

Economic Returns of Gari Processing Enterprises in the Mampong Municipality, Ghana

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Abstract – This study sought to ascertain the economic viability of gari processing enterprises in the Mampong District of the Ashanti Region under the Root and Tuber Improvement and Marketing Program (RTIMP). To determine the socio-economic characteristics, profitability and the factors influencing net margins accruing to processors, a multistage sampling technique was employed to gather data on 110 processors from across three communities in the district. Descriptive statistics, budgetary technique, and a multiple regression model were used to analyze data collected. The study revealed that gari processing was a female-dominated (84.5%) activity, with a majority (85%) aged between 31-50 years and a mean age of 46 years. Most of processors were married (86%), were either breadwinners or co-breadwinner (99%); and with an average household size of 7.3 persons. Most processors (71%) had only basic level education; had an average of 7.3 years of processing experience and 72% depended on personal savings as source of finance for business. The study also showed that gari processing was economically viable as it generated an average gross margin and net returns of GH¢31,038.85 and GH¢30,474.16 respectively very within the period. Again all the financial indicators namely operating ratio, profitability index, and rate of return were favorable at 0.59, 0.40 and 67% respectively. The key determinants of profitability or net returns to gari processing were access to labor, cost of cassava, labor cost, household size, credit access, and cost of fuel. Economic returns to gari processing enterprise in the study area can further be enhanced if processors are able to source cassava from cheaper sources, adopt more labor saving methods like mechanizing operations and assisted with cheaper loans or credit access.

Keywords – Gari Processing, Gross Margin, Multiple Regression, Net Returns, Profitability.

I. INTRODUCTION

Cassava (*Manihot essculenta Crantz*) is one of Ghana's foremost root crops widely cultivated on a commercial basis in at least in seven out of the ten regions. Cassava production in Ghana has received a massive boost in the last decade under the Root and Tuber Improvement and Marketing Program (RTIMP) sponsored by International Fund for Agriculture Development (IFAD) and the Government of Ghana. Data from MoFA indicates that area under cultivation increased by approximately 17% from 2005 to 2010 whereas output increased by 41% within the same period. Though national average output has remained low, at 13.8MT/Ha against the achievable yields of 48.7%, RTIMP beneficiary farmers have recorded 25-30MT/Ha [1]. The significance of cassava as a food security crop and more recently as a commercial cash crop is depicted in the several value-adding opportunities to the commodity through products like bio-ethanol for alcoholic beverages, dried chips for animal feed rations, high quality cassava flour (HQCF) and food products like gari.

A recent study by [2] showed that approximately 50% of cassava harvested in Ghana is either consumed or sold as fresh roots to produce (at household level) boiled or pounded cassava (*Fufu*). Of the remaining 50% approximately, 25% was used to produce *Gari* (roasted fermented cassava); 18% for *Agbelima* (fermented cassava mash); 6% for *Kokonte* (dried chips) and 1% used for industrial purposes. In another study, [3] reported that whiles cassava fresh roots fetched GH¢2/50kg, the prices received by processors of various cassava by-products in Ghana within the same period were as follows: *Gari* at GH¢ 45/50kg, *Agbelima* at GH¢ 25/50kg, and HQCF at GH¢ 40-50/50kg. It can be argued that under such market circumstances, *gari* is by far the preferred product to process and sell.

Processing of cassava offers huge opportunities for job creation, adds value to products, reduces waste through spoilage, improves acceptability and enhances the technical and marketing skills of rural people [4] [5]. *Gari* (a creamy-white, partially gelatinized, roasted fermented cassava with a sour taste) is by far the most important derivative of cassava in Ghana accounting for more than 50% of all processed cassava in Ghana. Production, consumption and utilization of *gari* is influenced by its storability (2-3years shelf-life), convenience, easy handling, relatively cheaper price and high demand especially as it forms part of weekly menu of almost all second cycle institutions in Ghana. There is a growing export market for Ghana's *gari* to Europe and West Africa including the Gambia, Sierra Leone, Niger and Liberia. *Gari* processing in Ghana is basically at the artisanal level, dominated mostly by women in the rural and a few peri-urban areas. 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-industrial venture with potential returns. [6] suggest that processing of cassava can guarantee much higher income for processors, and as much as 50% profit [2]. The extended shelf-life, ready to eat, enhanced value and convenience of *gari* has enabled significant domestic trade in the commodity in Ghana. Garification (the process of roasting partial fermented grated cassava dough) though a predominantly rural-based agro-based activity, involves some investment in processing equipments, transportation, fuel/energy, packaging, labour, marketing and sales.

