.94	2.00
5.	Not washing the seeds after uprooting	2.94	2.00

(Maximum Obtainable Score-3)

The concept of SRI usually in organic way for which 10 tons well decomposed farm yard manure or compost are recommended. Green manuring and vermicompost can be used to supplement manure. The state department of Agriculture has also advised for 50.00% of the recommended dose of NPK if, adequate amount of organic manure not available. But, the respondents had not adequate knowledge (Table–4) on application of compost/FYM, green manuring and vermicompost use. Application of recommended dose of organic manure are essential in SRI method for which the respondents need further exposure to realize the benefits. However, the respondents had better knowledge on using half of the recommended dose of NPK, application of potash in two and nitrogen in three splits.

Table-4: Knowledge on nutrient management (n=96)

Sl. No.	Knowledge	Mean Score	Rank
1.	Applying 10 tons of compost / FYM per ha.	2.28	24.00
2.	Green manuring practice	2.20	26.67
3.	Applying vermicompost	2.23	25.67
4.	Using half of the recommended dose of NPK	2.84	5.33
5.	Nitrogen to applied in three splits	2.70	10.00
6.	Potash to be applied in two splits	2.91	3.00

(Maximum Obtainable Score-3)

As standing water not recommended, weed population are more in SRI method. Therefore, minimum of four weeding are recommended. Moreover weeding has to be done with cono weeder and incorporate in to the soil to facilitate more aeration at plant root levels along with growth of diverse soil micro organisms that increase nutrient availability to the plant. The respondents had better knowledge on various aspects of weed management (Table–5) particularly using cono/mandva weeder for weeding, irrigating one day before weeding, uprooting weeding manually near to the plant and incorporating weeds in to the soil to add organic matter. It has been recommended minimum of four weeding at 10 days interval not only to control weeds but providing more aeration at the root zone. Poor knowledge observed on number of weeding require for further sensitization to realize the benefits.

Table-5: Knowledge gap on weed management (n=96)

Sl. No.	Knowledge	Mean Score	Gap (%)
1.	Irrigation one day before weeding	2.92	2.67
2.	Using cono/mandava weeder for weeding	2.94	2.00
3.	Minimum of 4 weeding at 10 days interval	2.07	31.00
4.	Incorporating weeds in to the soil	2.52	16.00
5.	Uprooting weeds manually near to the plant	2.91	3.00

(Maximum Obtainable Score-3)

Flood irrigation is not recommended in SRI. Rather, soil should kept be kept in wet condition and need light irrigation during hairline cracks noticed. It is observed from Table–6 that the respondents had good knowledge on maintaining water at soil saturation, keeping drainage channel around the sub–plot and to some extent draining water after 20 days of flowering. Poor knowledge were observed on light irrigation during hairline cracks, alternate drying and wetting of the field as well as keeping standing water of 2–3 cms after flowering that needs further sensitization.

Table-6: Knowledge gap on water management (η=96)

Sl. No.	Knowledge	Mean Score	Gap (%)
1.	Maintaining water at soil saturation	2.96	1.33
2.	Keeping drainage channel	2.95	1.67
3.	Alternate drying and wetting of the field	2.17	27.67
4.	Light irrigation during hairline cracks	1.73	42.33
5.	Standing water of 2-3 cms after flowering	2.23	25.67
6.	Draining water after 20 days of flowering	2.50	16.67

(Maximum Obtainable Score-3)

Comparative analysis (Table–7) revealed that the respondents had better knowledge on main field preparation. Considerable deficiencies were observed on water and nutrient management, transplanting, weed management as well as nursery raising.

