



## Economic Analysis of Water Saving Rice Production Systems Under NSP Right Canal of Guntur District of Andhra Pradesh

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### ABSTRACT

The economic analysis of different rice production technologies, viz. system of rice intensification (SRI), direct sowing and farmers practice has been carried out under NSP right canal of Guntur district. Among the three rice production technologies analyzed, the total cost of cultivation has been recorded highest in SRI (Rs. 68501.85 ha<sup>-1</sup>), followed by farmers practice (Rs. 67465.30) and direct sowing (Rs. 63165.30). But, the per hectare yield has been found highest in direct sowing (5.9t/ha), followed by SRI (5.7t ha<sup>-1</sup>) and farmers practice (5.2 t ha<sup>-1</sup>). The net returns and B-C ratio are maximum in direct sowing (Rs. 31386.30; 0.49), followed by SRI (Rs. 24667.48; 0.36) and farmers practice. The water use efficiency was found highest in SRI (6.61 Kg/ha/mm), followed by direct sowing method (5.42 Kg/ha/mm) and farmers practice (3.57 Kg/ha/mm) and the water use efficiency benefit (Rs/ha-mm) also recorded maximum in SRI cultivation (105.76) followed by direct sowing method (86.90) and farmers practice (57.25).

**Key words :** Rice production systems, System of rice intensification, Water use efficiency.

Water plays an important role in different sectors like domestic, industrial, power generation besides agriculture. The increasing demand for water for these sectors will deplete the per capita availability of water resources. The per capita availability of water in Andhra Pradesh is estimated to decline from the present level of 1400 cum to 1000 cum by 2025 (AP Water vision, 2003). The water utilization by agricultural sector in the state is estimated to increase from the present level of 2268 tmc to 3814 tmc by 2025. Rice is the predominant crop in Andhra Pradesh and more than 95 percent of rice area is under irrigated conditions, consuming 67 percent of irrigation water in the state. Rice is the major irrigated crop, accounting for approximately 30 percent of the total irrigated area. In view of this, the present study was taken up with an objective of analyzing the economics and water use efficiency of water saving rice production technologies in NSP right canal command area of Guntur district.

### MATERIAL AND METHODS

The study was conducted under NSP right canal command area of Guntur district. Multistage random sampling technique was used to select the respondents covering three mandals. Two villages from each mandal were selected. Thus the total

sample of the study was 240 farmers. The main emphasis of the study was to analyze the economics and water use efficiency of rice crop under different water saving production technologies in comparison to farmers practice.

The water use efficiency (WUE) of different rice production technologies was calculated by

$$\text{Water use efficiency (WUE)} = \frac{\text{Grain yield (kgs)}}{\text{Total water used (mm)}}$$

$$\text{Water use efficiency benefits} = \frac{\text{Grain returns (Rs)}}{\text{Total water used (mm)}}$$

### RESULTS AND DISCUSSION

The item wise cost of cultivation of in different production technologies is presented in the Table.1 The results revealed that the System of Rice Intensification (SRI) technology was most expensive over the direct sowing and farmers practice. The total cost of cultivation was Rs. 68501.85 in SRI followed by Rs. 67465.23 in farmers practice and Rs. 63165.30 in direct sowing.

Table 1. Cost of cultivation of different rice production technologies.

S.No.	Particulars	Direct Sowing (Rs ha <sup>-1</sup> )	SRI (Rs ha <sup>-1</sup> )	Farmers practice (Rs ha <sup>-1</sup> )
I	<b>Operational costs</b>			
1	Material costs			
a)	Seed	1422.20	103.74	1159.96
b)	FYM	1754.98	4693.00	1388.54
c)	Fertilizers	5030.99	4627.55	5824.11
d)	Plant protection chemicals	2184.72	2054.05	2668.88
2	Labour costs			
a)	Human labour	11323.00	21883.93	14792.24
b)	Machine labour	13829.38	7421.34	13932.33
3	Interest on working capital	666.47	764.69	745.61
	<b>Total operational costs</b>	<b>36211.75</b>	<b>41548.30</b>	<b>40511.68</b>
II	<b>Fixed costs</b>			
1.	Taxes and cesses	494.00	494.00	494.00
2.	Depreciation	586.60	586.60	586.60
3.	Rental value of owned land	24700.00	24700.00	24700.00
4.	Interest on fixed capital	1172.95	1172.95	1172.95
	<b>Total of fixed costs</b>	<b>26953.55</b>	<b>26953.59</b>	<b>26953.55</b>
	<b>Total Cost of Cultivation (Rs/ha)</b>	<b>63165.30</b>	<b>68501.85</b>	<b>67465.22</b>

