ECONOMIC ANALYSIS OF GARI PRODUCTION IN EKITI STATE, NIGERIA

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Abstract

This study examined the socio-economics of gari production in Ekiti State. Data for this study were obtained using structured questionnaire administered to one hundred randomly sampled commercial gari producing enterprises from four Local Governments. Data collected were analyzed using descriptive statistics, budgetary analysis (gross margin) and econometric method involving regression analysis. The study result revealed that gari production was dominated by females as over 90% of producers were females. About 52% of the respondents have no formal education while majority (80%) of the producers have less than 10 years production experience. Gross margin analysis revealed that gari production was a profitable venture in the study area with an average gross margin per annum of N299, 102.49. The regression analysis revealed that about 90% of the variation in the income of the producers was explained by the variables considered (R^2 = 92%) The quantity of cassava tubers, quantity of fuel for transportation (litres), machine hour for grating and man-hour of labour for peeling were significant variables in gari production. The resource-use efficiency results also revealed that the quantity of cassava tubers as well as machine hour for grating were under-utilized while quantity of fuel for transportation (litres) and man-hour of labour for peeling were over-utilized. Based on the findings in this study, it is recommended that to ease the problem of smoke and heat, chimney should be constructed alongside the structures where production takes place and the structures should allow for cross ventilation. There should be adequate extension training for the producers on the effective and efficient management of their resources so as to avoid wastages. To also ease the problem of inadequate capital, producers should form cooperative societies to aid easy access to credit facilities for members.

Keywords: Profitability, Efficiency and Gari Production

INTRODUCTION

Gari" a product of Cassava (*Manihot esculenta Crantz)* is a major food in Nigeria which is Africa's most populous country and the world's largest producer of cassava with production level of about 34 million metric tonnes annually. Total area cultivated of the crop (cassava) in 2001 was 3.125 million hectares with an average yield of 10.83mt per hectare. In recent time,

the production has risen to an annual level of 40 million metric tons (International Institute for Tropical Agriculture, 2005). It is a third more than the production in Brazil and almost double the production of Indonesia and Thailand. Cassava production in other African countries, such as the Democratic Republic of Congo, Ghana, Madagascar, Mozambique, Tanzania and Uganda appears small in comparison to Nigeria's substantial output (FAO, 2004b).

The Food and Agriculture Organization of the United Nations (FAO) (FAO, 2004a) estimated cassava production in Nigeria to be approximately 34 million tonnes. The trend for cassava production reported by other agencies such as the Central Bank of Nigeria mirrored the FAO data figures. The Central Bank in 2000 put the production at 37 million tonnes. Project Coordinating Unit on the other hand (PCU, 2003) had a conservative estimate of production at 28 million tonnes in 2002. PCU data collates state level data provided by the Agricultural Development Project (ADP) offices in each state. Comparing the output of various crops in Nigeria, cassava production ranks first, followed by yam production at 27 million tonnes in 2002, sorghum at 7 million tonnes, millet at 6 million tonnes and rice at 5 million tonnes (FAO, 2004a).

Cassava is important, not only as a food crop but even more as a major source of income for rural household. As a cash crop, cassava generates cash income for the largest number of households in comparison to other staples. It is produced with relevant purchased inputs as frequently as, and in some cases more frequently than other staples. A large proportion is planted annually for sale. Apart from generating income for large number of households, it also provides employment opportunities. According to IITA (2006), a 1000 unit capacity cassava starch plant can support employment for at least 300 people along the commodity chain. Similarly, one plant of ethanol (ENA) i.e 500litres/day capacity will be able to provide employment for at least 400 to 500 persons along the commodity chain in one year of 300 days. Reports also show that for Nigeria to meet its domestic demand for cassava starch; we may need at least 15 to17 starch plants and ethanol (ENA) and this requires about 120 small scale plants.

Gari constitutes livelihood or means of earning income in rural and urban areas in the south and middle-belt of Nigeria (Agbamu and Waziri, 2006). This opinion was corroborated by Ekwe and Ekwe (2005) who stated that "gari occupies a strategic position in the food systems of Nigerians". Therefore, it has the potential of bridging the gap created between food production and increasing population. Apart from playing a vital role in food security in Nigeria, it also helps to reduce cases of food poisoning caused by cyanogens in fresh cassava roots. There is need to process cassava into various products (especially gari which is one of

the major food items commonly processed in Nigeria) that have a longer shelf life; easier to transport and market; containing less cyanide content and have improved palatability. As a result of the high demand generated from gari, it is necessary to ensure an efficient production and distribution of gari to meet up with the ever increasing demand. Thus, the need for economic evaluation of costs incurred and returns receivable from gari production.

