

An Analysis of Sugarcane Production of Small holders in Papa Lanto, Nigeria

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ABSTRACT

A study was conducted to specify the pattern and problems of sugarcane production by small-holders in Papa Lanto, Ogun State, Nigeria. Primary data on farm and household activities were obtained from a cross-sectional survey of fifty sugarcane farmers during August to October, 1996. Results showed that about 84 percent of all farm lands were cultivated with sole sugarcane, and eleven different combinations of sugarcane and six other arable crops including maize, yam, cocoyam, cassava, rice and vegetables. The averages farmland cultivated was about 2 ha, with the modal farm size being in the range 0.5-1.0 ha. Factor intensity was 253.12 per man-day, and about 98 percent of cane output ended up in the cane market. On an average, net farm income per annum was 36,239.75, while non-farm income per annum was 22,152.00. However, family living expenditure took 91 percent of all income earned within a typical sugarcane producing household in the study area. Regression analysis indicated inefficiency, albeit under-utilization of all production inputs & especially land resource in the study area. Increasing returns to scale was evident in the study area, thus confirming ample scope for expansion in sugarcane production in Papa Lanto. Any expansion bid may however be constrained by several factors including high cost of finance, bureaucracy in input supply, lack of infrastructure and access to raw materials, and policy uncertainties.

Key words : Sugarcane production, small holders, analysis, Nigeria.

INTRODUCTION

The Nigeria agriculture has not performed well in the past two decades. Sugarcane is consumed raw (chewing) as well as manufactured into industrial sweeteners in the upstream industries. Statistics on sugarcane production in Nigeria showed that the annual output increased from 607,000 tons in 1970 to 926,000 tons since 1981, and in a stand still position of 6,33,000 tons since 1994 (CBN, 1994). For the periods since the introduction of economic structural adjustment in Nigeria, the estimated average percent growth in sugarcane output dropped from 41 percent in 1988 to 30.1 percent in 1994. In addition, between 1988 and 1994, the estimated average annual percent change in sugarcane output was 3.6 percent.

It is obvious that the evaluation of some Nigeria sugarcane clones which can be a source of increasing production and consequently used to improve the poor and obviously deteriorating performance of this vital sub-sector has not been properly elucidated (Oworu, 1978a, 1973b). Sugarcane production is predominantly in the hands of small-scale producers. Consequently, any improvement in domestic cultivation and output of sugarcane must urgently address related problems such as social, economic, educational or managerial (Irvine, 1978).

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Several studies in the past have confirmed the rationality of the small -scale food crops producers (Hopper, 1965; Welsch, 1965; Chennareddy, 1967; Dittich and Myers, 1971). However, the pertinent issue is not only that of ensuring a rational use of all farm resource but also the identification of the major limitations faced by the small farmers. The farms faced problem should adopt the modern technologies and resources most affordable and suitable to their farming system and business. Hence, the need to develop a sound knowledge of the current situation as regards small-holders who formed the bulk of farm producers in Nigeria, including those in sugarcane production. Specific attempts were made in this study to confirm the efficiency of resource allocation in small holder sugarcane production, and also to identify proper solutions to the major obstacles to improve small holders sugarcane production in Papa Lanto, Ogun, State, Nigeria.

MATERIALS AND METHODS

The primary data employed in this study were collected from a survey of sugarcane farmers and households in Papa Lanto, Ifo L.G.A, Ogun State. Structured questionnaires were administered on fifty sugarcane farmers between August and October, 1996. Information was sought on farm and non-farm incomes, number of household members, sex, education, age and farming experience of sugarcane farmers, size of farm land and farm capital out-lay, for borrowing, number and size of farm parcels cultivated, input use and output, cultural practices and technologies in practice.

Both descriptive and quantitative analyses were carried out in the study. The descriptive analysis was carried out so as analyse the socio-demographic characteristics of sugarcane farmers and farm-households, the farming systems and production technologies in operation, the returns structure and obstacles to expansion in the study area. The quantitative analytical tool in form of regression analysis was used to determine the returns to scale in small holder sugarcane production in the study area.

