Profitability Analysis of Selected Cassava Enterprises among Rural Dwellers of Oyo State

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Abstract

The profitability of cassava enterprises is one of the reasons stakeholders engage in them. Information abounds on each of the enterprises (production, processing, and marketing), but information on the profitability differentials across the three enterprises is scarce. This study analyzed the profitability of selected cassava enterprises in rural areas of Oyo state, Nigeria. A multistage sampling procedure was used to select 160 respondents for the study. An interview schedule was used to obtain data on respondents' socioeconomic and enterprise characteristics, constraints, and profitability of cassava enterprises. Data were analyzed using descriptive and inferential statistics (PPMC and ANOVA) at p=0.05. Results show that 50.6% of respondents belonged to the Cassava Farmers' Association and sourced information through co-entrepreneurs (69.4%). Most producers (49.4%), processors (51.4%), and marketers (92.1%) had between 6 and 9 hectares of land, large processing units, and retailers respectively. The major constraints faced by the producer, processors, and marketers were price fluctuation (ws=181.2), cassava glut (ws=189.2), and inadequate credit facilities (ws=186.9) respectively. *Garri* marketing was the most profitable enterprise among cassava production ₦4,577.40), processing ₦3,001.99), and marketing ₦352,914.54). Farm size (r=0.568), number of processing units (r=0.532) marketing type (r=-0.509), and constraints to cassava production (r=0.662) were significantly related to profitability. The study recommends that cassava producers should be abreast of cassava marketing information and scale up using value-addition strategies for optimum profitability; cassava processors should embark on good storage systems, while marketers should pull their resources together for crowd funding of their enterprises.

Keywords: Cassava entrepreneurs, Cassava glut, Marketing type, Value addition strategies**.**

Introduction

Cassava has been playing a significant role in Nigeria's agricultural sector. It has been used to diversify and boost the country's economy. Cassava's comparative production advantage over other staples encourages its production by rural people. Cassava is a crop that has a high ability to enhance people's economic status, reduce their poverty level, and at the same time, contribute significantly to the Gross Domestic Product (GDP) of the country despite its low input for production (Osun, *et. al.*, 2014). Rural dwellers engage in different activities in the cassava value chain as it accords them a source of livelihood and the hope of improving their socio-economic status. However, the activities in the cassava value chain differ in terms of technicality; therefore, cassava value chain

stakeholders are not always limited to one enterprise, as some produce (producers/farmers), some process (processors), and some market the finished products (marketers). As valuable as the crop is, it is mostly limited by rapid Post-harvest Physiological Deterioration (PPD) within 48 hours of harvest due to the presence of cyanogenic compounds. This invariably means roots have little market value after 48 hours of being harvested and this limits the range over which fresh roots can be marketed and exported for additional income. According to Sahel Capital (2016), cassava processing prevents partial or total loss and also provides varieties of foods from cassava (*Fufu, Lafun, Abacha, Tapioca*, cassava chips, and *Garri* among others) with an acceptable taste, good texture, and aroma, and makes it available during price fluctuation, all year round. However, this study focuses on *Garri* as it is one of the most reliable value-adding activities considering its high demand, marketing, and high-income generation as a result of the favourable prices for it as against fresh root. Cassava is seen as a subsistence crop to low-income households as about 40 percent is consumed at home, while the remaining 60% of the crop products in rural areas of Nigeria are sold or marketed as processed food; mostly as *Garri* (Orifah, 2015). Due to the importance of cassava, governments at various levels in Nigeria and Non-Governmental Organizations introduced different programmes that have increased cassava production, reduced poverty, provided food security and profit for those in the enterprise (production, processing, and marketing), and by extension boosted the country's economy via foreign exchange. The government has been providing advocacy for finding appropriate structures for organizing millions of small-scale farmers to achieve sustainable food security in Nigeria (Mudashiru, 2017).

