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FINANCIAL PERFORMANCE AND CONSTRAINTS IN GARI PRODUCTION IN KUMASI, GHANA

Nimoh F[1]*, Richmond Anaman R[1], Asiamah MT[1], Yeboah B[1], Agyekum I[1], Kpe PDK[1] and DK Kouao[1]

Nimoh Fred

*Corresponding Author Email: frediemoh@yahoo.com / fnimoh.agric@knust.edu.gh

[1]Department of Agricultural Economics, Agribusiness and Extension
Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

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ABSTRACT

Gari is a crisp and crunchy West African food made from grated cassava with the excess liquid dried out. It is a major food security product consumed by most households and students in second cycle institutions in West African. Gari production is an important source of livelihood for many women in the informal sector in Ghana. It serves as a vital avenue for value addition to cassava, thus helping to address the problem of post-harvest losses and generating income for producers. This study assessed the financial performance and constraints in gari production in Kumasi, Ghana. Primary data from a cross-sectional survey of 46 gari producers who were identified using snowball sampling technique was used. Descriptive statistics, profitability indicators, and a 5-point Likert scale were used to analyse the primary data. Results showed that gari production is predominantly done by women 30-75 years old with a mean age of 50 years. Majority of producers had no formal education (57%) and had been in production for an average of 24 years. It was found that gari production in Kumasi is financially profitable, with all the profitability indicators employed showing positive returns on inputs employed in production, although the values were less competitive relative to other producers' values elsewhere. The profit margin was favourable at 22%, return on capital employed (ROCE) at 29% and operating expense ratio at 76%. The relatively low ROCE of 29% compared with the opportunity cost of capital (31%) by commercial banks in the study area indicates the underutilization of producers' capital in gari production. Key constraints identified in the gari production business were seasonality and high cost of cassava. Adoption of cost-effective management strategies and release of all year round cassava varieties could help improve gari production and livelihoods of producers and other actors along the cassava value chain.

Key words: Cassava, Gari, Production, Profitability, Constraints, Women, Livelihood, Kumasi-Ghana

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INTRODUCTION

Processing of cassava into local products such as *fufu*, *agbelima*, *agbelikaklo*, and *gari* is vital as these foods serve as a source of nutrients and livelihood for many people in Ghana and West Africa. Gari is the most commercialized cassava product as it constitutes about seventy percent of all cassava products in Ghana [1, 2]. Its wide consumption is attributed to its relatively long shelf life and ease of preparation for consumption. Cassava processed into gari makes the root tuber overcome its main challenge of high perishability; fresh cassava tuber may not last for more than four days after harvesting.

The growing demand for gari among consumers, especially students and workers in Ghana and abroad, provides an opportunity for cassava farmers and gari producers to expand and sustain their businesses. In Ghana, improvements in gari production have helped address food security problems and also provided income for the sustenance of standard of living, particularly among women. However, gari production has some challenges and consumers also perceive the product as inferior and are, thus, not willing to pay a good price for the product. Meanwhile, gari producers incur high costs in acquiring inputs for their operations with the high costs mainly attributed to the transportation of cassava tubers for processing [3], other challenges as seasonality of cassava tubers, incidence of decay and other poor storage conditions of cassava tubers, which all escalate the cost of production.

There is a dearth of knowledge on the costs and returns and challenges associated with gari production in urban communities where consumption of gari is relatively high. Access to such information is vital for decision-making by producers, policymakers and other stakeholders in this business. The importance of gari production, particularly as a source of livelihood for women and the economy as a whole, necessitates an investigation into the (financial) performance and constraints in production to help generate information for investment decisions and policy formulation.

METHODOLOGY

Description of the study area

The study was conducted in the Kumasi Metropolis, the capital of Ashanti region and the second largest city in Ghana. Kumasi covers a total land area of 254 square kilometres, with a total population of 2,069,350 and a population density of 8,100/km$^{2.}$ The majority (86%) of the active population in Kumasi are economically active with an annual population growth rate of 5.47 percent [4]. It encompasses about 90 suburbs, many of which were absorbed into it as a result of the process of growth and physical expansion. The economic activities sustaining the livelihood of the residents in the Metropolis can be categorized into Service (Trade/Commerce) 72%; Industry 23%; and Agriculture 5% [5].

