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PROFITABILITY ANALYSIS AMONG ACTORS OF HIGH-QUALITY CASSAVA FLOUR IN SOUTH WEST NIGERIA

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ABSTRACT

High-Quality Cassava Flour (HQCF) as one of the value added products of cassava has the potential to revolutionizing the Nigeria cassava sector. Profitability of the actors in the production of HQCF in South-western Nigeria is therefore the subject of this study. A four multistage sampling technique was used to investigate the working efficiencies and practices of cassava farmers. Mapping surveys for all the areas of production and marketing of HQCF were produced. A total of 381 valid actors (311 cassava producers, 18 processors and 26 marketers) were used. The resulting data was were analysed using descriptive statistics and profitability analysis. Age, household size, and farming experience of the HQCF actors were; 48.3±8.46, 47.6±8.08, 44.1±6.79 years, 6.91±2.15, 5.26±1.03, 7.08±2.47 members, and 21.7±10.81, 8.4±2.11, 10±1.38 years, respectively. Profitability indicators were gross margin and net farm income. The HQCF actors were; ₦849,361.17 and ₦828,499.28/ha/year for cassava farmers. ₦46,028,307.98 and ₦43,761,365.97 for HQCF processors. Marketing margin was ₦8,249.88/year for HQCF marketers. Profitability Index (PI) for the actors were 0.98 and 0.35 cassava farmers and HQCF processors respectively.

Contribution/Originality: Profitability indicators revealed that cassava production, HQCF production, and marketing of HQCF were profitable, with cassava production being the most profitable. Factors influencing the revenues of the HQCF actors included the cost of labour, farm size, costs of inputs, years of worker experience, capital assets, alternate source of electricity/power, and transportation.

1. INTRODUCTION

Globally, cassava production is 277 million tonnes per year (Food, 2018). In particular, Nigeria produces approximately one fifth of the global production of cassava (52,000,000 tonnes per year), followed by Thailand, Indonesia, Brazil, Ghana, Congo and other nations (Lamboll et al., 2018). Growing more cassava than any of these countries, Nigeria's cassava production is done primarily by smallholder farmers, who cultivate less than 2 hectares in scattered parcels (Peter-Ikechukwu, Osuji, Ihediohamma, Okafor, & Chukwu, 2019) When compared to Indonesia and Thailand, which have mean yields of 23.4 tonnes and 22.2 tonnes per hectare, respectively, Nigeria's mean yield of 11 metric tons per hectare can be considered extremely low (Peter-Ikechukwu et al., 2019). The dilemma faced by

the above is how Nigeria, as largest global producer of cassava, can raise the average yield per hectare to match the capabilities of the other leading producers.

According to Lamboll et al. (2018), the value chain of cassava flour indicates that cassava is still a subsistent/semi-commercial crop with little to no substantial market share for manufactured products.

Lamboll et al. also stress that the ability of an investment to generate returns while also sustaining its performance is crucial, and how uncertainty is central to the uneven performance of the High-Quality Cassava Flour (HQCF) actors. This is because it discourages business actors from investing in the growth of the value chain. It should be stressed that uncertainty differs from risk. Whereas with risk the probabilities of a given outcome can be known, uncertainty refers to a situation in which not only are particular outcomes unknown or unknowable, but that the odds of a given imagined outcome cannot be known or calculated in advance. In these conditions, business actors are much less willing to invest. Secondly, the business actors in the value chain (growers, HQCF processors, and bakeries) have not devised a viable strategy to adapt to uncertainty and thereby capture the potential opportunities presented by HQCF.

In addition, the low capabilities of processing and preserving foods contributes to food and nutrition insecurity in many African nations, as well as slow growth of rural-based small-scale food processing enterprises, limited capacity to generate employment in the rural areas, and failure to reduce rural–urban migration (Abass et al., 2019).

