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# ECONOMIC ANALYSES OF *GARI* PROCESSING IN EBONYI STATE, NIGERIA

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**Abstract**
This study determined the economic analyses of *gari* processing in Ebonyi State, Nigeria. A multi- stage random sampling technique was used for data collection, from the 300 respondents used for the study, with the aid of a structured questionnaire. Both descriptive and inferential statistics were used for data analysis. The study showed that gari processing was economically viable as it generated an average gross margin and net farm income of ₦35, 000.00 and ₦24,500.00 respectively per 1000kg of cassava root processed. The major cost components of gari processing were found to be the total variable cost – mainly cassava root, labour, and transportation costs. Results of the multiple regression analysis showed that age, gender, and cost of cassava roots had negative influence on profitability of gari processing and were statistically significant; while access to labour, years of processing experience, household size, income and access to credit had positive influence on the economic returns on gari processing and also significant. The results therefore call for policies aimed at encouraging more female gari processors who are still strong and agile to increase gari processing by provision of inputs and services at subsidized cost. These inputs and services are not limited to credit and labour saving devices to reduce the drudgery in processing. Processors should ensure that they source their raw materials from the cheapest sources possible.

**Keywords: Cassava root, *Gari*, Processing, Processors, Economic Returns**

## Introduction

Cassava (*Manihot Spp*.) is a root crop that is widely cultivated on commercial basis in Ebonyi State. This crop, which few decades ago was a subsistence food for the poor and livestock in the tropics has grown to a crop of high demand in several African countries and beyond (Idenyi, 2010). Over 80% of the Nigerian population live in the rural areas and eat cassava meal at least once a day, and when compared with rice and maize, cassava has a carbohydrate content which is about 40% higher than rice and 25% more than maize. Also, it is the cheapest source of calories for both human and animal consumption. Hence, cassava plays a major role in the country's food security (Muhammad *et al*., 2013). Besides, cassava generates income for its producers, processors, transporters and marketers and it serves as raw material in industries such as bakery, textile, paper, plywood and confectioneries (FAO, 2015). The significance of cassava as a food security crop and more recently as a commercial cash crop is depicted in the several value opportunities to the commodity through products like *foofoo*, *tapioca*, starch, chips, bio-ethanol for alcoholic beverages, dried chips for animal feed rations, high quality cassava flour (HQCF) and gari. Given the advantages that cassava exhibit such as ability to grow on marginal lands, low input requirement and high drought tolerance, the role of the crop have increased. These have made it an important commodity for intervention by the government and stakeholders in the Nigerian Agricultural Sector. Cassava production in Nigeria has received a massive boost in the last decade under the Cassava Value Chain Development Programme sponsored by International Fund for Agriculture Development (IFAD) and the Nigerian government.

Azogu (2010) observed that approximately 50% of cassava harvested in Nigeria is either consumed or sold as fresh roots (at household level), boiled or pounded cassava (*foofoo*). Presently in Nigeria, agricultural products are underutilized for income generation and cassava is not left out. Cassava roots are prone to wastage due to inefficient harvest and post-harvest handling. According to FAO (2015), value addition improves the shelf life of agricultural products and generates income for participants. Of all the aforementioned products of cassava, gari is by far the most preferred product to process, consume and sell. Processing of cassava offers huge opportunities for job creation, add value to products, reduce waste through spoilage, improves acceptability and technical and marketing skills of rural people. Production,

consumption and utilization of gari are influenced by its storability (2-3years shelf-life), convenience, easy handling, relatively cheaper price and high demand in Nigeria and other African countries. The capacity of this off-farm income generating enterprise to improve livelihoods of operators is quite phenomenal, given the widespread demand for the commodity. Fortunately, gari production is a relatively low-cost, mostly rural-based agro-potential return (Opoku-Mensah *et al*., 2013). The fact that gari processing lends itself as an employment generating, income earning and food security staple food, especially for rural poor, makes it one of Nigeria's most important agro-processing activity. This makes it an important commodity worth examining as far as economic returns to the main value chain actors are concerned. This study is therefore imperative to fill this information gap and ascertain the economic performance of gari processing in the study area.

