

ECONOMIC PROFITABILITY OF IMPROVED METHODS OF CASSAVA ROOT (*Manihot Spp*) PROCESSING INTO GARRI BY WOMEN OF ORUK ANAM L.G.A OF AKWA IBOM STATE, NIGERIA.

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ABSTRACT

*The study presents an improved method of cassava (*Manihot Spp*) roots processing into garri by women of Oruk Anam Local Government Area of Akwa Ibom State, Nigeria. Data collected were analyzed using descriptive statistics, budgetary technique and multiple regression model. The result of the study revealed that 80% of the respondents were within the active reproductive ages (25-55yrs). It also showed that 85-90% of them were married and have long years of experience in garri processing in the study area. The coefficients for credit access, income and co-operative membership have direct relationship with output; while the coefficients for age, marital status and labour have indirect relationship with output; however, they were all significant at varied probability levels. The major constraints identified include: poor access to credit, inadequate processing equipment, ineffective extension services and high cost of production inputs. These results call for policies that would ameliorate these problems of the cassava women processors in the study area so as to make room for more efficient and sustainable garri processing in the future.*

Key Words: Socio-Economic Analysis, Improved Methods, Cassava Roots, Cassava Women Processors, Garri Processing.

INTRODUCTION

Cassava (*Manihot esculenta* Crantz) is one of the productive and most important root crops in the tropics (Ezedinma et al 2002). It derives its importance from the fact that its starchy, thickened, tuberous roots are valuable source of cheap calories, especially in developing countries where calorie deficiency and malnutrition are widespread (IITA, 2002). Over two third of the total population of cassava is consumed in various forms by humans; and it is a major staple food crop for over 50 million Nigerians, providing more than 75% of their energy requirements in the cassava growing areas (FGN, 2004).

Nigeria is the largest producer of cassava in the world, with a total production of 34 million metric tons a year (FAO, 2004) and on land area of between 1.2 - 1.4 million hectares (NAQAS, 2002). Cassava is the most important food staple after maize in terms of calories consumed (Nweke, 2004) and the sixth major staple crop in the world after rice, wheat, maize, potato and sweet potato; with an annual production of 185 million metric tons (FAO, 2003). All parts of cassava plants can be consumed; including the starchy roots and foliage since it provides efficient carbohydrates which can be used as food, animal feed, starch and alcohol (FAO & IFAD, 2000). It also provides substantial amount of protein, minerals (iron and calcium) and vitamins (A & C) through leaf consumption (Dixon et. at 2003).

Cassava has many uses which gives the crop high potentials as a major foreign exchange earner in Nigeria. Thus, it can be processed into garri, fufu, chips, tapioca, alcohol, starch, glucose and fuel (starch and gasoline) and can also be used as a livestock feed (Nwakpu, 2004). Among the products of cassava, garri is the most important form in which cassava can be consumed in West Africa. Garri is fermented and gelatinized dry-coarse flour, which is very popular in Africa and has a very staple food in Nigeria, Ghana, Republic of Benin and Togo. Its ability to store well and its acceptance as a "convenience food" is responsible for its increasing popularity in the urban areas of West and Central Africa. It is often consumed as the main meal in form of dough or a thin porridge. Both are prepared in the house by mixing dry garri with hot or cold water and cooking, and thereafter served with soup or stew. Garri is also eaten as a snack when mixed with cold water and sugar, and sometimes milk. It swells three to four times its volume when mixed with cold water.

Garri is produced from fresh cassava roots through processing. The improved cassava processing steps involves a combination of several activities which are performed in stages and they include;- harvesting- peeling- washing- grating- pressing- fermenting- sieving- frying- bagging- packaging. These steps help to reduce the effect of hydrogen cyanide (HCN) and other undeniable materials present (Nkamatu, 2005; IITA, 2005). Processing machines are the major innovations in

cassava processing. It reduced losses by 54% and gives up to 75% of water.

In Nigeria, women constitute 60-80% of the agricultural labour force, depending on the location. These women produce about 67% of the food crops and they reside primarily in the rural areas, exploiting natural resources on daily basis. Basically, they are involved in the supply of labour, production of food crops and livestock, processing and transportation of farm produce for effective storage and marketing (Shannon, 1995; Ugwu and Agbo, 1999). Despite the high level of their involvement in agricultural activities, they are inadequately recognized and undervalued. (Ajayi, 1995; Henn, 1995; Nwachukwu and Jibowo, 2000).

