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ECONOMIC CONTRIBUTION OF CASSAVA PRODUCTION (A CASE STUDY OF KUJE AREA COUNCIL FEDERAL CAPITAL TERRITORY, ABUJA, NIGERIA)

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ABSTRACT
The study determined the economics of cassava production in Kuje Area Council FCT. Simple random selection was used to select 100 farmers and to collect from them using a well structured questionnaire. The data were analysed using descriptive statistics, farm budgeting and regression analysis. The result revealed that the mean age of the farmers was 32 years. Also majority (87%) of the farmers were male and (13%) female. Furthermore, the result showed that majority (80%) have formal education. Similarly, the result revealed that a mean of 4 people was recorded for household size and 16.80 years as farming experience. Majority (71%) acquired their land through inheritance; mean farm size under cassava production was found to be 1.20 hectares, with majority (57%) having between 0.3 – 1.0 hectare. Cost of production was found to be N7, 310.11 per hectare. Furthermore the study revealed a net farm income of N14, 042.27 and a return on Naira invested as 0.92. Cobb – Douglas regression model revealed that R^2 value was 65.4% with exogenous variables farm size, and cassava cuttings significant ($p<0.001$) and ($p<0.05$) while labour was not significant. Also MVP/MFC for farm size, cassava cuttings and labour were 0.49, 0.53 and 0.78. Major constraints like inadequate capital, lack of machinery, high labour cost and transportation were found to be affecting cassava production in the area. It was recommended that, production could be improved and sustained through provision of soft loans and accessible roads to ease transportation cost.

Key Words; Economics, Cassava, Production, Kuje-Abuja

INTRODUCTION

Cassava is well known as *Manihot esculenta or Manihot utilissima*. The cassava is believed to have originated in Northern Brazil and Central America (Roger, 1963). This popular crop is now grown in almost every tropical country. In Nigeria it was introduced into Warri the then Bendel State of Nigeria, by Portuguese explorer in the 16^{th} – 17^{th} century (Lean, 1976). Since then Nigerians have accepted cassava as one of their main non-cash crop (staple) and cash crop within the domain. The large population of Nigeria depended on daily basis on it as their main dish. Because of its high demand both locally and internationally, it is deemed fit to be cultivated more than it is done now.

Nigeria is the leading producer of cassava, In 1993 – 1995, 84 million metric tons of cassava were produced per year in sub-Saharan Africa. Of this, 75% was produced in 4 countries; Nigeria, 31 million metric tons representing 36.90%, Dr Congo 19 million metric tons (22.62%), Tanzania, 7 million metric tons (8.33%), Ghana, 6 million metric tons, (7.14%). In the same period, 95% of production after (discounting waste) was used for human consumption. According to FAO the remaining 5% was used for feed, industrial raw material and export was minimal (CIAT, 2000). Recently out of 186 million metric ton produced in the world, Nigeria accounted for 36 million metric tons (Tell, 2004) and in 2004 production was 55.69 million metric tons (CBN, 2004). This shows a slow rate in the past compared to the present times in production but more need to be done.

The cassava crop consists of 15% peel and 85% fresh tuber flesh. The tuber consists of 20 – 30% starch, 62% water content, 2% protein, 1 – 2% fibre with trace of vitamins and minerals. As main source of carbohydrate it's noteworthy to mention here that cassava also contains 2 cyanogenic glycoside namely linamarin and lotaustralin which are highly toxic to human and animals. Therefore, it must be properly processed before it become suitable for consumption. There are many derivatives from cassava example being starch, ethanol, monosodium glutamate, paper and textiles etc.

In view of the Federal Government policy on cassava production for both local and international market the Federal Government has adopted a strategy of adding 10 percent cassava flour in wheat flour for local industries from January, 2005. It is based on the Federal Government policy on cassava that this research was conducted to determine the cost magnitude of cassava production inputs such as labour and cassava cutting.

Specific objectives of this study are**; t**o describe the socio-economic characteristics of cassava farmers in the study area; to examine the cost and returns patterns in cassava production; to determine the resource use efficiency of the farmers in the study area and to identify the problems associated with cassava production in the study area.

MATERIALS AND METHODS

The study area

This study was carried out in Kuje Area Council of Abuja (FCT). Kuje is located in the north central of Abuja. It lies between $8^0 – 9^0$ East and lattitude 7^0 North. The area is bounded on the Northeast part by Abuja Municipal Area Council to the west by Gwagwalada area council and to the southwest by Abuja area council. The area council covers a total land area of 1,800sq km, about 22.5% of the Federal Capital Territory, it has an estimated population of 250,000 people comparing of Gbagy, Gude, Bassa, Hausa and Fulani with other ethnic groups that have migrated into the area council from all other part of Nigeria. The area is native to Gbagy and Gude (NPC, 1991).

Kuje is usually characterized by alternate dry and wet condition with mean annual rainfall varying from 1000mm – 1500mm. The average rainfall is 1200mm and spreads from late April to late October, while the dry season stars in late October to March. The mean maximum temperature varies between $27^{O} – 30^{O}$ C depending on the weather condition while the period of dry cool weather of November to January is known as Harmattan (Oyedipe *et al.*, 1982). The major livelihood of the people is farming. The use of machine implements is minimal; most labour is manual coming from household and communal activities.

