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Comparison Between Traditional and Improved Method of Paddy Cultivation for Doubling Farmers Income

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A B S T R A C T

Rice (*Oryza sativa*) is the staple food for more than half of the world's population and plays a pivotal role in food security of many countries. More than 90 per cent of the global production and consumption of rice in Asia. Multistage sampling design was adopted in selection of district, tehsil and villages. On the basis of area under both the methods of paddy cultivation, Dharmapuri and Sarangapur tehsils of Karimnagar district were selected for the present study. From each tehsil, five villages were selected on the basis of traditional and SRI methods of paddy cultivation. From each village, 10 farmers were selected randomly comprising 5 farmers for traditional and 5 farmers for SRI methods of paddy cultivation. Thus, from 10 villages, 100 paddy growers were selected with the equal distribution of 50 for traditional and 50 farmers for SRI methods of paddy cultivation.The economics of traditional paddy and SRI method paddy found that the per hectare cost of cultivation (Rs. 48945.9) for SRI paddy was more when compared to that (Rs. 47341.61) of traditional paddy. Total cost of cultivation was more by about Rs.1604.29 for SRI when compared to that in traditional method. The per hectare gross returns realized for traditional paddy farmers and SRI paddy farmers, respectively were Rs. 86860 and Rs. 112420. The net returns were Rs. 39518.39 for traditional method and Rs. 63474.1 for SRI method. The net returns over Cost A, Cost B and Cost C were also higher in SRI method when compared to those in traditional method. The return per rupee spent was around Rs. 1.83 in traditional method and it was 2.29 in SRI method. The major attributing factor for the high operational cost in SRI method of rice was human labour. The study revealed that the higher total operational costs were compensating the yield advantage of SRI method of rice. The Major reasons for practicing SRI method by sample farmers were less water requirement and higher yield levels.

Introduction

Rice (*Oryza sativa*) is the staple food for more than half of the world's population and plays a pivotal role in food security of many countries. More than 90 per cent of the global production and consumption of rice in Asia.

In Andhra Pradesh rice is cultivated in an area of 4.00 Million hectares, production of rice during 2011-12 was 9.32 million tones and yield was 3146 kg per ha. It is expected that about 20 lakh tones of fine rice would be exported from the state.

In System of Rice Intensification (SRI) method, synergic interaction increases land labour and water use efficiency. SRI method deviates from the traditional method of cultivating irrigated paddy in a number of ways.

For instance, 5kg per hectare of seeds is sufficient in SRI as against the usual 50-60 kg per hectare in traditional method. The transplantation of the seedlings is carried out within 2 weeks as against 4-5 weeks with a wider spacing and 1 seedling per hill.

The root development is more and healthier under SRI method; tillering is almost double, and the crop does not lodge, the grain weight is more with fewer incidences of pests and diseases in the new method. Thus it involves the application of certain management practices, which together provide better growing conditions for rice plants, particularly in the root zone, than the traditional method. The reduced demand for water facilitates conservation of water and soil that is not kept saturated has greater biodiversity.

The un-flooded paddy fields do not produce methane, one of the major greenhouse gases contributing towards global warming. This water saving and water use efficient method of rice cultivation is suitable for resource poor farmers and water scarce areas.

The main objectives of this study includes the comparison between improved method and traditional method of paddy cultivation. Also to compare the cost and returns of paddy cultivation in improved and traditional methods of paddy cultivation

Materials and Methods

Multistage sampling design was employed in selection of district, tehsils, villages and paddy growers. In first stage, Karimnagar district was purposively selected on the availability of traditional and system of rice intensification methods of paddy area for the study. In second stage, on the basis of area under both the methods of paddy cultivation, Dharmapuri and Sarangapur tehsils of Karimnagar district were selected for the present study. In third stage, from each tehsil, five villages were selected on the basis of traditional and SRI methods of paddy cultivation.

The selected villages in the Dharmapuri tehsil were namely, Donoor, Nakkalapeta, Gadhepalli, Dharmapuri, Teegala Dharmaram and the selected villages in the Sarangapur tehsil were namely, Nagnur, Pembatla, Sarangapur, Rechpally, Konur. In the fourth stage, from each village, 10 farmers were selected randomly comprising 5 farmers for traditional and 5 farmers for SRI methods of paddy cultivation.

Thus, from 10 villages, 100 paddy growers were selected with the equal distribution of 50 for traditional and 50 farmers for SRI methods of paddy cultivation. Then cross sectional data were collected with the help of well-structured pretested schedule by personal interview method. The data were collected during the year 2015-16 for the period from 1st July, 2015 to 30th June, 2016. The data were related

to socio-economic characteristics, costs, returns and profitability, trend in market arrivals and prices, constraints and suggestions of rice growers.