## Methodology

### *Study area*

This study was carried out in Ebonyi State, Nigeria. Ebonyi State is located in South-East geopolitical zone of Nigeria. The State is one of the six States created in 1996 by Late General Sanni Abacha's administration. Ebonyi is composed of thirteen Local Government Areas (LGAs) with an estimated population of 4,339,136 based on the 2005 census and the inhabitants are spread across 5,935 square kilometres (NPC, 2006). The State shares borders with Benue State to the North, Enugu State to the West, Imo and Abia States to the South and Cross River State to the East. The tropical climate of the State is broadly of two seasons which are the rainy season between April and October and dry season between November and March. The temperature throughout the year ranges between 21°C to 29°C and humidity is relatively high. The annual rainfall varies from 2,000mm in the southern areas to 1,150mm in the northern areas. The State enjoys luxuriant vegetation with high forest zone (rain forest) in the south and sub-savannah forest in the northern fringe (Ebonyi, 2011). The State is predominantly dominated by the Igbos with other minority ethnic groups from neighbouring States. The people are predominantly farmers and traders. The main crops produced in the State are rice, cassava, yam, palm produce, maize, groundnut, plantain, banana, fruits and vegetables.

### *Sampling procedure*

A multi stage random sampling technique was used for the study. The first was a random selection of one LGA from each of the three Agricultural Development Project (ADP) Zones in the State (Ebonyi-North, Ebonyi-Central and Ebonyi-South). The second was a random selection of two autonomous communities from each of the selected LGAs (Ohaukwu, Ezza-North and Ivo). The third involved a random selection of five villages from each of the selected autonomous communities. The final stage was a random selection of ten respondents from each village; giving a sample size of 300 respondents.

### *Analytical procedure*

A well structured questionnaire was employed for data collection and administered to the gari processors.

The inferential statistics used for this study include; farm enterprise budgeting and regression analysis. Enterprise budgeting was used to determine the gross margin and net farm income of the gari processors, while multiple regression analysis was used to determine the effect of some socio-economic factors on the economic returns of gari processing in the study area.

#### *a. Gross margin and net revenue analysis*

TC = TVC + TFC……(1)

GM = TR – TVC……..(2)

NI = TR – TC……(3)

RRI = NI/TC X100…...(4)

Where, TC = total cost, TVC = total variable cost, TFC = total fixed cost, GM = gross margin, TR = total revenue, RRI rate of return on investment, NI = net income.

#### b. Multiple regression analysis

The multiple regression model of the Ordinary Least Squares (OLS) was used to determine the influence of some socio-economic factors on the economic returns of gari processing. The implicit form of the model is specified as:

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9) + e \ldots\ldots (5)$$

The explicit form of the model is stated in the linear forms as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + e \ldots\ldots. (6)$$

Where:

Y = Profit (Returns per 1000kg of cassava root processed and expressed in ₦)

$\beta_0$ = intercept

$X_1$ = Age (years)

$X_2$ = Gender (dummy: male = 1, female = 0)

$X_3$ = Educational level (yrs)

$X_4$ = Household size (number)

$X_5$ = Labour access (dummy: hired = 1, family = 0)

$X_6$ = Processing experience (years)

$X_7$ = Cassava cost (dummy: high = 1, low= 0)

$X_8$ = Income level (naira)

$X_9$ = Access to formal credit (dummy: access = 1, no access = 0)

e = Stochastic error term

## Results and Discussion

### *Cost and returns analysis of gari processing*

The cost and returns analysis of the 300 gari processors indicated that gari processing was generally lucrative in the study area as it recorded both positive gross margins and net income (Table 1). The major cost components of gari processing enterprises were driven largely by variable cost items such as cost of cassava roots, transportation and labour. Cost of cassava roots is as high as ₦5, 000.00 per 100kg and increases in off-season. In most cases the processors travel to the farm