High-quality cassava flour (HQCF) is a refined product made from dewatered cassava that has been pulverized and filtered to produce a finer flour that can pass through a 0.25 mm sifter. HQCF is typically greater than ninety percent starch, although it is not a pure starch since it contains grain, traces of protein, and fat (Ogboji, 2016). The name HQCF was chosen to distinguish it from other cassava-based products, the most of which are regular cassava flours. Studies have shown that if its various elements are properly utilized, cassava has the capability to industrialize Nigeria. Lamboll et al. (2018) reported that Nigeria could earn around US$ 5 billion per year from cassava and its by-products, making it a huge earner of foreign exchange. Quite a number of comparative indices appear to place Nigeria as a potential leader of cassava production. Firstly, cassava is grown in all agro-ecological areas of Nigeria, and secondly, cassava is a major staple crop in Nigeria. In particular, HQCF has multiple food and commercial uses and provides smallholder farmers and processors the ability to venture into the supply and processing of raw materials. Potential economic benefits include substitution for imports, job formation, growth in transportation and manufacturing industries, and higher revenues for small-scale cassava farmers. The quantity of HQCF used depends on the degree of inclusion, such as the ability to generate jobs in the HQCF bread-making industries as the amount of HQCF produced and used by the bread and confectionery industries are inextricably linked.

The Nigerian administration started a presidential action plan in 2003 with the goal of turning cassava into a cash crop, and the country's wheat flour policy was modified to include 10% high-quality cassava flour (HQCF), prompting a surge in HQCF production in Nigeria.

Nigeria is experiencing the rapid growth in noodle production shown by the establishment of noodle facilities by virtually all flour mills in the country, according to Shittu and Sowunmi (2019), encouraged by the high significant demand for noodles in the country. Moreover, the reduction in food preparation time, the rapid pace of urbanization and the increased demand for processed food also increase the demand for food and agricultural products imported to feed increasing urban populations. For example, imported wheat results in the production of 2.2 million tonnes of bread per year, 500,000 tonnes of biscuits/snacks, and 300,000 tonnes of noodles. As a result of the presidential action plan, the 10% substitution rate translates to 220,000 tons of HQCF for bread production, 50,000 tons for biscuit manufacturing, and 30,000 tons for noodle production. However, the current level of supply of HQCF replacement and usage is massively inadequate given the annual national demand for HQCF (300,000 tonnesprojected for demand, 50,000 tonnes national supply) (Ayodeji, Remi, Adebayo, & Ayodeji, 2017).

Depsite being the largest global producer, value-added cassava products from Nigeria are rarely seen in international trade. Between 2011 and 2018, the global cassava processing industry grew by 2.6 percent, reaching a production volume of about 253.4 million tonnes in 2018, Wamba and Akter (2019). In Nigeria, barely 10 percent of cassava is currently processed into flour, sweeteners and industrial goods, unlike Brazil, where 85 percent of cassava goes to manufacturers, and 95 percent in Thailand, where the vast majority of production is consumed by humans, (FAOSTAT, 2017). In view of the above, the question is how Nigeria can emerge as the largest global producer of cassava as one of the globe's foremost export markets of value-added cassava especially HQCF. Given the current state of production there is need to increase the potential economic benefits of HQCF. This paper is therefore set to determine the cost and returns accrued in the production of high-quality cassava flour, determine the most profitable actor in the production.

2. MATERIALS AND METHODS

The study was conducted in the six south-western states of Nigeria: Oyo, Osun, Ogun, Ondo, Lagos, and Ekiti. Located at a latitude of 6 degrees north and 4 degrees south and longitudes of 40 degrees west and 60 degrees east, the south-west of Nigeria holds many of the largest cassava-producing regions, as well as the majority of cassava-processing companies that manufacture HQCF.

Both primary and secondary data were used in the analyses. The primary data, produced from cassava producers, HQCF processors (flour millers), and HQCF marketers, were collected using a structured and concise questionnaire, and collated information such as yields, inputs parameters, market prices for both inputs and outputs, transport costs, and cost associated with storage.

In the study, cassava farmers were chosen using a multistage sampling method. The first stage involved the selection of Oyo and Osun, two principal producers of cassava in South-West Nigeria. The second stage involved a random selection of four out of thirty-three local government areas (LGAs) from each state and 30 LGAs (plus an area office) in each state. In the third stage, four villages from each LGA were chosen at random. Finally, 10 cassava farmers at random from each village for a total of 320 cassava farmers. A mapping survey for all the areas of production, marketing, and processing of HQCF in the area were done and the total number of available HQCF processors (18) were utilized. The list of marketers were provided by the HQCF processors/millers. The study focused on the three important relevant actors in the HQCF value chain using a final total of 381 responses (311 cassava producers, 18 processors and 26 marketers).

