

Full Length Research Paper

A Comparative Assessment of the Profitability of Cassava Processing Enterprises in Kwara State, Nigeria

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Abstract

This study compared the profitability of Cassava Processing Enterprises (Garri, Lafun and Chips) among the Local Government Areas (LGAs) in Kwara state, Nigeria. Data was collected using a 2-stage sampling technique randomly selecting one hundred and sixty (160) respondents in the sixteen (16) LGAs of Kwara State. Structured interview schedule was used as instrument to collect information on socio-economic characteristics of cassava processors and the cost of cassava processing, including the cost of roots, transportation and marketing. The data were analyzed using simple descriptive statistics like means, percentages and cross tabulations. The gross margins of the three products were computed, while their profitability were compared using a single factor analysis of variance (ANOVA). The results revealed that cassava processing enterprises in the state yielded low but positive gross margins, with Garri having a mean gross margin of ₦2,970:00, Chips ₦2,950:00, and Lafun ₦2,350:00 per tonne of processed root respectively. The study further revealed that there was no significant difference between the gross margins of Garri and Chips, but the difference in the gross margins of these products and that of Lafun was statistically significant at 5% level. The study recommended an accelerated improvement in scaling up of cassava processing enterprises if it is to make the desired contribution to the Gross Domestic Product and generation of foreign exchange earnings.

Key words: *Cassava processing, enterprises, gross margins, profitability.*

Introduction

Food security and poverty alleviation are key issues every developing nation addresses. Cassava (*Manihot esculanta*), variously designated as Manioc, Tapioca or Yucca has been acknowledged as one of the most popular staple crops, and its role in Nigeria's food security and poverty alleviation can never be over emphasized. According to Ezedinma (2003), the cassava transformation coming up in Nigeria will to a large extent depend on value addition, diversification of processing options and commercialization of cassava by the numerous small-scale processors. As a traditional crop of the poor, expanding cassava processing enterprises can bring direct economic benefits to the farmer, and increase investment in the downstream sector of the cassava commodity system. Cassava is an essential part of the diet of more than seventy (70) million Nigerians (FAO 2003). Cassava appears to be a 'food choice' even in the face of alternative food options in urban areas. Close to 40 percent of Nigerians consume cassava more than 4 times in a week (Philips et al 2006). Cassava's starchy roots produce more food energy per unit of land than any other staple crop. The amount of carbohydrates contained in dry cassava roots is higher than maize or any other cereal. It supplies close to 40 percent of calorific requirements of Nigerians (Okigbo 1980). All parts of the cassava plant are useful, including the foliage which provide substantial amount of protein, minerals (iron and calcium) and vitamins (A and C) when consumed (Dixon et al 2003). Nigeria is the largest producer of cassava. Annual production is currently put at over 40 million metric tons from a cropped area of about 3.5 million hectares, and an average yield of 12.83 tons per hectare (FAO 2009 and PCU 2006). The figure is expected to double in the next few years if the huge investment under the Federal Government Cassava Initiative, Root and Tuber Expansion Programme (RTEP) and the private sector starts yielding results (Nigeriafirst 2009). It therefore becomes imperative to step-up processing and utilization to absorb the increase in national production and also guarantee higher prices for farmers. The need for cassava processing arises in order to reduce bulkiness (contains 60-70 percent water), remove the toxicity (contains free and bound cyanogenic glycosides), increase shelf life and stabilize product prices. A part from food products (gari, fufu, fermented flour etc), cassava can be processed into chips, pellets, starch, ethanol and high quality cassava flour (HQCF) which can be used in confectionery baking. The economics of producing both food and industrial products revealed that they are profitable (Anyaeibunam et al 2008). Youssouf Camara et al (2009) compared the profitability of cassava-based production systems in three West African countries (Nigeria, Ghana and Cote D'Ivoire) concluding that cassava production systems were profitable enterprises, but with varying gross margins.

Methodology

The Study Area

This study was conducted in Kwara state of Nigeria. The State is located in the North-Central geographical zone, and has a land mass of about 32,500 square kilometers (Km²). It is situated between the coordinates 6.50° and 11.50° North latitudes of the Equator and longitudes 2.80° and 7.50° East. The average temperature varies between 27°C to 35°C. The rainfall pattern follows a tropical type, with mean annual rainfall varying between 1000mm and 1500mm. The raining/wet season usually starts in early April and ends towards end of October, while the dry (harmattan) season starts in November and ends in March.

