

Diffusion of System of Rice Intensification (SRI) Across Tamil Nadu and Andhra Pradesh in India

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ABSTRACT

System of Rice Intensification (SRI) is one of the few innovations developed by the farmers that have resulted in greater level of interest and enthusiasm not only among the farmers but also among scientists. SRI was diffused first to Tamil Nadu State in India during the year 1999, followed by Andhra Pradesh. However, there is a need to study how SRI was diffused and adopted across the States of Tamil Nadu and Andhra Pradesh. The initial diffusion of SRI was mainly through literature. In Tamil Nadu, out of 31 districts, in 19 districts SRI has been introduced. At present out of 23 districts in Andhra Pradesh State, SRI has been introduced in 22 districts. The study revealed that farmers' awareness of SRI happened during 2004-05. The gap between initial awareness and actual adoption ranged from one to twelve months. The delay in adoption was mainly due to labour and technical constraints. Mass media were the major sources of awareness for the farmers, while State Department of Agriculture and State Agricultural Universities were the major sources that provided subsequent knowledge and training. At present, the rate of adoption of SRI practices is at take-off stage. The important attributes which aroused the interest of farmers to gain more knowledge about SRI were high grain and straw yield, lower seed rate, less water requirement and less cost of cultivation. Few farmers discontinued (which is more of disenchantment discontinuance) due to more of labour and institutional constraints and less of technical reasons. Important reasons for non-adoption of SRI practices were risk involved in adopting new practices, shortage of agricultural labour and psychological fear of loss.

Key words: SRI; Diffusion; Adoption; Discontinuance; Non-adoption

SRI is a civil society innovation occurred outside the formal research system that was first developed accidentally in Madagascar by Father Henri de Laulanié, who combined field observations of rice plant performance with a series of experiments over a decade (Laulanié, 1993). The new set of practices greatly improved the growing environment for rice plants, evoking more productive phenotypes from all rice genotypes on which the practices were used. The story of SRI in India indicates the complex evolution process of innovation and development. Today, India has one of the largest numbers of SRI farmers in the world. Official record indicates that SRI diffused first to Tamil Nadu State, followed by Andhra Pradesh in India (Prasad, 2006). However, there is a need to study how SRI was diffused and adopted across the States of Tamil Nadu and Andhra Pradesh (Krishnan, 2008).. Hence,

the present study attempted to analyse the diffusion of SRI across the States of Tamil Nadu and Andhra Pradesh in India at macro (State level) and micro level (Village level).

METHODOLOGY

Diffusion of System of Rice Intensification (SRI) was operationalised as a process by which SRI was communicated through certain channels over a certain period among the members of various States in India. The diffusion of SRI across the States of Tamil Nadu and Andhra Pradesh in India at macro (State level) was studied through secondary data collected from published documents, while the diffusion at micro level (farm level or village level) was done through ex-post facto research design in the State of Tamil Nadu and Andhra Pradesh.

Out of 31 districts, one district namely Thanjavur

from Tamil Nadu and out of 23 districts, two districts namely Guntur and Vizianagaram from Andhra Pradesh were selected purposively based on the area under SRI.

Under SRI in Tamil Nadu, out of eight taluks, three taluks (Thanjavur, Thiruvaiyaru and Kumbakonam) from Thanjavur district were selected. Out of 93 villages, two villages (Surakottai and Thirukattupalli) from Thanjavur taluk, out of 89 villages, one village (Arasur) from Thiruvaiyaru taluk and out of 124 villages, one village (Swamimalai) from Kumbakonam taluk were selected. Under SRI in Andhra Pradesh, out of 34 mandals, two mandals (Gurla and Gantiyada) from Vizianagaram district and out of 57 mandals, one mandal (Kolluru) from Guntur district were selected. Out of 24 villages, two villages (Kolluru and Krishna Nagar) from Kolluru mandal, out of 39 villages, one village (Kottangi) from Gurla mandal and out of 45 villages, one village (Vasadi) from Gantiyada mandal were selected.