The socio-demographic, environmental, and institutional attributes of cassava farmers, HQCF processors, and HQCF marketers were defined using descriptive statistics using frequency tables, means, percentages, and standard deviations. Profitability analysis techniques used to assess the profit levels in the value chain included net farm income (NFI), profitability index (PI) , rate of return on nvestment (ROI) , capital turnover ratio (CTO), and benefit-cost ratio (BCR).

3. RESULTS AND DISCUSSIONS

3.1. Socio-Economic Characteristics of the Actors

As shown in Table 1, the median age of cassava farmers was 48.29 years. About 17.36 % of the farmers were younger than the average age of 48.29 years, while 33.44 percent of the cassava farmers were older. Only 2.57 % of cassava farmers were under the age of 30, while the majority (63.99 %) were within the ages of 30 and 50. These findings were consistent with those of Odetunmibi et al. (2017); Tofi, Tondo, and Egbe (2019), who found that cassava farmers were mainly between the ages of 36 and 56 with a median age of cassava producing farmers in Delta state of 42 years, showing that a significant proportion of them were of working-age population, Akerele et al. (2019) found the median age of HQCF processors to be 47.61 years and the median age of marketers to be 44.12 years. Processors between the ages of 41 and 50 were found to be more interested in the establishment of HQCF

processing businesses, possibly due to the high financial investment needed to start the HQCF enterprise. The majority of the HQCF processors were between the ages of 45 and 54, according to Ogboji (2016); Adejo, Saliu, and Adejo (2020).

Table 1. Age distribution of actors in the HQCF value chain.

Characteristics	Cassava producers (n=311)		HQCF Processors/millers (n=18)		HQCF Marketers (n=26)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Age						
≤30	8	2.5	0	0	1	3.85
31-40	46	14.79	2	11.11	4	15.38
41-50	153	49.20	11	61.12	14	53.85
51-60	66	21.22	1	5.55	3	11.54
>60	38	12.22	4	22.22	4	15.38
Mean	48.29		47.61		44.12	
Standard dev.	8.46		8.08		6.79	

Male farmers, processors, and marketers accounted for 78.14 %, 96.15 %, and 70.45 % of the research pool, respectively. The majority of HQCF processors (96.15 %) were also male, while 3.85 % were female. This is likely due to the fact that male processors are more able to endure the rigorous demands of system operation, maintenance, and personnel management. They could also take more financial risks than their female counterparts.

Table 2. Gender distribution among the actors in the HQCF value chain.

Characteristics	Cassava producers (n=311)		HQCF Processors/millers(n=18)		HQCF Marketers (n=26)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Gender						
Male	243	78.14	14	77.77	18	69.24
Female	68	21.86	4	22.23	8	30.76

Table 3 provides a breakdown of the marital statuses of the actors, in which 84.57 % of cassava producers, 65.38 % of HQCF processors, and 90.91 % of HQCF marketers were shown to bemarried. The high percentage of married people meant that family labor would be available for actors in the HQCF value chain, which decreases the amount spent on hired labor. Shee et al. (2019) Found that married people participated in the cassava flour value chain due to the ability to include their families in farming activities.

Table 3. Marital Status among the actors in the HQCF value chain.

Characteristics	Cassava producers (n=311)		HQCF Processors (n=18)		HQCF Marketers (n=26)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Marital status						
Single	8	2.57	1	5.55	1	3.84
Married	263	84.57	9	50.00	22	84.63
Widowed	24	7.71	2	11.11	2	7.69
Divorced	16	5.15	6	33.34	1	3.84

Table 4 shows that the average household size for cassava producers was 6.91, for HQCF processors, 5.62, and for HQCF marketers, 7.08. Large household sizes are known to be a source of farm and off-farm income generating activities (Enimu, Edet, & Ofem, 2016). However, it is worth noting that large household sizes do not necessarily lead to improved efficiency, as family labor may consist predominantly of school-aged children who are often more occupied by school. The marketer's household size ranged from 4-6 family members, as did the household size of the

HQCF processors. The median family size for the actors in the HQCF value chain was as follows: cassava producers; 6.91, HQCF processors; 5.26, HQCF; marketers 7.08.

