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Economic performance of Sri Method of paddy cultivation in Bhalaghat district of Madhya Pradesh

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Abstract

It is true that Indian economy is predominantly rural and agriculture oriented where the declining trend in the average size of the farm holding possess a serious problem. The average size of land holding found to 1.16 hectare. On the other hand, in agriculture 60 per cent of the holding is less than 1.42 hectares. Majority of them are dry lands and even irrigated areas depend on the vagaries of monsoon. No doubt, India made a commendable progress in agriculture after green revolution the rate of growth in food production has been marginally more than the rate of growth of population. Of all the food articles, main food crops including cereals, pulses and oilseeds constitute the most significant part of the Indian diet. Nearly 60 per cent of the per capita income is spent on food crops by the lower half of the Indian population. The crops acreages have been found to be changing in specific areas subject to change in technology, market factors and economic status of producers and consumers etc. All the causal factors are bringing about changes in the cropping pattern of the regions. These positive changes occurred in agriculture determined the progress in agricultural production. Paddy cultivation is not the same in India after SRI. Farmers are trying, experimenting and modifying the method to suit local conditions; it can be either age of seedlings or the design of weeder. What is SRI and what is not SRI is not important, what is more important is that SRI has changed the way farmers look at the Rice plant. This is only the beginning. Millions of Indian farmers with this knowledge and experience in SRI will not only change their practice of using the resources but will force the establishment to invest in such methods that will lead to achieving food security and promoting efficient use of land and water. Now, SRI method of rice cultivation received important place of pride in increasing the yield per hectare of land with low cost of production which ultimately increases the profit of paddy growers. The country needs to increase its food grain production to 450 million tonnes by the year 2050 to meet its food scarcity. Increase in paddy production will have to come from the same area or even a reduced area. This means the future of rice production has to come by improving yields. The scientists of AICRIP, KVK's were actively engaged to popularize the SRI in Rewa, Shahdol, Jabalpur, Katni, Panna, Sidhi, Umaria Balaghat, Seoni etc. Very good impact was assessed. Farmers were achieved the rice grain yield ranging from 60 to 90q/ha under SRI in highly yielding varieties and hybrids. Approximately 25000 hectare area was under SRI at present in the state. In fact it is necessary here to describe system of Rice Intensification (SRI) at a glance. India is one of the largest producers of rice in the world; however, rice cultivation in recent times has suffered from several interrelated problems.

Keywords: System of Rice Intensification, Simple Random Sampling Technique, Cost and Return

Introduction

The System of Rice Intensification (SRI) – introduced in India in 2000 when the Tamil Nadu Agricultural University (TNAU) initiated experiments involving SRI principles – provides an option to improve yields while simultaneously reducing other inputs. SRI method of rice cultivation was popularized in the state very effectively by the Department of Agriculture and JNKVV Jabalpur. The System of Rice Intensification (SRI method) methodology for raising rice production makes three main changes in irrigated rice cultivation: transplanting younger seedlings, preferably 8-14 days old before the plants enter their fourth phyllochron of growth, planting the seedlings singly rather than in clumps of 3-6 plants, and keeping the paddy soil moist but not continuously saturated during the plants' vegetative growth phase. System of rice intensification is referred as a set of practices rather than a technology based upon a number of insights in to how to create the best growing environments for rice plants as compared to other improved methods of rice cultivation under limited water resources. In Madhya Pradesh rice is grown in the area of about 16.62 lakhs hectare with production of 22.27 lakhs tonnes and productivity 14.15 q/ha (in the year 2013-14) which is far below than the average national productivity (2010 kg/ha). In Madhya Pradesh about 1/3rd area of paddy is under hybrid rice particular in under irrigated production system.