One hundred sample farmers (50 from each State) were selected through proportionate random sampling technique from the villages where SRI was being practiced to study the diffusion of SRI in Tamil Nadu and Andhra Pradesh. Similarly, to study the reasons for non-adoption of SRI practices, out of eight taluks, two taluks (Thanjavur and Kumbakonam) from Thanjavur district were selected. Out of 124 villages, two villages (Sakkotai and Darasuram) from Kumbakonam taluk, out of 93 villages, one village (Madigai) from Thanjavur taluk were selected. Similarly, in Andhra Pradesh, out of 34 mandals, one mandal (Gurla) from Vizianagaram district and out of 57 mandals, one mandal (Kolluru) from Guntur district was selected. Out of 24 villages, one village (Donepudi) from Kolluru mandal and out of 39 villages, one village (Nadipudu) from Gurla mandal was selected.

One hundred respondents (50 respondents from each State) were selected through proportionate random sampling procedure from the selected villages to study the reason for non-adoption of SRI practices. Data collection was done through interview method. Data were subjected to suitable statistical analysis like percentage analysis and chi-square test in Statistical Package for the Social Sciences (SPSS). Garrett's Ranking Technique was used to identify and rank the attributes of SRI that interested them to gain more

knowledge about it, reasons for adoption, delay in adoption, discontinuance and non-adoption of SRI practices. Garret's ranking technique provides the change of orders into numerical scores. The prime advantage of this technique over simple frequency distribution is that the reasons and factors are arranged based on their importance from the point of view of respondents. Garret's formula for converting ranks into percent is given below:

$$\% \text{ position} = \frac{R_{ij} - 0.5}{N_j} \times 100$$

Where,

R_{ij} = Rank given for i th factor by j th individual

N_j = Number of factors ranked by j th individual

The per cent position of each rank was converted into scores referring to the Table given by *Garret and Woodworth (1969)*. For each factor, the scores of individual respondents were added together and divided by the total number of the respondents for whom scores were added. The mean scores for all the factors were arranged in descending order, ranks were given and the most important factors or reasons were identified.

RESULTS AND DISCUSSION

Awareness of SRI : The data in Table 1 revealed that overall (Tamil Nadu and Andhra Pradesh combined) 58 per cent of farmers knew SRI during the year 2005, followed by 30 per cent during the year 2004. Majority of Tamil Nadu farmers (60%) knew SRI during the year 2005, followed by 28 per cent during the year 2004. Very few farmers from Tamil Nadu knew SRI during the year 2002 (4%) and 2003 (8%). Similarly, more than half of the farmers (56%) in Andhra Pradesh knew SRI during the year 2005, followed by 32 per cent during

Table 1 Awareness of SRI

S.No.	Year	Tamil Nadu (n=50)		Andhra Pradesh (n=50)		Total (N=100)	
		No.	%	No.	%	No.	%
1.	2002	02	04	01	02	03	03
2.	2003	04	08	05	10	09	09
3.	2004	14	28	16	32	30	30
4.	2005	30	60	28	56	58	58

$\chi^2 = 0.648$ NS

NS – Non-significant

2004. Only ten per cent and two per cent of them knew SRI during 2003 and 2002 respectively. The study showed that there was no significant difference between Tamil Nadu and Andhra Pradesh farmers with respect to the awareness of SRI. This signifies that the same trend was observed from both the States with respect to the awareness of SRI.

Sources of awareness about SRI : It is observed from Table 2 that 38 per cent of farmers in Tamil Nadu initially knew SRI through farm magazines, newspaper, All India Radio and TV channels, followed by State Department of Agriculture (SDA) (30%), Tamil Nadu Agricultural University (TNAU) (16%) and friends and neighbours (16%).

Table 2. Sources of awareness about SRI

S. No.	Source	Tamil Nadu (n=50)		Andhra Pradesh (n=50)		Total (N=100)	
		No.	%	No.	%	No.	%
1.	SAUs	08	16	15	30	23	23
2.	SDA	15	30	04	08	19	19
3.	Friends & neighbours	8	16	06	12	14	14
4.	Channels	19	38	24	48	43	43
5.	Conference	0	0	01	02	01	01

$$x^2 = 10.366^*$$

* $P < 0.05$

Little less than half of the farmers (48%) in Andhra Pradesh initially knew SRI through farm magazines, newspaper, All India Radio and TV channels, followed by 30 per cent from Acharya N.G.Ranga Agricultural University (ANGRAU), 12 per cent from friends and neighbours, eight per cent from State Department of Agriculture and two per cent from international conference. Overall analysis (Tamil Nadu and Andhra Pradesh combined) indicated that 43 per cent of farmers knew SRI for the first time through farm magazines, newspaper, All India Radio and TV channels. The study showed that there was a significant difference between the Tamil Nadu and Andhra Pradesh farmers with respect to sources utilized for knowing SRI.

