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Resource Efficiency in Intensive Agricultural District Programme and Non-Intensive Agricultural District Programme Farms

by

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The main object of the paper is to ascertain with precision the factors which are discriminating or by means of which it is possible to place a holding under Intensive Agricultural District Programme or non-Intensive Agricultural District Programme farms. The second object is to study the efficiency with which the factors are used in both the areas.

Material and Methods: With a view to have as much homogeneity as possible, the area irrigated by Cauvery river irrigation system alone in both the taluks of Lalgudi and Thanjavur were taken into account. Six villages namely, Serudaiur, Kiliyanallur and Seshasamudram in Lalgudi taluk and Rajagiri, Sathanur and Vaidyanathanpettai in Thanjavur taluk were selected at random and thirty-five farmers were selected in each taluk. The taluk of Thanjavur represented the Intensive Agricultural District Programme area while Lalgudi represented the non-Intensive Agricultural District Programme area. The data were collected for the year 1963—'64.

To study the discriminating power of the different variables, a discriminant function of the following type was fitted to the data collected.

$$Z = \lambda_1 x +_1 + \lambda_2 x_2 +_3 \lambda x_3 + \lambda_4 x_4 + \lambda_5 x_5$$

The Cobb Douglas function of the following type was fitted to study the resource efficiency of the farms.

$$Y = a\, x_1^{b_1}\, x_2^{b_2}\, x_3^{b_3}\, x_4^{b_4}\, x_5^{b_5}$$

Where $\lambda 1$; $\lambda 2$.....are weights or discriminating power of the variables.

Y = Gross income in rupees
X_1 = Manures in rupees
X_2 = Land in acres
X_3 = Bullock labour days
X_4 = Human labour days
X_5 = Seeds in rupees
a = Constant
b_1, b_2 = are the partial regression coefficients.

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Results and Discussions: After the calculation of the gauss multipliers the λ values (appropriate weights) were determined and the function obtained is as follows:

$$Z = -x_1 + 64{\cdot}25\ x_2 + 5{\cdot}56\ x_3 - 1{\cdot}81\ x_4 + 2{\cdot}31\ x_5$$

Ignoring the signs of the weights in the above equation, the relative weights of the factors namely manure, land, bullock labour, human labour and seeds were found to be 1,64·25, 5·56, 1·81 and 2·31 respectively. Since the function fitted when tested was found to be significant at 0·01 level, the following inference can be made from the equation. Among the five factors considered best discrimination of the Intensive Agricultural District Programme and non-Intensive Agricultural District Programme area can be done by taking into consideration the land in acres under each of the groups since it has the maximum weight. The bullock labour in days to some extent discriminates better between the two groups under study, whereas human labour in days and seeds in rupees have almost equal scores by means of which it can be distinguished whether the unit belongs to Intensive Agricultural District Programme or non-Intensive Agricultural District Programme area. The least discriminating power is possessed by the factor manures in rupees which is equivalent to one in this case. This is because the factor is taken in monetary value. Though the farmers in both the areas spent equal amount on manures, the farmers in Intensive Agricultural District Programme areas get more quantity since the price is fixed. But the farmers in Non-Intensive Agricultural District Programme areas get only less quantity for the same amount because they could not get the fertilisers at the fixed price.

To study the resource efficiency of the farms two Cobb Douglas functions, one each for Intensive Agricultural District Programme and Non-Intensive Agricultural District Programme area were fitted and the functions obtained are as follows:

Intensive Agricultural District Programme:

$$Y = 1{\cdot}97155\ x_1^{0{\cdot}153}\ x_2^{0{\cdot}536**}\ x_3^{0{\cdot}056}\ x_4^{0{\cdot}189}\ x_5^{0{\cdot}66}$$

Non-Intensive Agricultural District Programme:

$$Y = 1{\cdot}68258\ x_1^{0{\cdot}110}\ x_2^{0{\cdot}760**}\ x_3^{-0{\cdot}617}\ x_4^{0{\cdot}727**}\ x_5^{-0{\cdot}340}$$

** = Signficant at 0·01 per cent level.

In the above two equations the partial regression co-efficient of land and human labour in Non-Intensive Agricultural District Programme is significant. If it is interpreted it gives that for every one per cent increase

in land area keeping all other factors constant, the gross income will increase by 0·536 and 0·760 per cent respectively in Intensive Agricultural District Programme and Non-Intensive Agricultural District Programme farms. It is natural that if more land area is brought under cultivation the yield will be more. So two other functions were fitted omitting the factor x_2 namely land and the equations obtained are as follows:

Intensive Agricultural District Programme:

$$Y = 1{\cdot}10161\ x_1^{0.122}\ x_2^{0.049}\ x_3^{0.651**}\ x_4^{0.176}$$

$R^2 = 0{\cdot}986 \qquad \sum bi = 0{\cdot}998$

Non-Intensive Agricultural District Programme:

$$Y = 0{\cdot}35585\ x_1^{0.504**}\ x_2^{-0.013**}\ x_3^{1.515**}\ x_4^{-0.216}$$