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Rice hybrid produce about 14-18 per cent higher grain yield include a more vigorous and extensive root system Now, farmers are growing rice hybrids in lowlands and banded uplands under irrigated ecosystem in M.P. and Rewa division in particular consequently. Among the total rice production in the State, more than 75.00 per cent of it's from rainfed and less than 25.00 per cent from irrigated areas. Due to popularity of "System of Rice Intensification" (SRI method) of paddy cultivation offers opportunities to researchers and farmers to expand their understanding of potentials already existing in the rice genome. In MP, total area under rice production is 1.7 million hectare in which only 223 thousands hectare comes under irrigated situation. Total rice production is 1710 thousand tonnes in which 1313 thousands tonnes is from rain fed and 397 thousand tonnes is from irrigated area. The productivity of total rice area in Madhya Pradesh is 1103 kg/ha while irrigated area has 1273 kg/ha.

Material and Methods

Collection of data

The study is based on both primary and secondary data. The primary data was collected from the selected respondents with the help of pre-tested interview schedule by the personal interview method and secondary data was collected from Madhya Pradesh agriculture statistics, land record office, annual districts statistics and other published and unpublished reports.

Methodology

Sampling technique Balaghat block of Balaghat district was purposively chosen as the study area because, it has the larger area under Rice cultivation in the district. A multistage simple random sampling technique (SRS) was adopted to select the block, villages and the respondents, market and different farmer involved in Rice production and marketing in Balaghat district. The details of the sampling techniques at various stages are given as under:

Profitability aspects

Net farm income (NFI) = Gross income – Cost C₃ (total cost)

Family labour income (FLI) = Gross income – Cost B₂

Farm business income (FBI) = Gross income – Cost A₁

B: C ratio (Benefit cost ratio) = Gross income/ Gross expenses

Results and Discussion

Cost concept

The breakup of cost of cultivation as per the cost concepts used in study, it is found that in SRI method of paddy cultivation, the cost A₁ on sample holding was found to be Rs.24648 per hectare. It is noted here that cost A₁ is the paid out cost on actual inputs and their scarified costs. In this cost assessment process cost A₂ was not determine because the paddy growers used their own land in paddy cultivation. In case of cost B₁ and B₂, the corresponding cost B₁ was found to Rs.24838 and cost B₂ was Rs.28338 per hectare. The total cost estimates i.e. cost C₁, C₂ and C₃ based on the imputed values would give an unrealistic and even misleading picture of costs. It is attributable to the fact that paddy growers try to minimize only out of pocket expenses of cultivation that's why and large, they make maximum use of resources they own, but it is also not justifiable to take into account only paid out costs. To determine the cost structure cost C₁, C₂ and C₃ were also analyzed in the present study. It is revealed that the

average cost C₁ and cost C₂ of paddy cultivation with SRI method shows the corresponding costs C₁ was found to Rs.39038 and cost C₂ was Rs.42538 per hectare. It is concluded that (cost C₃) is the main cost incurred in cultivation process. The data revealed that in cultivation of SRI method of paddy the total cost C₃ was found to be Rs.46792 per hectare.

Table 1: Cost of cultivation on Rice according to cost concept on Sample farms. (Rs./ha.)

Cost	Nursery Management + Crop Production (Rs./ha.)
Cost A1 and A2	24648
Cost B1	24838
Cost B2	28338
Cost C1	39038
Cost C2	42538
Cost C3	46792

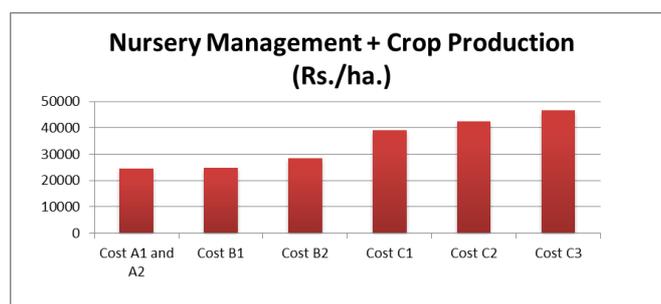


Fig 1: cost of cultivation on rice according to cost concept on sample farms

Profitability concepts

It was observed during study that the market price of paddy per quintal was received by different farmers found to variation. It was due to size of marketing cost, time of selling and quality of produce which made differences on total gross return, accordingly. The study revealed that the gross income on SRI method of paddy cultivation was realized Rs.62968 per hectare. The net income is real income for which farmers are interested to realize as highest as possible. The study reveals that the net income Rs.16176 per hectare was realized by SRI method of paddy growers. The other measurement of farm profit like family labour income was found to in case of SRI method of paddy cultivation i.e. Rs.34630 per hectare, while, the farm business income is also important profitability measurement and it is depicted that it was found to Rs.38320 per hectare in case of SRI method of paddy cultivation. In the last of profitability measurement of paddy cultivation with SRI method, the benefit over per rupee investment also found to i.e. 1.35.

