

Original Research Article

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## Economics of Paddy Cultivation under Different Sowing Techniques in Raipur District of Chhattisgarh

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### ABSTRACT

The present study was conducted during 2017-18 in Raipur district of Chhattisgarh, with the objective to compare the cost & return and identifying constraints in paddy cultivation under different sowing techniques (SRI, Transplanting, Broadcasting and Line sowing). The study was conducted with the help of questionnaire, interviewed over 100 farmers. The cost of preparatory tillage was 7, 35 & 45 per cent more than line sowing. The material cost was found to be 9, 31 & 34 per cent more than broadcasting. However the yield was found to be 39, 46 & 83 per cent more in case of line sowing, transplanting and SRI over broadcasting. Total cost occurred in cultivation of paddy in SRI is Rs. 60809, in transplanting Rs. 49587, line sowing it is Rs. 43346 and broadcasting Rs. 42574. Per hectare return of SRI was Rs. 122000, transplanting Rs. 96111, line sowing Rs. 91600 and broadcasting Rs. 66140. The return per rupees was around Rs 2.11 in line sowing, Rs 2 in SRI, Rs 1.94 in transplanting and Rs. 1.55 in broadcasting. Major constraints in paddy cultivation were found to be unawareness of technologies and more labour requirement in SRI and transplanting and costly input cost.

#### Keywords

Line sowing,  
Transplanting,  
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Questionnaire,  
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### Introduction

Rice acknowledges as a supreme commodity to mankind, in light of the fact that rice is really an existence, culture, custom and method for business to millions. In India, there is a growing demand for rice due to ever burgeoning population. India's having highest area under rice and stand in second place for

production. Rice cultivation takes place in all States of India, but West Bengal, Uttar Pradesh, Punjab, Tamil Nadu, Andhra Pradesh and Bihar are the major rice producing states. Nowadays, rice is being cultivated by different methods of sowing in the world the most important methods are SRI (System of Rice Intensification), transplanting and direct seeded (broadcasting and line sowing).

Presently, direct seeded rice is followed in America, Western Europe such as Italy and France, Russia, Japan, Cuba, India, Korea, Philippines and also in some parts of Iran, due to high technology, high labour cost and shortage of skilled labour thereby shifting trend from transplanting method of cultivation (Akhgari, 2004). SRI is environment friendly.

Reduced demand for water frees up water for other uses and soil that is not kept saturated has greater biodiversity. Un-flooded paddy fields do not produce methane, one of the major “greenhouse gases” that are contributing towards global warming. The method uniqueness includes use of less seed, less water, less chemicals etc. (Reddy *et al.*, 2005).

### **Materials and Methods**

The present study was undertaken in Raipur district of Chhattisgarh. Raipur district consist of four blocks Dharsiwa, Abhanpur, Tilda, Arang out of which Dharsiwa block was selected purposively as in this block all the four sowing techniques of paddy cultivation i.e. SRI, Transplanting, Broadcasting and line sowing were found to be practiced.

From Dharsiwa block three villages were selected namely Saragaon, Nilja and Pauni based on the area under each type of sowing techniques i.e. SRI, transplanting, broadcasting and line sowing.

The selection of farmers was done according to the per cent proportionate method, the total number of farmers in the three villages was found to be 554, out of which 38, 230, 201 and 85 was found to be practiced SRI, transplanting, broadcasting and line sowing. From all four sowing techniques approx. 18 per cent farmers were selected i.e. 7 from SRI, 42 from transplanting, 36 from broadcasting and 15 from line sowing constituting the total sample size of 100 respondents.

### **Cost concept**

The cost concepts i.e., Cost A1, Cost A2, Cost B and Cost C, which are generally followed in farm management studies and CACP (Commission for Agriculture Cost and Prices), were adopted for the present study.

### **Farm business analysis**

Besides the cost concepts, farm business analysis has been undertaken to test the efficiency of the farm. It includes the items like net income, family labour income, farm business income and farm investment income.

### **Garrett ranking**

To find out the most significant factor which influences the respondent, Garrett’s ranking technique will be used.