Sampling and data collection

The study used primary data from 46 gari producers in Kumasi who were identified through snowball and census sampling techniques. This non-probability technique was employed because the producers could not easily be identified individually and had to

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depend on identified gari producers to reach others. The inadequate number of gari producers in the study area led to the consideration of the entire producer-population for the study. Primary data such as socioeconomic characteristics, cost, returns, and constraints were collected with the use of a semi-structured questionnaire.

Analysis

Descriptive statistics were used to summarise the data for the study. Profitability indicators were used to assess the financial performance of gari production, and a 5-point Likert scale was used to assess the constraints in production.

Gross margin, defined as gross income less variable costs, was employed to assess the effect of direct inputs costs (variable costs) on revenue.
The gross margin technique is expressed as [6]:

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

$$TR = P \times Q \quad (2)$$

Where, GM = Gross Margin, TR = Total Revenue, TVC = Total Variable Costs including cost of cassava roots, labour cost, fuel cost, grating cost, among others, P = the unit price in GH¢ for producers' output, Q = the quantity/amount of Gari in kilogram (kg) sold by the producers. Moreover, the net income (NI) was computed as follows:

$$NI = TR - TC \quad (3)$$

$$NI = TR - (TFC + TVC) \quad (4)$$

Where TC = Total cost of Gari production comprising total fixed costs (TFC) such as depreciation of fixed assets like frying pan, and total variable costs (TVC), NI = Net income in GH¢ ascertained by Gari producers for their output.

Profitability indicators such as profit margin, rate of return on variable cost, rate of return on investment and undiscounted benefit-cost ratio were used to assess the efficiency of resources used or return per inputs employed in gari production in the study.

Indicators and measures of profitability:

$$Profit\ margin\ (PM) = (NI / TR) * 100 \quad (5)$$

$$Rate\ of\ return\ on\ variable\ costs\ (RVC) = (GM / TVC) * 100 \quad (6)$$

$$Undiscounted\ benefit\text{-}cost\ ratio\ (UBCR) = TR / TC \quad (7)$$

$$Operating\ expense\ ratio\ (OER) = TVC / TR \quad (8)$$

$$Return\ on\ capital\ employed\ (ROCE) = NI / TC \quad (9)$$

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*Gross profit margin = (GM / TR) * 100* (10)

Revenue per employee = TR / No. of employees (11)

Moreover, the economic profit was computed to estimate the economic value added (EVA) to capital for production. The economic profit is measured as the product of the economic capital employed and the difference between return on capital employed and economic cost of capital [7], expressed mathematically as:

$EP = (r-c) * K$ (12)

Where EP = Economic profit (or economic value added- EVA)
r = Returns on Investment
c = Cost of Capital
K = Capital Employed

If EP > 0, it means value added and thus gari producers are performing well, and
If EP ≤ 0, it means no value addition/ breakeven or gari producers are not performing well.

A 5-point Likert scale was used to analyse the constraints in gari production. Respondents ranked the identified constraints in the range of most important (5) to the least important (1) based on the severity of the constraint on the gari production business. The computed mean scores of the ranked constraints were used to conclude on the severity of the constraints with the highest mean score being the most severe constraint.

RESULTS AND DISCUSSION

Descriptive statistics

The results in Table 1 show the socio-economic characteristics of gari producers. It was found that gari producers in Kumasi have a minimum age of 30 years and a maximum of 75 years with the mean age of 50 years. This shows that the respondents are almost at the onset of their old age, though they were found to be very active in their production activities during the survey and thus capable of engaging in economic activities to generate income for the sustenance of their households. The mean age concurs with other studies [8] that more middle- and old- aged persons are engaged in gari production.