These findings derives support from the findings of *ICRISAT-WWF project (2009)*, which reported that the coverage on SRI by media viz., newspapers, magazines, All India Radio was very helpful in the spread

of SRI.

Gaining more knowledge about SRI : The data in Table 3 revealed that overall (Tamil Nadu and Andhra Pradesh combined) 66 per cent of farmers gained more knowledge about SRI during the year 2005, followed by 27 per cent during the year 2004. Among the farmers of Tamil Nadu, majority of them (68%) gained more knowledge about SRI during the year 2005, followed by 24 per cent during the year 2004. Very few farmers from Tamil Nadu gained more knowledge about SRI during the year 2003 (8%). Similarly, 64 per cent of the farmers in Andhra Pradesh gained more knowledge about SRI during the year 2005, followed by 30 per cent during 2004. Only six per cent of farmers gained more knowledge about SRI during 2003. The study showed that there was no significant difference between the Tamil Nadu and Andhra Pradesh farmers with respect to gaining more knowledge about SRI. It can be concluded that, similar trend was observed in both States with respect to gaining more knowledge about SRI. Since Tamil Nadu and Andhra Pradesh Government took initiative in popularizing SRI during 2004-05, majority of farmers gained more knowledge about SRI from State Department of Agriculture and State Agricultural Universities.

Table 3. Gaining more knowledge about SRI

S.No.	Year	Tamil Nadu		Andhra Pradesh		Total	
		No.	%	No.	%	No.	%
1.	2003	04	08	03	06	07	07
2.	2004	12	24	15	30	27	27
3.	2005	34	68	32	64	66	66

$$x^2 = 0.536 \text{ NS}$$

NS – Non-significant

Sources of knowledge about SRI: It is observed from Table 4 that the overall (Tamil Nadu and Andhra Pradesh combined) 32 per cent of the farmers gained more knowledge about SRI from Agricultural University and 30 per cent from State Department of Agriculture.

Among the farmers in Tamil Nadu, 44 per cent of them gained more knowledge about SRI from State Department of Agriculture, followed by 22 per cent through farm magazines, leaflets, pamphlets, folders, new stories and internet, 24 per cent from TNAU and 10 per cent from friends and neighbours.

Among the farmers in Andhra Pradesh, majority of them (40%) gained more knowledge about SRI from ANGRAU, followed by 30 per cent through farm magazines, leaflets, pamphlets, folders, new stories and internet, 16 per cent from State Department of Agriculture, 12 per cent from friends and neighbours and two per cent from international conference. The study showed that there was a significant difference between the Tamil Nadu and Andhra Pradesh farmers with respect to sources utilized for gaining more knowledge about SRI.

Table 4. Sources of knowledge about SRI

S. No.	Source	Tamil Nadu (n=50)		Andhra Pradesh (n=50)		Total (N=100)	
		No.	%	No.	%	No.	%
1.	SAUs	12	24	20	40	32	32
2.	(SDA)	22	44	08	16	30	30
3.	Friends & neighbours	05	10	06	12	11	11
4.	Channals	11	22	15	30	26	26
5.	Conference	00	00	01	02	01	01

$\chi^2 = 10.24^*$

* $P < 0.05$

Attributes of SRI: Farmers' preference: Attributes on which farmers were interested to gain more knowledge about SRI were studied and presented in Table 5. Farmers were asked to rank the enlisted attributes of SRI that interested them to gain more knowledge about it, and then this rank was converted into mean score with the help of Garrett's Ranking Technique. These mean scores were arranged in

descending order, ranks were given and most important attributes were identified.

Overall analysis (Tamil Nadu and Andhra Pradesh combined) indicate that high grain and straw yield (63.35), lower seed rate (61.21) and less water requirement (35.01) were the first three important attributes which interested the farmers to gain more knowledge about SRI. Other attributes which interested the farmers to gain more knowledge about SRI were less cost of cultivation (29.26), more number of tillers per plant (21.55), use of cono-weeder for weed management (21.54), wider spacing (19.36), resistant to drought and lodging (9.16) and less or no use of inorganic fertilizer (4.93).