### **Results and Discussion**

The results obtained from the present study as well as discussions have been summarized under following heads:

#### **Socio economic characteristics of respondents**

The average age of respondents using SRI, transplanting, broadcasting and line sowing was found to be 51, 50, 54 and 49 with average family size of 4, 4, 4 and 3. The male and female population was found to be 2:2, in SRI, transplanting, broadcasting and 2:1 in line sowing.

Maximum farmers was found to be literate up to high school (40%) followed by higher secondary (39%) across all respondents. Male members are involved in farming activities while female was found to be house wife, children’s were found to be student or in service across all respondents. The average

size of land holding was found to be 1.14, 2.09, 1.68 and 2.04 ha in SRI, transplanting, broadcasting and in line sowing (Table 1).

**Cost and return of paddy cultivation under different sowing techniques**

**Cost of cultivation**

The total cost of cultivation of paddy under different sowing techniques was shown in the Table 2, total cost occurred in cultivation of paddy in SRI is Rs. 60809, in transplanting Rs. 49587, line sowing it is Rs. 43346 and broadcasting Rs. 42574. The similar findings were reported by Makaida *et al.*, (2014), Shelke *et al.*, (2017) (Table 3).

**Yield**

The main yield quintal per hectare was found to be more in SRI i.e. 70 as compare to transplanting (55.62), line sowing (53) and broadcasting (38.2).

SRI was found to be best sowing techniques because the planting design of SRI is such that every plant gets sufficient light, water and air which leads to profuse tillering which helps in getting higher productivity per unit area. Makaida *et al.*, (2014), Bhatt (2015), Kirar *et al.*, (2017), Agrawal *et al.*, (2018) (Table 5).

**Net return**

The net return obtained in SRI was found to be maximum in case of SRI (Rs 61190.61), line sowing (Rs. 48253.7), transplanting (Rs. 46523.2) and broadcasting (Rs. 23565.14). which indicated that SRI is not only superior over the other sowing technique techniques in physical terms as it giver higher productivity but at the same time but at the same time it is giving better monitoring returns than other sowing techniques. Makaida *et al.*, (2014), Agrawal *et al.*, (2018), Mithra and Bhaskaran (2018) reported similar findings in their study (Table 6).

**Table.1** Socio – economic character of respondents (per form)

Parameters	SRI (7)	Transplanting (42)	Broadcasting (36)	Line sowing (15)
Age (years)	51	50	54	49
Family size (no)	4	4	4	3
Male	1	1	1	1
Female	1	1	1	1
Children	2	2	2	1
Education status				
Illiterate	0	1 (2.38)	0	1 (6.66)
Primary	2 (28.57)	8 (19.04)	9 (25)	3 (20)
High school	3 (42.85)	17 (40.47)	15 (41.66)	10 (66.66)
Higher sec.	2 (28.57)	13 (30.95)	10 (27.77)	1 (6.66)
Graduate	0	3 (7.14)	2 (5.55)	0
Total	7 (100)	42 (100)	36 (100)	15 (100)
Land holding(ha)	1.14	2.09	1.68	2.04

Note – figures in parenthesis shows the percentage to total respondents

**Table.2** Cost of cultivation of different sowing techniques (Rs/ha)

Particular	SRI	Transplanting	Broadcasting	Line Sowing
<b>VARIABLES COST</b>				
human labour	14580	10056	7256	5396
bullock labour	257	173	180	66
machine labour	2456	2365	2538	3851
Seed	932	1350	1607	1373
Manure	800	809	305	248
Fertilizer	5626	4562	4096	5013
Irrigation	838	939	247	107
Plant protection chemicals	254	565	41	117
Total variable cost	25745	20822	16273	16175
Interest on working capital	1287	1041	813	808
<b>SUBTOTAL</b>	27033	21863	17087	16984
<b>FIXED COST</b>				
Land revenue	69	69	58	63
Depreciation	6500	6023	11506	6023
Rental value	20333	16018	9023	15266
Total fixed cost	26902	22110	20588	21353
Interest on fixed capital	1345	1105	1029	1067
<b>SUBTOTAL</b>	28248	23216	21617	22421
<b>TOTAL COST</b>	55281	45079	38704	39405
10% as managerial cost	5528	4507	3870	3940
<b>TOTAL COST OF CULTIVATION</b>	60809	49587	42574	43346