The focus of the RTIMP in Ghana, which is to improve rural livelihoods and poverty reduction using cassava as one of the commodity chains, clearly falls in tandem with the Millennium Development Goal – 1. In furtherance of its goal therefore, the RTIMP has supported the construction of about ten (10) Good Processing Centres (GPC's) between 2010 and 2012 to support the processing

of high quality cassava by-products, with gari as the leading commodity. The fact that gari lends itself as an employment generating, income earning and food security staple food especially for rural poor women, makes it one of Ghana's most important agro-processing activity. The widespread consumption of the staple in both rural and urban areas especially amongst secondary schools across Ghana, makes it an important commodity worth examining as far as economic returns to the main value chain actors is concerned.

Performance analysis of most development projects, have focused extensively on qualitative and quantitative parameters like number of beneficiaries, gender mainstreaming issues, degree of technology adoption, income generation prospects, etc. This study fills the gap by providing empirical evidence to measure performance with specific reference to the financial returns using the budgetary technique to analyze important financial indicators and thus benefits to operators.

This study therefore seeks to ascertain the economic performance of gari enterprises or processors who have benefitted from the RTIMP interventions. The study would address issues such as whether gari processing is a profitable agro-based venture? If so, what is the extent of profitability? What factors determine or influence the level of profitability of gari processing?

The specific objectives of this study are:

- (a) To identify and describe the socio-economic characteristics of gari processors
- (b) To analyze the profitability of gari processing units/enterprise
- (c) To analyze the socio-economic factors that influences the profitability of gari processors net returns

II. RESEARCH METHODOLOGY

A. Study Area and Location

The study was conducted in the Mampong Municipal which is one of the twenty seven (27) administrative districts in the Ashanti region of Ghana. Mampong is located on the northern part of the region, and shares boundaries with Atebubu district, Sekyere East district, Afigya-Sekyere district, and Ejura Sekyeredumasi district to the north, east, south, and west respectively. The Municipal is located within longitudes 0.05°W and 1.30°W and latitudes 6.55°N and 7.30°N. The Mampong Municipal area which covers a total land area of 2,346km² is made up of about some 220 settlements and mostly rural in setting. The study was undertaken in three major communities namely Kyerimfaso, Krobo, Nsuta and Mampong township. According to the 2010 Population and Housing census the Mampong Municipal has a population of 201,444 people. The predominant economic activity is agriculture, although commerce and agro-processing are also important.

B. Sampling Technique and Data Collection

The study used both primary and secondary data. Primary data, which was basically cross-sectional, was gathered from a total number of one hundred and ten (110) gari processors sampled from the Mampong district in the

Ashanti region. A multi-stage sampling technique was used. First, a purposive sampling technique was used to select three communities within the Mampong Municipal which constitute one of the RTIMP focused areas or zones. Next, with the assistance of extension personnel from MoFA in the Mampong, 110 gari processing enterprises were selected randomly from four communities namely: Nsuta, Kyerimfaso, Krobo and Mampong municipal.

The data collection instrument employed was a well structured questionnaire administered to the gari processors. The questionnaires were mostly closed ended in order to obtain more accurate responses for better analyses of data. The key areas of data collected included – the socio-economic characteristics of the respondents, the cost elements including fixed cost items, and revenue, and constraints as captured for the year 2012.

