

Extent of adoption of practices under system of rice intensification in Odisha

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ABSTRACT

System of rice intensification (SRI) has been popularized in all the rice growing areas across the World. Department of Agriculture, Govt. of Odisha has made intensive effort for popularization of SRI. But the area expansions were not significantly increased. A study was made with 115 SRI growers covering 81 villages and 42 blocks in 23 districts of Odisha. It was observed that the farmers have good perception about advantages of rice in comparison to their conventional practice and adopting SRI since last five years. There were deficiencies in adoption of suitable variety, optimum seed rate, selecting quality seeds with salt solution, preparing channels in 2 mts. distance in the main field, transplanting 8-12 days old seedling, putting seedlings in a thin metal sheet for transplanting, transplanting immediately after uprooting, applying recommended quantity of manures, not practicing green manuring/brown manuring, maintaining water at soil saturation, alternate drying and wetting, light irrigation during hair line cracks, keeping 2-3 cms. standing water after flowering, four weeding at 10 days interval and uprooting weeds manually near to the plant. Since, social participation, cosmopolitanism and holding size of the respondents positively and significantly influence adoption, it is therefore suggested that the farmers need to be further exposed through training, demonstration etc. so that they will convince and realize the importance and adopt all these practices under SRI and harvest the desired yield.

Key words: SRI, adoption, respondents, practices, Odisha

System of rice intensification (SRI) stands for a special method of cultivation of rice and not related to variety. It involves a set of practices for nursery, plant, soil, water and nutrient management. The convergence of changes in the way that plants, soil and water are best managed and produced is known as the systems of rice Intensification. The technology tries to change the traditional practices especially with respect to water management that existed for thousands of years. Though the method was developed originally in 1983, had been spread to other rice growing countries across the world. Farmers have however modified some of the practices of SRI depending on soil, climate and other local conditions. In view of several advantages with this method, it has caught the attention of all the rice growing states in India and particularly in Tamil Nadu, Andhra Pradesh, Punjab, West Bengal, Odisha and Chhattisgarh.

Department of Agriculture, Govt. of Odisha had made intensive effort for popularization of SRI.

Block demonstrations comparative in large acreage are conducted in most of the major rice growing blocks. The technique has also been included under Brining Green Revolution in Eastern India. It has been observed that the farmers are not developing any enthusiasm in spite of all efforts and incentives provided by the State Department of Agriculture, Odisha. The farmers who were involved in the demonstration and got good harvest not continuing. Unless the farmers are well equipped with the knowledge and skill competency and develop confidence over the changed practice, they will not continue. Basing on this hypothesis, the present study has been designed to assess the extent of adoption of various practices of SRI.

MATERIALS AND METHODS

The study was undertaken during 2012 in 23 districts of Odisha except Nabarangapur, Koraput, Kandhamal, Sonepur, Deogarh, Keonjhar and Cuttack. Five farmers adopting SRI were randomly selected from each

district. Thus, 115 SRI adopting farmers covering 81 villages and 42 blocks from the said 23 districts were selected randomly for the study. A schedule has been developed covering different practices of SRI which has been pre-tested and finalized. Information were collected from the respondents with face to face discussion. Sufficient probing has been made with the respondents to collect factual information. Percentage, mean score and co-efficient of correlation were employed for analysis of data.

RESULTS AND DISCUSSION

SRI method has the advantage of saving irrigation water up to 30-40%, saving of 85.00% on seed, higher yields with lower inputs and crop duration reduced 7-10 days. The perception of the respondents about SRI revealed that (Table 1) majority of the respondents had stated for the relative advantage, profitability, sustainable production, cost effective, economic use of labour and technical feasibility. Poor perception towards simple operation may be due to lack of skill competency for which sufficient training may be organized to develop knowledge and skill competency.

Table 1. Perception of the respondents about SRI

Perception	Frequency	Percentage
Relative advantage	110	95.65
Profitability	111	96.52
System compatibility	95	82.61
Technical feasibility	91	79.13
Sustainable production	105	91.30
Simple operation	37	32.17
Cost effective	101	87.83
Economic use of labour	92	80.00

High productivity of SRI method is mainly due to maximum tillers, profuse root growth, aerobic condition, minimum pest and disease attack etc. Information collected on scale point of strongly agree, agree and disagree revealed that (Table 2) considerable gap of 23.33% were observed on knowledge of the respondents about SRI. The respondents had good knowledge on younger seedlings facilitate maximum tillers and weeding by weeder facilitates profuse root growth. The respondents therefore need to be further exposed through training for detail knowledge and skills

Table 2. Knowledge about advantages of SRI

Knowledge	Mean score	Gap (%)
Younger seedling facilitate maximum tillers	2.75	8.33
Alternate wetting and drying create aerobic condition	2.24	25.33
Weeding by weeder facilitates profuse root growth and tillering	2.57	14.33
Incorporating weeds adds bio-mass	2.37	21.00
Wider space minimizes pest and disease attack	2.32	22.67
Maximum uptake of nutrients	2.16	28.00
Microbial activities increases as root zone	2.19	26.33
Total	2.30	23.33

(Maximum obtainable score-3)

so that they will convince about the advantages of SRI and adopt all the recommended practices.