The vegetation cover is rain forest in the southern part, and gradually tends to reduce to Guinea Savannah as one move towards the northern part of the state. The landscape comprises undulating hills, plains, valleys and grassy open spaces. River Niger transverse the state. Other major rivers are Asa, Osin and Owu which has a fall and serves as tourist centre. The climate, topography, vegetation and soil type in the state supports cultivation of several crops of economic importance. These crops include cassava, yam, rice, sorghum, cowpea, vegetables etc. The state is also suitable for raising livestock. The state is cohabited by four major ethnic groups including Yoruba, Nupe, Fulani and Baruba (KWSG Diary 2010).

Kwara state has sixteen Local Government Areas (LGA's) with the capital and seat of government at Ilorin. It has four (4) agricultural zones with headquarters located at Kaiama (zone A), Pategi (zone B), Igbaja (zone C) and Maletе (zone D). The study was state-wide involving all the sixteen (16) Local Government Areas (L.G.As) in the state. They are namely; Asa, Baruten, Edu, Ekiti, Ifelodun, Ilorin-East, Ilorin-South and Ilorin-West. Others include Irepodun, Isin, Kaiama, Moro, Offa, Oke-Ero, oyun, and Patigi.

Sampling Procedure

A two-stage sampling technique was adopted for this study. In the first stage, ten (10) cassava processing communities were randomly selected in each of the 16 LGAs. The second stage involved the random selection of one cassava processor from each of the communities in the 16 LGAs; making a total of 160 respondents. Kwara State Agricultural Development Project provided the sampling frame from the list of registered cassava processors maintained in the Rural Institution Development (RID) Department (KWADP 2008).

Sources of Data and Data Collection

Primary data was collected from the respondents using structured interview schedule as instrument. Kwara state ADP field staffs were trained as research assistants/enumerators, and they assisted in administering the instrument. Data captured in interview schedule covered personal characteristics, general socio-economic characteristics and the cost of cassava processing enterprises including the cost of roots, transportation and marketing.

The data collected was analyzed using simple descriptive statistics like mean, percentages and cross tabulations. The analytical frame work incorporates the concept of gross margin analysis as described by Brown (1979) which states that:

$$GM = TR - TVC \quad \text{where}$$

GM = Gross Margin
 TR = Total Revenue
 TVC = Total Variable Cost

To calculate the Gross Margin (GM), the Total Variable Cost (TVC) was computed by aggregating the cost of roots, processing and marketing. Processing costs included the cost of carrying out the activities in the process flow of producing the products. For instance, gari production involved cost of roots and its transportation/handling (loading and off loading) charges, peeling, washing, grating, pulverizing, and toasting (frying). Similarly, marketing costs involved bagging, cost of packaging materials (bags, polyethylene) and transportation to point of sale (markets). The enterprise Total Revenue (TR) was computed by multiplying the quantity (Q) of processed product from 1 ton of roots by the price (P) i.e. Q * P. To assess the profitability of the three major cassava products in the study area, means of the three products were compared using single factor analysis of variance (ANOVA).

Empirical Results and Discussion

The gross margin analysis for production of gari in the study area is shown in Table 1. Analysis of the data showed that the mean gross margin for processing 1ton of cassava roots into gari is ₦2,970 or a cost/benefit (c/b) ratio of 1.07, implying that for every 1 Naira spent, there is a return of only 7kobo. The highest margin of ₦3,910 (c/b ratio of 1.10) was recorded for Patigi LGA followed by Baruten LGA with ₦3,290 (c/b ratio of 1.09). The lowest margin of ₦2,500 was recorded for Ekiti LGA, probably because of the high processing cost. This is however compensated by the comparatively large scale of operation prevalent in the LGA.