To analyse the economics of scale in sugarcane production, an unrestricted Cobb-Douglas production function was fitted by the ordinary least square method to the available data. The estimated function in linear form is given as.

$$\ln Q_i = \ln A + b_1 \ln X_{1i} + b_2 \ln X_{2i} + \dots + b_4 \ln X_{4i} + \ln e_i \dots \dots \dots (i)$$

Where,

Q_i is the value of the i th farm's sugarcane output in naira per year,

X_{1i} is the amount of land used by the i th farm for sugarcane production in hectares;

X_{2i} is the amount of hired labour employed on the i th farm in mandays;

X_{3i} is the amount of family labour used on the i th farm in mandays;

X_{4i} is the amount of own and borrowed capital used on the i th farm in naira;

A is the intercept term, which represents the average physical product - a measure of the efficiency of technology adopted by the i th farmer.

$b_1, b_2, \dots, b_4$ are the slope terms representing the elasticity of production for the different inputs used by the i th farm in the study area;

e_i is the disturbance term.

For the unrestricted Cobb-Douglas production function, the returns to scale is measured algebraically as :

$$\sum_{i=1}^4 b_i \dots \dots \dots (2)$$

where, b_i is the i th regression coefficients.

A value of unity implies a constant return to scale, value greater than unity implies increasing return to scale, and value less than unity implies decreasing return to scale.

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RESULTS AND DISCUSSION

The summary statistics of a typical sugarcane producing household in Papa Lanto, Ogun State is presented in Table 1. The table showed that a typical sugarcane producing household had about 6 members. Seventy percent of the households had 1 to 4 working members per household. Besides, an average sugarcane farmer was about 47 years old with 13 years' experience in sugarcane production. Fifty percent of the farmers had no formal education. The bulk (68 percent) were motivated into sugarcane, and eleven different combinations of sugarcane and six other arable crops including maize, yam, cocoyam, cassava, rice and vegetables. Fifty percent of the farmlands cultivated with sugarcane solely or in combinations with some other crops were inherited within the family. The average farmland cultivated was about 2.0 ha (Table 1), with the modal farm size being in the range 0.5 to 1.0 ha. Moreover, the estimated Simpson Index among the study sample was 0.95. Thus, confirming excessive farm fragmentation among sugarcane farmers in Papa Lanto, with a typical farmer operating several non-contiguous land parcels during the agricultural season. The cropping patterns operated by sugarcane farmers in the study are were : Sugarcane (Sc), Sugarcane/Maize (Sc/Ma), Sugarcane/Vegetables (Sc/Ve), Sugarcane/Cassava (Sc/Ca), Sugarcane/Rice (Sc/Re), Sugarcane/Cassava/Rice (Sc/Ca/Re), Sugarcane/Maize/Rice (Sc/Ma/Re), Sugarcane/Maize/Cassava (Sc/Ma/Ca), Sugarcane/Cassava/Yam (Sc/Ca/Ym), Sugarcane/Maize/Ym, Sugarcane/Maize/Vegetables (Sc/Ma/Ve, and sugarcane/Maize/Cocoyam (Sc/Ma/Co).

Table 1. Summary statistics of a typical sugarcane producing household in Papa Lanto, Ifo Local Government Area, Ogun State, 1996.

Indicator	Average	Coefficient of Variation
<u>A. Demographic Variables :</u>		
Age of Farmer/Household (yrs.)	46.56	0.72
Household Size	5.92	0.54
Farming Experience of Household Headd (yrs.)	13.18	0.69
<u>B. Socio-Economic Variables :</u>		
Farm size (ha.)	1.97	0.10
Farm Capacity Utilization (percent) ^a	83.64	.30
Simpson Index ^b	0.95	
Borrowing (yr.)	20,151.50	0.95
Distance from Loan Source (km)	1.57	0.70
Factor Intensity (md.)		
Capital-Labour	253.12	
Agricultural Commercialization Rate (percent) ^c	97.83	0.02
<u>Farm and Non-Farm Incomes :</u>	28,363.22	0.49
Total Farm Revenue (per ha.)		
Gross Margin (per ha.)	19,450.23	0.33
Net Farm Income (peryr.)	36,239.75	0.12
Non-Farm Relations (perhr.)	22,152.00	0.26
Net Gift from Relations (peryr.)		
<u>Family Living Expenses :</u>		
Food Expenditures (per/yr.)	21,914.00	0.65
Non-Food Expenditures (peryr.)	31,360.00	0.56

^aEstimated as the proportion of the available farmland cultivated with sugarcane.

$$b_{\text{Estimated as :}} \frac{1 - [\epsilon_i A_i^2]}{[A^2]}$$

Where A_i is the area of the i th plot and $A = \epsilon_i A_i^2$ is the total farm area. A value of zero thus indicates complete land consolidation (i.e the operation of only one farm parcel) while the value of many parcels of equal size (Blarel, et al, 1992).