The overall objective of this study is to assess the economics of "gari" production in Ekiti State, Nigeria. To achieve this overall objective, the study considered the following specific objectives, to: (a) examine the socio economic characteristics of "gari" producers in Ekiti State; (b) determine costs, returns and profit by categories of "gari" producers in the study area; (c) identify the factors influencing gari production in the study area; (d) examine the resource-use efficiency for "gari" producing enterprises in the state; and (e) identify the problems militating against "gari" production in the study area.

METHODOLOGY

Study Area: The study was conducted in Ekiti State, Nigeria. It is bounded by Kwara State in the north and Ondo State in the south, Osun State in the east and Kogi State in the west. It has a population of about 2,737,186 (Wikipedia, 2008) and total area of 6353km^2 with 16 Local Government Areas. The state has a tropical climate and lies in the rainforest zone with two distinct seasons. These are the rainy season (April-October) and the dry season (November-March). Temperature ranges between 21° and 28°C with high humidity. The state is mainly an upland zone, rising above 250 meters above the sea level. It lies within the area underlain by metamorphic rock of the basement complex. It has a generally undulating land surface with a characteristic landscape that consists of old plains broken by step-sided out-crops dome rocks that may occur singularly or in groups or ridges (NAERL and PCU, 2002). Agriculture (crop farming) forms the base of the overall development thrusts of the state, with about 75% of the population being agrarian. Crops grown include maize, cowpea, rice, cassava, plantain, yam, pepper, tomatoes, and other varieties of green vegetables. They also grow cash crops, which include Cocoa, Kola, and Palm tree. Farmers in the State are predominantly small-scale. They depend on traditional method of farming. Apart from farming, they also engage in trading and other activities such as tailoring, shoe making and barbing.

Sampling Techniques: The multi-stage sampling procedure was used because of the heterogeneous nature of the study area. Data mainly from primary sources were collected from Four Local Government Areas which were purposively selected out of the sixteen Local Government Areas (LGAs). These are Gbonyin, Ikere, Ekiti West and Ado LGAs. The

choice of these Local Government Areas was on the preponderance of a large population of commercial Cassava processors. In the second stage, five towns/villages were randomly selected without replacement from each LGA. The final stage involved random sampling of five producers from each village /town making total of 100 commercial gari producing enterprises. The use of primary data was employed for this study. Data were collected through the use of interview schedule consisting of open and close–ended questions, which elicited required data from the target respondents. Data collected from the processors include quantity of gari produced (kg), quantity of cassava tubers (kg), quantity of fuel for transportation (litres), man-hours of labour for peeling and frying, price, cost and revenue involved in gari production and constraints to gari . Data were also collected on the socio–economic variables such as years of schooling, farming experience, age, household size and number of extension contact.

Data Analysis

The analytical techniques involved the use of descriptive statistics such as mean, percentage and frequency distribution table to analyze the socio-economic characteristics of gari producers, econometric methods, using the Ordinary Least Square (OLS) estimates technique were used to explain the relative influence of the various explanatory variables on the net revenue from farm output of the processors.

The budgeting technique such as Gross Margins and Returns on Investment were employed in examining the profitability of gari processing enterprises in the selected area. The gross margin is the difference between the Total Revenue (TR) and the Total Variable Cost (TVC). It is a useful planning tool in situations where fixed capital is negligible portion of the farm enterprise as in the case of small scale subsistence agriculture (Olukosi *et al*, 2006).

$$GM = GFI - TVC \quad (1)$$

Where GM = Gross Margin, GFI = Gross Farm Income, TVC = Total Variable Cost.

The processors were categorized into large, medium and small-scale for ease of analysis. The large scale processors were those that produced above 1000bags per annum; the medium scale produced between 500bags per annum and 1000bags/annum while small scale processors are those that produced less than 500 bags per annum. Each bag is 25 kilograms.