Table 4. Household size distribution among the actors in the HQCF value chain.

Characteristics	Cassava producers (n=311)		HQCF Processors/millers(n=18)		HQCF Marketers (n=26)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Household size						
1-3	3	0.96	0	0	0	0
4-6	139	44.70	15	83.33	13	50.00
7-above	169	54.34	3	16.67	13	50.00
Mean	6.91		5.26		7.08	
Standard dev.	2.15		1.03		2.47	

Surveying the actors' educational level showed that 58.20% of the cassava producers had some form of formal schooling, implying that the implementation of new cassava farming technologies is relatively easy [Table 5]. Higher education appears to enable HQCF processing, as 100% of HQCF processors were trained and 59.05% were educated. The necessity for this is demonstrated by the processors' ability to make well-informed decisions. This result demonstrates the value of education to stakeholders who have recognized the many benefits and advantages it provides. This result corroborates (Ayoola & Ayoola, 2016 ; Ogboji, 2016; Oluyole, 2017) findings that HQCF processors were taught. Education is likely to affect processors' ability to implement advanced processing technology and, as a result, increase productivity and performance. Farmers and HQCF processors with a high literacy level would be able to understand production methods and new technology adoptions. The years of experience have an effect on the managers' skills and productivity in carrying out their processing tasks, as per Ayoola and Ayoola (2016).

According to Table 6, 23% of farmers had more than 20 years of farming experience, while 19.23% of processors had more than 8 years of processing experience, which lends to implications about the managers' skill and productivity in carrying out their processing tasks (Kelemu & Negatu, 2016). The majority of the marketers (72.73%) have had more than ten years of experience.

The average farm size of 2.78 hectares survyed showed that a huge proportion of the cultivated farm were less than 3 ha. The average HQCF production was 34.88 tonnes, and the average HQCF marketer farm size was 2.85 tonnes. Furthermore, more than 90% of cassava production were shown to take place on subsistence farms that usually grow 0.5 ha of cassava (Akerele et al., 2019).

Table 5. Educational levels among the actors in the HQCF value chain.

Characteristics	Cassava producers (n=311)		HQCF Processors/millers(n=18)		HQCF Marketers (n=26)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Years of education						
0	0	0	0	0	0	0
6	14	4.50	0	0	2	7.69
9	112	36.01	0	0	21	80.76
12	4	1.29	0	0	0	0
15	156	50.16	18	100	3	11.55
Mean	9.31		15		3.48	
Standard dev.	3.59		0.84		1.35	

Table 6. Years of experience among the actors in the HQCF value chain.

Characteristics	Cassava producers (n=311)		HQCF Processors/millers (n=18)			HQCF Marketers (n=26)	
Years of experience	Frequency	Percentage	Years of existence	Frequency	Percentage	Frequency	Percentage
≤10	45	14.47	≤5	13	72.22	5	19.23
11-20	143	45.98	6-10	5	27.78	1	3.84
21-3	60	19.29	11-15	0	0	5	19.23
31-40	31	9.29	>15	0	0	15	57.70
>41	32	10.29					
Mean	21.73			8.44		10	
Standard dev.	10.81			2.11		1.38	

Table 7. Farm/Firm size among the actors in the HQCF value chain.

Characteristics	Cassava producers (n=311)		HQCF Processors/millers (n=18)			HQCF Marketers (n=26)	
Farm size	Frequency	Percentage	Firm size/output	Frequency	Percentage	Frequency	Percentage
≤3	107	34.41	≤30kg	0	0	0	0
3-5	80	25.72	≤200kg	13	72.22	0	0
6-8	72	23.15	≤1ton	3	16.66	10	38.46
8-10	30	9.64	≤5ton	2	11.12	4	15.39
>10	22	7.07	>5ton	0	0	12	46.15
Mean	2.78		34.88ton			2.85 ton	
Standard dev.	2.82		0.66			2.58	