C. Analytical Framework and Data Analysis

Both descriptive and inferential statistics were used to analyze data collected from the survey. Descriptive statistics such as percentages, frequency, means, etc was used to describe the socio-economic characteristics of gari processors. The inferential statistics included cost and revenue, average annual returns, rate of returns and regression analysis. To determine the economic returns of gari processing enterprises, the budgeting technique was employed, more specifically, to determine the gross margins and net income from the 110 processors. Statistical software PASW-SPSS version 18.0, STATA and MS-Excel were used to analyze both qualitative and quantitative data gathered from respondents.

D. Gross Margin and Net Margin Analysis

The farm budgeting technique was used to determine the gross margins and net income from respondent. Gross margin is a technique that is used to ascertain the economic viability of small enterprise. Though a very simple tool, [7] asserts that it is a sufficiently powerful tool for economic analysis. Gross margin was used on the assumption that most rural based agro-processing activities do not incur massive capital expenditure items and secondly because gross margins is a highly convenient, widely used method and quick means to ascertain the profitability of most enterprises. The analysis therefore involved collection of data on variable cost items such as cost of cassava tubers, labor, transport, fuel etc and income from the sale of gari. Fixed cost involved in gari processing activities was ascertained mainly from depreciation of processing equipments and tools like grating machine, peeling knives, frying saucepans, stools etc. The gross margin is calculated as the difference between the total revenue and the total variable cost. And the net profit as the difference between the gross margin and fixed cost involved in production.

The mathematical model adopted to determine profitability using the gross margin and net revenue, is stated as:

$$GM_{ij} = \sum(TR_{ij} - TVC_{ij}) \dots \dots \dots (1)$$

$$TR_{ij} = P_{ij} \times Q_{ij} \dots \dots \dots (2)$$

$$NR_{ij} = TR_{ij} - (TVC_{ij} + TFC_{ij}) \dots \dots \dots (3)$$

Where

GM_{ij} = Average gross margin in GH¢, earned by processors $i=1,2,3,\dots,n$

TR_{ij} = Total revenue in GH¢ earned by i th processor for j th gari output

TVC_{ij} = Total variable cost in GH¢ incurred by i th processor for j th gari output

P_{ij} = Unit price in GH¢, for i th processor for j th gari output

Q_{ij} = volume/quantity of gari in kg, sold by i th processor for j th gari output

NR_{ij} = Net revenue in GH¢ incurred by i th processor for j th gari output

TFC_{ij} = Total fixed cost in GH¢ incurred by i th processor for j th gari output

Indicators and Measures of Profitability

$$\text{Profitability Index (PI)} = \frac{NI}{TVC} \dots \dots (4)$$

$$\text{Rate of Return (ROR)} = \frac{GM}{TVC} \dots \dots \dots (5)$$

$$\Pi = f (AGE, GEND, EDUCL, PROCEXP, LABSIZ, HHSIZE, ACRDIT, FTRG, OINCOM, CASSCOST, FCOST, TRASCOST, BSKTCOST, LABCOST,) \dots \dots \dots (7)$$

The explicit form is stated in the linear, semi-log and double log form as:

$$\text{(Linear): } \Pi = \beta_0 + \beta_1 AGE_1 + \beta_2 GEND_2 + \beta_3 EDUCL_3 + \beta_4 PROCEXP_4 + \beta_5 LABSIZ_5 + \beta_6 HHSIZE_6 + \beta_7 ACRDIT_7 + \beta_8 OINCOM_8 + \beta_9 CASSCOST_9 + \beta_{10} FCOST_{10} + \beta_{11} LABCOST_{11} + \beta_{12} TRASCOST_{12} + \beta_{13} BSKTCOST_{13} + \beta_{14} FTRG_{14} + \epsilon_0 \dots \dots \dots (8)$$

$$\text{(Semi-log): } \Pi = \beta_0 + \beta_1 AGE_1 + \beta_2 GEND_2 + \beta_3 \log EDUCL_3 + \beta_4 \log PROCEXP_4 + \beta_5 \log LABSIZ_5 + \beta_6 \log HHSIZE_6 + \beta_7 ACRDIT_7 + \beta_8 OINCOM_8 + \beta_9 \log CASSCOST_9 + \beta_{10} \log FCOST_{10} + \beta_{11} \log LABCOST_{11} + \beta_{12} \log TRASCOST_{12} + \beta_{13} \log BSKTCOST_{13} + \beta_{14} FTRG_{14} + \epsilon_0 \dots \dots \dots (9)$$