Among the farmers in Tamil Nadu, the important attributes which interested them to gain more knowledge about SRI were lower seed rate (69.90), high grain and straw yield (61.28) and less cost of cultivation (30.24). Similarly, among the farmers in Andhra Pradesh, the important attributes which interested them to gain more knowledge about SRI were high grain and straw yield (65.42), lower seed rate (52.52) and less water requirement (49.56). This finding derives support from the findings of *Satyanarayana, et. al., (2006)* and *Uphoff (2007)*. They reported that the most attractive features of SRI which aroused the interest of farmers to gain more knowledge about SRI were reduction in inputs such as seeds, water, chemical fertilizers and pesticides.

Source of information during adoption of SRI : It could be seen from the Table 6 that almost equal

Table 5. Farmers' preference based on attributes of SRI

S. No.	Attitude	Tamil Nadu (n=50)		Andhra Pradesh (n=50)		Total (N=100)	
		Mean score	Rank	Mean score	Rank	Mean score	Rank
1	Lower seed rate	69.90	I	52.52	II	61.21	II
2	Wider spacing	27.36	IV	11.36	VII	19.36	VII
3	Less water requirement	20.46	VI	49.56	III	35.01	III
4	Less or no use of inorganic fertilizer	07.18	IX	02.68	IX	04.93	IX
5	Use of cono-weeder for weed management	27.08	V	16.00	VI	21.54	VI
6	More number of tillers per plant	16.00	VII	27.10	V	21.55	V
7	Resistant to drought and lodging	12.52	VIII	05.80	VIII	09.16	VIII
8	Less cost of cultivation	30.24	III	28.28	IV	29.26	IV
9	High grain and straw yield	61.28	II	65.42	I	63.35	I

proportion of farmers obtained information about SRI during adoption stage from friends and neighbours (30%), Agricultural University (29%), and State Department of Agriculture (28%). Little less than half of the farmers (42%) from Tamil Nadu obtained information about SRI during adoption stage from State Department of Agriculture, followed by 26 per cent from friends and neighbours and 22 per cent from TNAU. Among the farmers of Andhra Pradesh, 36 per cent of them obtained information about SRI during adoption stage from ANGRAU (36%), followed by 34 per cent from friends and neighbours and 16 per cent through farm magazines, newstories and internet. The study showed that there was a significant difference between the Tamil Nadu and Andhra Pradesh farmers with respect to sources utilized during adoption of SRI practices.

Table 6. Source of information during adoption of SRI

S. No.	Source	TN (n=50)		AP (n=50)		Total (N=100)	
		No.	%	No.	%	No.	%
1.	SAUs	11	22	18	36	29	29
2.	SDA	21	42	07	14	28	28
3.	Friends & neighbours	13	26	17	34	30	30
4.	Channels	05	10	08	16	13	13
5.	Conference	00	00	00	00	00	00

$$\chi^2 = 9.916^*$$

* $P < 0.05$

Table 7. Time gap from knowledge to adoption of SRI

S. No.	Time Period	TN (n=50)		AP (n=50)		Total (N=100)	
		No.	%	No.	%	No.	%
1.	Immediately after knowing	15	30	07	14	22	22
2.	1-4 months	16	32	11	22	27	27
3.	5-8 months	10	20	19	38	29	29
4.	9-12 months	09	18	13	26	22	22

$$\chi^2 = 8.266^*$$

* $P < 0.05$

Knowledge to adoption: Time gap: Even though some farmers started knowing SRI from 2002 onwards, but majority of them adopted during the year 2005. Hence, there was a time gap from knowing to adoption of SRI.

This time gap was analyzed and presented in Table 7. Only 30 per cent and 14 per cent of farmers adopted SRI immediately after knowing SRI in Tamil Nadu and Andhra Pradesh respectively. Thirty two per cent of farmers in Tamil Nadu and 22 per cent of farmers in Andhra Pradesh adopted SRI after one to four months period from knowing about SRI. After five to eight months period from knowing SRI, 20 per cent and 38 per cent of farmers adopted SRI in Tamil Nadu and Andhra Pradesh respectively. Overall 22 per cent of farmers adopted SRI after nine to twelve months period from knowing about SRI in both the States combined. The study showed that there was a significant difference between the Tamil Nadu and Andhra Pradesh farmers with respect to time gap from knowing to adoption of SRI practices.

