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ANALYZING CASSAVA PROCESSORS' PREFERRED OUTPUT AND PROFITABILITY OF CASSAVA PROCESSING IN HOHOE MUNICIPALITY

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Abstract
Cassava is one of the most perishable tuber crops, and to prevent postharvest losses cassava processing is an essential component of the cassava value chain. This study analyzed the preferred output forms of the cassava processors and the profit margins of the various output forms. This was done in the Hohoe municipality of the Volta Region, Ghana. A total of 135 respondents were selected through a multistage sampling procedure and interviewed through the use of structured questionnaires. The data was analyzed using Stata version 17 and SPSS version 23. The various output derived from cassava are dough, gari and pellets. From the result, the most preferred output was cassava dough (93.1%) while the most profitable cassava processing venture is gari (93.8%) processing. The factors that significantly influenced the profitability of dough were age, educational level, cassava farm size, experience, cassava source, contract on dough, dough purpose, price per bag (25kg) of dough, training in dough processing and a price of dewatering. The result also showed crosscutting challenges such as labour intensive, difficulty in drying cassava chips, unstable market and time consuming. Opportunities for cassava processing into various forms are ready market for the products. The study concluded that to increase the returns from cassava processing, processors are encouraged to process cassava into gari other than pellet or dough. The study also recommended that technological advancement on gari processing should be promoted to make the activity less labourious and difficult.

Keywords: Cassava Processing, Hohoe Municipality, Multiple Linear Regression, Preferred Output, Profitability

Introduction
In Ghana, agriculture contributed about 18.9% of Gross Domestic Product (GDP) in 2016 (World Bank, 2018) and provided 51% of employment in the country (Stutley, 2010). The major crops produced in the country include maize, rice, yam, banana and cassava with cocoa, oil palm, cotton and coconut being the critical cash crops produced within the nation (Food and Agriculture Organization [FAO], 2015). Cassava (*Manihot esculenta*) is a staple root crop which originated from Central America and is presently developed within the tropics and expended by millions of individuals around the world. In the early 18th century, cassava was introduced into West Africa (Jones, 1959). Cassava's adaptability to the tropical climate and soils enables it produce excellent harvest in Africa. Cassava has easily become a commercial crop for most households. It is known to be one of the most suitable food crops due to its ability to withstand drought. Research has shown that cassava is a commercial crop and an essential food security crop that is produced in all agro-ecological zones of Ghana. Among the starchy and cereal staples produced in Ghana, the land area under cassava cultivation is highest (Ministry of Food and Agriculture [MoFA], 2013). Cassava is one of the resilient crops with the potential of contributing greatly to the agricultural share of Ghana's GDP. Income generated from cassava and post-harvest handling or ability of processors to process cassava into other forms like gari in order to increase the shelf life of the crop represent around one fifth (22 percent) of Ghana's agriculture share of GDP (Ministry of Food and Agriculture [MoFA], 2014). The crop is one of the most imperative crops grown within the tropics and a major carbohydrate staple. It is the third most vital source of calories within the tropics after cereal crops (Prakash, 2008). For the attainment of food security, it is preferable to other seasonal crops because gari for instance can be eaten in several forms and even the crop itself can be boiled, roasted and eaten raw or with stew unlike other

seasonal crops (Ministry of Food and Agriculture [MoFA], 2013).

