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IMPACT OF SYSTEM OF RICE INTENSIFICATION (SRI) TECHNOLOGY AMONG PRACTICING RICE FARMERS OF NAGAPATTINAM DISTRICT OF TAMIL NADU

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ABSTRACT

Rice is the most important staple food crop for about two thirds of the population. The recent break through in rice cultivation known as System of Rice Intensification (SRI) method is the one which can be considered as a new system of rice cultivation for increasing productivity with a comprehensive package of practices involving less seed, less water , less chemical fertilizers and pesticides. The present study was conducted in Nagapattinam district of Tamil Nadu. This district was purposively selected for the study because it is one of the leading rice producing districts of Tamil Nadu and also it ranked first in SRI paddy coverage for the period of 2011-12. Out of eleven blocks from the Nagapattinam district four blocks and three villages from each selected block were purposively selected according to the highest area under SRI. From each village ten SRI farmers were selected by following simple random sampling procedure, thus making a total of 120 respondents. The study revealed that education, training undergone, social participation, extension contact, economic motivation, scientific orientation, management orientation, achievement motivation, innovativeness, mass media exposure and risk orientation were found to be positively significant with their extent of adoption of SRI technology. Age and farming experience were found negatively and significantly related whereas land holding had non-significant relationship with their extent of adoption of SRI technology. Further the association between various attributes with production level of paddy among SRI practicing farmers revealed that education, farming experience, training undergone, extension contact, scientific orientation, innovativeness, mass media exposure and risk orientation were found to be significant with production level of paddy whereas age, land holding, social participation, economic motivation, management orientation and achievement motivation had showed non-significant association with production level of paddy among SRI practicing farmers.

KEYWORDS: Extent of adoption, production levels, SRI technology, rice

INTRODUCTION

Tamil Nadu is considered as one of the leading rice producing and consuming states of India. Out of the total geographical area of 130 lakh hectares, around 51 lakh hectares are the net cultivated area. About 28.63 lakh hectares constituted the net irrigated area and the balance area of 22.37 lakh hectares is rainfed. So it was felt necessary to adopt a low water consuming rice production technology to attain the targets of National Food Security Mission. Thus System of Rice Intensification was introduced by the State Government. SRI method is the one which can be considered as a new system of rice cultivation for increasing productivity with a comprehensive package of practices involving less seed, less water , less chemical fertilizers and pesticides. So it was felt important to study the impact of SRI technology among the practicing rice farmers.

MATERIALS AND METHODS

The study was conducted with an expost- facto research design to study the the impact of SRI technology among the practicing rice farmers. The study was conducted in Nagapattinam district of Tamil Nadu. Nagapattinam district was purposively selected for the study because it is one of the leading rice producing districts of Tamil Nadu as it lies in the Cauvery Delta zone and also it ranked first in SRI paddy coverage for the period of 2011-12 in the Tamil Nadu. Out of eleven blocks from the Nagapattinam district four blocks were purposively selected to represent the north and southern parts of the districts according to the highest area under SRI. Three villages from each selected block were purposively selected according to the highest area under SRI. From each village 10 farmers were selected by following simple random sampling procedure, thus making a total of 120 respondents. Extent of adoption and production levels of SRI technology by the

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respondents was studied by a well-structured and pre-tested schedule developed for the study.

RESULTS AND DISCUSSION

Extent of Adoption by the respondents

Extent of adoption refers to measure how far a particular technology was adopted by the individual correctly without any distortion of message. Hence an attempt was made to assess the extent of adoption of SRI cultivation. Eight major areas were listed with 26 sub items. The overall adoption and practice-wise adoption were studied and presented. The values of adoption indices obtained from the survey are classified and presented in the Table 1.