Table 1: Gross Margin Analysis for Gari Production in Kwara State

Location (LGA)	Cost of Root (N'000)	Transport Cost (N'000)	Processing Cost (N'000)	Marketing cost (N'000)	Total Variable Cost (N'000)	Revenue (N'000)	Gross Margin (N'000)	Cost/Benefit Ratio
Asa	15.00	5.12	15.75	3.00	38.87	41.75	2.88	1.07
Baruten	14.70	6.35	14.03	2.91	37.99	41.28	3.29	1.09
Edu	15.10	5.14	15.01	2.96	38.21	41.70	2.79	1.09
Ekiti	16.15	5.08	15.82	3.00	40.05	42.55	2.50	1.06
Ifelodun	15.51	5.01	15.73	2.98	39.23	42.42	3.19	1.08
Ilorin East	16.00	5.11	15.75	3.00	39.86	42.42	2.56	1.06
Ilorin South	16.03	5.12	15.67	3.00	39.82	42.42	2.60	1.07
Ilorin west	16.01	5.11	15.70	3.00	39.81	42.42	2.61	1.07
Irepodun	15.52	5.10	15.55	3.00	39.17	42.00	2.83	1.07
Isin	15.04	4.91	15.68	2.90	38.53	41.75	3.22	1.08
Kaiama	14.65	6.45	13.99	2.88	37.97	41.00	3.03	1.08
Moro	15.04	5.16	15.55	2.87	38.61	41.75	3.14	1.08
Offa	15.00	5.04	15.72	2.96	38.72	41.75	3.03	1.08
Oke Ero	15.33	5.01	15.71	2.85	38.90	41.75	2.85	1.07
Oyun	15.04	5.00	15.70	2.94	38.68	41.75	3.07	1.08
Patigi	15.10	5.20	15.68	2.91	37.79	41.70	3.91	1.10
Total	245.22	83.91	247.04	47.16	622.21	670.41	47.50	1.07
Mean	15.33	5.24	15.44	2.95	38.89	41.90	2.97	1.07

Source: Field Survey 2011

Table 2 showed the gross margin analysis for Lafun (fermented cassava flour) from 1 ton of fresh cassava roots. The mean gross margin for the product in the study area is ₦2,350, or a return of only 8 kobo on every 1 Naira invested (c/b ratio of 1.08). The highest gross margin of ₦3,370 (c/b ratio of 1.11) was recorded for Ekiti LGA followed by Asa (₦2,530). The lowest is recorded by Ifelodun (₦2,060.00) or 1.06 cost benefit ratio, followed by Patigi, which is ₦2,100.

Table 2: Gross Margin Analysis for Production of Lafun in Kwara State

Location (LGA)	Cost of Root (N'000)	Transport Cost (N'000)	Processing Cost (N'000)	Marketing cost (N'000)	Total Variable Cost (N'000)	Total Revenue (N'000)	Gross Margin (N'000)	Benefit /Cost Ratio
Asa	15.00	5.12	8.00	2.00	32.12	34.65	2.53	1.08
Baruten	14.70	6.35	8.10	2.00	31.15	33.64	2.49	1.08
Edu	15.10	5.14	8.01	2.08	30.33	32.58	2.25	1.07
Ekiti	16.15	5.08	7.85	2.20	31.28	34.65	3.37	1.11
Ifelodun	15.51	5.01	8.00	2.00	30.52	32.58	2.06	1.06
Ilorin East	16.00	5.11	8.00	2.10	31.21	33.65	2.44	1.08
Ilorin South	16.03	5.12	8.00	2.10	31.25	33.65	2.40	1.08
Ilorin west	16.01	5.11	8.00	2.10	31.22	33.65	2.34	1.08
Irepodun	15.52	5.10	8.00	2.10	30.72	32.89	2.17	1.07
Isin	15.04	4.91	7.96	2.10	30.01	32.20	2.19	1.07
Kaiama	14.65	6.45	8.20	2.00	31.30	33.50	2.30	1.07
Moro	15.04	5.16	8.00	2.05	30.25	32.20	2.13	1.06
Offa	15.00	5.04	8.01	2.00	30.05	32.20	2.15	1.07
Oke Ero	15.33	5.01	8.00	2.00	30.34	32.81	2.47	1.08
Oyun	15.04	5.00	8.00	2.00	30.04	32.20	2.16	1.07
Patigi	15.10	5.20	8.03	2.08	30.41	32.51	2.10	1.07

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Total	245.22	83.91	128.16	32.91	492.20	529.56	37.55	1.08
Mean	15.33	5.24	8.01	2.05	30.76	33.10	2.35	1.08

Source: Field Survey 2011

Similarly, the gross margin analysis for production of chips from 1ton of fresh roots is shown in Table 3. The chips are mostly dried cassava chunks split into irregular shapes and sizes. The table showed a mean gross margin of ₦2,950.00 for the product in the study area. Baruten LGA had the largest margin of ₦3,920.00 followed by Kaiama which had ₦3,320.00. In these LGAs, cassava chips are mostly dried directly on the farm before transporting the product home. This would translate to reduced transportation cost, hence the higher margins. The lowest margin of ₦2,270.00 was recorded for Ekiti LGA apparently for the reason earlier adduced for gari.

