

Adoption of System of Rice Intensification(SRI) in Kerala

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ABSTRACT

A field study was undertaken to analyse the nature and constraints in adoption of System of rice Intensification in Kerala. An ex-post-facto research design was followed for the study conducted in selected three districts of Kerala. A total of 200 adopter categories representing small, medium and large farmers were taken as sample. The sample categories under the study comprises the beneficiaries of System of Rice Intensification(SRI)schemes implemented under the central and state governmental schemes. Constraints under the seven major core components of SRI viz., single seedling planting, wide spacing, water management, Mat nursery preparation, Levelling, weed management and Application of organic Manures were studied. Needed strategies for upscaling of SRI include Farmer to farmer extension, Organisation of farm field school, incentives for SRI, Mechanisation, regulation of water flow, availability of SRI tools and information support, awareness campaign and involvement of SHGs.

Key words: Adoption, system of rice intensification, constraints, strategies, rice farmers

INTRODUCTION

India has the largest area of 44.6 million ha under rice in the world and ranks second in production next to China. Rice is the staple food and its demand is ever increasing in India. Rice is grown in 534 districts spread across 30 states and Union Territories of the country. Further intensification of irrigated rice farms is necessary to feed the growing population and to maintain food security in the near future. Rice farmers, however, face several problems: stagnating yield; declining profit (due to rising input costs and the low rice price); less land, water, and labor for rice cultivation; crop failures due to adverse weather; high post-harvest losses; and growing environmental concerns. The system of rice intensification(SRI), an improved cultivation practice is claimed to greatly enhance yield and substantially reduce water and other inputs use in small holder farming (Uphoff 2003). Since being first implemented in Madagascar in the second half of the 1990's, it has reportedly spread to nearly 50 countries in Asia, Africa and South America. The emergence of SRI in India was slower as compared to other rice growing countries. The adoption levels and yield increase are still being debated in different circles including among Researchers and Extension officials. There are questions about profitability and field trials producing inconsistent results (Glover 2011) as well as assertions that SRI productivity claims go beyond the physiological yield potential of rice (Dobermann 2004). In Kerala trials on SRI was conducted by various agencies like MSSRF in

Waynaddistrict, NGOMitraniketan KVK in Trivandrum district and Kerala Agricultural University in Palakkad, Malappuram, Ernakulam and Trichur districts of Kerala. However the discontinuance of technology was seen among the farmers due to various reasons. Keeping the above fact in view this paper uses data to address the nature of adoption and constraints faced by the farmers in adoption of SRI and suggests suitable strategies to overcome the problems in adoption.

METHODOLOGY

Kerala State comprises on 14 districts representing 5 main agroecological zones. Out of the 14 districts Palakkad and Malappuram from Central zone and Trivandrum district from Southern zone of Kerala is purposively selected for the study based on the rice area and adoption level of farmers on SRI cultivation. 200 number of Adopter categories were selected in consultation with extension professionals. The ex-post facto research design was employed for the study. The sample of farmers under the programme would comprise the SRI beneficiaries of various central and state government schemes. A Structured interview schedule was prepared for interview with respondents at farm and home. The selected farmers were Post stratified into three groups as Marginal, Small and Big farmer. The study was conducted during 2010. The data collected were analyzed with the help of statistical tools such as percentage, cumulative frequency and mean.

RESULTS AND DISCUSSION

Table 1: Distribution of Sample farmers

District	Number of SRI farmers	Number of Non-SRI farmers	Total
Palakkad	111 (55.50)	25 (62.50)	136(57.0)
Malappuram	13 (6.50)	2 (5.00)	15 (6.00)
Trivandrum	76 (38.0)	13 (32.50)	89 (37.0)
Total	200	40	240

Figures in Paratheses indicates Percent

SRI farmers in the study was operationalised as farmers who adopt SRI cultivation in last three years and Non SRI farmers are sample farmers who follow conventional rice farming in the same village. Among the districts selected majority of the SRI farmers (55.50 %) were selected from Palakkad district the Rice bowl of Kerala followed by farmers from Trivandrum(38.00 %) and Malappuram (6.50 %) farmers.