Results and Discussion

Compare Costs and Returns Structure in Traditional and Sri Methods of Paddy Production

Per hectare input use pattern in Traditional and SRI methods of paddy cultivation

The pattern of inputs used in both the methods of paddy cultivation and total cost of cultivation for sample farmers is depicted in Table 1. A glance at the table indicated that farmers of traditional paddy were found to use more of seeds (75 kg), N fertilizer (183.5 kg), P fertilizer (57.5 kg), K fertilizer (75 kg) and plant protection chemicals 1550 ml as against 5 kg of seeds, 156 kg of N fertilizer, 46 kg of P fertilizer, 60 kg of K fertilizer and 1300 ml of plant protection chemicals by SRI paddy farmers. However, SRI paddy farmers used 57 man days of human labour, 13.75 hours of machine labour and 7.42 tonnes of farmyard manure, which were more against 51.25 man days of human labour, 10 pair days of bullock labour, 3.5 hours of machine labour and 3.06 tonnes of farmyard manure used by traditional paddy farmers. Irrigation charges, rental value of land, interest on fixed capital were found to be more for traditional paddy farmers, whereas interest on working capital and depreciation were found to be more for SRI paddy farmers.

Cost of cultivation of paddy production

Per hectare cost of cultivation of paddy was calculated and is presented in Table 2. The per hectare cost of cultivation (Rs. 48945.9) for SRI paddy was more when compared to that (Rs. 47341.61) of traditional paddy. The share of human labour in total cost was 21.70 per cent (Rs. 10275) for traditional paddy farmers and 27.27 per cent (Rs. 13350) for SRI paddy farmers. The expenditure made on machine labour was 11.1 per cent (Rs.5250) for traditional paddy farmers and 31.66 per cent (Rs.15500) for SRI paddy farmers and the expenditure made on bullock labour was 21.12 per cent for traditional paddy farmers. The next important item of expenditure in both the methods of paddy cultivation was the expenditure made on fertilizers, which worked out to be 15 per cent and 12 per cent, respectively for traditional and SRI paddy farmers. The rental value of land was the major expenditure contributing to the fixed cost (12.73% and 12.25%, respectively for traditional paddy farmers and SRI paddy farmers). The share of variable cost was 84.96 per cent (Rs. 40226.01) to the total cost in traditional paddy and 84.83 per cent (Rs. 41524.13) in SRI paddy cultivation. The variable cost was found to be less by about Rs. 1298.12 in traditional method, when compared to that in SRI method. The share of fixed cost was 1.53 per cent (Rs. 724.86) and 1.52 per cent (Rs.721.2) for traditional and SRI paddy farmers, respectively. Total cost of cultivation was more by about Rs.1604.29 for SRI when compared to that in traditional method.

Method wise paddy output

The per hectare paddy output obtained in both the methods is presented in Table 3. The yield per hectare realized in traditional method was 6.3 tonnes. The paddy yield realized by SRI paddy farmers was 8.2 tonnes per hectare. There was a glaring difference between the two methods in the paddy straw yield. Traditional paddy farmers obtained 4.96 tonnes per hectare and SRI paddy farmers realized 5.82 tonnes per hectare.

Table.1 Per hectare input use pattern in Traditional and SRI methods of paddy Cultivation.

Sr.No.	Particulars	Units	Traditional	SRI
			Quantity	Quantity
1.	Seeds	kg	75	5
2.	Fertilizers			
	N	kg	183.5	156
	P	kg	57.5	46
	K	kg	75	60
3.	FYM	tonnes	3.06	7.42
4.	Plant protection Chemicals	Ml	1550	1300
5.	Human labour	days	51.25	57
6.	Bullock labour	days	10	
7.	Machine labour	hours	3.5	13.75

Table.2 Total cost of cultivation in Traditional and SRI methods of paddy cultivation

