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ANALYSIS OF FARM LABOUR UTILIZATION IN MAIZE PRODUCTION IN ZARIA LOCAL GOVERNMENT, KADUNA STATE, NIGERIA

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Abstract

The study examined farm labour utilization in Maize Production in Zaria Local Government Area, Kaduna State Nigeria during 2006 cropping season. Primary data were collected and analyzed using production function analysis. Results indicate that farm labour was inefficiently allocated in an attempt to optimize production goals. It is recommended that farmers be encouraged to expand their farm sized as to absorb the surplus family labour supply.

Introduction

Over the years, there has been a lot of work done to promote maize production and consumption in Nigeria, but emphasis has only been laid on agronomic practices and vertical recommendations with little or no depth study into the factors such as land, labour, capital, and management involved in its production (Amos et al, 1993). Little information is available to farmers about labour utilization in maize production both for farm family and/or hired labour. Therefore, further investigation is necessary to appraise the resource requirements for the production of maize.

Labour is a very important resource in agriculture, because, it influences decision making power in agriculture. Farm households engaged in farming either as a primary or secondary occupation. In doing so, they set goals to govern their farming decisions (Norman et al, 1982). The farmer is faced with the problem of how to make decisions with regards to how to attain an efficient level of agricultural production. It had been realized that human labour utilization especially in the tropics is normally ineffective, careless and wasteful owing to inadequate planning and management. Also, labour is often limited on small holdings. Therefore, a rise in output needs either more labour or the substitution of capital for labour to cope with labour peaks (Johnson, 1990).

Land and labour are the two factors of production which are likely to be least abundant in agriculture in Nigeria. It often forms a bottle neck to increased production with very low capital inputs in farming (Kanku and Mukerji, 1998). Mandell (1985) also asserts that labour is the primary instrument for increasing production within the framework of traditional agriculture. The fundamental and critical determinant of production is the effectiveness of the organization of land and labour as means of production.

The specific objective of this study therefore is to examine the efficiency of labour resource utilization in maize production and make policy recommendations towards efficient labour resource utilization to increase productivity in the study area.

Methodology

Area of Study

The study was carried out in Zaria LGA of Kaduna State. Zaria is situated on a plateau at a height of about 700m above sea level in the centre of Northern Savannah Zone with an annual rainfall of about 1,110mm. It is located on longitude 7^0-8^0 east and latitude 11^0-12^0 north and covers an area of about 11,120sqkm. Farming is traditional in nature and the main emphasis is the cultivation of crops. Besides the food grains of maize and sorghum, other principal crops grown are cowpea, rice, pepper, onion, lettuce etc. The farm

economy of the study area is characterized by small sized and fragmented land holdings. Cultivation is by traditional hand, hoe method with very few farmers using hired tractors.

Sampling Technique and Data collection procedure

Purposive and random sampling techniques were used for this study. Five villages were selected from the LGA, namely Dikacce, Bizzara, Jushi, Galma and Tsugugi. These were purposively selected because of the predominance of maize farmers in these areas. From each of the villages, 20 farmers were selected using the simple random sampling procedure. A total number of 100 farmers were selected to whom copies of the questionnaire were administered. Information relating to labour utilization by farmers as well as relevant input-output data were collected.

Analytical Technique

The analytical technique used in achieving the objective of the study is the Ordinary Least Squares (OLS) multiple regression analysis. The production function model employed is presented in implicit form as:

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, e) \quad \ldots\ldots(1)$$

Where:

Y = Total Output of Maize (in kg); X_1 = Farm Size (in hectares); X_2 = Family Labour (in mandays); X_3 = Hired Labour (in mandays); X_4= Other sources of labour (animal and machine labour hiring) (₦); X_5 = Fertilizer (kg); X_6=Other input e.g Improved seeds, agrochemicals etc (₦); X_7= Capital inputs e.g Depreciation on fixed capital items, rent on land, interest charges on borrowed capital etc (₦); e = Error term which is assumed to be normally and independently disturbed with zero mean and constant variance.

Various functional forms such as the linear, semi-log, exponential and double log were tried and on the basis of the explanatory power of the model (R^2), magnitude of estimated coefficients, conformity of signs with a priori expectation and the F-ratio, i.e. the normal economic, econometric and statistical criteria. The linear functional form was chosen as the lead equation. Consequently, elasticity of output was computed using the following formula:

$$e = \frac{\delta y}{\delta x} \cdot \frac{x}{y}$$

where, e = Elasticity of output; $\delta y/ \delta x$ = first partial derivative of x with respect to y; x and y are the geometric means of x and y respectively.

The marginal factor cost (MFC) is the addition to total cost resulting from using an extra unit of input. To examine the efficiency of labour resource utilization, the ratio of MVP to MFC was computed. A firm maximizes its profit with respect to an input if the ratio of MVP to MFC is one (Kay, 1981). A ratio less than unity shows over utilization of resource and profit would be increased by decreasing the quantity of that input. A ratio greater than unity, indicates under utilization of the input and increasing the rate of use of that input will increase the level of profit of the farm. Allocative efficiency is concerned with choosing optimal sets of input. It is the ability to maximize profit by equating the MVP of resources to their respective unit prices.