Table 3: Gross Margin Analysis for Production of Chips in Kwara State

Location (LGA)	Cost of Root (N'000)	Transport Cost (N'000)	Processing Cost (N'000)	Marketing cost (N'000)	Total Cost (N'000)	Total Revenue (N'000)	Gross Margin (N'000)	Cost/Benefit Ratio
Asa	15.00	5.12	6.80	1.50	28.42	31.53	3.11	1.11
Baruten	14.70	6.35	6.50	1.51	29.06	32.98	3.92	1.13
Edu	15.10	5.14	6.80	1.50	28.54	31.62	3.08	1.11
Ekiti	16.15	5.08	6.95	1.53	29.71	31.98	2.27	1.08
Ifelodun	15.51	5.01	6.75	1.49	28.76	31.77	3.01	1.10
Ilorin East	16.00	5.11	6.91	1.51	29.53	31.83	2.30	1.08
Ilorin South	16.03	5.12	6.90	1.51	29.56	31.88	2.32	1.08
Ilorin west	16.01	5.11	6.90	1.51	29.53	31.84	2.31	1.08
Irepodun	15.52	5.10	6.75	1.51	28.88	31.68	2.80	1.10
Isin	15.04	4.91	6.71	1.51	28.17	31.52	3.36	1.12
Kaiama	14.65	6.45	6.61	1.52	29.23	32.55	3.32	1.08
Moro	15.04	5.16	6.45	1.53	28.18	31.50	3.32	1.12
Offa	15.00	5.04	6.80	1.51	28.35	31.51	3.16	1.11
Oke Ero	15.33	5.01	6.79	1.52	28.65	31.49	2.84	1.10
Oyun	15.04	5.00	6.70	1.53	28.27	31.50	3.23	1.11
Patigi	15.10	5.20	6.80	1.51	28.61	31.50	2.90	1.10
Total	245.22	83.91	108.12	24.20	461.45	507.68	47.25	1.10
Mean	15.33	5.24	6.76	1.51	28.84	31.73	2.95	1.10

Source: Field Survey 2011

For all the 3 products, a conversion ratio of 4 (roots) to 1 (product) was achieved because of the traditional method of processing predominantly employed by the processors. The low profit margin can be attributed to the fact that most households consumed their processed products without attaching monetary value. The study took cognizance and actually valued the contributions of family labour in cassava processing operations. This further reflected on the low profit margins recorded for the enterprises.

Profitability of Processed Products

In order to assess the profitability of the three major cassava products in the study area, means of the three products were compared using single factor analysis of variance (ANOVA). This is to determine whether or not the revenue (profits) accruing from the three products are statistically the same on the average.

Table 4: Analysis of Variance for Gross Margin Analysis

Source of Var.	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	4.024	2	2.012	13.694	0.001
Within Groups	6.612	45	0.147		
Total	10.636	47			

Source: Output from SPSS 16.0

Table 5: Descriptive Statistics for Gross Margin Analysis

Output	N	Mean ('000)	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
Gari	16	2.9688	0.35336	0.08834	2.7805	3.1570
Lafun	16	2.3469	0.31187	0.07797	2.1807	2.5131
Chips	16	2.9531	0.46760	0.11690	2.7040	3.2023
Total	48	2.7563	0.47570	0.06866	2.6181	2.8944

Source: Output from SPSS 16.0

Result in table 4 showed significant differences between the mean values of these cassava products at 1percent level, implying that at least one of the three cassava products had a higher return when compared to the rest. Further investigations in table 5 showed that returns from gari and chips were statistically the same on the average, but were significantly different from the gross margin of lafun. It can therefore be concluded that margins from the three cassava products are not the same. Also, the gross margins from gari and chips (₦2,969.00 and ₦2,953.00) were seen to be approximately equal (to the nearest hundred). This again implies that the former were more profitable than the later in the study area. However, this may be due to factors such as the inputs cost, processing cost, marketing cost, transport cost and/or forces of demand and supply.

Conclusion and Recommendation

Generally, there were positive but low margins for the three cassava enterprises (gari, lafun and chips) in the study area. Positive gross margins indicate that value addition is a profitable investment option in Kwara state, type of product notwithstanding. The low margins could be associated with the scale of operation of processors. If processors are empowered and encouraged to expand their operational scale, they would probably reap scale advantage. An accelerated improvement in the scaling up of cassava processing enterprises is recommended if it is to make the desired contribution in enhancing farmer's income, the Gross Domestic Product and generation of foreign exchange earnings.

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