3.2. Profitability Analysis of the HQCF Value Chain.

Table 8 revealed that the revenue from sale of cassava roots was ₦902,553.10/annum which constituted 98.11% of the total revenue, while the sales generated from the sale of other products processed by the farmers (garri, starch and fufu) is ₦17,409.61/annum, 1.89% of the total revenue. The table also reveals that the mean total variable cost (TVC) in cassava production is ₦70,601.01 /annum, with labour 57.58% of the TVC. The cost of cassava cuttings and herbicides were 11.39% and 31.04%, respectively, while the other costs of land clearing, agrochemicals, and harvesting constituted 8.92%, 7.13%, 4.31% and 37.22%, respectively. That the labour and cost of other inputs (herbicides and cuttings) have the largest share of variable costs of cassava production in this study area agrees with the study conducted by Enimu et al. (2016) which also found labour and input cost constituted the highest share of variable cost in cassava production. Furthermore, the table revealed that the mean total fixed cost (TFC) in cassava farming was ₦ 20,862.42/annum amd the cost of capital assets made up of 79.14% of the TFC, while the cost of land and depreciation constituted 12.95% and 7.91% of the TFC respectively. The mean total cost of production of cassava was estimated at ₦ 91,463.44 /ha/annum, making the cost of capital assets a major fixed cost in cassava farming. The mean gross margin and net farm income from cassava production was ₦849,361.17/ha/annum and ₦828,499.28/ha/annum respectively, confirming that cassava production in the study area was profitable, a finding that corroborates with that of Ogboji (2016), who reported a gross margin of N127, 742.39/ha. The profitability Index (PI) was 0.98, which indicated that for every naira earned as revenue, 98 kobo returned to cassava farmer as net income. The rate of return on investment (IRR) was estimated at 90.6%, meaning that for every naira invested on cassava production, N90.60k was the return on investment. The capital turnover (CTO) per hectare was greater than 1 (10.6), meaning that for every naira invested per hectare of cassava production, about N100.60 Kobo returned as revenue to the producers. The benefit-cost ratio was 9.56, implying that farmers earned about ₦10 on every naira invested in cassava production. In addition, the hired labour ratio revealed that women were more involved in cassava production than the male.

Table 8. Cost and return analysis of Cassava Farmers/year.

S/No	Item	Amount (₦)	Percentage
A	Revenue		% of TR
i	Revenue cassava roots	902553.10	98.11
ii	Revenue (garri,fufu)	17409.61	1.89
iii	Total Revenue (TR)	919962.71	
B	Costs Variable costs		% of TVC
i	Cost of cassava stems	8038.91	11.39
ii	Cost of herbicides	21911.90	31.04
iii	Total cost of inputs	29950.81	42.42
iv.	Costs of Labour		
v	Land clearing	6295.82	8.92
Vi	Planting	5032.15	7.13
vii	Agro chemical application	3042.77	4.31
viii	Harvesting	26279.46	37.22
ix	Total cost of labour	40,650.20	57.58
X	Total variable cost	70,601.01	
C	Fixed costs		% of TFC
i	Cost of land	2701.77	12.95
ii	Cost of capital assets	16509.68	79.14
iii	Cost of depreciation	1,650	7.91
iv	Total fixed cost (TFC)	20,862.42	
v	Total production cost	91463.43	
D	Gross margin (TR-TVC)	849,361.17	
E	Net farm income (NFI)	828499.28	
F	Benefit Cost Ratio (TR/TC)	9.56	
G	Profitability index (PI)	0.98	
H	Rate of Return on investment (RRI)	90.6%	
I	Capital Turn Over (CTO)	10.6	
J	Hired labour Ratio (male: female)	10:12	
K	Mean Output	31.43 tons/year	

