

ALLOCATIVE EFFICIENCY OF LABOUR RESOURCE IN SWAMP RICE PRODUCTION IN OBU DU LOCAL GOVERNMENT AREA OF CROSS RIVER STATE, NIGERIA

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ABSTRACT

The paper examines the allocative efficiency of labour resource (in land clearing and weeding) for swamp rice production in Obudu Local Government Area of Cross River State. Sixty four (64) rice farmers were selected and used for the study. Data collected include; output of paddy, quantity of fertilizer applied, farm size, and most especially labour used in land clearing and weeding. A multiple regression analysis approach involving the use of Ordinary Least Squares (OLS) estimation technique was adopted. The ratio of the marginal value product of labour (MVP_L) to labour wage rate (P_i) was used to estimate the labour allocative efficiency. The study revealed that though labour for clearing and weeding had a significant and positive influence on output of swamp rice in the area, however, the resource was inefficiently allocated.

Keywords: Swamp rice, allocative efficiency, production, labour resources.

INTRODUCTION

Rice which is consumed by more than half of the world's population has assumed the status of a staple food (along side other crops like yams, millet, cassava, etc.) in Nigeria. It is not only important as food but serves also as a source of raw materials for agro-allied industries, (Chinyelu, 1999). In fact its by-product (rice bran) is used in livestock nutrition.

Domestic production of rice has always fallen short of its demand in spite of the production potentials in the country. As a result of this deficit, the country over the years had resorted to importation so as to bridge the gap. Infact, substantial amounts of her foreign exchange have been devoted to rice importation. Available statistics show that between 1975 and 1985, government spent about N125.40 million annually on imported rice and this trend was ameliorated when the government completely banned its importation in 1986 as part of the Structural Adjustment Programme (SAP). The increase in importation had however led to the depression of domestic prices thus constraining the expansion of domestic rice production internally. From 1986, government had also designed and implemented various projects and programmes aimed at increasing domestic production. These include the Fadama Rice Programme, Japanese Assisted National Rice Production Project, and the River Basin Development Authority Rice Programme, among others. These efforts had led to some successes in terms of increased domestic rice production after 1986.

Rice is cultivated either in upland or swamp areas. However, other resources are needed for its production. For there to be an appreciable increase in domestic production, the efficiency of these resources, especially labour has to be enhanced because of its importance in the production system (Eremie and Akinwumi, 1992). Several studies have shown that labour resource significantly influences output of rice (Welsch, 1964; Karirajan, 1981; Fujimoto, 1988; Joe, 1992; Eremie and Akinwumi, 1992; and Modey, 1994). However, in these studies labour was aggregated and not discriminated by type of activity. Some of the important labour activities in rice production are land clearing, puddling, fertilizer application and weeding. Other studies have only separated the labour resource into family and aggregate labour (Fujimoto, 1988). Joe (1992) considered labour for weeding and related it to output and found that, labour for weeding significantly influenced output of swamp rice. The importance of labour in land clearing in swamp rice production had received little or no attention. The combined effect of land clearing and weeding as explanatory variables in swamp rice production is still unknown even for Cross River State.

It is on this basis that allocative efficiency of labour for clearing and weeding in swamp rice production in Obudu Local Government Area is undertaken. Specifically, the paper therefore examines the allocative efficiency of labour resource in swamp rice production as it affects land clearing and weeding in the area of study.

METHODOLOGY

The study covered 11 major swamp rice- producing villages in Obudu Local Government Area of Cross River State. These are Abonkib, Bebuabong, Atiekpe, Ikwomikwu, Bebuabong, Kakum, Bebuatsuan, Bebuabie, Igwo, Ukpe and Betukwel. The areas were purposively selected because of the pre-ponderance of swamp soils that favour rice production. The study was carried out between June and November, 1999.

Six rice farmers were selected from each of the villages, thus, making a total of 66 farmers. However, only 64 farmers were available and used for the study. Data were obtained using the cost-route approach observations. The data collected include farm sizes, which were determined by measuring with a tape in square meters by the researchers. This was later converted to hectares. Output of paddy rice and fertilizer applied were measured in kilogrammes. The amount of labour used in clearing and weeding were recorded over the production period in man- days. Labour input for women and children were also converted to man equivalent using an adjustment factor of 0.67 and 0.33 for women and children respectively (Upton, 1996). Product and input prices were taken as the average market price of paddy and the on going labour wage rate per day in the area respectively. All the data obtained were on a per farmer basis.

A multiple regression analysis approach involving the use of Ordinary Least Squares (OLS) estimation technique was used to estimate the model. The linear, exponential and double-logarithmic functional forms were fitted. However, the double logarithmic form gave a better fit and therefore was chosen as the lead equation and used in estimating the elasticity of production as well as for discussion.

The model took the form specified below

$$\ln Y = \ln a_0 + a_1 \ln X_1 + a_2 \ln X_2 + a_3 \ln X_3 + a_4 \ln X_4 + U$$

Where:

- Ln = natural logarithm
- Y = output of paddy rice in kg
- X₁ = farm size in hectares
- X₂ = labour for clearing in man days
- X₃ = labour for weeding in man days
- X₄ = fertilizer applied in kg
- U = error term.

a₁, a₂, a₃, a₄, are coefficients of the above variables investigated while a₀ is the y-intercept.