Results And Discussion

Socio-economic Characteristics

The results indicate that the mean age of farmers is 40 years. A typical household head was male with 8 family members, had 15 years farming experience and realized up to N35,000 as income from maize production.

Allocative Efficiency

Labour input was disaggregated into family, hired and machine/animal sources and incorporated in the model. The result of the estimated production function is presented in Table1. The lead equation (linear function) has an R^2 value of 0.77. It implies that about 77.10% of the variation in the output of maize is explained by the independent variables ($X_1 - X_2$) included in the model while the remaining 22.90% is a result of errors in estimation and non inclusion of some explanatory variables. The F-statistic was statistically significant at 1% level which implies that the independent variableS adequately explained the dependent variable. For a linear production function, the estimates are not direct elasticities and were thus computed. The results are presented in Table 2.

The results in Table 2 indicate that t resou s were inefficiently utilized. In particular, farm size was over utilized since its allocative ef iency dex value which is 0.845 is less that 1.The allocative efficiency index of family labour was ound t e 0.511 which is less than 1 indicating that farmers in the survey area are over utilizing family labour. The surplus labour can be productively employed in other off farm ventures during off-peak periods of agricultural production. In the case of capital inputs, the allocative efficiency index value is 216.63 whi is gr er than 1 and indicates under utilization. In small holder agriculture, investment in capital inp s is g erally low, given the poor resource base of the farmer. Furthermore, from the analysis in Tal e 2, far size was the resource closest to optimality with a value of 15.5. the resource with a value farthest from optimality was capital inputs with a value of -21563, suggesting that capital input was the most grossly inefficiently utilized resource.

Conclusion and Recommendation

The findings indicate that maize farmers were not efficient in farm labour utilization. Since farm size was found to be significant in explaining the output of maize, farmers should be encouraged to expand their farm sizes so as to be able to absorb the surplus labour to accomplish farm operations. However, surplus labour could be re-channeled into other off-farm profit yielding ventures during off-peak periods of agricultural production.

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Table 1: Regression Estimates of Maize Production Function in Zaria LGA, 2006

Variable	Linear	Semi log	Double log	Exponential
Constant	569.863	402.484	6.379	6.560
	(7.908)***	(0.577)	(12.622)***	(1117.075)***
X_1 (farm size)	208.734	338.717	0.262	0.164
	(5.733)***	(4.569)***	(4.882)***	(5.790)***
X_2 (family labour)	1.453	32.250	6.756E-03	5.879E-04
	(2.151)***	(0.827)	(0.239)	(1.119)
X_3 (hired labour)	0.263	-18.073	-3.253E-03	3.8779E-04
	(0.406)	(-0.427)	(-0.106)	(0.769)
X_4 (animal labour)	2.173E-02	51.735	3.666E-02	1.925E-05
	(0.826)	(1.363)	(1.332)	(0.941)
X_5 (fertilizer)	-0.153	-57.905	4.498E-03	-1.434E-05
	(1.806)	(-0.717)	(0.935)	(-0,371)
X_6 (other inputs)	-0.6203E-02	-54.353	4.498E-03	1.831E-05
	(-1.247)	(-0717)	(0.935)	(-0.371)
X_7 (capital inputs)	4.803E-02	112.036	5.651E-02	1.831E-05
	(4.406)***	(3.415)***	(2.375)**	(2.160)
R^2	0.771	0.575	0.626	0.751
R^2 Adjusted	0.754	0.542	0.597	0.738
F-ratio	44.304***	17.601***	21.746***	40.907***

Source: Computed from field survey data, 2007.

Note: ***, ** and * Implies significance at 1%, 1% and 1% levels respectively. Figures in parenthesis are the respective t – ratios.

Table 2: Allocative Efficiency of Farm Labour Utilization for Maize production in Zaria LGA, Kaduna State, 2006

Variable	MFC (Acquisition cost) (₦)	Elasticity(bi)	MVPi = bi.Py	Ki = MVPi / MFCi	Percentage deviation from optimality (1-Ki) x 100
X_1 (farm size) (ha)	1000	0.2913	844.80	0.845	15.50
X_2 (family labour)	285	0.0502	145.60	0.511	48.90
X_3 (hired labour)	285	0.0109	31.61	0.111	88.90
X_4 (animal labour)	485	0.0234	67.86	0.238	76.20
X_5 (fertilizer) (kg)	300	0.0188	54.52	0.019	98.10
X_6 (other inputs)	1	0.0495	143.60	143.6	-1426.00
X_7 (capital inputs)	1	0.0747	216.63	216.63	-2156.00

Source: computed from field survey data, 2006. Note Py = N2,900 (Py = Price of a bag of maize unit of laburin man-days.