Sampling Technique

In the study random sampling technique was used to ensure that farmers producing in the study area were selected. Twenty (20) farmers from; Kuchiyako, Lanto, Paseli, Rubochi an Sundaba were interviewed giving a total of 100 respondent used for the study.

Data Collection

Primary and secondary data were used. The primary data collection were carried out through the use of a well structured questionnaire administered to the 100 selected respondents by the researcher and trained enumerators from the zonal area to collect information from the respondents through interview schedules. Secondary data collected were obtained from text, journals and abstracts.

Analytical Techniques

The data were analysed using descriptive statistics for the socio-economic characteristics and constraints.

Farm Budget

The farm budgeting analysis enables the estimation of the total expenses (cost) as well as various receipts (revenue or returns) within a production period (Olukosi and Erhabor, 1989). The difference between total revenue and total cost make up the Net Farm Income (NFI) while the difference between revenue (returns) and total variable cost makes up the Gross Margin (GM).

The farm budget is applied in this study in the following ways

Gross Margin (GM) = GI – TVC

Net Profit = GI – TCP

Where: GI = Gross Income
GM = Gross Margin
TVC = Total Variable Cost
TCP = Total Cost Production

GI is given as sum of total revenue (Y. Py) and the home consumed cassava plus value of cassava given as gift (if any).

TVC = $X_1 P_{x1}$

Where: Y = Output of cassava in kg/tons
Py = Unit price of cassava (~~₦~~)
X_1 = Total number of variable input (non durable)
P_{x1} and P_{x11} = Unit price of variable and fixed units

This used to determine the cost and returns also to be considered are

Returns per Naira which is $\frac{\text{Total Revenue}}{\text{Total Cost}} = \frac{TR}{TC}$

Operating Ratio which is $\frac{\text{Total Cost}}{\text{Total Revenue}} = \frac{TC}{TR}$

All this determines profitability and financial level of production.

Production Function Analysis

The production function was derived by the use of many algebraic equation forms. The most widely used equation forms include spill man, square root function and Cobb Douglas function (Yakasai et al, 2008). The production model employed for this study is Cobb-Douglas model. The equation for this is given by;

$$Y = f(X_1 X_2 X_3 + U) \quad \text{.....(1)}$$

The model was estimated through multiple regression analysis using the Cobb Douglas equation model. The equation is expressed as: -

$$Y = a\, x^1 b_1\, x^2 b_2\, x^3 b_3\, U \quad \text{.....(2)}$$

Expressing the function in the logarithmic form gives;

$$\text{Log } Y = \log a + b_1 \log x_1 + b_2 \log x_2 + b_3 \log x_3 + U \quad \ldots\ldots\ldots\ldots\ldots\ldots (3)$$

The marginal value products (MVP) of the inputs, elasticity of production with respect to each input categories and return to scale prevalent in the study was obtained from Cobb-Douglas production function analysis. The elasticity of production with respect to each input was given as the regression coefficient of input while returns to scale in the study were obtained by adding together all the elasticities of production (that is returns to scale bi).

The marginal value productivities (MVP) of the inputs included in the model were computed using the equation.

$$MVPx_i = \underline{b_i x_i} \times Py \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

Where:
- Y = Output of (Cassava kg) b_1 coefficient
- X_i = Geometric mean of X_i
- Y_i = Geometric mean of Y_i
- X_1 = Farm size
- X_2 = Cassava cuttings
- X_3 = Labour
- U = Error
- b_1-b_3 = Coefficients
- Y = Geometric means X_i
- X_1-X_3 = Geometric means X_i

The production function analysis measures the objectives resources use efficiency of the farm in the study area. This was done by equating the marginal value production (MPV) of an input resource with marginal factor cost of the input resources ($MVR_{X1} = MFC_{X1}$) at which Economic Option (EO) is attained, as explained by (Olukosi and Erhabor, 1989).

RESULTS AND DISCUSSION

Costs and Results Analysis

Results of the study as revealed by (Table1) shows that, labour accounts for 55% of cassava production cost, indicating cassava production to be labour intensive. Similarly, based on comparison of adjusted coefficient of multiple determination (R^2) standard errors, and the statistical significance of the estimated regression coefficients the Cobb-Douglas function was selected as the lead equation for rest of the analysis.

Regression result of the estimated Cobb-Douglas function indicated that, 65.4% of the variation in yield among the sampled fields, was explained by the factors (inputs) specified in the model (Table2). The other unaccounted variations were attributed to other important explanatory factors like soil fertility, weather condition and farmer's managerial ability, which have not been included in the model.

However, using the critical t-value of the regression coefficients farm size (X1) and cassava cutting (X2) were found to be statistically significant at ($p<0.001$) and ($p<0.01$) respectively, while Labour (X3) was not statistically significant.

Return to scale measure the proportionate change in output if all the inputs are change simultaneously by one percent. It represents the sum of all the elasticities of production with respect to all the inputs.