with the cassava farmers to buy and even assist in cassava root harvesting. Transportation or conveyance of cassava roots from either the farm or the market is also demanding. Cassava roots contain high percentage of water especially during the rainy season. As most rural roads are not accessible, processors resort to manual conveyance which is time demanding and expensive, thereby reducing the income of the processors. The same is applicable to firewood which is always scarce during the rainy season. The cost of other variable cost items such as peeling, washing, bagging, dewatering, sieving, garification, transport to market etc. are considerably low as most of these services are either rendered by family members or hired at a very cheap rate. Fixed cost items were very minimal. The net income accruing to the venture is ₦24,500 per 1000kg of cassava root processed. This indicates that gari processing is profitable since the processing period for 1000kg of cassava root does not exceed four days. Thus, the rate of return on investment of 25.85% indicates that the processors make a profit of ₦1.25 per ₦1 invested in

**Table 1: Costs and returns analysis of gari processing per 1000kg of cassava root**

| S/N. | Variable | Unit | Quantity | Unit Price (₦) | Total Amount (₦) |
|---|---|---|---|---|---|
| **1.** | **Revenue** | | | | |
| | Sales of gari | Basin | 20 | 6,000 | **120,000** |
| | **Total Revenue (TR)** | **-** | **-** | **-** | **120,000** |
| 2. | **Variable Cost** | | | | |
| | a. Cost of cassava roots | Per 100kg | 10 | 5,000 | 50,000 |
| | b. Transport home | Per bag | 10 | 200 | 2,000 |
| | c. Firewood | Bundle | 4 | 1,000 | 4,000 |
| | d. Peeling | Mandays | 5 | 1000 | 5,000 |
| | e. washing/bagging | Mandays | 2 | 500 | 1,000 |
| | f. Transport to machine | Per 100kg | 10 | 100 | 1,000 |
| | g. grating /dewatering | Per bag | 10 | 500 | 5,000 |
| | h. sieving | Per bag | 10 | 100 | 1,000 |
| | i. garification | Per bag | 10 | 500 | 5,000 |
| | j. bagging | Per bag | 10 | 300 | 3,000 |
| | k. transport to market | Per bag | 10 | 200 | 2,000 |
| | l. market ticket | Per bag | 10 | 100 | 1,000 |
| | m. transport home | - | - | 500 | 500 |
| | n. Miscellaneous | - | - | 5000 | 5,000 |
| | **Total Variable Cost (TVC)** | **-** | **-** | **-** | **85,500** |
| 3. | **Fixed Cost** | | | | |
| | Depreciated | - | - | - | 10,000 |
| | **Total Fixed Cost (TFC)** | **-** | **-** | **-** | **10,000** |
| 4. | **Total Cost (TC)** | **-** | **-** | **-** | **95,500** |
| 5. | **Gross margin** | - | **-** | **-** | **35,000** |
| 6. | **Net farm income** | - | **-** | **-** | **24,500** |
| 7. | **Rate of return on investment 9%)** | **-** | **-** | **-** | **25.65** |

**Source: Field Survey, 2020**

***Determinants of economic returns in gari processing***

Results showed that age was significant at 1% level and negatively related to economic returns on cassava processing in the study area (Table 2). This implies that any increase in age of the respondents will lead to a corresponding decrease in profit among gari processors. Thus, ageing reduces active participation in gari processing activities. This finding is consistent with that of Agbola *et al*. (2010) who noted that as household heads advance in age, their farm productivity declines, hence decreasing their level of commercialization and related activities. The coefficient of gender was negative and significant at 10% level. This implies that female processors made more economic returns than their male counterparts. This might because of the dominance of women in gari processing expertise which has given them some level of expertise in processing skills, which enhanced economic returns to them. The coefficient of processing experience was positive and significant at 5% level. This implies that any increase in processing experience will lead to a corresponding increase in economic returns among the gari processors. This is expected because processing skills will enhance gari output and quality, expected to impact on economic returns positively. The coefficient of income level was significant at 1% level and positively related to profitability of gari processing. This is an indication that increase in income level is directly proportional to profit level because availability of funds makes the respondents to take advantage of any business opportunity when it becomes available. This finding agrees with that of Onyegbulam *et al*. (2020). The coefficient of access to labour was also positive and significant at 1% level of probability; this implies that access to labour will lead to a corresponding increase in output and profit. This result is in tandem with the *a priori* expectation, given that family labour provides the respondents with readily available source of labour. The coefficient of cost of cassava root was negatively signed and significant at 1% level. This result implies that an increase in the cost of cassava root; which is the main raw material for gari processing would result in lower