The Average Net Returns per Kilograms of gari produced and Net Returns per Processor is estimated using equations (2) and (3).

$$NR_i/N = \sum(TR_i/N) - \sum(TC_i/N) \quad (2)$$

$$NR(Q)^{-1} = \left(\sum TR_i\right)\left(\sum Q_i\right)^{-1} \quad \left(\sum TC_i\right)\left(\sum Q_i\right)^{-1} \qquad (3)$$

NR_i = Net return per *ith* processor

NR_i/N = Average net return per *ith* processor

$ANR(Q)^{-1}$ = Average net return per kg/*ith* processor

TR_i = Total sales revenue accruing to the *ith* processor

TC_i = Total cost incurred by the *ith* processor

N_i = Number of processors

Q_i = Quantity of gari (kg) produced by the *ith* processor

$$Qg = f\left(X_1, X_2, X_3, X_4, X_5, X_6, X_7, U_i\right) \qquad (4)$$

Where,

Qg = quantity of gari produced (kg)

X_1 = quantity of cassava tubers (kg)

X_2 = quantity of fuel for transportation (litres)

X_3 = man-hours of labour for peeling cassava tubers

X_4 = machine hours for grating

X_5 = man-days of labour for frying

X_6 = experience in years

X_7 = Education level (years)

U_i = error term

Four functional forms namely linear, semi-log and cobb-douglas, exponential functions were fitted to data generated using the Ordinary Least Square technique (OLS) under the assumption that data fulfilled the assumptions of the Multiple Regression Model.

The explicit form of these functions take the following forms:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + U_i\,(linear) \qquad (5)$$

$$Y = a + b_1 \ln X_1 + b_2 \ln X_2 + b_3 \ln X_3 + b_4 \ln X_4 + b_5 \ln X_5 + b_6 \ln X_6 + b_7 \ln X_7 + U_i\,(semi\log) \qquad (6)$$

$$\ln Y = a + b_1 \ln X_1 + b_2 \ln X_2 + b_3 \ln X_3 + b_4 \ln X_4 + b_5 \ln X_5 + b_6 \ln X_6 + b_7 \ln X_7 + U_i\,(double\log) \qquad (7)$$

$$\ln Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + U_i\,(\exp onential) \qquad (8)$$

Computation of Resource-Use Efficiencies of the inputs used

This is estimated as follows:

$$r = \frac{MVP}{MFC} \quad (9)$$

Where,

MVP = Marginal Value Product of a variable input,

MFC = Marginal Factor Cost,

r = Efficiency ratio,

The MVP was estimated as follows:-

$MVP = MPP.P_Y$

$MFC = Px_i$

Where,

MPP = Marginal Physical Product

P_Y = Price of Output.

Px_i = Unit Price of input Xi

If r = 1, resource is efficiently utilized,

If r > 1, resource is under-utilized,

If r < 1, resource is over-utilized.

RESULTS AND DISCUSSION

Socio-economic characteristics of sampled farmers: The variables socio-economic analyzed in this study include sex, marital status, age, education and years of experience.

The results in Table1 show that overwhelming majority (90%) of the producers are females while few are males. It is also shown in the table that 70% of the producers were married, 20% were widowed, while only 7% were singles. Table1 shows that majority (37%) of the producers are in the age group of 31-40. This is followed by those in age bracket of 41-50 years (32%). Some (8%) of the producers are less than 30 years of age while those above 50years constituted about 23%. The study also revealed that the maximum age of producers was 65 years while the minimum age was 23years. The average age of the producers was 45 years. Gari production is practiced mostly by people between the ages of 30 and 50 years (69%). Thus, majority of the producers are middle-aged which implies that they are still in their economically active age which could result in a positive effect on production.

From the field survey it was observed that 52% of the processors were illiterates, 28% had primary school education, 17% had secondary school education while only 3% had post

secondary school education (Table1).This finding agrees with work of Chukwuji (2007) where he reported that majority of the gari producers in Nigeria are illiterates. The producers with higher level of education are likely to be efficient in the use of input than their counterparts with little or no formal education. The analysis in Table 1 also shows that 32% of the producers got their cassava tubers directly from their personal farms, 20% bought from cassava farmers while majority of them got from both their personal farms as well as from other cassava farmers. Thus, most of them have their own farm and they also bought from other farmers in order to give them more returns.

Table1: Socio-economic Characteristics of Sampled Farmers.