All respondents considered were females (100%). This indicates that gari production is a female business and almost all the production activities are done at locations closer to their place of residence, therefore, keeping the females engaged during most times of the day. More than half (56%) of the respondents were married, and the average family size of producers was six persons. It was found that producers use family labour in their operations. The results showed that about two-thirds (63%) of the producers were co-breadwinners contributing to the upkeep of their households; this signifies the importance of gari production as a livelihood activity and, thus, the role of the producers (women) in supporting the sustenance of their households.

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The educational level of respondents was very low; more than half (57%) had no formal education. Like the number of respondents who attended primary school only, the proportion of respondents who attended both primary and Junior High School (JHS) was 20% of the sample. Only 4% of the respondents had Senior High School (SHS) education. This is not surprising since gari production, like other artisanal works, is a skilled job which requires less sophisticated technology for production, though it can be noted that the level of education influences the level of profitability [9]. Only 20% of the respondents had some level of formal training in gari production. Majority (80%) of the respondents had informal training on gari production from their mothers or relatives with experience in gari production. Producers in the study area had an average of 24 years of experience in production. The high level of experience is likely to influence efficiency in production. The average workforce was found to be two employees (mainly family members), implying that gari production is less labour intensive in the study area. It was found that majority (65%) of producers use their own funds for production; few (17%) of the respondents obtained their capital from money lenders and other financial institutions, mainly savings and loan companies, rural banks and other microfinance companies. Majority (59%) of the respondents did not belong to any association.

Cost and return estimates

Table 2 below presents the costs incurred and revenue generated from gari production in the study area. It was found that a cycle for gari production in the study area lasted a week. The analysis of costs and returns was conducted by using data for the weekly operations after which projections were made for operations per annum. On average, respondents produced about 683kg of gari from 1000kg (approximately a tonne) of cassava in a week. The average annual estimates of 52,052kg of cassava yield 33,117kg of gari. The study identified the total cost of gari production to comprise mainly variable cost items (98%) such as cost of cassava tubers, labour cost, fuel cost, grating cost, cost of water used for production and other costs classified as miscellaneous. The miscellaneous cost was made up of loading and off-loading of cassava, firewood and the finished product (gari), and cost of packaging. Operating overhead cost items included the cost of replacing baskets, sacks, sieves and '*afake*' (stirrer), annual land rent paid and depreciation on fixed assets like frying pan. Labour cost included costs incurred on people who were temporarily employed to perform activities such as peeling, washing, sieving and roasting activities in gari production.

The main source of revenue generated GH¢65,756 (in the USD at an exchange rate $1 = GH¢3.91) by producers' operations was from the sale of gari as the primary output (98%); sale of cassava peels as livestock feed contributed only 2% to the total revenue. The annual total cost of production on 52,052kg of cassava input yielding 33,117kg of gari output was estimated at GH¢51,040, comprising GH¢50,203 (98.36%) on variable cost items and GH¢836 (1.64%) as operating overheads. The dominant cost item was the raw material (cassava), which was 67.68% of the total cost. The cost of cassava was the supplier (middlemen) price of the roots made up of the cost at which the middlemen purchased the roots from cassava farmers and additional margin to cover their transportation and other operating costs. A comparison of the cost and return estimates of gari production in the study area showed that the venture is financially profitable based

on both an annual gross margin of GH¢15,553 and net return of GH¢14,716.69 on an average of GH¢51,039 invested as capital.

From Table 2, the average annual cost of labour totaled up to GH¢6,157 for the two employees required on the average to produce an estimated 33,117kg of gari in the study area. This implies that the cost of a single unit of labour per annum is equal to GH¢3,079. Given that the current daily minimum wage in Ghana is GH¢7, an average employee earns approximately GH¢1,848 per annum. Comparing this annual minimum wage with the average amount earned by an employee in gari production which is approximately GH¢3,079 per annum, producers in gari production in the study area earn 67% more than an average worker in Ghana. This implies that gari production in the study area is a good venture for the producers (women).