Table 1. Distribution of respondents according to their Adoption Level (n=120)

S. No.	Category	Number	Per cent
1	Low	19	15.83
2	Medium	78	65.00
3	High	23	19.17
	Total	120	100.00
	Mean	45.98	
Standard Deviation		2.72	

From the Table 1 it could be observed that more than half of the respondents (65.00 %) had medium level of adoption in the cultivation of paddy under SRI method and 19.17 per cent and 15.83 per cent of the respondents had come under high and low level of adoption respectively. It could be understood that majority of the respondents possessed medium to higher level of adoption. This might be due to their higher knowledge level on the recommended practices, better social participation, medium levels of scientific and risk orientation. This finding was in agreement with results of Alagesan and Budhar (2009).

Item wise analysis of extent of adoption of recommended package of practices in SRI cultivaiton

The data in Table 2 showed that some variation existed in the extent of adoption of the recommended practices under SRI method of cultivation. Some of the recommended practices like soaking the seeds in water for 24 hours before transplanting, transplanting the seedlings at the field saturation level, using field markers for spacing in the main field and transplanting only one plant / hill were fully adopted by the farmers.

However, considerable gap was observed in adopting the other recommended practices *viz.*, broadcasting seeds uniformly on the raised beds in a thin layer, pulling the seedlings along with soil without causing any damage, and not applying any weedicides (97 % each) followed by seed treatment (94 %), using only 2 kg seed for nursery, soaking and incubation (91 % each), applying well decomposed manure to nursery (89 %), transplanting 8 to 12 day old nursery and using conoweeder for weeding in the main field (87 %), maintaining field at saturation level (80 %), adopting a spacing at 25 X 25 cm in the main field (75 %), providing drainage channels and maintaining correct plant density of 16 plants / m2 (74 % each), preparing raised beds for growing nursery (67 %) and nutrient management only through organic sources (65 % only).

From the above results, it could be inferred that the gaps that existed in the adoption were mainly in the nutrient management of the main field, preparing raised beds for nursery, maintaining correct plant population etc. It was also observed in the field that farmers expressed difficulty in maintaining the field at the saturation levels (mud condition without water stagnation) throughout the crop growing period. This clearly indicated that there were some knowledge gaps with respect to nutrient management in SRI, hence application of higher doses of fertilizers was observed. This needs a focused attention to improve the availability of the manures and educate the farmers how the organic manures coupled with saturated field conditions and turning the weeds in the field with cono weeder will help in exploiting the rice genome capacity to yield on par with conventional cultivation. The improvement in the availability of manures will in turn be dependent on the livestock availability in the villages.

The results in the Table 3 exhibit that out of fourteen variables studied Education (X_2), Training undergone (X_5), Social participation (X_6), Extension contact (X_7), Economic motivation (X_8), Scientific orientation (X_9), Management orientation (X_{10}), Innovativeness (X_{11}), Achievement motivation (X_{12}), Mass Media exposure (X_{13}) and Risk orientation (X_{14}) showed a positive and significant association with Extent of Adoption of the SRI technology by SRI farmers at one per cent level of significance.

Table 2. Extent of adoption of recommended practices of SRI method of cultivation

(n=120)