$$\text{(Double log): } \log \Pi = \beta_0 + \beta_1 AGE_1 + \beta_2 GEND_2 + \beta_3 \log EDUCL_3 + \beta_4 \log PROCEXP_4 + \beta_5 \log LABSIZ_5 + \beta_6 \log HHSIZE_6 + \beta_7 ACRDIT_7 + \beta_8 OINCOM_8 + \beta_9 \log CASSCOST_9 + \beta_{10} \log FCOST_{10} + \beta_{11} \log LABCOST_{11} + \beta_{12} \log TRASCOST_{12} + \beta_{13} \log BSKTCOST_{13} + \beta_{14} FTRG_{14} + \epsilon_0 \dots \dots \dots (10)$$

F. Description of Variables

The dependent variable Net Profit (Π) is obtained as the product of quantity of gari (kg) and the price at which gari was sold (GH¢) minus the total cost. The independent variables that account for net profit are explained as:

β_0 = intercept of the regression equation
 $\beta_1 \dots \beta_{14}$ = vector of unknown coefficients (parameters to be estimated)
 ϵ_0 = error term

AGE = age of processor measured in years. Younger or more youthful processors are expected to be enterprising and therefore achieve greater output than much older processors.

GEND = Gender of processors, this is made of males and females. Female processors are expected to earn higher income than their male counterparts since females are better versed in food processing activities. The variable is measured as a dummy '1' = female and '0' = male.

EDUCL = Educational level of processors (measured in years). Processors with much higher level of formal education are expected to have better access to market information, new technology, credit that are critical to

$$\text{Rate of Return on Investment (RRI)} = \frac{NI}{TC} \times 100 \dots \dots \dots (6)$$

Where NI = Net Income or Net Revenue

TVC = Total variable cost

GM = Gross Margin

TC = Total Cost

E. Multiple Regression Analysis

The multiple regression model of the Ordinary Least Squares (OLS) was used as a tool to determine the effect of the factors that account for profit levels accrued to gari processing enterprises. Regression analysis was conducted using STATA. The factors which were basically the socio-economic characteristics of processors that were identified to affect profit included – age, gender, educational status, household size, labor access, processing experience, membership of association, other source of income, and access to credit etc. The model is implicitly specified as:

effective business decision making and thus earn higher income and vice-versa.

PROCEXP = Experience in gari processing (measured in number of years). Processors with more years of processing activity are expected to be more effective in agro-processing and thus capable of earning higher in terms of output and incomes than those with less experience.

HHSIZE = Household size. This refers to the number of people in the household of the processor. Household members are expected to provide readily available or cheap or even free labor that can reduce production cost, increase output and profits and vice-versa. Processors with large household numbers would tend to earn much higher profit levels.

OINCOM = Income from other sources. Processors who earn income from other sources are expected to be better placed to inject extra resources (cash) in gari processing enterprise and thus perform better than their counterparts whose sole source of income is gari. Variable is a dummy, '1' being access to extra income and '0' as otherwise.

ACRDIT = Access to credit or financial services. A processor with access to financial services is expected to acquire production resources, increase output and

therefore profit, compared to processors who depend entirely on personal savings and have no access to formal credit for production. The variable thus assumes a dummy of '1' if respondent has access to credit and '0' otherwise.

FTRG = Formal training. The Good Processing Centers of RTIMP provides technological innovations and business management skills to processors to enhance their performance. Variable assumes a dummy of '1', if processor has acquired formal training in agro-processing and '0' if otherwise.

LABSIZ = Number of employees or paid labor used by processors is expected to increase output and returns to enterprises.