The respondents were further asked about the year of adoption of SRI. It is observed that majority of 51.30% of the respondents were adopting SRI since last three years and only 29.57% adopted last year (Table 3). Hence, the respondents had good experience about SRI.

Table 3. Year of adoption of SRI

Perception	Frequency	Percentage
Last year	34	29.57
Last 3 years	59	51.30
Last 5 years	13	11.30
Above 5 years	9	7.83

High tillering, popular recommended variety of the locality and hybrid varieties are recommended for SRI. Information collected on scale point of always, some times and never reveal that (Table 4) the respondents had poor knowledge about recommended

Table 4. Adoption of varieties under SRI

Variety	Mean score	Gap (%)
High tillering variety	1.95	35.00
Popular variety of the locality	1.88	37.33
Hybrid variety	1.44	52.00
High yielding variety	2.72	9.33

(Maximum obtainable score-3)

varieties for SRI. The respondents were using high yielding varieties without the knowledge of its tillering habit. The respondents should have sufficient knowledge about the varieties to be grown under SRI so that they can adopt and get desired yield.

Nursery bed preparation is one of the most important practices under SRI. Information collected on scale point of always, sometimes and never adopting reveal that (Table 5) majority of the respondents were adopting all the recommended practices in preparing nursery bed.

Table 5. Practices adopted in nursery bed

Practice	Mean score	Gap(%)
Bed of 100 sq.mt. area for one ha. crop	2.67	11.00
Bed size of 1x10 mts.	2.45	18.33
Raised bed of 8-10 cm height	2.66	11.33
Putting equal amount of well mixed soil and FYM	2.63	12.33
Drainage channel on all sides	2.65	11.67

(Maximum obtainable score-3)

Raising nursery is also equally important in SRI. Information collected on same scale point of always, sometimes and never has been analysed. It is observed from Table 6 that majority of the respondents broadcasted sprouted seeds on bed and covering with well decomposed FYM. Significant gap were observed on selecting quality seed by dipping with salt solution and not using optimum seed rate. As discussed, the farmers were using more seeds and not dipping with salt solution due to their ignorance for which they may be convinced through training and demonstration for using recommended practices.

Regarding practices followed in land preparation, it has been observed from Table 7 that majority of the respondents were preparing good

Table 6. Practices adopted in raising nursery

Practice	Mean score	Gap(%)
Using 5 kg. seed per ha. of crop	1.98	34.00
Selecting quality seed with salt solution	1.85	38.33
Sowing only sprouted seed	2.43	19.00
Broadcasting sprouted seed on bed	2.60	13.33
Covering with well decomposed FYM	2.57	14.33

(Maximum obtainable score-3)

Table 7. Practices adopted in main field preparation

Practice	Mean score	Gap(%)
Well leveled fields with good drainage	2.59	13.67
Good puddling and leveling	2.89	3.67
Channel at 2 mts. distance	1.97	34.33
Marking at 25x25 cms. distance	2.81	6.33
Not keeping standing water during transplanting	2.55	15.00

(Maximum obtainable score-3)

puddling with well leveling, good drainage facility, marking at optimum spacing and not keeping standing water during transplanting. But significant gap of 34.33% were observed for making channels at 2 mts. distance for which the respondents have to be convinced about its essentialities so that they can adopt.

Transplanting under SRI requires skill competency. The farmers need to transplant one seedling per hill of 8-12 days old. It is observed from table 8 that majority of the respondents had transplanted one seedling per hill, not removing the seeds from the plant while transplanting and not washing the seedlings after uprooting from nursery. Considerable gaps was observed on transplanting of 8-12 days seedlings(30.33%), putting seedlings in a thin metal sheet to avoid damage and easy transplanting and transplanting immediately after uprooting (22.33%). It has been appraised during data collection that the farmers were not realized the importance of all these practices and suggested for exposure to the benefits of all these practices for adoption.

SRI concept is purely on organic farming. Since, sufficient organic manures are not available with the farmers, it has been suggested for applying half dose of chemical fertilizers. Nutrient management

Table 8. Practices adopted in transplanting

Practice	Mean score	Gap(%)
Transplanting 8-12 days seedlings	2.09	30.33
Putting seedlings in a thin metal sheet for transplanting	2.02	32.67
Transplanting one seedling hill ⁻¹	2.72	9.33
Transplanting immediately after uprooting	2.33	22.33
Not removing seeds from the plant	2.66	11.33
Not washing the seedlings after uprooting	2.47	17.67

(Maximum obtainable score-3)

practices adopted by the respondents as revealed from Table 9 indicated that majority of the respondents had adopted recommended quantity of fertilizers and applying in recommended splits. But the respondents had neither applying recommended dose of FYM/Compost, not applying vermi compost or practising green manuring/brown manuring. It is true that sufficient quantities of FYM/compost are not available with farmers. Application of recommended quantity of Vermi compost may be costly. Though State Department of agriculture advocating for Panchagavya, the farmers were not adopting may be due to complex procedure. Therefore the farmers need to be motivated for green/brown manuring to provide nutritional requirement of the crop.