Sr.No.	Particulars	Traditional		SRI	
		Value	Per cent	Value	Per cent
A.	**Variable costs**				
1.	Seeds	1500	3.17	100	0.20
2.	Fertilizers				
	N	2392.5	5.05	2033.95	4.15
	P	2707.5	5.72	2166	4.42
	K	2000	4.22	1600	3.26
3.	FYM	830	1.75	1877.26	3.83
4.	Plant protection Chemicals	1112.5	2.35	875	1.78
5.	Human labour	10275	21.72	13350	27.27
6.	Bullock labour	10000	21.12		
7.	Machine labour	5250	11.1	15500	31.66
8.	Interest on working capital @ 10%	3656.91	7.72	3774.92	7.71
9.	Irrigation charges	501.6	1.06	247	0.50
	Sub total	**40226.01**		**41524.13**	
B.	**Fixed costs**				
1.	Land revenue	10	0.02	10	0.02
2.	Rental value of land	6030.5	12.73	6000	12.25
3.	Depreciation	350.24	0.74	690.57	1.41
4.	Interest on fixed capital @ 12%	724.86	1.53	721.2	1.47
	Sub total	**7115.6**		**7421.77**	
Total cost cultivation		**47341.61**		**48945.9**	

Table.3 Method-wise paddy output.

Particulars(t/ha)	Traditional	SRI
Main Product	6.3	8.2
By Product	4.96	5.82

Table.4 Method-wise cost and returns in paddy cultivation (Rs/ha).

Particulars	Traditional	SRI
Cost A	38411.25	40124.7
Cost B	45166.61	46845.9
Cost C	47341.61	48945.9
Gross returns	86,860	1,12,420
Net returns over		
Cost A	48448.75	72295.3
Cost B	41693.39	65574.1
Cost C	39518.39	63474.1
B:C ratio	1.83	2.29

Table.5 Contribution of Cost-A, Cost-B and Cost-C in total cost of cultivation

Cost concepts	Traditional	SRI
Cost-A		
Hired human labour	8100	11250
Bullock labour	10000	0
Machine labour	5250	15500
Seed	1500	100
Manure	830	1877.26
Fertilizer	7100	5799.95
Plant protection chemicals	1112.5	875
Irrigation charges	501.6	247
Land revenue	10	10
Interest on working capital	3656.91	3774.92
Depreciation	350.24	690.57
Cost-B		
Cost-A+ rental value of land+ interest on fixed capital	45166.61	46845.9
Cost-C		
Cost-B+ imputed value of family labour	47341.61	48945.9

Method wise cost and return structure in paddy cultivation

The method-wise cost and return structure in paddy cultivation in study area is given in Table 4. It was clear from the table that return from main produce was Rs 81900 for traditional and Rs.106600 for SRI method of paddy cultivation. Similarly, return from by produce was Rs. 4960 for traditional and

Rs.5820 for SRI paddy farmers. Thus, gross returns realized for traditional paddy farmers and SRI paddy farmers, respectively were Rs. 86860 and Rs. 112420. The per hectare cost A, cost B and cost C for SRI method were more when compared to that in traditional method. The net returns were Rs. 39518.39 for traditional method and Rs. 63474.1 for SRI method.

The net returns over Cost A, Cost B Cost C were also higher in SRI method when compared to those in traditional method. The return per rupee spent was around Rs. 1.83 in traditional method and it was 2.29 in SRI method.

Contribution of Cost-A, Cost-B and Cost-C in total cost of cultivation

Contribution of Cost-A, Cost-B and Cost-C in total cost of cultivation of paddy in traditional and SRI methods is presented in table 5. Cost-A includes hired human labour, bullock labour, machine labour, seed, manure, fertilizer, plant protection chemicals, irrigation charges, land revenue, interest on working capital, depreciation. Then, cost-B consists of cost-A plus rental value of land and interest on fixed capital. Cost-C includes cost-B plus imputed value of family labour. The contribution of Cost-A, Cost-B and Cost-C was higher in SRI method of paddy cultivation compared to traditional method of cultivation.

The month wise arrival and price indices of rice in selected market showed great fluctuation. It was also noticed that when the arrivals increased the prices showed the decreasing trend and vice-versa. The economics of traditional paddy and SRI method paddy found that the per hectare cost of cultivation (Rs. 48945.9) for SRI paddy was more when compared to that (Rs. 47341.61) of traditional paddy. Total cost of cultivation was more by about Rs.1604.29 for SRI when compared to that in traditional method. The per hectare gross returns realized for traditional paddy farmers and SRI paddy farmers, respectively were Rs. 86860 and Rs. 112420. The net returns were Rs. 39518.39 for traditional method and Rs. 63474.1 for SRI method. The major attributing factor for the high operational cost in SRI method of rice was human labour. The study revealed that the higher total operational costs were compensating the yield advantage of SRI method of rice.

The Major reasons for practicing SRI method by sample farmers were less water requirement and higher yield levels. The major constraint in adoption of SRI when new techniques are being learned, there are greater labour requirements. This can be a constraint to farmers for changing rice-growing practices, especially very poor ones who need to invest most or all of their labour in immediate income-earning opportunities.

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