CASSCOST = Cost of cassava, in Ghana cedis (GH¢). Cassava is the main raw material used in gari processing. Ceteris paribus, processors who are able to source for cassava tubers at a cheaper rate, would tend to minimize cost and maximize profits, and vice versa. Cost of cassava thus impact negatively on gross margins/net returns.

FCOST = Cost of fuel, also measured in Ghana cedis (GH¢) is expected to affect gross margins and net returns. Ceteris paribus, high fuel cost will raise production cost and therefore negatively affect profitability.

TRANSCOST = Cost of transport, measured in Ghana cedis (GH¢) is expected to affect gross margins and net returns. Cassava is bulky and transportation from farm

gate to processing site can be a major contributor to the cost for processors, and thus reduce net returns.

LABCOST = Labor cost, measured in Ghana cedis, (GH¢). Gari processing is a laborious activity and therefore consumes a lot of labor. Processors margins would thus be affected depending on the source and cost of labor available. [8] confirms that cassava processing is very labor demanding and constitute a heavy burden on women.

ϵ_0 = error term. This accounts for variables not captured in the model.

III. RESULTS AND DISCUSSION

A. Socio-economic Characteristics of Gari Processors in the Study Area

Results of the socio-economic variables of respondents are presented in Table 1. Analysis of data gathered from the study showed that gari processing is dominated by females (84.5%), an assertion confirmed by [9] and is similar to the findings of [10] and [2]. The dominance of women in food processing in Africa is well acknowledge and proven [9]. Majority of the processor (54.5%) were aged between 41-50 years and a mean age of approximately 40 years, suggesting that more middle aged persons are engaged in food processing.

Table 1: Demographic Characteristics of Respondents in the Study Area

Variable	Category	Percentage (%)	Mean	S.D
Gender	1=Male	15.5	0.15	0.36
	0=Female	84.		
Age	18-25yrs	4.5	39.99	7.73
	26-30yrs	4.5		
	31-40yrs	30.9		
	41-50yrs	54.5		
	50+ yrs	5.5		
Marital Status	1=Married	86.4	0.86	0.34
	0=therwise	13.6		
Educational Level	1=Illiterate	22.7	1.85	0.58
	2=Basic School	70.9		
	3=Secondary	5.5		
	4=Tertiary	0.9		
Household size	1=1-5	28.3	7.38	3.16
	2=6-10	59.0		
	3=11-15	12.7		
House status	1=Breadwinner	30.9	1.71	0.51
	2=Co-breadwinner	68.2		
	3=No obligation	0.9		
Other Source of income	1=Yes	43.6	1.60	1.51
	0=No	56.4		
Formal training	1=Yes	52.7	1.47	0.50
	2=No	47.3		
Sources of finances	1=Personal	72.0	1.60	1.51
	2=Family/Friends	18.0		
	3=Money lender	4.0		

	4=Formal Institution	6.0		
Years in Gari Processing	1=1-5 yrs	39	7.37	3.88
	2=6-10yrs	45.5		
	3=11-15yrs	12.8		
	4=16-20yrs	2.7		
Number of employees	1=1-5	76.4	4.24	2.53
	2=6-10	21.8		
	3=11-15	1.8		

Source: Field Survey, 2012.

On the whole the venture was dominated by the economically active and more energetic people, aged between 18–50 years old, which form over 90% of the respondents, signifying the laborious nature of the activity. Most of the processors (86%) were married, while only 6.4% were single. The dominance of married people in the business is not surprising since they generally have financial obligations as breadwinners towards their dependents. The educational status of respondents were rather very low as expected, in that only one person (0.9%) had tertiary education, 6 (5.5%) had secondary education while the majority 78 (70.9%) had basic education of approximately between 6-10 years. The remaining 22.7% were complete illiterates. The relatively low educational status of respondents is not surprising given the fact that most rural agro-industrial processing activities are at the artisanal stage and thus may not demand any higher level of academic experience. The household size of respondents ranged from one to fifteen, with an average size of 7.4. Most gari processors from the survey were either the household head or breadwinner (30.9%) or co-breadwinners (68%). This result is not surprising, since majority of the women were married and therefore bore some responsibility for upkeep of their children. The number of years in gari processing venture averaged 7.4 years working experience, with more than 52% indicating that they had some form of formal training in gari processing particularly under the RTIMP. Though gari processing is an important agro-enterprise in the study area, 62 (43.6%) of the respondents stated that it was their only or main source of income, while 48 (56.4%) claimed they had other sources of income either as petty traders or food crop farmers. The last socio-economic variable assessed was the agribusiness financing issue.