S. No.	Recommendations	Extent of Adoption					
		FA (2)		PA (1)		NA(0)	
		F	%	F	%	F	%
I	**Seed selection**						
1.	Recommended Hybrids / High yielding varieties	2	1.67	95	79.17	23	19.16
II	**Nursery Management**						
2.	Mat nursery	7	5.83	16	13.33	97	80.83
3.	100 m^2ha^{-1} area	6	5.00	15	12.50	99	82.50
4.	Use of recommended soil mixture.	6	5.00	16	13.33	98	81.67
5.	Use of wooden frames.	6	5.00	18	15.00	96	80.00
6.	Sowing of sprouted seeds.	112	93.33	5	4.17	3	2.50
7.	Sprinkling of water.	7	5.83	17	14.17	98	81.67
8.	Spraying fertilizer solution (optional)	5	4.17	63	52.50	52	43.33
III	**Seed rate**						
9.	7-8 kg/ha	7	5.83	16	13.33	97	80.34
IV	**Main field preparation**						
10.	Perfect puddling	31	25.83	84	70.00	5	4.17
11.	Perfect leveling	24	20.00	90	75.00	6	5.00
V	**Transplanting**						
12.	Using spacing markers	81	67.50	39	32.50	-	-
13.	Transplanting within 30 minutes after pulling out.	57	47.50	43	35.83	20	16.67
14.	Single seedling	120	100.00	-	-	-	-
15.	Seedling of 15 days old.	108	90.00	10	8.33	2	1.67
16.	Square planting of 25 x 25 cm.	120	100.00	-	-	-	-
VI	**Irrigation Management**						
17.	Irrigation only to moist the soil in the early period of 10 days (alternate wetting and drying).	21	17.50	66	55.00	33	27.50
18.	Restoring irrigation to a maximum depth of 2.5 cm after development of hairline cracks in the soil until panicle initiation.	18	15.00	59	49.17	43	35.83
19.	Increasing irrigation depth to 5.0 cm after PI one day after disappearance of ponded water.	23	19.17	58	48.33	39	32.50
VII	**Weed Management**						
20.	Using Rotary weeder / Cono weeder	120	100.00	-	-	-	-
21.	Moving the weeder with forward and backward motion to bury the weeds and as well to aerate the soil.	113	94.17	7	5.83	-	-
22.	Usage at 7-10 days interval from 10-15 days after planting.	34	28.33	81	67.50	5	4.17
23.	Usage on either direction of the rows and columns.	101	84.17	-	-	19	15.83
24.	Manual weeding after cono weeding.	118	98.33	-	-	2	1.67
VIII	**Nutrient Management**						
25.	Recommended green manure and farm yard manure application.	32	26.67	62	51.67	26	21.66
26.	Periodical observation of boot leaf and comparison with LCC	28	23.33	58	48.33	34	28.34

Table 3. Relationship between independent variables of SRI farmers with their extent of adoption

Variable No.	Variables	Correlation co-efficient 'r' value
X_1	Age	-0.5077**
X_2	Education	0.6343**
X_3	Experience	-0.5224**
X_4	Land Holding	0.1542 NS
X_5	Training Undergone	0.5464**
X_6	Social Participation	0.3831**
X_7	Extension Contact	0.3331**
X_8	Economic Motivation	0.5613**
X_9	Scientific Orientation	0.6149**
X_{10}	Management Orientation	0.3367**
X_{11}	Innovativeness	0.6074**
X_{12}	Achievement Motivation	0.3056 **
X_{13}	Mass Media Exposure	0.5790**
X_{14}	Risk Orientation	0.2102*

** - Significant at 1% level

* - Significant at 5% level

NS - Non- Significant

It is quite natural that as the education enhances the knowledge level of the farmers and helps to acquire latest technical know-how about SRI cultivation. Education helps them to find out the cause and effect of the specific constraints and enable them to address the constraints efficiently. Further the farmers who have undergone more number of trainings related to specific subjects will have more knowledge and exposure related to that particular aspect. And the training offered by the state department of agriculture was short in duration i.e. half day or one day. It was followed by the demonstration by the departmental personnel. So acquiring technical knowledge through the training could be easy for the respondents. After gaining familiarity with this technology the individual may develop a favourable attitude towards this innovation and eventually decides to adopt this technology.

Increased social participation of farmers provides more chances of getting exposed to different sources and ideas related to agriculture also provide better opportunity to have interpersonal interactions which will help in easy adoption of technologies and also to tackle the constraints. So interpersonal and cosmopolite channels would pave a way for more adoption. Extension contact always increases the adoption rate as it is positively related to adoption.

Farmers having more scientific orientation will always search for new and advanced production technologies and have keen observation power to find out the cause effect relationship in any constraint situation. Person who believes in science always looks for innovation. Most of the innovations will be adopted by the persons with more scientific orientation who prefer new technology. So a portion of respondents adopted SRI technology. Thus scientific orientation had positive relationship with the extent of adoption of SRI technology. Innovativeness is associated with the individuals' earliness in the use of new practices. Innovative farmers will always be experimenters. During any constraint situation farmers with high levels of innovativeness will experiment the new ways of doing things to change the existing situation. Generally person with more Innovativeness would be looking for new ideas. Thus innovativeness was found positively related with adoption of SRI technology.

