Adoption of System of Rice Intensification under Farmer Participatory Action Research Programme (FPARP)

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ABSTRACT

Dissemination of advanced technology on rice cultivation was the need of the hour. System of Rice Intensification (SRI) as a method of increasing yield was found successful in many countries and major rice growing tracts in India. The SRI on farm demonstration were initiated in 2007 and continued till 2008 in the five districts of Kerala namely Palakkad, Malapuram, Ernakulam, Kasaragod and Thrissur districts of Kerala. 62 farmers from 12 blocks representing 23 villages with farm size ranging from 0.4 to 1.0 ha. were selected. The results of demonstration revealed a yield increase of 17 per cent comparing the traditional method. The average cost of cultivation was Rs.24272 and Rs. 26552 per hectare for the conventional and SRI cultivation respectively. The net income was Rs.28812 and Rs.38142 per hectare for conventional and SRI respectively. The Benefit cost ratio worked out was 2.13 for traditional practices and 2.24 for SRI system of cultivation. Constraints such as economic, social, technical psychological and environmental were studied.

***Key words**: Paddy cultivation, System of rice intensification, Farmer participatory action research;*

Asia's population is projected to increase from 3.7 billion in 2000 to 4.6 billion in 2025. The community is faced with two challenges this millennium; one, the increased scarcity of water as seen from the drought in Australia, parts of Asia and Europe and two, the demand-supply mismatch in the availability of cereals such as rice, exacerbated by increasing prices. 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 area increased from 34.46 million hectares in 1960's to 45.16 million hectares in 2007-2008 and production from 39.31 million tons in 1964-65 to 96.14 million tons in 2007-2008 and productivity also increased from 1078Kg/ha to 2191 Kg/ha during the same period. 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. Rice is a profligate use of water, consuming half of all fresh water resources. About 2000 litres of water are required to produces 1 Kg of grain. Agriculture consumes 75% of total water use in India of which 70 per cent is utilized for rice cultivation. Total water inputs in lowland rice in Asia reportedly vary from 400mm in heavy clay soils to more than 2000 mm in coarse textured soils with 1300-1500 mm as most average value..In an agrarian country like India , intensified efforts to improve both crop and water productivity and subsequently the farmers income is a vital need of the hour. The extensive efforts to relieve off from the threats of water scarcity have resulted in efficient water management practices in wetland rice through System of Rice Intesification (SRI). Kerala state of India requires 47 lakh tones of food grains to feed 318 lakh people (2001 census) based on the per capita requirement of 460 g food grains. The current level of production is just 6.42 lakh tones (2006-07) with an average yield of 2435 Kg /ha. The area under rice in Kerala is diminishing every year. It was 7.43 lakh ha in 1951-52 which is reduced to 2.64 lakh ha during the

year 2006-07.However the Productivity of rice can be increased with the adoption of System of Rice Intensification (SRI) in some ecosystems of Kerala. It is with this objective that SRI is being included as a component in the National Food Security Mission (Centrally Sponsored Scheme) being implemented by State Department of Agriculture and it is also included in the Farmer Participatory Action Research Programme being implemented by Regional Agricultural Research Station of Kerala Agricultural University.. However trials conducted by *Sindhu et al., (2007)* and *Joseph et al. (2007)* did not record any merit for SRI compared to the best-recommended practice. With this background in mind the present study was undertaken with the objective to compare the costs and returns of paddy cultivation under System of rice intensification and traditional method of cultivation and to identify the important constraints in adoption of SRI technology in Kerala.

METHODOLOGY

The SRI on farm demonstration was initiated in 2007 and continued till 2008. Farmers with some awareness were selected and were also given exposure through Video lessons. The Demonstration was conducted by involving the Agricultural Officers of State Department of Agriculture who played a facilitative role in identifying innovative farmers and monitoring of the SRI fields along with Scientist of Regional Agricultural Research Station. All SRI practices were recommended for adoption in the farmer's field. The demonstrations were conducted in five districts of Kerala, namely, Palakkad, Malappuram, Ernakulam,Thrissur and Kasaragod districts of Kerala. A sample of 43 farmers from 12 blocks representing 23 villages with farm size ranging from 0.4 to 1.0 ha have been selected. The economics of Adoption of System of Rice Intensification was obtained with the help of a structured interview schedule. The respondents were asked to pin point the constraints in adoption of SRI.

RESULTS AND DISCUSSION

Comparative Costs and Returns in SRI and Traditional Cultivation of Paddy: A comparison of costs and returns in SRI and traditional method of paddy cultivation, given in Table 1, revealed that there was not much difference in the total cost of cultivation. However the grain yield showed an increase of 17 per cent over traditional method. The findings of *Anitha et al.(2011)* also revealed that SRI yields were higher than the traditional practice followed by the farmers. The increase in straw yield showed an increase of only 6.58 per cent. The net income showed an increase of 32 per cent over traditional method of cultivation. The study also revealed that the cost benefit ratio is higher for SRI (2.24) than traditional method (2.13).This study also supports the finding of *Rao (2011)* who reported higher benefit cost ratio of SRI than traditional method.

Table 1. Comparison of returns SRI Vs Traditional method

Parameter	SRI	Traditional	± %
Grain yield(kg/ha)	4283	3650	17.32
Straw yield(Kg/ha)	5097	4782	6.58
Cost of cultivation(Rs/ha)	26552	24272	-9.39
Gross income(Rs/ha)	59430	51887	14.54
Net income(Rs/ha)	38142	24272	32.38
C:B ratio	2.24	2.13	

Constraints in adoption of System of Rice Intensification : The constraints in adoption of SRI was studied under different heads as given below.