## 5.4.7. Costs and returns and water use efficiency of different rice production technologies:

Particulars	Direct sowing	SRI Cultivation	Farmers practice
1. Yield (t ha <sup>-1</sup> )	5.90	5.70	5.20
2. Cost of Cultivation(Rs ha <sup>-1</sup> )	63165.30	67512.91	67465.22
3. Gross Income (Rs ha <sup>-1</sup> )	94551.60	92180.40	84711.12
4. Net Returns(Rs ha <sup>-1</sup> )	31386.30	24667.48	17245.89
5. B:C Ratio	1.49	1.36	1.25
6. Water used(mm)	1088.00	908.00	1479.66
7. Water use efficiency(kg/ha/mm)	5.42	6.61	3.57
8. Water use efficiency benefit(Rs/ha-mm)	86.90	105.76	57.25

Among the different items of operational costs, human labour cost was very high in SRI with Rs.21883.93 owing to labour intensive operations like transplantation weed management and harvesting. The machine labour cost was high in case of farmers practice (Rs.13932.33) followed by direct sowing (Rs.13829.38) and SRI (Rs.7421.34).

The seed cost was significantly less in SRI Rs.103.74 due to low dosage requirement (2kg acre<sup>-1</sup>) followed by farmers practice Rs.1159.96 and direct sowing Rs.1422.20. Among the material costs, the expenditure incurred on seed was least followed by FYM, plant protection chemicals and fertilizers in all the technologies. Among the fixed costs, the rental value of owned land was higher followed by interest on fixed capital, depreciation and land revenue respectively for calculation of the rental value of the owned land, the exiting rate in the study area was taken into consideration, it accounted to Rs.24700.

The yields and returns are presented in the Table. 2. The table shows that the two technologies namely direct sowing (5.9 t) and SRI (5.7 t), recorded highest yield over farmers practice of 5.2 t.

The yield, gross income, the net returns and benefit cost ratio was high in direct sowing owing to lower cost of cultivation in direct sowing when compared to other technologies. The B-C ratios next to direct sowing were SRI and farmers practice.

The quantity of water used was low in SRI with 908mm followed by direct sowing (1088 mm), and farmers practice (1479.66 mm). The higher crop yield coupled with lower quantity of water used resulted in the higher water use efficiency of 6.61 (Kg/ha/mm) in SRI followed by 5.426, and 3.577 in direct sowing and farmers practice respectively.

The water use efficiency benefit was highest in SRI with 105.764(Rs/ha/mm) followed by

86.904(Rs/ha/mm) in direct sowing and 57.250(Rs/ha/mm) in case of farmers practice (Radha *et al*, 2009).

## CONCLUSIONS

Among the three production technologies analyzed, the total cost of cultivation has been recorded highest in SRI (Rs. 67512.91 ha<sup>-1</sup>), followed by farmers practice (Rs.67465.22) and direct sowing (Rs.63165.30). But, the per hectare yield has been found highest in direct sowing (5.9 t ha<sup>-1</sup>), followed by SRI (5.7 t ha<sup>-1</sup>) and farmers practice (5.2 t ha<sup>-1</sup>). The net returns and B-C ratio also follow the same trend i.e. net returns and B-C ratio are maximum in direct sowing (Rs. 31386.30; 0.49), followed by SRI (Rs.24667.48; 0.36) and farmers practice. The water use efficiency has been found highest in SRI (6.61 Kg/ha/mm), followed by direct sowing method (5.42 Kg/ha/mm) and farmers practice (3.57 Kg/ha/mm), while the water use efficiency benefit (Rs/ha-mm) has recorded maximum in SRI cultivation (105.76) followed by direct sowing method (86.90) and farmers practice (57.25), inferring that the direct sowing method of rice production was efficient over the other rice production technologies analyzed in the present study.

## LITERATURE CITED

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