Table 3 presents a summary of the different scenarios of cost and returns analysis for gari production in the study area. The annual aggregate income earned by the producers ranged from GH¢31,720 and GH¢129,220 per 52,052kg of cassava. Total variable cost ranged from GH¢18,042 and GH¢93,682 with an average of GH¢50,203, and total operating overheads cost between GH¢221 and GH¢1327 with an average of GH¢836 gross revenue and net income ranged from GH¢31,720 to GH¢129,220 and GH¢1,451 to GH¢53,484, respectively. The average annual net return- for gari production amounted to GH¢14,717 with a unit return of Gp0.44 per kg of gari, which is comparable to the national average return on the product.

Profitability of Gari Production in Kumasi

The study showed a profit margin of 0.22:1 (Table 4), implying that producers obtain a positive margin of 22% on a unit sale of gari in the study area, although the index is lower than that of another study of an index of 0.40 in a rural/peri-urban community, Mampong, relative to that of a an urban location for this study in the same region, Ashanti, Ghana [9]. The level is also lower than the result of a similar study [10] which recorded a net profit margin of 35% in a study to assess gari marketing in southwest Nigeria. The lower index can be attributed to the high cost of variable items, especially the cost of cassava which includes the cost of the cassava roots and transportation, and other added margins by middlemen who transport the cassava from the farm gate to the gari production centers in Kumasi, and the cost of fuel used in gari production in the study area. These cost items are usually cheaper in rural and peri-urban communities than in urban centres like the study area. For instance, while fuel cost was recorded as GH¢3,678 (8% of the total cost) [9], the fuel cost recorded for this study was about twice, GH¢6,658 (13% of the total cost), approximately 63% higher in the percentages.

The rate of return on variable costs expresses gross margin (GM) as a percentage of the total variable cost (TVC). The estimated rate of return on variable cost was 31%, implying that producers in the study area obtained a third of the variable cost of production. Again, the estimated undiscounted benefit-cost ratio (UBCR) for the study was 1.28:1, implying that for every GH¢1.00 of the cost incurred, GH¢1.28 is generated as revenue; every cedi yielded an extra 28 pesewas indicating a good return for investors. Although the UBCR is favourable since it is higher than the break-even ratio of 1:1, it is lower than the findings in a study of profitability of gari production in Imo State, Nigeria

[6]. However, producers could do better by adopting cost minimization strategies in their operations to boost profitability.

Moreover, the operating expense ratio from the analysis was 0.76:1, implying that 76% of the total revenue generated is used to cover the total variable cost of gari production operations in the study area (Table 4). This implies that the total variable cost accounts for 76% of sales. This is not surprising because the total variable cost in gari production accounts for more than 98% of the total production cost incurred within an operating year. The operating expense ratio of this study was higher than the 59% operating expense ratio recorded in a similar study [9]. This means that gari producers in the study area, Mampong, can operate efficiently to minimize the proportion of total revenue they use to cover their total variable cost better than the gari producers in Kumasi. The explanation to this difference is not different from that provided for the low-profit margin of 22%, above.

The gross profit margin for the study was 24% (Table 4), implying that 24% of the total sales amount generated by gari producers end up as gross income after 76% of the total sales are used to cover the total variable cost. This suggests that 0.76p for every GH¢1 revenue generated is used to cover variable costs while the remaining 0.24p is realized as gross income. Gross profit margin is positive, implying that gari production in Kumasi is financially viable, though it is below the gross profit margin recorded in another study as 46% [6]. The difference may be as a result of the high TR recorded by a study [6] over the TR recorded by this study. This may have been caused by the difference in marketing strategies employed by the different producers as well as the difference in the economic environments in which the gari producers operate.