The study showed not surprisingly though, that all 110 processors used internally generated incomes for their start-up operations. It was also quite revealing that even for scaling up of business operations, 72 per cent of processors claimed they relied on personal finance, 18 per cent on family sources, 4 per cent on local money lenders and 4 per cent on rural banks. Though approximately 56 per cent of processors indicated they had access to some formal financial institutions (mainly rural banks, savings and loans companies, and micro-finance institutions), only seven (4%) of them indicated they had secured some form of assistance from these formal sectors. Access to and actual demands for financial services are rather different sets of issues.

B. Profitability Analysis of Gari Processing Enterprises

The Profitability analysis of the 110 respondents in the study area for the year 2012, indicated that gari processing was generally profitable, recording both positive gross margins and net profits. The major cost components of gari processing enterprises were driven largely by variable cost items.

Table 2: Average Annual Returns for Gari Processing Enterprises in Study Area

Variables / Items	Value in GH¢	Percentage (%)
Gross Revenue	75,866.18	
Variable Cost:		
Cassava tubers	27,202.91	61%
Labor	9,494.40	21%
Fuel	3,678.11	8%
Transport	2,868.65	6%
Baskets/Sacks	565.53	1%
Miscellaneous	1,018.04	2%
Total Variable Cost	44,827.64	100%
Gross Margins	31,038.55	
Fixed Cost:		
Depreciation of Fixed Asset	564.38	
Net Margins	30,474.16	

Source: Field Survey, 2012

The major cost items in value and percentage points were fresh cassava tubers GH¢27, 202.91(61%), labor at GH¢9, 494.40 (21%), fuel GH¢3,678.11 (8%) and transport cost GH¢2,868.65(6%), as indicated in Table 2. Gross margins and net returns to gari production were therefore influenced largely by cost of cassava tubers, labor cost (mainly peeling, grating, sifting and roasting) and the cost of fuel which was mainly from fuel wood. The result follows a similar trend as observed by [11] which showed that the major cost centers of gari production were cassava tubers and labor.

Table 3 provides a summary of various scenarios of financial analysis on the 110 gari processing enterprises. The gari processing activity for the 110 processors as a whole was deemed as viable enterprise. Total revenue accruing to the ventures ranged between a minimum of GH¢40,800 and a maximum of GH¢ 207,360.00; total variable cost ranged between GH¢19,008.00 to GH¢144,480.00, and total fixed cost between GH¢246.00 to GH¢2,886.00. This yielded gross margins and net returns ranges of between GH¢ 5,472.00 to GH¢68,160.00

and GH¢4,988.40 to GH¢65,692.50 respectively. In other words, the least net returns to the enterprise was GH¢4,988.40 while the highest return was GH¢65,692.50. Given that the daily minimum wage in

Ghana in 2012 was GH¢4.48, an average worker would be earning approximately GH¢1,613.00 per annum, which is 210% less than the net income earned by the lowest earning processors in the study area.

Table 3: Summary of Cost and Returns on Gari Processing Enterprises

VARIABLE	VALUE IN GH¢			
	TOTAL	MINIMUM	MAXIMUM	MEAN
Total Revenue (TR)	8,164,800.00	40,800.00	207,360.00	75,866.18
Total Variable Cost (TVC)	4,931,040.00	19,008.00	144,480.00	44,827.64
Total Fixed Cost (TFC)	62,320.40	246.00	2,886.00	564.38
Total Cost (TC)	4,993,360.40	19,254.00	147,366.00	45,392.02
Gross Margin (GM)	3,223,760.00	5,472.00	68,160.00	31,038.55
Net Returns (NR)	3,171,439.60	4,988.40	65,692.50	30,474.16