Table 9 revealed that the mean total revenue/year (TR) from HQCF processing was ₦3,340,230:77/year. The revenues from the sale of HQCF, animal feeds (grits, unsuitable cakes, and cassava) and cassava peels were ₦2,965,384:62, ₦363,957:69 and ₦10,888:46 respectively, constituting 88.78%, 10.90% and 0.32% of the TR respectively. The TVC in HQCF processing was ₦ 71,692.02. The cost of alternate source of power, cost of cassava roots, cost of power and labour were 72.78%, 18.08%, 7.35% and 1.79% of the TVC respectively. The results revealed that the cost of alternate source of power was the most significant variable cost in HQCF processing, followed by the cost of cassava roots. These findings are in line with Lamboll et al. (2018), who found out that high-energy costs squeeze profit margins in HQCF processing because it is more energy intensive than wheat flour milling, The table further revealed that the mean total fixed cost (TFC) for HQCF processing was ₦2,195,249.98, which breaks down into milling, drying, dewatering, grating, peeling and chirping, which constituted 47.32%, 31.37%, 10.56%, 7.71%, 7.02% and 2.02% respectively. The mean total cost of HQCF production was ₦ 2,266,942.00, which indicates that initial capital investment in HQCF processing is very high, conforming to Manu (2017) who posited that HQCF requires high start-up capital. Furthermore, the mean gross margin and the net processing income from HQCF processing were ₦46,028,307.98 and ₦ 43,761,365.97 respectively, confirming that HQCF production in the study area was profitable and further corroborating that of Manu (2017) which also found that HQCF production was profitable in southern Ghana. The profitability Index (PI) was 0.35, which meantthat for every naira earned as revenue, 35 kobo returned to HQCF processor as net income. The rate of return on investment (IRR) was estimated as 50.51%, therefore for every naira invested in HQCF production, N50.51k was the return.

Table 9. Cost and return analysis of HQCF processors/year.

S/No	Item	Amount (₦)	Percentage
A	Revenue		% of TR
i	Revenue (HQCF)	2,965,384:62	88.78
ii	Revenue (waste A animal feeds)	363,957:69	10.90
iii	Revenue (waste B cassava peels)	10,888:46	0.32
Iv	Total revenue	3,340,230:77	
B	Cost Bi. Variable cost		% of VC
	Cost of power	5,269:71	7.35
i	Cost of alternate source of power	52,180	72.78
ii	Cost of cassava roots	12,961:54	18.08
iii	Cost of labour	1,280:77	1.79
iv	Total variable cost(TVC)	71,692:02	
	Bii. Fixed costs (machinery)		% of FC
i	Peeling machines	154,080:80	7.02
ii	Grating machine	169,325:00	7.71
iii	Chipping machines	44,423:08	2.02
iv	Dewatering machines	231,828:80	10.56
v	Drying machine	688,611:50	31.37
vi	Milling machine	906,980:80	47.32
vii	Total fixed cost	2,195,249:98	
viii	Total production cost	2,266,942:00	
C	Gross margin	3,268,538:15	
D	Net processing income	1,144,980:79	
E	Benefit Cost Ratio	1.52	
F	Profitability index (PI)	0.35	
G	Rate of Return on investment (RRI)	50.51%	
H	Capital Turn Over (CTO)	1.52	
I	Hired Labour Ratio in the HQCF Processing (**Men:** Women)		
i	Peeling	0:7	
ii	Washing	0:4	
iii	Slicing	0:3	
iv	Bagging	4:2	
v	Sealing	3:1	
J	Mean quantity of HQCF tons/year	4.88	

The results also conform to Ayoola and Ayoola (2016) that the rate of return of HQCF processors was 0.32 and positive, not only showing that 1 unit increase in the significant inputs will lead to 0.32 percent increase of HQCF output, but also that high-quality cassava flour processors are in stage II (rational stage) of their production cycle as output is increasing at decreasing rate relative to the level of quantity input use. The capital turnover (CTO) per tonne was greater than 1 (1.52), indicating that for every naira invested per tonne of HQCF production about ₦10.52 Kobo returned as revenue. The benefit cost ratio was 1.52 implying that the HQCF processor earned about ₦10 on every naira invested in HQCF production and indicating that it's a profitable enterprise, Ogboji (2016); Manu (2017). The hired labour ratio reveals that women were more involved in the peeling, washing and slicing units while the men dominated the bagging and sealing units of the HQCF production.

The results for the cost and return analysis for the HQCF marketers are presented in Table 10. The mean total revenue/year (TR) from HQCF marketing was ₦ 597724.10 while the mean total marketing cost (TMC) were ₦589,474.22. The costs of purchase, transportation, shopping facilities and salary payments were 95.56%, 2, 28%, 1.73% and 0.43% of the TMC respectively. The results above reveals that the cost of purchase of HQCF had the highest proportion of investment in HQCF marketing. The mean marketing margin (MM) from HQCF marketing was ₦8,249.88 which indicated that venturing into HQCF marketing was profitable, and corroborates with the findings of Ogboji (2016) which stated that HQCF marketers had positive gross margin of ₦ 20,365.46 per tonne of HQCF marketed. The gender ratio reveals that more hired female labour involved in marketing of HQCF than male.