$R_2 = 0{\cdot}987 \qquad \sum bi = 0{\cdot}986$

** = Significant at 0·01 per cent level.

The coefficient of multiple determination for Intensive Agricultural District Programme and Non-Intensive Agricultural District Programme farms was calculated as 0·986 and 0·987 respectively. This shows that 98 per cent of the variations in the final gross income of of both the farms were explained by the input factors used in the function. The partial regression coefficients indicate the elasticities of the individual factors of production. The elasticities show the average percentage change in the gross income for every one per cent change in the particular resource input, keeping other factors constant. When the partial regression coefficients were tested for significance, only the factor human labour in Intensive Agricultural District Programme farms and the factors manure, bullock labour and human labour in Non-Intensive Agricultural District Programme farms were found to be significant at 0·01 level.

In Intensive Agricultural District Programme farms the elasticity of the factor human labour was 0·651 and it means that for every one unit proportion of increase of human labour, keeping other factors at mean level, there would be on an average, increase in gross income by a proportion of 0·651 unit. Though there is an increase it is in the diminishing scale. The other factors namely manures, bullock labour and seeds do not appear to induce any marked response on the gross income even though their regression coefficients are positive. They are not significant when tested for significance.

The elasticity for the factor manures in Non-Intensive Agricultural District Programme farms was 0·504 indicating that for every unit increase in manures, keeping other factors at mean level, there would be an increase

in the gross income by a porportion of 0·504 unit. Similarly one unit increase in human labour will result an increase in gross income by 1·313 unit. The elasticity for the factor bullock labour is not only significant but also negative. This shows that an increase in bullock labour by one unit will result in a decrease in gross income by a porportion of 0·613 unit. The elasticity for the factor seed showed values less than zero. It shows apparently that an addition of this input would result in a decrease in the gross income. Since this factor is not statistically significant, it is not material to the investigation.

The summation of elasticities of all inputs included in the analysis reveals the returns to scale. The figure for Intensive Agricultural District Programme and Non-Intensive Agricultural District Programme worked out to 0·99 and 0·98 respectively, which indicated apparently constant returns to scale for the farm as a whole.

The Marginal value Product of each resource indicate the returns anticipated by the addition of one more unit of the particular resource input while retaining the levels of other inputs unchanged. Thus any change in the reorganisation of inputs for maximisation of returns could be suggested only on the basis of the marginal value productivities of the individual resources. The marginal value productivity for the significant factors for Intensive Agricultural District Programme and Non-Intensive Agricultural District Programme farms were calculated and is given below:

Intensive Agricultural District Programme:

M. V. P. for human labour	...	Rs.	8·20

Non-Intensive Agricultural District Programme:

M. V. P. for manures	...	Rs.	6·10
M. V. P. for bullock labour	...	Rs.	8·98
M. V. P. for human labour	...	Rs.	16·28

In Intensive Agricultural District Programme farms the marginal value product of human labour, holding other factors constant at arithmetic mean level was Rs. 8.20. This means that each additional day of human labour, costing Rs. 2.00, beyond the mean level would cause an increase of Rs. 8.20.

In Non-Intensive Agricultural District Programme farms an additional day of human labour would give an increase of income of Rs. 16.28. Similarly an investment of one rupee on manures and fertilisers would bring an income of Rs. 6.10. But an increase in bullock labour by one day, costing Rs. 5.00 would decrease the income by Rs. 8.98.

Conclusion: Though all the factors are significant in Intensive Agricultural District Programme farms, there is only possibility of increasing human labour. In Non-Intensive Agricultural Distrit Programme farms investment can be increased on manures and fertilisers and human labour. Since the factors bullock and seeds give negative returns, it shows that these factors are in over utilisation than the requirements. This clearly shows that the factors are more efficiently used in Intensive Agricultural District Programme farms than its counterpart.

A Preliminary Study on the Insect Fauna Feeding on *Launoe* sp., an Obnoxious Weed, at Iehore with Special Reference to *Lixocleonus incanus* MSHl.

by

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Koebele (1924) was the first who exploited the possibilities of control of weeds through insects as early as 1898. Very little work on the biological control of weeds seems to have been done in India. In this connection the work of Rao (1931) on Lantana weed, Ayyar (1931) prickly pears by *Dactylopius indicus* Green., *and Dactylopius tomentosus* (ckll) and Subramanyan (1964) on Lantana by *Agromyza Lantana* Froggot and successful introduction of *Dactylopius ceylonicus* (Indicus) Green from India to Australia against prickly pear (Rivett 1929) deserves special mention.

Observations: A survey of the RAK. Agriculture College, Sehore, M. P. farm was done during the rabi season in 1964 to note the insect fauna feeding on the *Launoea* sp. an abnoxious weed belonging to the family compositae. Following insects and mite were recorded on this weed.

S. No.	Scientific Name	Common Name	Systematic position
1.	*Lixocleonus incanus* Mshl,	Brown weevil	Curculionidae; Coleoptera
2.	*Aethus mumba* Dist.	Root bug	Cydnidae; Hemiptera

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