Source: Field Survey, 2012

In analyzing the average returns for enterprises as presented also in Table 4.3, it was realized that, the total variable cost of gari processing averaged GH¢44,827.64 whereas average fixed cost was estimated at GH¢ 564.38, thus giving a total cost of GH¢45,392.02. Estimation of sales from the 110 enterprises was valued at GH¢ 75,866 as the average total revenue for the season, and this yielded a gross margin of about GH¢ 31,000 and a net profit of GH¢ 30,400. Gari processing was therefore found to be a highly profitable enterprise in the study area within the period. It can be inferred from the budgetary analysis that gari processing is a profitable venture with variable cost accounting for more than 98% of total cost, while fixed cost accounted for only 2%. This suggests that for processors to be efficient and improve their profitability, they need to seriously reduce their cost of production such as sourcing from more cheaper sources, reducing labor cost through mechanization etc.

The study further assessed the extent or degree of economic viability of processing enterprises by analyzing other financial indicators. A summary of the analysis is presented in Table 4.

Table 4: Summary of Financial Indicators of Gari Processing Enterprises

VARIABLE	VALUE
Gross Margin (GM)	GH¢31,038.55
Net Returns (NR)	GH¢30,474.16
Profitability Index (PI)	0.40
Operating Expense Ratio (OR)	0.59
Rate of Return on Investment (RRI)	0.67 (67%)

Source: Field Survey, 2012

First, the operating ratio (OR) was estimated to be 0.59, which suggests that variable cost accounted for 59% of sales. This is not surprising since gari processing variable cost items account for over 90% of total production cost. Next, the Profitability Index (PI) was estimated to be 0.40. This indicates that 40% of the total revenue generated was made up of net income, which suggests a good positive

indicator of enterprise viability. This result is similar to the findings of [10] and [11], who realized favorable PI of 0.35 and 0.42 respectively. Next, the rate of return on investments (RRI) was calculated to be 0.67, indicating that for every GH¢1.00 invested in processing activity, a net profit of 67% accrued to processors. The favorable RRI is also in line with the findings of [12] and [11] where gari producers realized RRI of 86% and 73% respectively. A summary of profitability indicators as presented in Table 4 suggests that gari processing enterprises in the study area was by and large profitable for a typical agro-based industry as all profitability indicators were favorable.

C. Regression Analysis of Determinants of Profitability of Gari Processors

Table 5 shows the output from a STATA analysis on the factors that influenced net returns to gari production in the study area. The results from the regression analysis suggest that the model is statistically significant at 1% level (Prob (F) = 0.000). The coefficient of multiple determination (R^2) was 0.76 which implies that 76% of the variation in profitability of gari processing enterprise were explained by the explanatory variables included in the model while the remaining 27% was as a result of residual error. Six out of the fourteen variables regressed on the dependent variable, were statistically significant and met their a-priori expectation. These were access to labor, household size, credit access, cost of cassava tubers, cost of fuel and cost of labor. The results show that number of workers/labor employed for the processing of gari significantly impact on net of return at 1% level. This implies that a 1% increase in the number of labor employed leads to about a percentage increase in income of processors in the industry. The result also shows that a percentage increase in household size contributes to 0.2 percent increase in net revenue and this is significant at 10% level. Increase in household size of the processor impacts on net revenue positively. 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 regression results

indicate that the predicted net returns is approximately 80% higher for processors who had access to credit facility, holding other variables constant and thus is significant at 10% level. This confirms the assertion by

[13] and [14] that credit plays a significant role in agribusiness agro-processing and positively impact profitability and that lack of it can affect economic returns [15].