Agricultural Development Programmes (ADP's) constitute new strategy with the Federal Government of Nigeria (FGN) has adopted to implement its agricultural development policy and the integration of women into agricultural development through better extension services and training (Gladwin, 1991; BNARDA, 1995; Eboh et al, 1995; Amalu, 1998). In view of this, the Agricultural Development Programmes (ADP's) of the various states of the country made a very important advancement to incorporate gender in Agricultural Extension. They modified the ADP system mid-stream to provide the need of women farmers through the creation of Women-In-Agriculture (WIA) Programmes, such as in processing (Onyibe, 2001). The Integration of this programme becomes imperative for the achievement of women's agricultural goal through agricultural extension services in order to increase the rate of adoption of technologies by these women farmers in different states of the country (Onyemaobi, 2001). In the world over, women are the largest participants in agricultural activities, despite their domestic duties as wives and mothers. They are involved in production, processing, preservation, storage and in the marketing of any agricultural products.

It is certain that a number of Oruk Anam farmers go into cassava production and processing, but reliable information on research are lacking on what they do. Many of these women farmers have been in the farming business for a long time without any form of improvement being made in their welfare and that of their families. Most surprising is the fact that this situation still persists, even after more than a decade of agricultural research and extension services in Nigeria. The need for processing arises to stabilize crops for storage purposes and price stability; thereby guaranteeing higher prices for the farmers. Although improved methods of cassava processing reduce labour, produce high quality and marketable products; the cost of acquiring simple processing machines is very prohibitive for small-scale farmers. There is also a need to ascertain accurately the effect of processing costs on the final price of the cassava products. This

will no doubt influence investment decisions; especially for emerging agro-industries (Ukpabi, 2008). Problem of transporting fresh roots from the farm gates to the processing sites and other overhead costs has made transportation a major cost component in cassava processing. It is with these knowledge in mind that the study attempts to examine the

Economic Profitability of Improved Methods Of Cassava Roots (*Manihot Spp*) Processing Into Garri By Women Of Oruk Anam L.G.A Of Akwa Ibom State, Nigeria. Specifically, the study:

- i) described the socio-economic characteristics of a cassava women processors;
- ii) determined the effects of cassava women processors socio-economic characteristics on output of garri.
- iii) estimated the costs and returns in garri processing; and identified the constraints of garri processing in the study area.

METHODOLOGY:

Study Area:

The study was carried out in Oruk Anam Local Government Area, which is located in the south-west of Akwa-Ibom state. It lies between latitudes 4⁰⁴ and 5⁰⁰ north of the equator, and longitudes 70⁰³⁰ and 70⁰⁵⁰ east of the Greenwich Meridian. It is one of the eight Anang speaking Local Government Areas in the state. It falls within the tropical rainforest belt of the country's vegetation, with a mean annual rainfall range of 2500-3000mm. It has a temperature range of between 27⁰C-32⁰C and with a moderate relative humidity. Its population is estimated at 172,000 people (NPC, 2006). Its inhabitants are mostly farmers, craftsmen and civil servants. Among the crops grown in this area include: yam, cassava, cocoyam, maize and vegetables. They also raise some livestock; but all these are on a small scale.

Sampling procedure:

Data for the study was collected using purposive and random sampling techniques. Firstly, five (5) communities were purposely selected from the ten (10) communities that make up the study area based on the long history of high intensity of garri processing. Secondly, two (2) villages were chosen from each of the five (5) communities already selected in stage 1 using simple random sampling technique. Lastly, six (6) cassava women processors were chosen randomly from each village to give a total sample size of 60 respondents for the study. The five (5) communities chosen are; Atan, Idung Ntuk Umah, Agwa Udo, Nung Ukpog and Ibesit Okpokoro.

Analytical techniques:

Data collected were analyzed using descriptive statistics, budgetary technique, and multiple regression model.