profitability. The result consolidates Isibor and Ugwumba (2014), who obtained a similar outcome in their study on the determinants of water melon marketing in Nnewi Metropolis of Anambra State. The coefficient of household size was positive and significant at 10% level. This implies that increase in household size of the processor impacts on net revenue positively. Thus, gari processors tend to depend on their household members to assist them as they serve as a source of reliable and cheap labor, and therefore an important factor in profitability. The results of the analysis support *a priori* expectation that net returns to economic ventures are negatively impacted by expenditures and cost especially on variable inputs items. The coefficient of credit access was positive and significant at 5% level. This indicate that gari processors who have access to credit operate at higher income levels and make more profit than those without access. This confirms the assertion of Chikezie *et al*. (2012), who noted that credit plays a significant role in agribusiness agro-processing and positively impact profitability and that lack of it can affect economic returns.

**Table 2: Regression analysis results for factors influencing economic returns on gari processing**

| Variable | Linear | Exponential | Double log | Semi-log |
|---|---|---|---|---|
| Constant | 6462.18*** | 11.433*** | 1.246 | 24.33 |
| | (8.14) | (32.879) | (0.39) | (0.416) |
| Age ($X_1$) | -10112.22 | -0.003 | -5.107*** | 0.955*** |
| | (-0.983) | (-0.024) | (-3.789) | (12.873) |
| Gender ($X_2$) | 0.751*** | 0.298 | -0.214* | 0.2212 |
| | (5.387) | (0.123) | (-2.111) | (0.410) |
| Edu.level ($X_3$) | 24.157 | 0.968 | -0.67 | -874.25 |
| | (0.442) | (0.212) | (-0.556) | (-0.26) |
| Household size ($X_4$) | 1427.588** | 5.944E-8*** | 1.030* | 0.516** |
| | (2.329) | (6.422) | (1.685) | (2.342) |
| Labour access ($X_5$) | 3.679 | 6811.13*** | 0.577*** | 0.413*** |
| | (0.667) | (16.16) | (5.911) | (3.134) |
| Processing exp.($X_6$) | -3074.183 | 0.004 | 0.224** | -0.123*** |
| | (-1.581) | (1.350) | (2.081) | (-3.060) |
| Cassava cost($X_7$) | 2.623 | 8721.563*** | -0.749*** | 0.353*** |
| | (0.657) | (26.23) | (-6.718) | (3.299) |
| Income level ($X_8$) | 1.235 | 14.43*** | 0.5547*** | 6.593* |
| | (0.443) | (3.545) | (3.119) | (1.627) |
| Credit access ($X_9$) | 100.227*** | 4.391E-5 | 0.237** | 2.799 |
| | (4.317) | (0.118) | (2.099) | (0.285) |
| No. of observations | 300 | | | |
| R-squared | 0.863 | 0.872 | 0.898 | 0.737 |
| Adjusted R | 0.828 | 0.835 | 0.864 | 0.659 |
| F-ratio | 20.408*** | 25.307*** | 21.264*** | 8.527*** |

***Source: Field survey data, 2020***

## Conclusion

This study revealed that gari processing enterprise was profitable with gross margin and net income of ₦35,000.00 and ₦24,500.00 per 1000kg of cassava root processed respectively. Important factors influencing economic returns among the gari processors include; age, gender, and cost of cassava roots which were negative; and household size, labour access, processing experience, income and credit access which were positive. The results therefore call for policies aimed at encouraging more female gari processors who are still strong and agile to increase gari processing by provision of inputs and services at subsidized cost. These inputs and services are not limited to credit and labour saving devices to reduce the drudgery in processing. Processors should ensure that they source their raw materials from the cheapest sources possible.

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