Table 2: Returns and profitability of paddy production with SRI methods

Economics parameter	Rs/ha
Cost-C ₃	46792
Gross income	62968
Net income	16176
Family labour income	34630
Farm business income	38320
B.C. Ratio	1.35

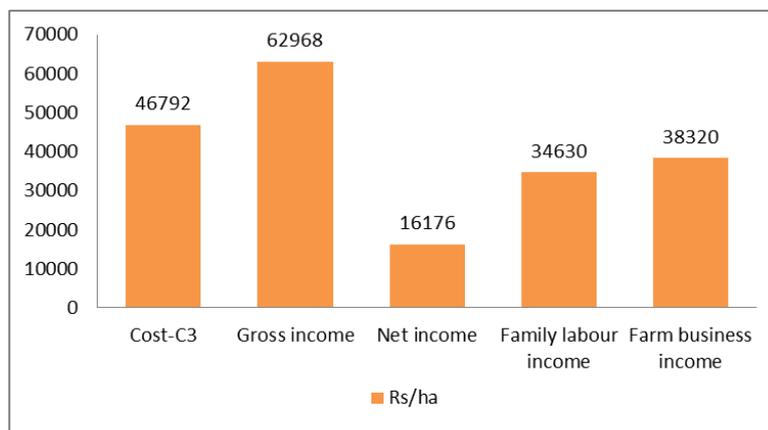


Fig 2: Returns and profitability of paddy production with SRI methods

Resource productivity

The production function analysis was also carried out to examine the resources productivity. To measurement of resources productivity in paddy production using Cobb–

Douglas production function with the help of least square technique and coefficients of elasticities of major resources along with value of R^2 and F ratio.

Table 3: Resource productivity of different variables in SRI method of paddy cultivation

Production variables	Regression value	standard errors
X_1 = Human labour value	0.083 N.S.	0.244
X_2 = Seed expenditure	0.283**	29.596
X_3 = Fertilizer value	0.175*	2.292
X_4 = Plant protection expenditure	0.455**	8.482
(R^2) Coefficient of multiple determinations (%)	95.40	--
F – Ratio	282.455	--

Note: * Significant at 0.05 per cent level of probability

** Significant at 0.01 per cent level of probability

R^2 Coefficient of multiple determinations

The values of coefficient of multiple determination of R^2 were found to be high in paddy cultivation which indicated that the selected resources in the production function were the best fit. In case of SRI method of paddy cultivation the R^2 coefficient of multiple determinations was found to quite high (95.40%), it clearly indicated that fitted function explain 95.40 per cent responsible for gross income. Study showed that in SRI method of paddy cultivation, 95.40 per cent variations in gross income of paddy cultivation were due to the included variables.

The F-ratio for fitted function was found to higher i.e. 282.455 in case of SRI method of paddy cultivation indicated that fitted Cobb-Douglas production function is more useful and best fitted to the data.

In case of “SRI method” of paddy cultivation the values of regression coefficient of overall average holding expenditure on human labour found to ($\beta=0.083$ N.S.), seed ($\beta=0.283^{**}$), fertilizer application ($\beta=0.175^*$) and plant protection measure ($\beta=0.455^{**}$) were found to be positive. This showed that the utilization of resources is being done properly. The data denoted that the use of these inputs would be realized positive and increase in gross income. It is concluded that SRI method of paddy growers used their inputs more efficiently as all the inputs independent variables shown positive contribution on gross return of cultivation. The data also shows that in case of human labour utilization the value of regression found to non significant and in other values was significantly positive correlated with gross value of paddy.

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