Risk taking is the ability to take the right decision during uncertainties; these uncertainties are nothing but the constraints. The farmer who is willing to take calculated risks during constraint situation will gain better results. Same time it was seen that many farmers were taking risks due to peer pressure or demanding situation. There is a generalization that "Early adopters are better able to cope with uncertainty and risk than are later adopters"-Rogers (1971).

These findings were in agreement with results of Kumar (2004), Gopinath (2005) and Thiyagarajan (2011).

The correlation values of the variables such as Age (X_1), and Farming experience (X_3) had showed a negative relationship with the Extent of Adoption of SRI technology. The variable Land holding (X_4) had showed a non-significant association with the extent of adoption of the SRI technology by SRI farmers. The data further revealed that, better participation of extension officials had positive response towards adoption which was reinforced by risk and scientific orientations, experience in SRI method and attending more number of trainings.

Table 4. Distribution of SRI practicing farmers according to their Production levels

(n=120)

S. No	Category	Frequency	Percentage
1	Low (40-45q)	37	30.83
2	Medium (46-50q)	60	50.00
3	High (51-55q)	23	19.17
	Total	120	100.00

Table 4 indicates the distribution of respondents according to their production level of paddy crop. It was found that half of the (50.00 %) practicing farmers who were adopting SRI method of paddy cultivation technology had obtained medium production level ranging from 46 quintal to 50 quintals per hectare followed by low production level ranging from 40 quintal to 45 quintals per hectare (30.83 %) and high production level ranging from 51 quintal to 55 quintals per hectare.

The results from the Table 5 indicated that the association between various attributes of SRI farmers like education, farming experience, training undergone, extension contact, scientific orientation, innovativeness, mass media exposure and risk orientation were found to be significant with production level of paddy among SRI practicing farmers, whereas age, land holding, social participation, economic motivation, management orientation and achievement motivation had showed non-significant association with production level of paddy among SRI practicing farmers. These findings were in agreement with results of Santhi (2006).

Table 5. Association of independent variables of SRI farmers with their production levels

Variable No.	Variables	Chi sqare value	Degrees of freedom
X_1	Age	4.56^{NS}	4
X_2	Education	16.51^{S}	3
X_3	Farming Experience	11.94^{S}	2
X_4	Land Holding	13.54^{NS}	2
X_5	Training Undergone	4.14^{S}	2
X_6	Social Participation	7.90^{NS}	2
X_7	Extension Contact	27.91^{S}	2
X_8	Economic Motivation	13.83^{NS}	2
X_9	Scientific Orientation	12.06^{S}	4
X_{10}	Management Orientation	25.14^{NS}	1
X_{11}	Innovativeness	12.94^{S}	2
X_{12}	Achievement Motivation	11.75^{NS}	2
X_{13}	Mass Media Exposure	12.68^{S}	4
X_{14}	Risk Orientation	12.97^{S}	2

CONCLUSION

The results showed that, education, training undergone, social participation, extension contact, economic motivation, scientific orientation, management orientation, achievement motivation, innovativeness, mass media exposure and risk orientation were found to be positively significant with their extent of adoption of SRI technology. Age and farming experience were found negatively and significantly related whereas land holding had non-significant relationship with their extent of adoption of SRI technology. Hence, there is every need to promote SRI method of cultivation focusing more on imparting the principles of SRI during the training programmes and demonstrations, skill development among rural youth and farmers. Further the association between various attributes of SRI farmers like education, farming experience, training undergone, extension contact, scientific orientation, innovativeness, mass media exposure and risk orientation were found to be significant with production level of paddy among SRI practicing farmers, whereas age, land holding, social participation, economic motivation, management orientation and achievement motivation had showed non-significant association with production level of paddy among SRI practicing farmers.

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