Economic constraints: A look at the table 2 indicates that a large majority comprising 81 per cent farmers expressed " High labour cost" as the major economic constraint in the adoption of System of Rice Intensification while around one third of the respondents expressed high capital cost as the constraint in the adoption of SRI cultivation. Peoples Science Institute (2006) also reported that High input of labour is required in SRI processes such as selection and segregation of healthy rice seeds and Transplanting.

Social Constraints: Four major social constraints in adoption of System of Rice Intensification were identified in the Project area (Table2). The Major constraint expressed by the participant farmers was mainly due to the difficulty in availability of System of Rice Intensification tools like Cono Weeder and Markers. This was followed by Lack of information on System of Rice Intensification technical Know-How and Need more labourers for adoption of System of Rice Intensification method. These three were the most important constraints faced by as high as 69, 63 and 49 per cent of the farmers respectively. However more one-third of the respondents expressed that the technique is best suited only to small and marginal famers and it is

Table 2. Constraints in adoption of System of Rice Intensification

Constraints	No.	%
Economic		
High capital cost	12	27.90
High Labour cost	35	81.30
Social		
Need more Laboures	21	48.80
Difficulty in availability of SRI tools	30	69.80
SRI suited to small and marginal farmers	15	34.80
Lack of information on SRI tech. Know-how	27	62.70
Technical		
Too technical to adopt	6	13.90
Need more technical support	11	25.50
Gap filling is difficult	33	76.70
More weeds	43	100.0
Cono weeding difficult in sandy soils	27	62.70
Cono weeder is heavier restricted to male labour	18	41.80
Take more time for transplanting	34	79.0
Difficulty in attaining uniform maturity	15	34.80
Providing canal at every 3m distance	28	65.10
Staggered sowing difficult to adopt	9	20.90
Difficulty in removing weeds close to the plant	26	60.40
Damage to conoweeder while in operation	18	41.80
Psycholoical		
Farmer's mind set for flooding in soil	30	69.70
Resistance of laboures	29	67.40
Lack of mental satisfaction	39	90.60
Environmental		
Incidence of leaf folder and pink borer	26	60.40
Damage due to crabs and cranes	19	44.10
Unforeseen climatic change in the initial stage	22	51.10
Not suitable for the first crop season	38	88.30

difficult for big famers to adopt the technology in the large area. *Suresh (2006)* also reported that SRI adoption is advantageous to small farmer than big farmer who depend on Hired labour.

*Technical constraints :*Evidently from Table 2, it is seen that almost all the respondents expressed more weeds due to wide spacing and unflooded condition as the foremost technical constraint in the adoption of System of Rice Intensification. It is true because without flooding, weeds can become a problem, with SRI hence it is necessary to begin weeding about 10 days after transplanting and to do 2 to 4 weedings at 10-15 days intervals. Using a simple mechanical push weeder called cono weeder it is possible to aerate the soil and also eliminate the weeds. Farmers who have not adopted this practice perfectly would have faced the problem. It is also seen that in some of the areas rice farming is taken up for the first time after a long period of land being kept fallow. Hence it is advisable to select area for SRI cultivation in areas where weed menace is under control..A majority of the farmers expressed Take more time for transplanting and Gap filling difficult in System of Rice Intensification. This was followed by more than 50 per cent of the farmers expressing providing canal at every 3m distance is difficult to follow, Cono weeding difficult in sandy soils and Difficulty in removing weeds close to the plant. Cono weeder is heavier and restricted to male labourers and damage to the cono weeder while in operation was expressed by 41.80 per cent of the farmers.

Psychological constraints : A critical perusal of Table 2 reveal that a vast majority of the farmers expressed Lack of mental satisfaction during the initial stage due to the poor Crop stand as the major psychological constraint in the adoption of System of Rice Intensification. This was followed by Farmer's mind set for flooding in soil and Resistance of laboures to adopt single seedling per hill expressed by 69.70 per cent and 67.40 per cent of the farmers respectively. *Ranghaswami (2008)* reported Lack of Cooperation from the transplanting labour and Traditional mindset of the farmers as the reason for non adoption of SRI in the sub basins of Tamil Nadu. *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.

*Environmental Constraints :*The data incorporated in Table 2 reveal that the majority of respondents were confronted with Non suitability of System of Rice Intensification in the first season. *Sain et al. (2008)* reported that 40 per cent farmers felt SRI not suitable for all the ecosystem of rice cultivation. The other constraints which respondents perceived were the incidence of Leaf folder and Pink borer due to wide spacing. Unforeseen climatic change in the initial stage of crop was accorded third rank. *Karmakar (2008)* also reported that 'fear of dry-spells' as the most important inhibiting factor to adopt SRI. Damage due to crabs and cranes was also perceived as a constraint by 44.10 per cent of the farmers.

CONCLUSION

The demonstrations conducted in the farmer's field showed that SRI performed better than traditional method of rice cultivation. Owing to its economic viability SRI has potential for up-scaling of production. However since SRI is a skill oriented technology precision in management of resources is the need of the hour. However yield improvement in SRI can be sustainable only when major constraints faced by the farmers are addressed. Hence an alternative form of SRI with stress on mechanization would be very much beneficial to States like Kerala where labour is a limiting factor in Agriculture.

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