Despite all these efforts to increase the profitability of the enterprises, there are still some gaps in what is produced, processed, and marketed and what is expected from the entrepreneurs. Several odds still work against their efforts to produce in abundance and to increase their enterprises' profitability to attract people into the various enterprises. A vast number of resources research and literature exist on the profitability of each of the cassava enterprises. For example, Kingsley *et al.* (2014) researched on determinants of cassava production and profitability, while Okpeke and Onyeagocha (2015) analyzed the profitability of processing cassava tubers into *Garri.* However, the studies tended to concentrate on the profitability level of an individual or two enterprise(s) without affirming the profit differentials among the three enterprises. Therefore, profitability differences across the three enterprises were investigated to ascertain the most profitable among cassava production, cassava processing, and *Garri* marketing enterprises. The profitability of some of the enterprises may probably make them more attractive and appealing to people in terms of input and output ratio. To this end, the socioeconomic characteristics of cassava entrepreneurs, constraints, and profitability of cassava enterprises were determined in this study. The test of hypotheses indicates that no significant relationship existed between

selected socioeconomic characteristics and enterprises profitability, enterprise characteristics and enterprise profitability, processing and marketing enterprises constraints and enterprise profitability and there was a significant relationship between farming enterprise constraints and enterprise profitability.

Materials and methods

The study was carried out in Oyo State. The state was selected due to the high concentration of cassava producers, cassava processors, and *Garri* marketers. A multistage sampling procedure was used to select respondents for this study. The first stage involved a purposive selection of 75% out of the four agricultural zones in Oyo State due to high cassava production and *Garri* processing activities; these include Ibadan/Ibarapa, Oyo, and Ogbomoso zones. The second stage also involved a purposive selection of 15% of the blocks from each zone, making a total of three blocks.

In the third stage, 25% of the cells in each block were randomly selected. This gave a total of 6 cells. In the fourth stage, proportionate sampling was used to select 2% of the producers, 5% of processors, and marketers from each cell. A total of 160 respondents (85 cassava producers, 37 processors, and 38 marketers) were used for this study while an interview schedule was used to elicit necessary information from the respondents. Data were analyzed using both descriptive (frequencies, percentages, mean) and inferential statistics (PPMC and ANOVA at p=0.05).

Total expenditure and total revenue of various enterprises across the cassava value chain were captured to estimate the profitability of the enterprises. Total Variable Cost was calculated for each of the enterprises to determine their total expenditure. Total expenditure was estimated for cassava production in terms of the amount spent to produce cassava in tonnes per hectare. Total expenditure was estimated for processors by adding all expenses on processing tonnes of cassava into *Garri*. Total expenditure was estimated for *Garri* marketers by summing up all expenses in marketing the tonnes of *Garri* bought.

Producers' enterprise total income was measured in tonnes of cassava harvested on the land dedicated to cassava production by the current amount sold per tonne. Processors' enterprise total income was measured in terms of tonnes of *Garri* processed per annum multiplied by the amount sold per tonne, while marketers' enterprise total income was measured using the number of tonnes of garri bought per annum multiplied by the amount sold per tonne. The profitability of enterprises was calculated using the Gross Margin difference between the Total Revenue (TR) and Total Variable Cost (TVC). Gross Margin (GM) was calculated for each of the enterprises by subtracting Total Variable Cost (TVC) from Total Revenue (TR). The profitability of each enterprise was further calculated by dividing the profit made per annum by the tonnes produced per annum. The profitability difference among the three enterprises was also determined using ANOVA. Further analysis was also done using the LSD post-hoc test.

Results

Selected socioeconomic characteristics of respondents

The results in Table 1 show that most of the respondents had between 14 and 25 years of experience in their various enterprises with a mean year of experience of 23.3.±12.1. However, the respondents must apply their long years of experience to their enterprises' profitability. Most of the respondents mostly source information via co-entrepreneurs (69.4%). The modal farm size of cassava producers was between 6 and 9 hectares of land with the mean being 2.4 hectares while 51.4% of the processors had large processing units and most (92.1%) of the marketers were retailers.

Constraints faced by cassava entrepreneurs

The results in Table 2 indicate that price fluctuation [weighted score (ws) =181.2] and climatic factors (ws=181.1) were rated as the major constrained faced by the producers in their enterprises; cassava glut (ws=180.0) and inadequate extension services (ws=189.2) were the major constraints faced by the processors, while inadequate credit facilities (ws=186.9) and inadequate extension services (ws=181.6) were rated as the major constraints faced by the *Garri* marketers in the study area.