^cEstimated as the percent of total farm output sold in the market.

The estimated factor intensity on a typical sugarcane farm was ₦ 253.12 per manday. Moreover, about 98 percent of the sugarcane output in Papa Lanto were sold in the market. The gross margin per hectare was ₦19,450.23 while the net farm income within household during the farming season was ₦ 36,239.75. The non-farm income per annum within a typical sugarcane producing household in Papa Lanto was ₦ 22,152.00. Thus, giving a total annual household income of ₦ 58,391.75. Ninety-one percent of the total income was however, used to defray the family the family living expenses which amounted to ₦ 53,274.00 per annum. The estimated form of the unrestricted C-D production function above (equation 1) is given as :

$$\text{Ln}Q_i = 6.7419 + 1.0714 \text{Ln}X_{1i} + 0.08801 \text{Ln}X_{2i} + 0.2415 \text{Ln}X_{3i} + 0.2291 \text{Ln}X_{4i} \dots\dots\dots(3)$$

(4.88110) (0.6287) (1.2334) (1.2456)

$R^2 = 0.602; F = 14.782.$

According to equation (3), the right-hand-side variable explained 60 percent of the variations in the value of sugarcane output in the study area. Moreover, land availability significantly determines the value of sugarcane output among the study sample. The positive coefficients in the regression equation tend to suggest under-capacity utilization of all farm resources, and a wide scope for increasing inputs use in sugarcane production. Besides, the summation of the elasticity's of production (or the regression coefficients) in equation (3) yielded a value of 1.63, which was above unity; thus, confirming increasing returns to scale, and consequently, an ample scope for the expansion of sugarcane production in the study area. Such expansion possibilities may, however, be constrained by scarcity of hired labour, bureaucracy in inputs supply, lack of essential infrastructure, high cost of finance, lack of access to required raw materials, and policy uncertainties.

This study analysed the small-holder sugarcane production in Papa Lanto, Ogun State, Nigeria and the results confirmed among others a wide scope for the expansion of sugarcane production in the study area. However, such expansion bid may be constrained by several factors including scarcity of hired labour, bureaucracy in raw materials supply and the lack of access to essential raw materials, lack of required infrastructure, high cost of finance and policy uncertainties. Thus, to brighten the prospect of small-holder sugarcane production, a concerted effort should be evolved in particular to solve or alleviate the myriad of obstacles in the study area.

REFERENCES

- Blarel, B.; Hazell, P.; Place, F. and Quiggin, J. 1992. The Economics of Farm Fragmentation : Evidence from Ghana and Rwanda. *The World Bank Economic Review*, 6 (2) : 233-254.

- Central Bank of Nigeria (CBN), 1994. Statistical Bulletin, 5 (2) , December.
- Chennareddy, V. 1997. Production efficiency in South Indian agriculture, *Journal of Farm Economics*, 49 : 816-820.
- Dittrich, S.R. and Myers, R.H. 1971. Resource Allocation in traditional agriculture : Republican China, 1937-1940. *Journal of Political Economy*, 79 : 887-895.
- Hopper, W.D. 1965. Allocation efficiency in a traditional Indian agriculture. *Journal of Farm Economics*, 47 : 611-624.
- Irvine, J.E. 1978. Problems affecting large-scale sugarcane production. In. Olowe, Tayo; Oworu, Tola; Remison, Uduzen; and Olufowote, Olu (eds.) Proceedings of the International Symposium on Sugarcane in Nigeria, August 28-September 1. pp. 41-50.
- Okogu, B.E. 1992. Africa and economic structural adjustment : Case studies of Chana, Nigeria and Zambia. The OPEC Fund of International Development Pamphlet Series No. 29, December.
- Oworu, O.O. 1978a. Botanical description of some Nigerian local sugarcane clones. In Olowe *et al.* (eds) *Proc. of the International Symposium on Sugarcane in Nigeria*. Aug. 28-Sept. 1. pp. 62-71.
- Oworu, O.O. 1978b. Preliminary evaluation of the agronomic potentials of some Nigeria local sugarcane clones. In Olowe *et al.* (eds.) *Prco. of International Symposium on Sugarcane in Nigeria*, Aug. 28-Sept. 1. pp. 81-91.
- Welsch, D.E. 1965. Response to economic incentive by Abakaliki rice farmers in Eastern Nigeria. *Journal of Farm Economics*, 47 : 900-914.