Variables.	**Frequency**	**Percentage**
Sex		
Male	10	10
Female	90	90
Marital Status		
Single	7	7
Married	73	73
Widow(er)	20	20
Age (years)		
Below 31	8	8
31-40	37	37
41-50	32	32
51-60	13	13
61-70	10	10
Education		
No Formal Education	52	52
Primary	28	28
Secondary	17	17
Tertiary	3	3
Years of Processing Experience		
1-10	77	77
11-20	13	13
Above 20	10	10
Sources of Cassava Tubers		
Personal Farm	32	32
Cassava farmer	20	20
Personal farm and from market	48	48

Source: 2007

Costs and Returns Analysis

From results in Table 2, ₦75, 232,839.00 represents the gross revenue for all the processors interviewed per annum. The study also revealed net revenue per producer of ₦72, 644.00 per annum for small scale processors who produced 5588bags/annum. The net revenue/bag represents ₦247. 00. The medium scale category, which accounted for the highest in number (66), produced a total of 44448bags/annum. This category had a total revenue/annum of ₦37, 881,212.00 and the net revenue/annum of ₦11, 703,942. The net revenue/bag stands at ₦263.00. A total revenue/annum of ₦32, 312,779.00 was recorded by the large scale processors (15) who produced 39208bags/annum. It also shows that the net revenue/annum is ₦16, 570,113.00 with a net revenue/bag of ₦423.00 due to the fact that they enjoyed economies of scale. The overall analysis shows that gari production is profitable in the area with revenue per producer increasing with increased scale of production.

Analysis results in Table 3 also show a gross margin of ₦30, 127,674.00 for all producers. It also shows that the least gross margin per producer of ₦75, 259.58 and gross margin /annum of ₦ 1,429,932.00 by the first group. This is followed by the second group with gross margin of ₦12, 002,977.00 and ₦181, 863.29 as gross margin/processor showing increases alongside the scale of production. The gross margin of the large-scale producers is ₦16, 694,765.00 with gross margin per producers of ₦ 1,112,984.30. This shows that profitability increases with increase scale of production because of discount enjoyed on the cost of buying inputs in bulk.

Table 2: Costs and returns per annum in gari production.

Categories	Small scale		Medium scale		Large scale	
A. Costs	**Quantity/Cost (₦) N=19**	**%of total cost ₦**	**Quantity/ cost (₦) N=66**	**% of total cost (₦)**	**Quantity/ cost (₦) N=15**	**%of total cost (₦)**
I. variable cost						
Cost of cassava tubers	1271396	34.75	9550425	36.48	6071826	38.57
Cost of transportation	637440	17.42	5234370	20.00	2665402	16.93
Cost of labour	985940	26.95	5340125	20.40	3201013	20.33
Cost of grating	289400	7.91	2085870	7.97	1474640	9.37
Operating cost	424740	11.61	3667445	14.01	2205133	14.01
Total Variable Cost	3608916	98.64	25878235	98.86	15618014	99.21
II. Fixed cost	49705	1.36	297535	1.14	124652	0.79
III.Total Cost (I + II)	3658621		26177270		15742666	
B. Revenue						
Quantity of Gari produced (Bags)	129600		974311		831090	
Unit Price	38.88		38.88		38.88	
Total Revenue	5,038,848		37,881,212		32,312,779	
Gross Revenue(all categories)	75,232,839					
Net Revenue(NR)	1,380,227		11,703,942		16,570,113	
Net Revenue per producer(NR/N)	72,644		177,333		1,104,674	
Net Revenue per bag	247		263		423	
No of bags	5588		44448		39208	

Price per bag = ₦1, 200.00

Source: Field Survey, 2007

Table 3: ***Gross Margin Analysis.***

Group	No of Producers	Total No of Bags (25Kg)	Total Revenue/ Annum(₦)	Total Variable Cost/Annum (₦)	Gross Margin/ Annum (₦)	Gross Margin/ Producer (₦)
Small-scale	19	5588	5,038,848	3,608,916	1,429,932	75,259.58
Medium-scale	66	44448	37,881,212	25,878,235	12,002,977	181,863.29
Large-scale	15	39208	32,312,779	15,618,014	16,694,765	1,112,984.30
Total	**100**	**89244**	**75,232,839**	**45,105,165**	**30,127,674**	**1,370,107.20**

Field survey 2003

Table 4: Factors influencing net return to gari production (Linear function as lead equation)

Factors	Regression Coefficient	Standard Error	t-values	Level of Significance
Constant	-2127.890	2550.614	0.834	0.710
X_1	0.051	0.025	2.064**	0.034
X_2	-0.171	0.037	-4.622***	0.000
X_3	-0.069	0.027	-2.568**	0.016
X_4	0.378	0.120	3.150***	0.003
X_5	0.015	0.048	0.312	0.760
X_6	3.837	96.613	0.040	0.963
X_7	302.579	213.607	1.417	0.984
R^2	92.00%			
Adjusted R^2	85.30%			
F value	73.618***			