Profitability of cassava production enterprise per annum

The production cost per annum for cassava as revealed in Table 3a shows that the mean Total Variable Cost (TVC) on the production of 137.247 tonnes of cassava was ₦ 449,246.38; the Total Revenue (TR) was ₦1,067,000.00, while the profit (Gross Margin) was ₦628,234.12. Hence, the profit of cassava producer per tonne per annum of cassava produced was ₦ 4,577.40.

Profitability of cassava processing enterprise per annum

Table 3b reveals that the average Total Variable Cost (TVC) for the processing of 366.8108 tonnes of cassava into *Garri* per annum was estimated as ₦5,640,308.1. The analysis shows an estimated Total Revenue (TR) of ₦6,741,470.3 and a Gross Margin (GM) of ₦1,101,162.20. The profit of cassava processor per tonne per annum of cassava processed was ₦ 3,001.99

Profitability of *Garri* marketing enterprise per annum

The result in Table 3c reveals the Total Variable Cost (TVC) incurred in marketing 1.7224 tonnes of *Garri* per annum by the marketers was ₦1,964,497.9, with Total Revenue (TR) of ₦2,572,357.90 and the Gross Margin (GM) of ₦607,860.00. Hence, the profit of *Gaari* marketer per tonne per annum of *Gaari* marketed was ₦352,914.54

Categorization of cassava enterprises by profitability

The result in Table 4 reveals that the profit in cassava production, processing, and *Garri* marketing were ₦628,234.12; ₦1,101,162.2 and ₦607,860.00 respectively. The most profitable enterprise across the value chain was *Garri* marketing considering profit made per tonne per annum.

Test for the relationship between selected enterprise characteristics and profitability.

Selected enterprises' characteristics were tested against profitability using Pearson Product Moment Correlation (PPMC). The result in

Table 5 reveals that a significant relationship existed between profitability and {farm size (r=0.568, p=0.000), number of processing units (r=0.532, p=0.001), and marketing type (-0.509, p=0.001)}.

Table 1: Distribution of respondents by socioeconomic characteristics (n=160)

Variable	Freq	Percentage
Years of experience		
2-13	37	23.10
14-25	61	38.10
26-37	34	21.30
38-49	22	13.80
>49	6	3.80
Mean	23.3±12.1	
Total	160	
Sources of information		69.40
Co-entrepreneurs	111	10.60
Ministry of Agriculture	17	13.10
Extension Agents	21	6.90
Customers	11	
Total	160	
Area of farm size		
2-5	10	11.80
6-9	42	49.40
10-13	30	35.20
≥14	2	2.40
Total	84	
Number of processing units		
Small	18	48.60
Large	19	51.40
Total	37	
Marketing type		
Whole seller	3	7.90
Retailer	35	92.10
Total	38	

Source: Field Survey (2019)

Table 2: Weighted mean scores for constraints experienced by cassava entrepreneurs in their production enterprises

Constraints	Producers	Processors	Marketers
Non availability of land	76.50	167.60	147.70
Inadequate credit facilities/inadequate capital	169.50	183.80	186.90
Unavailability of input facilities	97.70	110.80	118.50
High cost of input	177.60	127.00	113.10
Cassava glut	180.00	189.20	147.30
Poor access to marketing info	69.40	89.20	55.30
Lack of adequate manpower (labour)	76.40	97.20	47.30
Price fluctuation	181.20	183.80	142.10
Poor road network	135.30	113.40	118.40
High cost of transportation	116.60	113.40	105.30
Lack of storage facilities	77.60	113.40	86.90
Pest and disease attack	160.00	143.30	137.00
Inadequate extension services	75.30	189.20	181.60
Lack of timely information	40.60	62.20	60.60
Climatic factors	181.10	154.10	144.80

Source: Field survey (2019)