Reasons for delayed adoption of SRI : Since there was a time gap from knowing about SRI to adoption, reasons for delay in adoption of SRI practices was studied and presented in Table 8. Farmers were asked to rank the reasons for delay in adoption of SRI practices and then this rank was converted into mean score with the help of Garrett's Ranking Technique. These mean scores were arranged in descending order, ranks were given and most important reasons were identified. The overall analysis (Tamil Nadu and Andhra Pradesh combined) revealed that shortage of agricultural labour for timely operation (54.28), risk in early transplanting with single seedling (38.23) and non-willingness among agricultural labour to transplant young seedling singly (31.44) were the first three important reasons expressed by the farmers for delay in adoption of SRI practices. Other reasons were to witness the SRI performance on other fields (28.46) and to expertise in SRI practices (16.31).

Farmers in Tamil Nadu (57.94) and Andhra Pradesh (51.30) expressed that shortage of agricultural labour for timely operation was the prime reason for delay in adoption of SRI practices. Other main reasons expressed by farmers in Tamil Nadu were that the agricultural labour are not willing to transplant young seedling singly (45.31) and risk in early transplanting with single seeding as it may consume more time and labour (27.63). Similarly, farmers in Andhra Pradesh expressed that risk in early transplanting with single

Table 8. Reasons for delayed adoption of SRI

S. No.	Reasons	Tamil Nadu (n=50)		Andhra Pradesh (n=50)		Total (N=100)	
		Mean	Rank	Mean	Rank	Mean	Rank
1	Risk in early transplanting with single seeding as it may consume more time and labour	27.63	III	46.86	II	38.23	II
2	Risk in transplanting singly as there is chance of mortality of young seedling	21.91	IV	24.95	IV	23.58	V
3	To expertise in SRI practices	15.37	VI	17.07	VI	16.31	VI
4	To see the SRI performance on other field	21.26	V	34.33	III	28.46	IV
5	Agricultural labour not willing to transplant young seedling singly	45.31	II	20.14	V	31.44	III
6	Shortage of agricultural labour for timely operation	57.94	I	51.30	I	54.28	I

Table 9. Discontinuance of SRI

S. No.	Reasons	Tamil Nadu (n=50)		Andhra Pradesh (n=50)		Total (N=100)	
		No.	%	No.	%	No.	%
1.	Discontinuance of SRI	03	06	05	10	08	08

Table 10. Reasons for discontinuance of SRI

S. No.	Reasons	Tamil Nadu (n=50)		Andhra Pradesh (n=50)		Total (N=100)	
		Mean	Rank	Mean	Rank	Mean	Rank
1	Difficulty in early transplanting of single seedling and maintenance of required plant population due to high mortality of young seedlings	32.67	VII	29.60	VI	30.75	VII
2	Difficulty in pulling the marker and cono-weeding in black/ clay soils	14.00	VIII	21.60	VIII	18.75	VIII
3	Weed infestation due to wider spacing	47.33	IV	34.20	V	40.91	IV
4	Non-availability of cono-weeder and marker	34.67	VI	39.00	IV	37.38	V
5	Difficulty in water management in delta areas	45.67	V	25.20	VII	32.88	VI
6	Shortage of agriculture labour for timely operation	71.33	I	77.60	I	75.25	I
7	Lack of cooperation from local community to develop drainage channels for alternate wetting and drying	61.00	II	43.60	III	50.13	III
8	Lack of institutional support like subsidies	53.33	III	44.40	II	53.12	II

Table 11. Reasons for non- adoption of SRI

S. No.	Reasons	Tamil Nadu (n=50)		Andhra Pradesh (n=50)		Total (N=100)	
		Mean	Rank	Mean	Rank	Mean	Rank
1	Lack of awareness about SRI	11.60	VII	9.66	VII	10.63	VII
2	Risk involved in adopting new practices	49.28	I	35.04	I	42.16	I
3	Psychological fear of loss	27.30	III	23.46	III	25.38	III
4	Higher labour requirement due to lack of skill in SRI practices	13.68	VI	19.54	IV	16.61	V
5	SRI is cumbersome to adopt in bigger holdings	6.90	VIII	6.90	VIII	6.90	VIII
6	Poor economic condition of small and marginal farmers	21.82	IV	15.58	V	18.70	IV
7	Not convinced with SRI performance in other field	18.28	V	14.22	VI	16.25	VI
8	Shortage of agricultural labour	33.48	II	33.08	II	33.28	II

seeding (46.86) and to see the SRI performance on other fields (34.33) were the main reasons for delay in adoption of SRI practices.