Source: Field Survey, 2007

******* Significant at 1%, ** Significant at 5%

Factors Influencing Gari Production in the Study Area

Based on the statistical criteria for selecting the "lead" equation, linear function is chosen for economic interpretation and discussion in this project because it gave the best fit in terms of the number of significant variables, F-value and Adjusted R^2 value. This is presented in Table 4. The R^2 shows that 85.3% of the adjusted variability in the quantity of gari produced was explained by all the independent variables. The positive regression coefficients of quantity of cassava tubers (X_1), machine hour for grating(X_4), man-days of labour for frying (X_5), experience (X_6) and education (X_7) imply that a 1percent increase in the amount of these variables will lead to 5.1, 37.8, 1.5, 383.7,30257.9 percent changes in gari output

respectively. The significant F-value shows that all variables jointly determined the quantity of gari produced.

Resources-Use Efficiencies of the Producers

The quantity of cassava tubers used and machine-hour for grating were under-utilized. That is, the efficiency ratio is greater than 1. Hence, the quantity of cassava tubers and machine-hour for grating should be increased. Quantity of fuel used and man-day of labour for peeling were over-utilized. That is, the efficiency ratio is less than 1. This implies they were not efficiently utilized. Hence, the quantity of fuel used and labour for peeling should be reduced to avoid wastage of such resources.

Table 5: Resource-use efficiencies of the respondents

Variables	MPP	MVP	MFC (Px)	Efficiency ratio (r)	Remark
Quantity of cassava tubers (X_1)	0.05516	66.19	40	1.655	Under-utilized
Quantity of fuel for transportation (X_2)	-0.171	-205.20	70	-2.9314	Over-utilized
Man-hour of labour for peeling (X_3)	0.06933	83.196	150	0.555	Over-utilized
Machine hours for grating (X_4)	0.378	453.60	100	4.5360	Under-utilized

Source: Field survey, 2007.

Problems Involved in Gari Production

Analysis results in Table 6 show the problems of cassava processing in the study areas. The problems identified included burns during frying which cause injury to their hands; poor quality of equipment, inadequate capital which makes expansion seemly difficult and smoke which cause great injury to the eyes.

Table 6*:* Distribution of Respondents by Problems Encountered

Problems	Frequency	Percentage
Improper handling of the tubers by cassava farmers	100	100
Old age of equipment	100	100
Inadequate capital	80	80
Smoke and heat from frying arena	70	70
Partial Frying	68	68
Leaving peeled /unpeeled cassava overnight	40	40
Too long fermentation period	30	30
Leaving grated cassava overnight	30	30

Source: Field Survey, 2007

SUMMARY, POLICY IMPLICATION AND CONCLUSION

SUMMARY

This study examined the socio-economics of cassava gari production in Ekiti state.

The cost and return analysis showed an average annual revenue per producer of ₦ 61,942.00 for a small scale; ₦ 177,352.00 for medium scale and ₦ 1103,651.00 for a large scale Gari producers. This shows that cassava processing in Ekiti State is profitable.

The regression result revealed that about 92% of the variability in the dependent variable (Total Revenue) is explained by all the explanatory variables considered. Quantity of cassava tubers, quantity of fuel for transportation, man-hours of peeling cassava tuber and machine hour for grating were significant in determining the level of revenue accruing to each producer per annum. The study revealed that the major problems include improper handling, burns and inadequate good quality equipment. The least of these problems is the problem of leaving grated cassava overnight.

CONCLUSION AND RECOMMENDATION

This study has revealed that Gari production is highly profitable venture depending on the category small, medium or large- scale. It could therefore help reduce unemployment in our society and increase available food for consumption. It was also shown that the producers in the study area were not efficient in their use of production resources. While cassava tubers

used and machine hours for grating were under-utilized, man-days of labour and quantity of fuel used were over-utilized. Relevant intervention is therefore needed in the transfer of production technologies that would enhance the current level of efficiency of gari producers in the study area. This would serve as a mitigating measure against possible crisis in gari production that may result in the country if the producers are allowed to continue to operate inefficiently.

Based on the findings of the study, the following recommendations are made: Producers should co-operative societies for easy allocation of credit facilities to interested members. More agricultural extension effort should also be devoted to organizing seminars on how the producers can improve the quality of gari produced in the study area. To ease the problem of smoke and heat, producers should construct chimney alongside the structures where production takes place and the structures should allow for cross ventilation. Government should also provide adequate extension training for the producers on the effective and efficient management of their resources so as to avoid wastages.

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