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Resource Productivity and Allocative Efficiency of Paddy in N.S.P.Left Command Area in Nalgonda District of Andhra Pradesh

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ABSTRACT

The study conducted in N.S.P Left Command area of Nalgonda district comprised six mandals, eighteen villages and 360 farmers, selected for the study. The Cobb- Douglas production function model was chosen to estimate the returns to scale. Increasing returns to scale prevails in the study area. MVP to OC ratio was less than unity for all the variables *viz* nitrogen, phosphorous, potossium, pesticides and human labour indicating excess use. So the costs on these inputs needs to be decreased as they result in decreasing additional returns.

Key words : Allocative Efficiency, Resource Productivity

Agriculture is the backbone of Indian economy as it continues to be the engine of economic growth. More than 65 per cent of the population is directly or indirectly depends on agricultural activities and contributes nearly 32 per cent of the national income. The slogan 'Rice is life' is most appropriate for India as this crop plays a vital role in our national food security. It is grown in 44 million hectares with a production of about 90 million tonnes. During the period 1950-51 to 2001-02, the area has increased by one and half times (31.0 million hectares to 44.6 million hectares) productivity by three times (668 kg ha^{-1} to 2086 kg ha^{-1}) and production by four and half times (20.58 million tonnes to 90 million tonnes. [The Hindu Survey of Indian Agriculture, 2005]. At the current rate of population growth, rice production has to be enhanced to about 125 million tonnes by 2020. Nalgonda of Andhra Pradesh NSP Left Command Area is predominant rice producing area with an area of 70,972 ha. The present study was carried out to estimate the resource productivity and allocation of resources.

MATERIAL AND METHODS

The present study was undertaken in the NSP Left Command Area of Nalgonda district. A sample of 360 farmers from 18 villages in six mandals was selected. From each selected village 20 farmers were selected from different locations of the canal command area through stratified random sampling method. Data pertaining to the agricultural year 2006-07 were collected through personal interview method. Cobb-Douglas (1928) production function is the best suited model to estimate the resource productivity and returns to scale. The general form of the model is.

The specific form of Cobb-Douglas production function

$$Y = a\, x_1^{b1}\ x_2^{b2}\ x_3^{b3}\ x_4^{b4}\ x_5^{b5}\ Ut$$

The log linear transformation of this production function is

$$\log Y = \log a + b_1 \log x_1 + b_2 \log x_2 + b_3 \log x_3 + b_4 \log x_4 + b_5 \log x_5 + Ut$$

Where, Y = Gross output (kg ha^{-1})
x_1 = Nitrogen (kg ha^{-1})
x_2 = Phosphorus (kg ha^{-1})
x_3 = Potassium (kg ha^{-1})
x_4 = Pesticides (Lt ha^{-1})
x_5 = Human labour (Mandays)
Ut = Error term
a = Intercept
b_1 to b_5 = Production elasticities of the respective inputs

RESULTS AND DISCUSSION

The production function analysis provides the coefficient which explains the relationship of each of the variables with the output. An attempt has been made in this section to discuss the resource productivity and returns to scale with the help of production function analysis.

The Table 1 showed that the coefficient of multiple determination R^2 was 0.857, which indicates 86 per cent variation in yield and was explained by the selected input variables. The remaining 14 per cent variation might be attributed to the inter-farm differences in soil fertility, skill of the farmer and other factors not included in the study. The R^2 value

Table1. Production elasticities of inputs, returns to scale and coefficient of multiple determination

S.No.	Item	Regression coefficients (b_i)	Standard errors (SE b_i)	Statistic 't' values
	Intercept value	1.5965		
1	Nitrogen (kg ha^{-1}) X_1	0.05967	0.1042231	0.5725630 NS
2	Phosphorus (kg ha^{-1}) X_2	0.55513	0.1148249	4.8345499**
3	Potassium (kg ha^{-1}) X_3	-0.10145	0.0846521	1.1984348 NS
4	Pesticides (L ha^{-1}) X_4	0.68954	0.2203459	3.12935**
5	Human labour (Mandays ha^{-1}) X_5	-0.04038	0.0497527	0.8116744 NS

**= Significant at 1% level
*= Significant at 5% level
NS= Non significant

Sum of elasticities = 1.2416
R^2 value = 0.857
Number of observations = 360

Table 2. Marginal Value Product (MVP) to Opportunity Cost

S.No.	Item	MVP	OC	MVP/OC	Input use
1	Nitrogen (X_1)	0.1486	6	0.025	Over – use
2	Phosphorus (X_2)	1.5239	7	0.2177	Over – use
3	Potassium (X_3)	-0.2982	2	-0.1491	Over – use
4	Pesticides (X_4)	2.3190	1	2.3190	Under – use
5	Human labour (X_5)	-0.0518	1	-0.0518	Over – use

showed the goodness of fit to the Cobb-Douglas production function.

The coefficient of nitrogen (X_1) was positive and non-significant. It did not significantly contribute to increase in the output.

The estimated coefficient of phosphorus (X_1) was positive and significant at one per cent level. This implies that for every increase in one per cent of input, the gross output increase by 0.555 per cent.

The coefficient of potassium (X_3) was found to be negative non-significant. It did not significantly contribute to increase in the output.

The coefficient of pesticides (X_4) was found to be positive and significant at one per cent level. This would indicate that for every increase in one per cent of application of plant protection chemical leads to increase the gross output by 0.689 per cent.

The coefficient of human labour (X_5) was negative and non-significant. It did not significantly contribute to increase in the output.

The sum of regression coefficients (Σb_i) was greater than one indicating increasing returns to scale. The results are in agreement with Chidambaram et al. (2003).

It is observed from the Table 2 that the MVP to OC ratio for variable pesticides was positive and more than one indicating under use of this inputs. There is scope for increasing the use of this input to realize higher profits. The ratio for variables nitrogen, phosphorus, potassium and human labour are below unity and negative for potassium and human labour. This indicates that the expenditure on these inputs needs to be reduced as they result in decreasing returns. The results are conformity with Deshmukh *et.al.* (1991).

It is observed that increasing returns to scale exist in the study area. MVP to OC ratio was less than unity for all the variables except pesticides indicating excess use. Therefore, the costs on these input needs to be decreased as they result in decreasing additional returns.

LITERATURE CITED

Chidambaram K, Haridoss R and Nadarajan S 2005. Dynamics of costs and returns structure in agricultural farms. Agricultural Situation in India L XII (3): 179-184.

Cobb C W and Douglas P H 1928. A Theory of production function. American Economics Review 18: 139-156.

Deshmukh P D, Hange D S, Kale N K and Pawar J R 1991. Resource costs,returns and resource use efficiency under different farming systems in drought-prone area of western Maharashtra. Indian Journal of Agricultural Economics 46(3): 473

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