Table 3a: Profitability of cassava production enterprise

Variable items	Mean	Minimum	Maximum	Standard deviation
Production cost	449,246.38	80,900.00	962,000.00	218,273.96
Revenue	1,067,000.00	112,500.00	2,500,000.00	702,988.28
Profit (Gross Margin)	628,234.12	43,632.00	1,850,000.00	528,112.07
Profit per tonne/annum	₦ 4,577.40			

Source: Field survey (2019)

Table 3b: Profitability of cassava Processing enterprise (₦)

Variable items	Mean	Minimum	Maximum	Standard deviation
Production cost	5,640,308.47	911,400.00	14,707,200.00	4,180,980.48
Revenue	6,741,470.30	1,728,000.00	18,432,000.00	4,853,684.65
Profit (Gross Margin)	1,101,162.20	283,920.00	8,880,000.00	1,419,193.71
Profit per tonne/annum	₦ 3,001.99			

Source: Field survey (2019)

Table 3c: Profitability of *Garri* marketing enterprise (₦)

Variable items	Mean	Minimum	Maximum	Standard deviation
Production cost	1,964,497.90	330,960.00	11272800.00	2,348,788.34
Revenue	2,572,357.90	384,000.00	13,440,000.00	3,020,889.82
Profit(Gross Margin)	607,860.00	42,240.00	2,745,600.00	758,082.19
Profit per tonne per annum	₦352,914.54			

Source: Field survey (2019)

Table 4: Distribution of cassava enterprises according to profitability (₦)

Variable items	Mean	Minimum	Maximum	Standard deviation	Profit per tonne per annum
Marketing profit	607,860.00	42,240.00	2,745,600.00	758082.19	₦352,914.54
Production profit	628,234.12	43,632.00	1,850,000.00	528112.08	₦ 4,577.40
Processing profit	1,101,162.20	283,920.00	8,880,000.00	1419193.71	₦ 3,001.99

Source: Field survey (2019).

Table 5: PPMC test of the relationship between selected enterprise characteristics and profitability

Variable	N	r-value	p-value	Decision
Area of farm size per hectare	85	0.568	0.000	Significant
Number of processing units	37	0.532	0.001	Significant
Marketing type	38	-0.509	0.001	Significant

Source: Field survey (2019)

Test of the relationship between entrepreneurs' constraints to cassava enterprise and their enterprises' profitability

The respondents' constraints across the value chain were tested against their profitability. The result of Pearson Product Moment Correlation (PPMC) in Table 6 reveals that there was a significant relationship between profitability and constraints to cassava production enterprise (r=0.163, p=0.000). The Table further reveals that no significant relationship existed between profitability and constraints of processors (r=-0.174, p=0.303) and marketers (r= -0.87, p=0.604).

Test of profitability difference among the cassava enterprises

The result in Table 7a shows that there was a significant difference in the profitability of cassava enterprises (F=4.383, p=0.014). Further analysis was done on the profitability of the cassava enterprises (Tonne/hectare) using LSD post-hoc test. The result in Table 7b shows that there was a statistically significant difference between processing and cassava production (x=472,928.045, p=0.006), and between processing and marketing (x=493302.162, p=0.014). However, there was no significant difference between the profit of cassava production and marketing (x=20374.1176, p=0.904).

Table 6: PPMC test of the relationship between constraints to enterprises of the entrepreneurs and their enterprises profitability (n=160)

Variables	r-value	p-value	Decision
Constraints to Cassava Enterprise vs. Profitability	0.662	0.000	Significant
Constraints to processing enterprise vs. Profitability	0.174	0.303	Not significant
Constraints to Marketing Enterprise vs. Profitability	-0.87	0.604	Not significant

Source: Field survey (2019)

Table 7a: Analysis of Variance of profitability difference among cassava enterprises.