Table 2: Intensity of SRI area to Total Paddy area in different seasons

% of share of SRI to total Paddy area	Kharif season						Rabi season						Summer season						
	08-09		09-10		10-11		08-09		09-10		10-11		08-09		09-10		10-11		
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	
<50	18	18.00	13	11.02	12	10.34	32	21.19	40	20.41	28	15.32	-	3	20.00	-	-	-	-
50-75	5	5.00	8	6.78	7	6.03	17	11.26	24	12.24	22	12.43	3	37.50	4	26.67	3	37.50	
>75	77	77.00	97	82.20	97	83.63	102	67.55	132	67.35	127	71.75	5	62.50	8	53.33	5	62.50	
All	100	100	118	100	116	100	151	100	196	100	177	100	8	100	15	100.00	8	100	

The share of SRI area to the total paddy area was categorized into 3 groups as 1) less than 50 per cent ii) 50-75 per cent and iii) more than 75 per cent. It was noticed that more farmers were falling under more than 75 per cent category followed by less than 50 percent farm categories. The 50-75 per cent category accounts to less number of farmers. It was seen from Table 2 that the number of farmers adopting SRI increased during the Rabi season. The reason might be due to the heavy rainfall occurrence in Kerala during the first season.

Table 3: Farmers allocate more than 75 per cent of rice area to SRI under different farm size

Farm size category	Kharif season						Rabi season						Summer season					
	08-09		09-10		10-11		08-09		09-10		10-11		08-09		09-10		10-11	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Marginal	66	85.71	78	80.42	73	75.26	76	74.51	97	73.48	94	74.01	5	100	7	87.5	5	100
Small	6	7.79	13	13.40	18	18.55	12	11.76	21	15.91	21	16.54	-	-	-	-	-	-
Large	5	6.50	6	6.18	6	6.19	14	13.73	14	10.61	12	9.45	-	-	1	12.5	-	-
Total	77	100	97	100	97	100	102	100	132	100	127	100	5	100	8	100	5	100

Comparing the figures of 2008-09 more farmers were seen in 2009-10 but the figure reduced in 2010-11. An analysis of the farm categories indicated that Marginal farmers followed by small farmers allocated comparatively more than 75 per cent of area to SRI than others.(Table 3) .Large farmers however do not allocate more than 75 per cent of the rice area to SRI. This might be due to intensive labour requirement and precision of the technology to be adopted