Table 5: Double log Regression Results of Determinants of Net Returns to Gari Processing by Respondents in the Study Area

Source	SS	Df	MS			
Model	9.02732963	14	.644809259	Number of obs = 110 (F14,95) = 21.05 Prob>F = 0.0000 R-Squared = 0.7563 Adj R-Squared = 0.7203 Root MSE = 0.17501		
Residual	2.90961981	95	.030627577			
Total	11.9369494	109	.109513			
LgNET_RETURN	Coef	Std. Err	T	P> t	95% Conf. Interval	
AGE	-0.3222037	0.3162715	-1.02	0.311	-0.950082	0.3056746
GEND	0.0564296	0.0469802	1.2	0.233	-0.0368378	0.149697
LgEDUCL	0.0115988	0.0431168	0.27	0.789	-0.0739989	0.0971966
LgPROCEXP	-0.0347116	0.0961551	-0.36	0.719	-0.2256036	0.1561805
LgLABSIZ	1.026088	0.1079026	9.51	0	0.8118743	1.240302
FTRG	0.0054506	0.0380539	0.14	0.886	-0.0700959	0.0809971
LgHHSIZE	0.2107966	0.1133949	1.86	0.066	-0.0143207	0.4359139
ACCRDIT	0.0801718	0.048135	1.67	0.099	-0.0153883	0.1757319
OINCOM	0.0148064	0.041453	0.36	0.722	-0.0674882	0.0971009
LgCASSCOST	-0.282925	0.1347287	-2.1	0.038	0.0154548	0.5503953
LgFCOST	-0.1698534	0.0913458	-1.86	0.066	-0.3511977	0.011491
LgLABCOST	-0.1872583	0.091362	-2.05	0.043	-0.3686349	-0.0058818
LgBSKTCOST	-0.0252974	0.0804412	-0.31	0.754	-0.1849933	0.1343985
LgTRANSCOST	-0.0885859	0.0887883	-1.00	0.321	-0.2648531	0.0876812
_Cons	4.109007	0.771071	5.33	0.000	2.578238	5.639777

Source: Field Survey, 2012.

The budgetary analysis showed that variable cost items led by cost of cassava labor and fuel were the major cost drivers of gari processing. Cost of inputs such as cassava tubers which is the main input, fuel and labour negatively influence net revenue at 5%, 10% and 5% significant levels respectively. The cost of cassava ranges from a minimum of 19 percent to 80 percent of the total cost with an average cost of about 61 percent. Regression analysis show that, a percentage increase in the cost of cassava leads to about 0.3 percent decrease in net revenue. Similarly, a percentage increase in cost of fuel and labor precipitate about 1.7 percent and 1.9 percent decrease in net revenue respectively. The findings support a priori expectation that net returns to economic ventures are negatively impacted by expenditures and cost especially on variable inputs items. Gender, education, formal training, income sources, age, experience, cost of basket and cost of transport were not statistically significant at 5% and 10% levels, and thus did not influence net returns to gari processing business.

In summary, the determinants of profitability (net returns) in gari processing were found to be the cost of inputs like cassava tubers, labor, fuel in addition to access to credit, labor and size of household. As a matter of financial viability and sustainability of gari enterprises, operators should aim at developing strategies to reduce

cost of inputs, acquire/access modern processing technologies through mechanization methods and improved marketing technologies.

IV. CONCLUSION AND RECOMMENDATION

Gari processing in the Mampong Municipality of the Ashanti Region of Ghana is a female dominated agro-enterprise that was operated mostly by the youthful and middle aged women. The gari production business was found to be profitable with the average gross margin and net returns of GH¢31,038.85 and GH¢30,474.16 respectively. Similarly, all the selected economic and financial indicators were positive and thus further confirm the assertion that gari processing can be an effective agri-business venture and a means of livelihood for most rural dwellers, particularly women. The major cost components of gari processing were found to be the total variable cost – mainly cassava tubers, labor cost, fuel cost, and cost of transport respectively. The major determinants of net returns to gari processing were access to labor, household size, credit access, cost of cassava tubers, cost of fuel and cost of labor. Thus to further enhance the financial viability and economic returns of gari processing, the processors should be encouraged and supported by

agencies like MoFA, RTIMP, etc to design more cost minimization measures particularly by sourcing for inputs such as cassava, labor and fuel from cheaper sources.

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