Table 9. Practices adopted under fertilizer management

Practice	Mean score	Gap(%)
Applying 10 tonnes FYM/Compost ha ⁻¹	2.02	32.67
Green manuring/brown manuring	1.78	40.67
Using vermi compost	1.63	45.67
Applying half of recommended fertilizer	2.43	19.00
Applying nitrogen in three doses	2.49	17.00
Applying potash in two doses	2.61	13.00
Applying Panchagavya	1.22	59.33

(Maximum obtainable score-3)

Water management is the crucial factor in SRI. Rice crop do not required standing water, but need optimum water management under SRI. Adoption of water management practices revealed from table 10 that the respondents were not adopting recommended water management practices except draining water after 20 days of flowering and providing drainage channel. Maintaining water at soil saturation, alternate drying and wetting increases microbial activities at root zone. Therefore, light irrigation usually recommended

Table10. Adoption of water management practices

Practice	Mean score	Gap(%)
Maintaining water and soil saturation	2.35	21.67
Providing drainage channel	2.59	13.67
Alternate drying and wetting	1.96	34.67
Light irrigation during hair line cracks	2.33	22.33
Standing water of 2-3 cms. after flowering	2.08	30.67
Draining water after 20 days of flowering	2.68	10.67

(Maximum obtainable score-3)

during hair line cracks observed. It is therefore suggested that the farmers have to be further exposed to the benefits of water management practices so that they will realize its essentialities and adopt accordingly.

Since, rice grown under soil saturation, weed infestation will be more. It is therefore recommended for weeding by cono/mandwa weeder and incorporate weeds in the soil to add biomass. It is observed from Table 11 that majority of the respondents were irrigating the field one day before weeding, using cono/mandwa weeder for weeding and incorporating weeds into the soil. The respondents were not practicing four weeding and uprooting weeds manually near to the plant as per the recommendation. The farmers need to be convinced through various extension approaches for practicing these practices since weed infestation near to the plant may reduce yield considerably.

Table11. Weed management practices adopted

Practice	Mean score	Gap(%)
Irrigating one day before weeding	2.57	14.33
Using cono/mandwa weeder	2.60	13.33
Four weeding at 10 days interval	1.90	36.67
Incorporating weeds into the soil	2.64	12.00
Uprooting weeds manually near to the plant	1.98	34.00

(Maximum obtainable score-3)

Further attempt has been made for a comparative analysis of the adoption of various practices. The pooled mean score under each practice were calculated for the analysis. It is observed from Table 12 that there was better adoption on nursery bed and main field preparation. Considerable gaps were

Table12. Comparative analysis for adoption of various practices

Practice	Mean score	Gap(%)
Variety	2.00	33.33
Nursery bed	2.61	13.00
Nursery raising	2.29	23.67
Field preparation	2.56	14.67
Transplanting	2.38	20.67
Fertilizer management	2.03	32.33
Water management	2.33	22.33
Weed management	2.34	22.00

(Maximum obtainable score-3)

observed on adoption of recommended variety, nursery raising, transplanting in the main field, fertilizers water and weed management.

Attempt has also been made to assess the influence of socio-economic variables on adoption of various practices under SRI. The results obtained through co-efficient of correlation revealed from Table 13 that social participation, cosmopolitaness and holding size had positive and significant influence in increasing adoption of various practices.

Table13. Influence of Socio-economic variables on adoption of practices

Variable	Correlation value	't' value
Age	0.082	0.875
Caste	0.176	1.901
Education	0.188	2.035
Social participation	0.623**	8.469
Cosmopolitaness	0.306**	3.417
Housing pattern	0.012	0.128
Holding size	0.270*	2.980
Annual income	0.106	1.134

*Significant at 0.05 level, ** Significant at 0.01 level

The findings therefore conclude that the respondents had good perception about SRI and expressed its advantage over conventional practice. The respondents had also good experience about SRI and majority of them practicing since last five years. But deficiencies were observed on adoption of suitable variety, optimum seed rate, selecting quality seeds with salt solution, preparing channels in the main field at 2

mts. distance, transplanting 8-12 days old seedlings, putting seedlings in a thin metal sheet for transplanting, transplanting immediately after uprooting, applying recommended quantity of manures, not practicing green manuring/brown manuring, alternate drying and wetting, keeping 2-3 cms. standing water after flowering, maintaining water at soil saturation, light irrigation during hair line cracks, four weeding at 10 days interval and uprooting weeds manually near to the plant. However, the respondents had adopted all most all the practices in nursery bed and main field preparation.

Since, social participation, cosmopolitaness and holding size of the respondents had significant influence on adoption of various practice, it is therefore, suggested that the farmers need to be further exposed through training, demonstration etc. so that they will be convinced and realize the importance and adopt all these practices under SRI and harvest the desired yield.

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