Table 4: Constraints in Adoption of SRI technology n=200

Component of SRI	Constraints	Marginal (n=118)		Small (n=55)		Large (n=27)		All (n=200)	
		No	%	No	%	No	%	No	%
Single seedling planting	Lack of trained labours in single seedling planting and use of marker	98	83	35	64	21	78	154	77
	Damage due to crabs and birds in the early stage of planting	33	28	11	20	9	33	53	26
	Time consuming for transplanting	101	85	46	84	21	78	168	84
	Crop stand not visible in the initial stage	89	75	36	65	15	55	140	70
	Problem of timely labour availability	56	47	27	49	23	85	106	53
Wide spacing	Lack of availability of markers	39	33	21	38	15	55	75	37
	Use of marker is difficult in heavy soil	23	19	10	18	5	18	38	19
	Marker difficult to use during rainy season	55	47	24	44	12	44	91	45
Water management	Square planting with rope not able to attain	77	65	31	56	11	41	119	59
	Intermittent wetting and drying in fragmented holding is difficult	91	77	33	60	6	22	130	65
	Providing canal at every 3 m distance is difficult to follow	28	24	11	20	4	15	43	21
	Not suitable when no irrigation source is available	16	14	7	13	6	22	29	14
	First Season not suitable	83	70	24	44	13	48	120	60
Mat nursery preparation	Water management difficult in low lying areas	68	58	19	34	14	52	101	50
	Lack of assured water source	20	17	16	29	10	37	46	23
	Staggered sowing difficult to adopt	55	47	20	36	8	30	83	42
	Lack of skilled labour	41	35	23	42	16	59	80	40
Leveling	Crop stand uneven due to lack of complete leveling	33	28	18	33	7	26	58	29
	Use of cono weeding laborious	109	92	39	71	16	59	164	82
Weed management	Weeds closer to hills/tillers have to be removed by hand	68	58	22	40	7	26	97	48
	Selecting field which has uncontrollable weed problem	38	32	6	11	3	11	47	23
	Lack of availability of weeder	56	47	28	51	13	48	97	48
	Conoweeder not of good quality and lasts 1-2 season	87	74	19	34	12	44	118	59
	Weeding cost is more	110	93	51	93	23	85	184	92
	Frequency(10 days interval) of weeding not adopted perfectly due to non availability of labour	96	81	37	67	19	70	152	76
	Number of weedings cannot be followed due to profuse tillering	48	41	15	27	11	41	74	37
Organic manure application	Lack of organic manure availability	33	28	11	20	6	22	50	25
	Lack of technical advice	100	85	28	51	6	22	134	67
Others	Lack of printed publications on SRI in Kerala	47	40	9	16	15	56	71	35
	Discouragement from fellow farmers	66	56	32	58	13	48	111	56

SRI technology adopted by farmers showed encouraging results and a yield advantage was noticed when compared to the conventional method of rice cultivation. But the technology to give the potential benefit among farmers requires overcoming the hurdles/ constraints in the adoption of technology. Constraints under the seven major areas is seen viz., single seedling planting, wide spacing, water management, Mat nursery preparation, Levelling, weed management, Application of Organic Manures and other constraints.(Table 4).

Under the single seedling planting it is seen that 84 per cent farmers expressed that it takes more time in planting as a result the labour cost is increased. Johnson and Vijayaragavan(2011) reported that 46.31 per cent of Agricultural labours in Tamil Nadu are not willing to transplant single seedling as it may consume more time and labour.Thiyagarajan (2008) also reported that negative mindset of contract labourers who do not like square planting and handling single seedling as the reason for farmers discontinuing SRI method.It was followed by lack of trained labour in planting and use of markers(77 per cent). It is to be noted that many of the farmers who adopt SRI are experimenting for the first time hence such a constraint is being expressed. Palaniswami et al.(2014) reported lack of skilled labour available in time of planting as the major constraint in adoption of SRI.Further 70 per cent of the farmers have expressed that the crop is not visible in the initial stage of planting. The reason for such expression is that many farmers depend on fellow farmers for advice. Hence it is the job of extension functionaries to educate the farmers about the merits and demerits of technology in the process of transfer of technology.

Wide spacing adoption constraint was expressed by farmers because of difficulty in square planting with rope as expressed by 59 per cent of farmers followed by 45 per cent of the farmers expressing difficulty in planting in rainy season with marker and 37 per cent of the farmers expressing non-availability of markers for planting. Palanisami and Karunakaran(2012) reported that one-third of the farmers cited the non-availability of suitable markers as a major reason for deviating from square planting.The reason for such a constraints as lack of training given to the farmers and also in many schemes implemented by different agencies on promotion of SRI it was seen that the critical input was not given priority in the initial stage of SRI implementation. Suresh (2006) suggested that the problem of non availability of markers and weeders may be solved by making available the equipment through Equipment Banks run by appropriate village level institutions. Needy farmers can take these equipments on rental basis on the norms decided locally.

