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Factors Influencing Paddy Yields in Sri Technology and Conventional Paddy

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ABSTRACT

The results of functional analysis revealed that the variables that influenced paddy yield significantly in SRI technology were area and number of irrigations. In conventional paddy human labour significantly influenced the yield, number of irrigations and higher education exerted negative influence on paddy yields.

Key words : Conventional paddy, Functional analysis, Influencing factors, SRI technology.

Rice is consumed both in urban and rural areas and its consumption is growing due to high-income elasticity of demand. To meet the growing demand, a rapid increase in paddy production is needed. There is little scope to increase the area; hence increase in production will have to come from a breakthrough in productivity and increased efficiency in production. At this juncture System of Rice Intensification ("SRI") came into light. It is no surprise that a simple method that claims to boost yields at lower cost to farmers is being hailed by many as a solution. Andhra Pradesh is the second state in the country which adopted SRI cultivation.

It is of interest to know the influence of various factors influencing paddy production under SRI and Conventional paddy cultivation. The present study is one in this direction.

MATERIAL AND METHODS

The present study was undertaken in Chittoor district of Andhra Pradesh which is one of the very important districts in Rayalaseema region where SRI cultivation was introduced. From the selected districts 8 mandals and 14 villages were purposively selected. From the villages so selected, 30 farmers practicing SRI method were randomly selected. Those 30 farmers were also conventional paddy farmers. The samples represented a substantial portion of the farmers practicing SRI in the district. The data used in this study were collected with the aid of presented schedule designed for the purpose. The data pertained to the agriculture year 2005-06.

To identify the factors influencing the paddy yields, the following functional formala was used.

$$Q_{yi} = b_0 + b_1X_{1i} + b_2X_{2i} + b_3X_{3i} + b_4X_{4i} + b_5X_{5i} + U_i$$

For i = 1 to n farmers

Q_{yi} = Yield in Quintals obtained by the i^{th} farmer.
X_{1i} = Area transplanted under paddy in acres by the i^{th} farmer.
X_{2i} = Human labour expenditure incurred by the i^{th} farmer in Rs.
X_{3i} = Capital expenditure incurred by the i^{th} farmer in Rs.
X_{4i} = Number of irrigations by the i^{th} farmer.
X_{5i} = Dummy variable for higher level of education.
X5i = 1 if the farmer is having higher level of education.
X5i = 0 if the farmer is not having higher evel of education.
b_0 = Intercept.
U_i = Stochastic disturbance term.

b_1, b_2, b_3, b_4 and b_5 = Partial regression coefficients to be estimated.

In order to know the goodness of fit, the adjusted coefficient of multiple determination $(\overline{R}^2)$ was calculated using the following formula.

$$(\overline{R}^2) = \left[1 - (1 - R^2)\left(\frac{n-1}{n-k}\right)\right]$$

Table 1. Regression coefficients of factors influencing paddy yield in SRI technology.

SI. No.	Particulars	Regression coefficients	Standard errors
1.	Intercept	41.219	
2.	Land area in acres(X_1)	26.07**	3.6901
3.	Human labour costs in Rs. (X_2)	0.00015	0.00017
4.	Capital cost in Rs. (X_3)	-0.00053	0.00078
5.	No. of irrigations (X_4)	1.58**	0.6026
6.	Dummy Variable for education (X_5) X_5 = 1 if the farmer has higher level of education X_5 = 0 if the farmer has lower level of education	-3.35	2.234
7.	Adjusted coefficient of multiple determination ($\bar{R}^2$)	0.90**	

**Significant at 1 per cent level

Table 2. Regression coefficients of factors influencing paddy yield in conventional method.

SI. No.	Particulars	Regression coefficients	Standard errors
1.	Intercept	54.021	
2.	Land area in acres(X_1)	5.67	5.8781
3.	Human labour costs in Rs. (X_2)	0.0023**	0.0008
4.	Capital cost in Rs. (X_3)	-0.00012	0.0007
5.	No. of irrigations (X_4)	-1.94**	0.9743
6.	Dummy Variable for education (X_5) X_5 = 1 if the farmer has higher level of education X_5 = 0 if the farmer has lower level of education	-10.40**	3.7575
7.	Adjusted coefficient of multiple determination ($\bar{R}^2$)	0.89**	

**Significant at 1 per cent level
*Significant at 5 per cent level

RESULTS AND DISCUSSION

Land productivity is dependent on several factors. Analysis of factors influencing the yield reveals the possibilities of bringing in the needed changes. The results are furnished in Table 1 and 2.

SRI Technology:

The adjusted coefficient of multiple determination () was 0.90 and highly significant which indicated that 90 per cent of the variation in the yield was explained by the independent variables included in the model. The coefficient of land area (X_1) was positive and highly significant at 1 per cent level which indicated that increasing area by one acre above. The geometric mean level, would result in an increase in the mean level of paddy yield by 26.07 quintals, keeping other variables at their geometric mean level. The coefficient of number of irrigations was positive and significant at 1 per cent level, which showed that increase of one irrigation over and above its geometric level would result in an increase in the mean level of paddy yield by 1.58 quintals, keeping other variables at their geometric mean level. The coefficients of the variables viz., human labour, capital and dummy variable for education were found to be non-significant Barrett *et al.,* 2004 and Stoop *et al.,* 2002 (Table 1).

Conventional method:

The adjusted coefficient of multiple determination ($\bar{R}^2$) was 0.89 and highly significant revealing that 89 per cent of the variation in the yield was explained by the variables included in the model. The coefficient of human labour (X_2) was positive and highly significant revealing that one rupee increase in the human labour above the geometric mean level would result in an increase in the mean level of paddy yield by 0.002 quintals, keeping other variables constant at their geometric mean level. The coefficient of number of irrigations was negative and significant at 5 per cent level, which indicated that increase in one irrigation over and above its geometric mean level would result in a decrease in the mean level of paddy yield by 1.94 quintals, keeping other variables at their geometric mean level. The coefficient of dummy variable has a significant negative impact on land productivity indicating that higher education was not a necessary condition. The other variables *viz.,* land area and capital were found to be non-significant Jain and Idhani 1996 and Surridge 2002 (Table 2).

This analysis brought to fore that the variables influenced paddy yield significantly in SRI technology were land area and number of irrigations, while in conventional paddy, the significant variable was human labour alone. In conventional paddy number of irrigations and higher education exerted negative influence on paddy yields.

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