Table 10. Cost and return analysis of HQCF Marketers/year.

S/No.	Item	Amount (₦)	Percentage
A	Revenue		% of TR
i	Sales (TR)	597,724.10	100
B	Variable cost		
i.	Purchase of HQCF	563,327.60	95.56
ii.	Cost of transportation	13,444.83	2.28
iii.	Rents (shop facilities)	2,514.29	0.43
iv.	Salaries of staff	10,187.50	1.73
v.	Total marketing cost (TMC)	589,474.22	
C	Market Margin	8,249.88	
D	Hired labour Gender ratio (Men to Women)	10:45	

The profitability analysis revealed that the majority share of the revenue to cassava farmers was from the sale of cassava roots, the cost of labour and cost of inputs have a huge share of variable costs of cassava production while the cost of capital assets was the major fixed cost. For the HQCF processors, a larger percentage of the revenues from HQCF processors came from the sale of HQCF, the cost of alternate source of power was the major variable cost in HQCF processing, followed by the cost of cassava roots, and the results from the profitability indicators confirmed that cassava production and HQCF processing in the study area were profitable. The cost of purchasing HQCF had a large share of investment in HQCF marketing. The mean marketing margin (MM) for HQCF marketing was ₦8,249.88 indicating that venturing into HQCF marketing was profitable.

4. CONCLUSION

The socio-demographic features of the stakeholders along the HQCF value chain showed that the median age for cassava farmers, processors, and marketers were 48.29 years, 42.84 years, and 45.16 years respectively. There were more male farmers, HQCF processors, and HQCF marketers than female and most of the actors were married. A larger percentage of the actors were formally educated and all the HQCF processors were highly educated, which suggested that education had an impact on the efficiencies of processing HQCF, which would be reflected in the processors ability to take good and well informed decisions. Furthermore, the profitability analysis revealed that the major revenue for the farmers came from the sale of cassava roots. The labour costs and cost of inputs have a huge share of variable costs of cassava production while the cost of capital assets was the major fixed cost in cassava farming. The mean gross margin and net farm income (₦849,361.17/ha/year and ₦828,499.28/ha/year) from cassava production were high and positive. The profitability Index (PI) revealed that 98 kobo returned to cassava farmer on every naira invested as net income and the rate of return on capital invested (IRR) was calculated to be 90.6%, meaning that the return on investment for each naira expended on cultivating cassava was N90.60k. The capital turnover (CTO) per hectare was greater than 1 (10.6), indicating that for every naira invested per hectare of cassava production, about N100.60 Kobo returned as revenue to the producers. The benefit-cost ratio was 9.56, implying that the farmer earns about ₦10 for every naira invested in cassava farming. All the profitability indicators confirmed that cultivating cassava in the study area was profitable. Also, a larger percentage of the revenues for the HQCF processors came from the sale of HQCF. The cost of alternate sources of power was the major variable cost in HQCF processing, followed by cassava root costs. The mean total cost of HQCF production was ₦ 2,266,942.00, which indicated that initial capital investment in HQCF processing was very high. Gross margin and the net processing income (₦46,028,307.98/year and ₦ 43,761,365.97/year) for HQCF processing were positive and high, and the profitability Index (PI) revealed that 35 kobo returned to HQCF processors as net income. The rate of return on investment (IRR) ascertained that, for every naira invested on HQCF production, N50.51k was the return on capital invested. Capital turnover (CTO) per tonne was greater than 1. Also, the benefit-cost ratio was 1.52, which confirmed that HQCF manufacture in the study area was profitable. The cost of purchase

of HQCF had a huge share of investment in HQCF marketing. The mean marketing margin (MM) for HQCF marketing was ₦8,249.88 indicating that venturing into HQCF marketing was profitable.

The profitability analysis revealed that cassava production, HQCF processing, and HQCF marketing were profitable, with the production of cassava having the highest returns compared to the other two nodes of production.

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