The study recorded a 29% return on capital employed (ROCE), implying that gari producers in the study area earn 29p profit on every GH¢1 invested in capital employed (Table 4). Although the return on capital employed is favourable, it is very much below the return on capital employed recorded by a study as 73% [6] and as 67% [9]. Per the ROCE recorded, gari production in Kumasi can be said to be profitable, although the value was found to be slightly lower than the average interest rate of 31% charged by commercial banks in Ghana such as the Ghana Commercial Bank, Agricultural Development Bank, United Bank of Africa, Standard Chartered Bank and Barclays Bank. The deficit of 2% in the economic value of producers' capital implies that producers are worse off relative to use borrowed funds from commercial banks for production. This is not surprising that most of the producers were found to be using their own funds for production (Table 1).

Constraints in gari production

The study found the high cost of cassava as the major constraint faced by the gari producers as shown in Table 5. The producers complained about the increase of the price of a bag of cassava from GH¢40 in 2015 to GH¢60 in 2016, which is a 50% increase. The increase in the price of the primary input can be attributed to the increased costs incurred by middlemen who transport the cassava roots from the farm gate to the urban production centers. The transportation cost is a major component of producers' access to cassava roots and this is mainly because most Ghanaian farms are located in the rural

areas where the road networks in such places make it unfavourable and expensive for transporting farm produce. The producers also pointed out that due to the high demand for cassava for various processing and consumption in alternative forms, farmers and middlemen charge higher prices for the cassava.

Moreover, seasonality and unavailability of cassava were identified as the second major problem faced by producers. The producers mentioned the inadequate supply of cassava for gari production, particularly from January to February. The reduced supply of cassava, as reported by the producers, is caused by the inability of farmers to harvest high quantities of cassava roots during January and February as a result of drought caused by unfavourable weather conditions. This eventually interrupts the operation of gari production in the study area, causing reduced productivity during that period. The third challenge was identified as the heat and smoke during the roasting of the gari. The producers did not have access to the mechanical roaster; they were using the traditional approach of roasting, which is the use of 'swish stoves' and firewood that produce a lot of smoke and heat. These cause increased heat transfer and smoke to their body, most especially their hands and thus often distract the processors from stirring effectively. The producer mentioned that this situation sometimes affects the quality of gari and their personal health. Lack of access to credit was identified as the fourth constraint. The respondents griped that they could not operate the scale as expected due to difficulty in accessing credit. They mentioned that microfinance and rural banks are not available to them and commercial banks are not a favourable option due to the high-interest loans and the producers' inability to provide them with collateral. The least of the identified challenges faced by the gari producers in the study area was the poor working environment. They said that it would have been more convenient to work if they had a suitable workplace; the production place becoming muddy during the rainy season and lack of storage place for production were mentioned as constraints to production.

CONCLUSION

Gari production in Kumasi is a female-dominated enterprise mostly done with the help of their family members. Majority of the producers have no formal education although they have high level of experience with an average 24 years in production. On average, gari producers in the study area generate total revenue of GH¢65,756 per annum per 52,052kg of cassava and incur a total variable cost of GH¢50,203 with a gross margin of GH¢15,553 per annum. Producers incur an additional overhead of GH¢836, resulting in a total production cost of GH¢51,040 per annum and thus an average net income of GH¢14,716.7 with a unit return of Gp0.44 per kilo gari produced per annum in the study area. The results showed that gari production in the study area is profitable. All the profitability indicators (profit margin, rate of return on variable costs, undiscounted benefit-cost ratio (BCR), operating expense ratio, gross profit margin, return on capital employed, revenue per employee and economic profit) showed positive returns on inputs employed in production, though the values were less competitive relative to other producers' values elsewhere. The major constraint faced by producers was identified as the high cost of the raw material (cassava) for gari production.

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The study recommends the need for improvement in cost management and the use of marketing strategies that could make producers competitive as other producers elsewhere. A low return on capital, irrespective of the use of own capital, relative to the opportunity cost of capital indicates inefficient use of producers' wealth and, thus, the need for improvement in operating activities for gari production in the study area.

