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The study has shown that the number of annual sales of agricultural land has increased three-fold during the last 25 years, yet on an average a seller of agricultural land sells only half as much land as he did before. This indicates that there has been a progressive decline in the size of land holdings—due largely to the splitting up of holdings—and that economic distress among the small holders is on the increase. Cultivation in the tribal region of Chotanagpur and Santal Parganas is more stable than in the north-eastern region of Bihar where land holdings change more often. It would be interesting to know the class of persons who are acquiring possession of the dispossessed lands of the small holders; but such information is not available from the registration statistics.

S. R. BOSE*

CULTIVATION OF HYBRID MAIZE AND PADDY ON EXPERIMENTAL FARMS—A COMPARATIVE STUDY†

The objective of this paper is to study the mathematical relationship obtaining between output and inputs in the case of hybrid maize and paddy crops raised on experimental fields in 1967 in the Karim Nagar district, Andhra Pradesh. Among the various types of production functions used in farm production analysis, Cobb-Douglas type is well known. The Cobb-Douglas function allows diminishing marginal productivity to each input factor as well as increasing or decreasing returns to scale. It assumes a constant elasticity of production over the entire range of inputs. This type of function can be expressed as linear in logarithms and is easy to fit by the method of least squares. The regression coefficients thus obtained give directly the elasticities of the respective input variables. Accordingly, this type of function has been selected for the present study.

The Cobb-Douglas production function can be written in the following general form :

$$P = AX_1^{b_1} X_2^{b_2} X_3^{b_3} \dots\dots\dots\dots X_n^{b_n}$$

Where P is the dependent variable and $X_1, X_2, X_3 \dots X_n$ are independent variables, b_i's ($i = 1, 2, \dots, n$) are the regression coefficients to be estimated and A is a constant which is also to be estimated. After logarithmic transformation the function assumes the following form :

$$P = a + b_1 x_1 + b_2 x_2 + \dots\dots\dots\dots + b_n X_n$$

where $p = \log P$, $x_i = \log X_i$ and $a = \log A$.

Variables Considered

The following variables have been considered for the present study.

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† The author wishes to express his thanks to his statistical friends who helped in preparing this paper.

Dependent variable : P = Gross value of the product in rupees. This includes the value of the by-product also.

Independent variables:

X_1 = Area under the crop in acres. (All the area is irrigated since both hybrid maize and paddy are irrigated crops).
X_2 = The total value of fertilizers used.
X_3 = The total human labour in eight-hour man-days.

RESULTS OF THE COBB-DOUGLAS PRODUCTION FUNCTION
HYBRID MAIZE

TABLE I

(Number of farms=109)

Resource		Symbol of regression coefficient	Value of regression coefficient	Standard error of the estimate	't' value
X_1	Land (acres)	b_1	1.14870	0.05649	20.3346*
X_2	Fertilizers (Rs.)	b_2	0.20637	0.12360	1.6697**
X_3	Human labour (eight-hour man-days)	b_3	0.07681	0.15280	0.5027

* Significant at 5 per cent level.
** Significant at 10 per cent level.

Coefficient of multiple determination : R^2 = 0.84622. This shows that 85 per cent of the variation in the output is explained by the inputs considered in this function. R^2 is found to be statistically significant at 5 per cent level. Multiple correlation coefficient : R = 0.9198.

Thus the function fitted is given by

$$P = 225.9\ X_1^{1.14870}\ X_2^{0.20637}\ X_3^{0.07681}$$

Marginal Value Product: Hybrid Maize

In Table II the marginal value productivity of each input calculated at geometric mean levels of the other inputs is given.

TABLE II

Resource		Geometric mean level of input	Marginal value product
X_1	Land (acres)	1.25	929.42
X_2	Fertilizers (Rs.)	87.94	2.38
X_3	Human labour (eight-hour man-days)	62.48	1.25

The marginal value product of land shows that an increase of one acre brings an additional yield of Rs. 929.42, keeping the other inputs constant at geometric mean levels. The marginal value product of fertilizers shows that an addition of one rupee worth of fertilizers adds Rs. 2.38 to the total output, keeping the other inputs constant.

PADDY CROP

Due to the existence of multicollinearity between land and labour inputs, only the former is taken into account.

TABLE III

(*Number of farms = 109*)

Resource	Symbol of regression coefficient	Estimated value of regression coefficient	Standard error of the estimate	't' value
X_1 Land (acres)	b_1	0.97091	0.05886	16.50*
X_2 Fertilizers (Rs.)	b_2	0.02840	0.03718	0.76

* Significant at 5 per cent level.

Coefficient of multiple determination : $R^2 = 0.8269$. This shows that about 83 per cent of the variation in the output is explained by the inputs considered in this function. R^2 is found to be statistically significant at 5 per cent level. Multiple correlation coefficient : $R = 0.9093$.

The function fitted is given by

$$P = 489.7\ X_1^{0.97091}\ X_2^{0.02840}$$

Marginal Value Product : Paddy

TABLE IV

Resource	Geometric mean level of input	Marginal value product
X_1 Land (acres)	3.17	528.47
X_2 Fertilizers (Rs.)	280.20	0.15

The marginal value product of land shows that an increase of one acre of land will bring an additional yield of Rs. 528.47, keeping the other input constant at the geometric mean level.

CONCLUSIONS

(1) The marginal productivity of land in the cultivation of hybrid maize is far higher than that of paddy and it appears to be more profitable to bring more land under hybrid maize.

(2) Regarding fertilizers it is found that the application of a rupee worth of fertilizers would yield an additional output worth Re. 0.15 only in the case of paddy, and Rs. 2.38 in the case of hybrid maize. This shows that the application of fertilizers is beyond the optimum level in the case of paddy cultivation. Application of more fertilizer to the maize crop would yield more output.

(3) In paddy cultivation, multicollinearity is found to exist between land and labour and hence the latter does not find a place in the function considered. In the case of maize cultivation, the marginal productivity of labour is Rs. 1.25 as against the prevailing wage rate of one rupee only, indicating its utilization below the optimum level.

P. V. KRISHNA*

ADJUSTMENT OF MEASURE OF INEQUALITY IN RURAL LAND OWNERSHIP FOR LANDLESS CATEGORIES

I

INTRODUCTION

Analyses of inequality in rural land ownership proceed usually along the lines of calculating a measure of inequality such as concentration ratio and comparing the measure-values cross-sectionally or over time. The need for and the problems in accommodating the rural landless population in such analyses seem to have evoked no discussion in the relevant literature. This is rather surprising since the need for including *some* of the rural landless categories in the analysis of inequality seems pretty obvious. For example, where a community is believed to have undergone increase in concentration in land ownership over a period of time partly through some holdings becoming smaller and partly through a section of erstwhile landowners becoming entirely landless, the inclusion of the latter in the analysis is obviously necessary to judge correctly the extent of increase in concentration. As a second example, let us suppose that a researcher desires to assess the inequality prevailing in a community in the context of a redistribution programme for reducing the prevailing inequality. If the objective of the programme is not merely to enlarge the currently small holdings but also, as is often the case, to confer ownership on currently landless classes like those of tenants and labourers, the researcher may reasonably require that the measure of prevailing

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