It is expected that a₁, a₂, a₃ and a₄ will carry positive signs. The allocative efficiency of labour resource was determined by ascertaining whether or not the ratio of the marginal value products to the input price was equals to one. .

$$\text{i.e } \frac{MVP_L}{P_L} = 1$$

Where MVP_L = marginal value product of labour
 = wage rate of labour either used in land clearing or weeding.

It should also be noted however that the coefficients of the variables (a_is) of the double log-linear function are the direct elasticities of production. The marginal products (MPs) were derived by multiplying the average product (AP) by the elasticities of production, given that :

$$Ep = \frac{MP}{AP}$$

RESULTS AND DISCUSSION

The estimated equations are given below

$$Y = -39.4872 + 1.0764X_1 + 3.1336X_2 + 1.7863X_3 + 3.9009X_4 \tag{1}$$

(0.2071) (4.2663) (3.9512) (4.6370)

R² = 0.91 adj R² = 0.90 F-ratio 203.2960

$$\ln Y = 2.2093 + 0.0003X_1 + 0.0451 X_2 + 0.0158 X_3 + 0.0074 X_4 \tag{2}$$

(0.17) (1.49) (3.74) (4.78)

R² = 0.84 adj R² = 0.83 F-ratio 75.8410

$$\ln Y = 1.7054 + 0.0745\ln X_1 + 0.0808\ln X_2 + 0.0089\ln X_3 + 0.034\ln X_4 \tag{3}$$

(0.2291) (2.5630) (3.2070) (6.8058)

R² = 0.94 adj R² = 0.93 F-ratio 209.77*

Note:

t-values are in parentheses

*- significant at the one per cent level.

From the estimated lead equation (eq. 3), the coefficients of labour for land clearing and weeding, fertilizer applied and farm size carry the expected positive signs. The coefficient of multiple determination ($R^2=0.94$) indicates that ninety four percent of the variability in output of swamp rice is explained by the independent variables. The F-ratio of 209.77 indicates the overall significance of the model at the one per cent level. The labour for clearing and weeding were significant at the one per cent level indicating that labour for clearing and weeding significantly influenced output of swamp rice in the area. Karlirajan(1981) and Fujimoto(1988) reported similar results for labour in the aggregate. Joe (1992) also reported that labour for weeding had a significant influence on output of swamp rice. The coefficient of fertilizer was positive and significant at the one per cent level while the coefficient of farm size was not significant but carried a positive sign.

The elasticities of production with respect to labour for clearing and weeding were 0.0808 and 0.009 respectively, implying that a 10 per cent increase in labour for clearing and weeding will lead to 0.8 per cent and 0.09 per cent increase respectively in output of swamp rice in the area.

Table 1;

Estimated Elasticities of Production (EP), Average Product (AP), Marginal Products (MP), Marginal Values Products of Labour (MVP_L), Labour Wage per Manday (P_L) with Respect to Land Clearing and Weeding and Allocative Efficiency Index of Labour (AEI_L)

Variable	EP	AP	MP	MVP	P _x	AEI _L
(MVP)/P _x						
Labour for clearing (X ₂)	0.08	74.83	6.05	217.66	60	3.63
Labour for weeding (X ₃)	0.009	116.74	1.04	37.40	60	0.62

Source: Computed from equation 1 and field survey data (1999).

Note: The price of paddy rice is N36/kg

The marginal value products of labour for land clearing and weeding were N217.73 and N37.4 respectively. The ratio of the marginal value product to the wage rate for land clearing was 3.63 while it was about 0.62 for weeding. This is therefore an indication that labour for clearing was inefficiently allocated. Infact it was underutilized. The under-utilization can be attributed to the relatively higher labour wage rate probably caused by the preponderance of children and women as sources of family labour activity that are paid in cash. Consequently this would have resulted in the underestimation of man days required for this type of activity because men predominate in it.

Olaoye (1997) obtained similar results but he considered labour in aggregate. In the case of labour

for weeding, there existed allocative inefficiency and its over utilization could have been the consequence of engaging predominantly more women and children in this class of activity. Ogunfowora, *et al.* (1974), Ike (1977) and Osuji (1978), obtained similar results even though they also considered labour input in the aggregate.

RECOMMENDATIONS

Farmers should be encouraged to use mechanical devices that are labour saving to allow for optimum labour utilization during clearing. This is necessary especially when labour is scarce and the wage rates are high. It is equally important in the sense that a properly cleared farmland reduces the growth of weeds and thus enhances output.

Farmers should be advised on the need to reduce the amount of labour during weeding and where necessary to encourage some members of their household to seek off-farm employment in order to boost the marginal product of labour especially for weeding.

CONCLUSION

The study has shown that labour for clearing and weeding had significant effect on output of swamp rice in the area. However, this resource was underutilized during clearing and over utilized during weeding. It is on this strength that the above recommendations emanated.

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