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Table 1: Socio-economic characteristics of gari producers in Kumasi

Categorical Variables	**Description**			**Frequency**	**Percentage**
Gender	Female			46	100
Marital Status	Single			2	4.4
	Married			26	56.5
	Widowed			18	39.1
Level of Education	No Schooling			26	56.5
	Primary			9	19.6
	JHS			9	19.6
	SHS			2	4.4
Formal Training in Gari	Yes			9	19.6
Making	No			37	80.4
Household Status	Breadwinner			12	26.1
	Co-Breadwinner			29	63.0
	Not a Breadwinner			5	10.9
Sources of Finance	Personal			30	65.2
	Family and Friends			8	17.4
	Money Lenders			8	17.4
Membership to	Yes			19	41.3
Association/Union	No			24	58.7
Continuous Variables	**Frequency**	**Min**	**Max**	**Mean**	**S.D.**
Age	46	30	75	50	11.2
Household Size	46	2	10	6	1.76
Level of Experience	46	3	50	24	12.3
Number of Employees	46	1	4	2	0.81

Source: Field Survey, 2016

Table 2: Average annual cost and returns for gari producers

Items	**Value in GH¢**	**Percent (%)**
Total Revenue	**65,756.26**	
Less Variable Cost		
Cassava (52,052 Kg)	34,546.09	67.68%
Labour	6,156.96	12.06%
Fuel	6,658.26	13.04%
Water	183.42	0.36%
Grating	2,361.48	4.64%
Miscellaneous	297.05	0.58%
Total Variable Cost	***50,203.26***	***98.36%***
Gross Margin	**15,553.00**	
Less Overheads		
Baskets/Sacks/Sieves/Afake	365.13	0.72%
Land Rent	339.07	0.66%
Depreciation of Fixed Asset	132.11	0.26%
Total Overheads	***836.31***	***1.64%***
Net Income	**14,716.69**	

Source: Field Survey, 2016

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Table 3: Summary of cost and returns of gari production enterprise in Kumasi

VARIABLE	VALUE IN GH¢				
	Total	**Minimum**	**Maximum**	**Average (GH¢)**	**Unit (kg)**
Total Revenue (TR)	3,024,788	31,720	129,220	65,756	1.99
Total Variable Cost (TVC)	2,306,990	18,042	93,682	50203	1.52
Total Operating Overheads	30,707	252	1,100	836	0.03
Total Cost (TC)	2,337,698	18,772	94,521	51,040	1.54
Gross Margin (GM)	717,797	2,024	54,184	15,553	0.47
Net Income (NI)	694,924	1,451	53,484	14,717	0.44

Source: Field Survey, 2016

Table 4: Summary of the profitability indicators

Variable	Value
1. Profit margin	0.22 (22%)
2. Rate of returns on variable cost (ROR)	31%
3. Benefit Cost Ratio (BCR)	1.28:1
4. Operating Expense Ratio	0.76:1 (76%)
5. Gross Profit Margin	24%
6. Return On Capital Employed	29%
7. Economic Profit	GH¢1531

Source: Field Survey, 2016

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Table 5: Summary of the major constraints faced by Gari Producers

Constraints	Description	Frequency	Mean Score	Rank
High cost of cassava	Most important	20		
	More Important	10	4.1522	1st
	Important	13		
	Less Important	3		
Seasonality and unavailability of cassava tubers	Most important	8		
	More Important	15		
	Important	7	3.1521	2nd
	Less Important	8		
	Not Important	8		
Smoke and heat from operations	Most important	10		
	More Important	9		
	Important	10	3.1304	3rd
	Less Important	11		
	Not Important	6		
Lack of access to credits	Most important	3		
	More Important	9	2.4348	4th
	Important	9		
	Less Important	9		
Poor working environment	Most important	6		
	More Important	3	2.3261	5th
	Important	7		
	Less Important	14		

Note: *Most important (5), More important (4), Important (3), Less important (2), Not important (1)* Source: Field Survey, 2016

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