Water saving though attributed as a main advantage of SRI technology could not be realized by the farmers because of fragmented holding as expressed by 65 per cent of farmers and in certain low lying areas it is difficult to control water flow which was expressed by nearly half of the respondents. Further the heavy down pour of rainfall in Kerala does not favour adoption of SRI in the first season which was expressed by 60 per cent of the farmers. Girijan (2004) also pointed out that SRI is not suitable for water logged areas. Lack of assured water source expressed by 23 per cent of the farmers was due to the fact that canal water is released in alternate days depending on availability of water stored. Hence such a constraint is expressed. With regard to Mat nursery preparation difficulty in following staggered sowing and lack of skilled labour was expressed by 40 per cent of the farmers.

In case of Weed management in SRI field it was seen that weeding is costlier and labourious which is expressed by 92 and 82 per cent of farmers. This is because of the drudgery involved in operation of conoweeder. Further the conoweeder supplied by different agencies was not of good quality which is expressed by 59 per cent of farmers. In addition to this difficulty in operating weeder in latter stage of crop, removing weeds close to plant and field having uncontrollable weed were the other constraint expressed by the farmers.

With respect to adoption of Organic manure application it is seen that one fourth of the farmers expressed that the organic manure in sufficient quantity is not available. In addition to the above mentioned other problems such as lack of technical advice from extension professionals, lack of printed publication and dissatisfaction from fellow farmers were expressed by 67 per cent, 35 per cent and 56 per cent of the farmers respectively. With the Twelfth five year plan approach programme highlighting the importance of System of Rice Intensification practices in improving crop productivity(GOI 2011).the rapid spread of SRI technology in Kerala could be made possible by suggesting suitable strategies .The following strategies need to be undertaken:

Farmer-Farmer Extension and Farmer Field Schools

Sharing of experiences by the farmers themselves will pave way for further spread of technology. Hence in all training sessions sharing of experiences amongst farmers is very much essential. Conduct of Farmer field schools on SRI helps in learning the technology at every stage of the crop growth.

Incentives for specialities rice varieties

Speciality Rices like Navara grown through organic

farming practices which is used for Ayurvedic purpose can be very successful if it is cultivated by SRI principles. Hence some incentives can be given for these varieties when it is cultivated using SRI principles.

Mechanisation

Labour scarcity has been the major problem for dwindling of area under rice cultivation. And already many places in Kerala the farmers have initiated planting of seedling using Transplanters. These transplanters should be calibrated so as to plant one seedling per hill so that the farmers save the labour cost. Further it is seen that the large farmers find it difficult to do weeding operations in a large area. Hence power operated weeders should be popularized to reduce the weeding cost and save time.

Control of water

Providing drainage channels around and between the field plots should be made compulsorily regulating the flow of water.

SRI tools with technical back up

Critical inputs like Markers and Conoweeders should be made available to the farmers through Panchayats/ SHGs. Farmers also need to be trained on the use and maintenance aspects of the tools.

Awareness Campaign

Awareness campaign of SRI should be started during the middle of Kharif season as the Rabi and Summer season are more conducive for adoption of SRI in Kerala. However SRI campaign in areas of Rainfed rice cultivation can be started in the beginning of the first season itself.

Involvement of Self help groups

Success of Kudambasree (Self Help group) is seen throughout Kerala. Experiences have shown that Agricultural activity involving Kudambasree has given then maximum benefit. So SRI groups can be formed for technological empowerment of these groups.

CONCLUSION

Up-scaling the adoption of SRI across the country would require a change in the mindset of farmers, who need exposure to best practices, technology transfer through community approach in raising nursery, skill up gradation of labour, adequate and timely availability of simple mechanical implements such as Markers and conoweeders. Any new technology when introduced for the first time in the farmers field will face lot of hindrances. Farmers who have practiced the SRI for two to three seasons could easily overcome the difficulties.

Further delineating the areas suitable for SRI cultivation should be made so as to avoid the failure. Training of farmers and Agricultural Professionals in the need of the hour and special drive is necessary from the planners to prepare an SRI map for India in giving recommendations suited to the area. As far as Kerala is concerned Rice Farmer groups already exist and hence it is easier for the extension machinery to rectify the constraints and make SRI cultivation a culture in Rice cultivation.

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