**Table.3** Cost of cultivation under different cost concepts (Rs/ha)

Particulars	SRI	Transplanting	Broadcasting	Line sowing
<b>COST A1</b>	33352	27690	28453	22860
<b>COST A2</b>	33352	27690	28453	22860
<b>COST A2 + FL</b>	33602	27955	28651	23071
<b>COST B1</b>	34697	28796	29483	23928
<b>COST B2</b>	55031	44814	38506	39194
<b>COST C1</b>	34947	29061	29681	24139
<b>COST C2</b>	55281	45079	38704	39405
<b>COST C3</b>	60809	49587	42574	43346

**Table.4** Cost of production under different cost concepts (Rs/qt)

Particulars	SRI	Transplanting	Broadcasting	Line sowing
<b>COST A1</b>	474	495	742	429
<b>COST A2</b>	474	495	742	429
<b>COST A2 +FL</b>	477	500	748	433
<b>COST B1</b>	493	515	769	449
<b>COST B2</b>	784	803	1006	737
<b>COST C1</b>	497	520	774	453
<b>COST C2</b>	787	808	1011	741
<b>COST C3</b>	866	889	1112	815

**Table.5** Yield and gross income of different sowing techniques

Particulars	SRI	Transplanting	Broadcasting	Line sowing
<b>MAIN YIELD(qt/ha)</b>	70	55.62	38.2	53
<b>PRICE (Rs/qt)</b>	1550	1550	1550	1550
<b>BY PRODUCT(qt/ha)</b>	150	110	77	105
<b>PRICE (Rs/qt)</b>	90	90	90	90
<b>Gross income</b>	122000	96111	66140	91600

**Table.6** Return obtained across various sowing techniques (Rs/ha)

Particulars	SRI	Transplanting	Broadcasting	Line sowing
<b>COST C3</b>	60809	49587	42574	43346
<b>GI</b>	122000	96111	66140	91600
<b>NET RETURN</b>	61190	46523	23565	48253
<b>Net return over cost A2 + FL</b>	88397	68155	37488	68528
<b>B:C RATIO</b>	2	1.94	1.55	2.11

**Table.7** Constraints in paddy cultivation

Particulars	Rank
<b>Unavailability of good quality seed</b>	8
<b>Financial constraints</b>	2
<b>Constraints in availability of fertilizer on time and inadequate quantity</b>	5
<b>Costly pesticide, ineffective weedicide</b>	4
<b>Lack of mechanization</b>	7
<b>Unawareness of technologies</b>	1
<b>Non availability of labour for transplanting</b>	3
<b>High rent charges of agricultural machinery</b>	6

### **Benefit cost ratio**

The return per rupees was found to be more (Rs 2.11) in line sowing, (Rs 2) in SRI, (Rs. 1.93) in transplanting and (Rs. 1.53) in broadcasting. Anon. (2015), Nirmala and Waris (2016), Mahala *et al.*, (2016), Manohar *et al.*, (2017) reported similar finding in their study (Table 4).

### **Constraints in paddy cultivation**

Constraints in paddy cultivation includes labour problem, unawareness of technologies timely available of fertilizer, costly input cost.

The finding is in line with the findings of Churpal *et al.*, (2015), Dhruw *et al.*, (2017), Lakra *et al.*, (2017) (Table 7).

The paddy yield is high in SRI method as compared to the yields in transplanting, broadcasting and line sowing method of paddy cultivation. Although the B: C ratio was found to be high in line sowing but yield, production and income can be increased using SRI method as it gave highest productivity and net return across various sowing techniques in the area under study, farmer can adopt method according to its requirement (resource restrictions/financial constraints).

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