Model Specification:

Budgetary Technique:

This was employed to estimate the profitability of garri processing enterprise. In estimating the costs and returns of farm business using the profit and loss account procedure, the following mathematical models were used:

$$\pi = TVP - TVC - TFC \text{-----} (1)$$

$$\pi = \sum_{i=1}^m P_i Q_i - \sum_{i=1}^n P_i X_i - \sum_{K=1}^r PK CK \text{-----} (2)$$

Where;-

- π - Net Farm Profit
- TVP- Total Value of Production
- TVC- Total Variable Cost
- TFC- Total fixed cost
- Q_i - Quantity of i^{th} Output
- P_i - Unit price of i^{th} Output
- X_i - Quantity of i^{th} variable output
- n- Number of inputs used in production
- m- Number of enterprises
- PK- Unit price of k^{th} fixed inputs
- CK- Quantity of k^{th} fixed inputs
- r- Number of fixed inputs
- Σ - Summation

Multiple Regression Model:-

This was used to express the technical relationship between inputs and outputs of the production cycle. Linear semi-log, double-log or exponential functional forms were employed, fitted and tried, and on the basis of economic theory, statistical and econometric criteria; exponential functional form was chosen as the lead equation. The explicit form of the model is presented below:

$$\ln Y = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + b_5 X_5 + b_6 X_6 + \dots + b_n X_n + e_i$$

Where:-

- Y- Output of garri (kg)
- X_1 - Marital Status (dummy, married=1, otherwise=0)
- X_2 - Age of the processor (years)
- X_3 - Access to credit (dummy, access=1, otherwise=0)
- X_4 - Income realized (naira)
- X_5 - Labour use (man-days)
- X_6 - Co-operative membership (member=1, non-member=0)
- X_7 - Access to extension contact (Access=1, otherwise=0)
- X_8 - Educational status (years)
- X_9 - Processing experience (years)
- X_{10} - Household size (numbers)
- e_i - error term
- b_0 - Constant term
- b_1 - b_{10} - coefficients to be estimated.

RESULTS AND DISCUSSION

Socio-Economic characteristics of respondents:

Analysis of the descriptive statistics on the socio-economic variables of the respondents (table I) revealed that greater proportion (80%) of the cassava women processors were within 25-55 age range. This implies that they are still in their active productive ages. However, since the ability of a farmer to take risk and be innovative decreases with age (Nwaru, 2004), there was likely to be a high prospect for increased garri processing among the cassava women processors in the study area, all things being equal.

The study also showed that 85% of the married couples were involved in garri processing in the study area. This therefore emphasizes the importance of garri as a source of food and income to the cassava women processors.

The result of the study indicated that majority (83.33%) of the respondents had between 7-21 years of garri processing experience, but with a mean of 17 years. This implies that most of the cassava women processors in the study area are well experienced in garri processing.

The study also showed that 90% of the respondents had household size of between 4-12 persons, but with a mean of 10 persons. Thus, since large household size eases labour constraints in farming operations and increase technology utilization (Onyenweaku and Nwaru, 2005), it then means that labour will not be a problem to garri processing in the study area.

Education is an important tool to determining farmer ability to understand and manage unfamiliar technology (Doss and Morris, 2001). Hence, the result in table I revealed that 90% of the respondents in the study area are literates, and it is supposed to enhance one's readiness to understand and evaluate new production techniques (Onyeweaku and Nwaru, 2005; and Nwaru, 2007).

Multiple Regression Analysis:

The result of the estimated parameters is presented in table 2 and it shows that the exponential functional form emerged as the lead equation. This result is in consonance with Onyemauwa (2012) who also selected an exponential function as lead equation in a similar study based on paucity of its standard error, in addition to other criteria.

The coefficients for credit access, income and membership of associations had direct relationship with output of garri; while the coefficients for marital status, age and labour use had inverse relationship with the output of garri. However, they were all significant at varied probability levels.

Coefficients for credit access and membership of association were positively signed and significant at 1% level of probability. The usefulness of credit is reflected by the fact that it is needed in agriculture to increase capital base of food producers so as to bring about increased productivity (Olawepo & Fatulu, 2012). Processor cooperators have the capacity to produce more garri than non-cooperators. This is in line with a prior expectation. However, cooperatives

operate as one of the main institutional machineries for empowering the economically weak members of the society (Awotide, 2012). Income also had a positive coefficient, but was rather significant at 10% probability level. Despite this, the result implies that increase in income will enhance garri processing; this is because income enhances the capacity of the processors to scale up their output.

The coefficients for age, marital status and labour posited negative signs, but were rather significant at 1% probability level. The negative coefficient for age means that the older processors were fewer than the quantity of garri produced. This is in accordance with the findings of Oladego et al. (2011) who reported that young women are more productive in farming operations than the older ones.

A negative coefficient for marital status portends that other forms of marital status with positive signs (such as the single, widowed, divorced) contributed more to garri processing than their married counterparts because of pressure of managing and maintaining families.