The sum of elasticities of production with respect or explanatory variables in the study area is 0.747. This implies that, if all the explanatory variable are simultaneously increased by 10%, the total physical product (output of cassava) will increase by 7.4%; (Olayide and Heady(1982), stated that the sum of the elasticities indicate the nature of returns to scale associated with particular production system. Therefore, the behaviour of the output when all the factors of production are changed simultaneously in the same proportion is referred to as returns to scale. This follows that for increasing constant or decreasing returns to scale.

Resource – use Efficiency in Cassava Product

The Table 3 below shows the marginal value productivities as well as the marginal factor cost (acquisition cost) per unit of the variable input

Table 3 shows that, farm size has a marginal value product of 543.60 Naira, which is less than the marginal factor cost (MFC) acquisition cost of 1101.50 Naira. This implies that increasing farm size input by one unit would lead to additional expense of 1101 Naira and revenue of 543.60 Naira. For the fact that expense incurred by one unit increase is greater than the revenue, farmers are advised to cut down the use their land efficiently to recover this cost. This is to achieve economic optimum (Sani et al, 2007).

The marginal value product (MVP) for cassava cuttings input was found to be 154.40 Naira, while the acquisition cost was found to be 300.00 Naira. This implies that for every unit increase in input cassava cuttings, while other variables remains constant, an additional cost of 300 naira is incurred and revenue of 154.40 Naira is realized. Since expense is greater than revenue on the unit increase farmers will be urged to reduce the usage of the input resource.

Labour input had a marginal value product (MVP) of 194.40 Naira, while the marginal factor cost was found to be 250.00 Naira. This implied that for every unit of labour increase, while other variable inputs remained constant an addition cost would be recorded, hence, there is the need to cut the use of manual labour and increase adoption of mechanized practices, because by implication it is been used above economic optimum level and this will affect profit (Sani *et al,* 2007).

Constraints in Cassava Production

The constraints in cassava production in the study area were found to be numerous starting from lack of capital, lack of machine, marketing problems, storage, processing and transportation. Table 4 below shows the gravity of these problems/ constraints in the study area.

These constraints reported by the respondents are critical, therefore, to be able to improve the production of cassava, in line with the government urge and drive toward the production of cassava, proper measure must be considered. This is necessary especially under the new policy tagged "Government initiative on cassava production".

Table 4 shows that majority of the respondent 87% reported lack of capital was a major problem in the production of cassava, 54% of the respondent also claimed that transportation was the major limiting factor in the production of cassava, while 45% and 41% of the respondents indicated that marketing of the product and lack of machinery was a serious problem in the production of cassava in the production area. Also 20% and 47% of the respondents reported processing of product and labour cost respectively was a limiting factor in the production area. These were reported to the reason for poor output and low areas under cultivation of the crop cassava.

Table 1: Cost and Results Analysis

A. Variable Input	Cost	Percentage
Cassava Cuttings	246226.20	33.68
Labour	402614.40	55.08
Machine	34800.00	4.76
Transport	47370.70	6.48
Total	**731011.30**	**100**

B. Revenue	Cost
Total Revenue	1201757.10
Quantity Consumed	133330.00
Quantity as Gift	69140.00
Total	**1404227.10**

Source: Field Survey, 2006

Table 2: Regression Result of Cassava Production

Variable Inputs	Coefficient	Standard	T-ratio
Farm Size (X_1)	0.45267	0.06867	6.59***
Cassava Cuttings (X_2)	0.13150	0.04599	2.86**
Labour (X_3)	0.1621	0.1026	1.58^{ns}
Constant	2.8384	0.1519	18.65

F 17.50***

Source: Field Survey, 2006

* = 0.1% Level of Significance, ** = 1% Level of Significance, *** = 5% Level of Significance

Table 3: Resource – Use Efficiency of Cassava Production

Variable Inputs	Marginal Value Product (N)	Marginal Factor Cost (N)	MVP/MFC
Farm Size	543.60	1101.30	0.49
Cassava Cuttings	158.40	300.00	0.53
Labour	194.40	250.00	0.78

Source: Field Survey, 2006

Table 4: Distribution of Farmer Based on Constraints

Constraints	Frequency	No. of Respondent	Percentage
Lack of Capital	87	100	87
Lack of Machinery	41	100	41
Marketing Problem	45	100	45
Labour Cost	48	100	48
Processing	20	100	20
Transportation	54	100	54

Source: Field Survey, 2006

Conclusion

From the result obtained in this study, it can be concluded that cassava production is profitable and more emphasis should be placed on the resource utilization to be able to sustain the producers of the crop. Increased labour will be require but not in the form of manual labour.

RECOMMENDATIONS

To overcome the production constraints identified, it is recommended that:

1. The Government should provide a standard price of inputs of production to reduce the cost of production instead of providing loans which may not or never be used by the farmers for production.
2. The Government Agencies in charge of this crop, cassava should try to ensure that varieties that are not desirable are eliminated from the system and replace with desirable ones.
3. Extension service should be improve so as to be able to encourage the production of this crop cassava where it's favourable but not yet considered to be grown.
4. Good road networks should be provided to ease the cost of transportation.

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