Discontinuance of SRI : In due course of adoption of SRI practices, few farmers discontinued. It is observed from Table 9 that very few farmers in Tamil Nadu (6%) and Andhra Pradesh (10%) discontinued SRI practices after one to two years of adoption. Overall, eight per cent of farmers discontinued SRI practices in both States combined together.

Reasons for discontinuance of SRI : The reasons for discontinuance of SRI practices was analysed and presented in Table 10. Farmers were asked to rank the reasons for discontinuance of SRI practices and then this rank was converted into mean score with the help of Garrett's Ranking Technique. These mean scores were arranged in descending order, ranks were given and most important reasons were identified.

It was found from overall analysis (Tamil Nadu and Andhra Pradesh combined) that the important reasons for discontinuance of SRI practices were shortage of agriculture labour for timely operation (75.25), lack of institutional support like subsidies (53.12) and lack of cooperation from local community to develop drainage channels for alternate wetting and drying (50.13). Other reasons were weed infestation due to wider spacing (40.91), non-availability of cono-weeder and marker (37.38), difficulty in water management in delta areas (32.88), difficulty in early transplanting of single seedling and maintenance of required plant population (30.75) and difficulty in pulling the marker and cono-weeding in black or clay soils (18.75). Almost similar kind of result was observed in Tamil Nadu and Andhra Pradesh State separately. It is more of disenchantment discontinuance (rejected an innovation as a result of dissatisfaction with its performance).

Reasons for non- adoption of SRI : The reasons for non-adoption of SRI practices was analysed and presented in Table 11. Farmers were asked to rank the reasons for non-adoption of SRI practices and then this rank was converted into mean score with the help of Garrett's Ranking Technique. These mean scores were arranged in descending order, ranks were given and most important reasons were identified.

The overall picture revealed that the important

reasons for non-adoption of SRI practices in both Tamil Nadu and Andhra Pradesh States combined together were risk involved in adopting new practices (42.16), shortage of agricultural labour (33.28), psychological fear of loss (25.38) and poor economic condition of small and marginal farmers (18.70). Other reasons were higher labour requirement (16.61), not convinced with SRI performance in other fields (16.25), lack of awareness about SRI (10.63) and SRI is cumbersome to adopt in bigger holdings (6.90). The important reasons for non-adoption of SRI practices in Tamil Nadu and Andhra Pradesh State separately was almost same to that of overall analysis. Reasons for discontinuance and non-adoption imply that few SRI farmers and majority of non-SRI farmers are not still convinced about the SRI practices. Moreover, shortage of agricultural labour was a serious problem, which discourages farmers for continuous adoption of SRI practices.

CONCLUSION

The diffusion study of SRI at macro level revealed that unlike other States, the acceptance and spread of SRI was rapid in Tamil Nadu and Andhra Pradesh States of India. This was mainly due to the efforts of public agencies, research institutes, universities, NGOs, farmer association and private sector. From the diffusion study of SRI at micro level, it can be concluded that the rate of adoption of SRI practices is at a take-off stage in Tamil Nadu and Andhra Pradesh States. From the attributes that aroused the interest of SRI farmers, it is evident that SRI has more relative advantage than conventional method. Majority of farmers felt SRI is a low cost and high yielding technology in rice production. Hence, it can be a sustainable alternative to conventional paddy production and can address the global issues like food security and poverty. From the reasons for discontinuance and non-adoption, it is clear that SRI is not suitable to all areas. Hence, it should be promoted based on location specific context. Policy and research interventions are needed to facilitate and support farmers for continuous adoption of SRI. Some of the strategies for continuous adoption of SRI are: Government can facilitate laser-levelling by providing hiring facilities, developing water drainage system in delta regions, ensuring the availability of markers and weeders in nearby areas and at a cheaper price, encouraging

community approach in nursery, water and weed management, developing a motorized cono-weeder and appropriate modification to suit local condition, capacity

building of farmers and extension personnel on SRI.

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