Labour use has a negative coefficient, but significant at 1% risk level. This is because labour use in agriculture has a huge implication for output. It was statistically significant because cassava women processors made use of family labour which invariably helped in reducing costs. Hence, Rahman (2004) reported that women form an active and reserve labour force in agriculture. This corroborates with the report of FAO (2011), Mehra and Rojas (2008) that women produce and process 60-80% of food in most developing countries and half of the world's food supply.

Costs and Returns analysis:

The result of the costs and returns analysis (table 3) revealed that garri processing business is very lucrative; as an average of 1,200 kg of cassava roots were processed into garri which generated gross farm income of N130,000 with a total cost of processing amounting to N82,500; thereby giving a net farm income of N47,500 and a benefit cost ratio of 1.58 or Return per naira invested of N0.58. This means that for every naira invested on cassava (garri) processing in the study area, there is a profit of N0.58

CONCLUSION:

Analysis of the socio-economic variables of the respondents revealed that greater proportion (80%) of them were within their active productive ages (25-55 yrs). In addition, most (85-90%) of them are married and have long years of experience in garri processing in the study area.

The coefficients for credit access, income and cooperative membership have direct relationship with the output of garri; while the coefficients for marital status, age and labour have inverse relationship with the output of garri. All of them

were however, significant at varied probability levels. Cassava processing into garri is a very rewarding and profitable venture if well managed. The identified constraints include: poor access to credit, inadequate processing equipment, ineffective extension services, and high cost of production inputs. Efforts should be made to ensure the provision of processing equipment to the cassava women processors; while agricultural extension services should be strengthened through public enlightenment and training for effective coverage of extension information. The cassava women processors should also be encouraged to form cooperatives in order to have access to credits and other production inputs

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Table 1: Socio-Economic Characteristics of Respondents

Variables	Frequency	Percentage (%)
Age in years		
25 – 35	6	10
36 - 45	23	38
46 – 55	19	32
56 - 65	12	20
TOTAL:	60	100
Educational level		
No formal education	6	10
Primary education	36	60
Secondary education	12	20
Tertiary education	6	10
Total	60	100
Household size		
1-4	10	16.67
5-8	14	23.33
9-12	30	50
13-16	6	10
Total	60	100
Processing experience		
1-6	6	10
7-13	32	53.33
14-21	18	30
22-28	4	6.67
Total	60	100
Marital Status		
Single	9	15
Married	33	55.
Widow	10	16.67
Divorced	8	13.33
Total	60	100

Source: Field Survey Data, 2017.

Table 2: Results of Multiple Regression Estimate in the analysis

Variables	Coefficients	Standard	T-Values
Constant	7.245	0.790	9.172***
X ₁ - Marital status	-0.304	0.095	-3.282***
X ₂ - Age	-3.044	0.717	-4.246***
X ₃ - Credit access	4.353	1.012	4.301***
X ₄ - Income	6.220	3.147	1.976*
X ₅ - Coop./ship	0.676	0.186	3.634***
X ₆ - Labour use	-0.002	0.001	-2.974***
X ₇ - Access to Extri	0.148	0.171	0.870
X ₈ - Proces. Experian.	0.006	0.023	0.277
X ₉ - Education	0.018	0.018	-1.026
X ₁₀ - Household size	0.037	0.030	1.212
R ²		0.722	
F-ratio			7.041***

Source: Computed from field survey data, 2017.

Note: *** implies significant at 1% level, ** implies significant at 5% level, * implies significant at 10% level.

Table 3 Costs and Returns of Garri Processing in the Study Area

Budget items	Unit	Qty	Price/Unit	Value (₦)
Output/Gross farm income	Kg	650	200	130,000.
Variable Cost:				
Cassava roots		1200	50	60,000
Peeling/washing	- do-		25	5,000
Grating/pressing	-do-		30	6,000
Sieving/frying	-do-		20	4,000
Firewood/fuel		30	100	3,000
Transportation				2,300
Total Variable Costs (TVC)				80,300.0
Fixed Cost:				
Rented Space				1,700.00
Depreciation				500.00
Total fixed costs (TFC)				2,200.00
Total cost (TC) = (TVC + TFC)				82,500.0
Gross margin (GM)=(GFI-TVC)				49,700.0
Net farm income (NFI) = (GM –TFC)				47,500.0
Benefit – cost ratio (BCR) = (GFI)				
Return/Naira invested = (NFI)				1.58
		$\frac{(TF)}{(TC)}$		0.58

Source: completed from field survey data, 2017.