Table- 7: Comparative knowledge gap of the respondents (n=96)

Sl. No.	Knowledge	Mean Score	Gap (%)
1.	Nursery raising	2.73	9.00
2.	Main field preparation	2.81	6.33
3.	Transplanting	2.59	13.67
4.	Nutrient management	2.37	21.00
5.	Water management	2.42	19.33
6.	Weed management	2.67	11.00

(Maximum obtainable score-3)

Attempt was made to assess the influence of socio – economic attributes of the respondents influencing their knowledge level. It is observed from path analysis (Table–7) that use of Agricultural implements had exhibited highest direct effect followed by family type, family size and education. Similarly, the attribute family size had the highest indirect effect having associationships with housing pattern, social participation, education, use of Agricultural implements, extension contact and annual income. Hence,

the attribute family size channelized through housing pattern, social participation, education, use of agricultural implements, extension contact and annual income could exhibit significant influence in increasing the knowledge level of the respondents on SRI method of rice cultivation. The residual effect being 0.037 inferred that 3.70% of the variation in this relation could not be explained.

Table:-8 Path analysis of socio-economics attributes influencing knowledge level

Sl. No.	Attribute	Total effect	Total direct effect	Total indirect reflect	Substantial effect		
					I	II	III
X_1	Age	0.012	–0.027	0.039	$0.109x_5$	$0.036x_2$	$0.016x_1$
X_2	Education	0.025	–0.247	0.272	0.157	$–0.139x_{12}$	$–0.059x_7$
X_3	Caste	0.091	–0.137	0.228	$0.113x_4$	$–0.73x_6$	$–0.034x_{13}$
X_4	Housing Pattern	0.256	0.129	0.127	$–0.256x_{12}$	$0.186x_{13}$	$–0.042x_9$
X_5	Holding size	0.240	0.110	0.130	$–0.144x_6$	$0.105x_4$	$–0.042x_1$
X_6	Social participation	0.278	0.032	0.246	$–0.026x_{12}$	$0.167x_9$	$0.008x_{11}$
X_7	Cosmopoliteness	0.093	–0.043	0.136	$–0.223x_3$	$–0.172x_8$	$–0.074x_7$
X_8	Extension contest	0.275	0.140	0.135	$–0.181x_{11}$	$0.117x_7$	$–0.062x_{12}$
X_9	Use of agricultural implements	0.639	0.611	0.028	$–0.203x_2$	$0.194x_{12}$	$–0.023x_5$
X_{10}	Annual income	0.346	0.160	0.186	$–0.206x_7$	$0.167x_9$	$0.008x_{12}$
X_{11}	Family type	0.131	0.520	–0.389	$–0.223x_5$	$–0.172x_8$	$–0.074x_9$
X_{12}	Family size	0.062	–0.482	0.544	$–0.081x_4$	$0.077x_7$	$–0.062x_5$
X_{13}	Occupation	–0.111	–0.040	–0.071	$–0.195x_{10}$	$0.114x_2$	$–0.023x_3$

Highest indirect effect – family size, Residual effect –0.037

Conclusion

System of Rice Intensification (SRI) is a simple methodology to increate rice productivity by changing the management of soil, water, plants and nutrients. In spite of intensive efforts by the state department of Agriculture, farmers are not developing enthusiasm to continue the practice. The study revealed that the respondent had poor knowledge regarding raising nursery bed at 80-100 cms height, putting single sprouted see in nursery bed, sub–plotting at two meters distance, putting seedlings in a thin metal sheet for easy transplanting, application of recommended dose of compost or FYM green manuring and vermicompost application, minimum of four weeding at 10 days interval, alternate drying and wetting of the main field, provide light irrigation during hairline cracks noticed and keeping 2–3 cms standing water

after flowering. Socio – economic attributes like family size, housing pattern, social participation, education, use of Agriculture implements, extension contact and annual income had significant influence in increasing knowledge level of the respondents.

Complete knowledge leads to complete adoption of the recommended practices. Poor knowledge observed from the study were the pertinent factors for successful crop raising. Hence, further exposure is essentially required to acquire details knowledge and understanding about the benefits of these practices so that the respondents may continue SRI method of rice cultivation.

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