	Sum of squares	Df	Mean square	F-value	p-value
Between Groups	6.543E+012	2	3271563575556	4.383	0.014
Within Groups	1.172E+014	157	746492139064.2		
Total	1.237E+014	159			

Source: Field survey (2019)

Table 7b: Further analysis (LSD) on profitability differences among cassava enterprises

(I) Enterprise category	(J) Enterprise category	Mean difference(I-J)	LSD
Processing	Production	472928.05	0.006
	Marketing	493302.16	0.014
Production	Processing	-472928.04*	0.006
	Marketing	20374.12	0.904
Marketing	Processing	-493302.16*	0.014
	Production	-20374.12	0.904

Source: Field survey (2019)

Discussion

The years (14-25) of experience of the respondents implies that they have long years of experience in their enterprises which may be the basis for mastery of the enterprise (Yakasai, 2010). The assertion of Ali *et al.* (2019) and Sunday (2015) on sources of information implies that co-entrepreneurs have influenced one another via information sharing for improved production and enterprise profit. The submission of Popoola (2015) affirms the findings that cassava farmers had limited availability of land for cultivation and that of Jenkins (2015) that the most basic factor that affects profit in any enterprise is the number of units. In the same vein, Ali *et al.* (2019) assert that *Garri* marketing is dominated by retailers.

Price fluctuation and climatic factors identified by the producers as the major constrained faced in their enterprises might be one of the major stumbling blocks for their enterprise profitability. The finding is in line with Popoola (2015) who reported that price fluctuation is seen as a constraint in the Igboora community of Oyo State.

The inadequate credit facilities/inadequate capital constraint faced by the *Garri* marketers indicated that there was a low supply of *Garri* to the market which might help in realizing more profit since there was not enough capital to run the enterprise. This was corroborated by the assertion of Saheed *et al.*, (2018) that low agricultural credit facility creates a great challenge to productivity.

The major constraint encountered by the processor was the cassava glut and inadequate extension services, the glut could have made them sell to the marketer below the amount they were willing to sell hence a possible reduction in the profitability envisaged. The insufficient access to extension services might have been responsible for insufficient market information needed for higher profitability. However, Abasilim, *et al.* (2018) assert that the extension contact was low in rural communities.

The average profit the farmers earned per tonne per annum (₦ 4,577.40) shows that there are still more opportunities for profitability in cassava production if all things are properly placed. This implies that in the short run of

production, cassava production is profitable in the study area. This is in line with the findings of Ojiako *et al*. (2018) that the production of cassava was a viable (profitable) farm initiative in rural communities

There was an appreciable level of profit from the processing of cassava tubers into *Garri*. Even though, *Garri* processing was the least profitable enterprise across the enterprises even with large processing units. The reason for this might be because the producers and the marketers were at the mercy of the middlemen who operate between them and the next level of the value chain. This result was contrary to the earlier research of Ezekiel (2010) who found a high profitability in *Garri* processing in the rural communities.

Garri marketing profitability was the highest among the three cassava enterprises considered. The result indicates that *Garri* marketing is the most profitable in the study area. The reason for this might be because they are next to the consumer and may sell the product as a dim fit at a given period. The result of this study corroborates the assertion of Ebewore and Eldoge (2015) and Ali *et al.* (2019) that *Garri* marketing is highly profitable. The result is also in line with Jenkins (2015) who found that different enterprises have different levels of profitability as they have different levels of cost of production; some are short term while some are long term and this contributes to their profitability, or as a result of overhead cost.

Despite the farmers' constraints, they were able to cope and develop coping strategies that enhanced their profitability. This result was in accordance with the findings of Sunday (2015) who found a significant relationship between constraint and profitability. This indicates that there is a direct relationship between their enterprise constraints and profitability, the higher the constraint, the higher the profitability. The result also suggests that the constraints faced by the processors and marketers in their enterprises obstruct profitability and that the higher their constraints, the lower their profitability and vice versa.

Conclusion and recommendations

Entrepreneurs have long years of experience in their enterprises. The scale of production of the cassava entrepreneurs varies across the value chain. The most profitable enterprise was *Garri* marketing. The producers' constraints do not affect their profitability while marketers' and processors' constraints affect their profitability. The study recommends that cassava producers should keep themselves abreast with cassava marketing information and scale up using value-addition strategies for optimum profitability; cassava processors should embark on good storage systems while marketers should pull their resources together for crowd funding their enterprise.

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