Ghana was the fifth largest producer of cassava in the world in terms of value (Food and Agriculture Organization Corporate Statistical Database [FAOSTAT], 2016), with a production of 14,240,867 metric tons of cassava throughout the country annually. It is estimated that 1,752,287 metric tons are lost along the chain (Naziri, Quaye, Siwoku, Wanlapatit, Phu, Bennett, 2014). There has been a considerable increase in the production level of cassava (Poole, Chitundu, Msoni & Tembo, 2010), because of its generation of cheap energy, all-year-round accessibility and resilience to extreme biological conditions. Cassava tubers contain about 70% moisture content which results in a short shelf life (3-4 days) due to deterioration after harvesting (Oduro, Ellis, Dziedzoavi & Nimako-Yeboah, 2000). Fortunately, the crop is multifaceted, hence, can be transformed or processed into a wide range of output forms, including starch, gari, flour, tapioca, beverages and cassava pellet. Cassava processed into gari, for instance, is relatively cheaper than other carbohydrate sources, especially rice and maize (Iwuoha, 2013). The proximity of a processing center to the source of cassava tubers or farm is crucial for cassava processing. The per capita consumption of cassava in Ghana averages 152.9kg per year (Ministry of Food and Agriculture [MoFA], 2010). It serves as a major source of income to rural folks especially women. According to Ogunleye, Adeola & Ibigbami (2008), women are dynamic within the cassava industry, especially with the processing and marketing of the produce. However, processing into a particular output form may depend on a number of factors, such as the socioeconomic characteristics, income and market information available to the processor. This also implies that the economic returns from cassava processing may differ based on the processed output form.

Ironically, the profitability of each processed output form is not known and have also not been given the needed research attention. Therefore, it is possible that a current return from cassava processing is not being maximized as there is no empirical evidence to support it. The guiding principle is that, if the returns to the processed outputs are known, policy makers can direct specific policies to promote such processed output forms and also advance strategies for improving the benefit of cassava processing. To avert the negative consequences of this missing gap and to maximize the returns from cassava processing, this research analyzed the output forms the processors preferred to process cassava into and the profitability of each of these output forms.

Materials and Methods

Study Area

The study was conducted in the Hohoe Municipality of Volta region, Ghana. The Municipality was established in 1979, with its capital being Hohoe. The Municipality is located within longitude 0º15'E and 0º45'E and latitude 6º45'N and 7º15'N. It covered an area of 1,172 square kilometers (117,200 hectares), representing 0.55 percent of Ghana's land mass. The annual rainfall of the area ranges between 1,100mm and 1,500mm, with an average of 1,300mm. The Municipality experiences a bimodal rainfall pattern; the population of the Municipality stood 167,016; constituting 79,967 males and 87,049 females (Ghana Statistical Service [GSS], 2012). Agriculture is a major activity of most of the households, especially, those communities located outside Hohoe. The land area of Hohoe Municipality is 1,172km^2 and the major staple crops grown are cassava, rice and maize.

Sampling Procedure and Data Collection

The Hohoe Municipality was chosen purposively due to the high level of cassava processing into different output forms in the region. Also, the Hohoe market is a major market for most agricultural products in the Central Volta, creating opportunities for communities in the municipality. Five (5) communities within the municipality were selected using simple random sampling procedure. This gave every cassava processing community in the municipality an equal likelihood of inclusion in the study. Again, simple random sampling was used to select 27 processors in each selected community. Therefore, a total sample size of 135 participants was selected for this study. The data for the study was collected using a structured questionnaire. The data gathered included information on the processors' perceptions on processing cassava into different output forms, the production activities, inputs used, cost of processing and revenue as well as the challenges and opportunities of cassava processing in the municipality.

Budgeting Technique

Budgeting technique was used to analyze the profit potential of processing cassava into various output forms. The budgetary analyses involved the use of gross margin. Gross margin is a useful tool for cash flow planning and determining the relative profitability of processing enterprises (Rural Solutions, 2012). Gross margin helps to measure how the processors'

processing costs relate to their revenues. The gross margin is chosen in this study over the net margin since information required for predicting depreciation of the fixed assets was not available. Therefore, the gross margin was used in this study to analyze the total variable costs and returns for the purpose of determining the profitability level involved in cassava processing in the study area.

To calculate the gross margin, there is the need to know the total sales revenue as well as the cost of processing (variable costs). Generally, gross margin is given as the difference between the revenue and the cost (Nandi, Gunn & Yurkushi, 2011). Thus;

$$GM = TR - TVC$$

Where GM is the gross margin, TR is total revenue determined by the product of the output price and quantity (TR=P*Q) and TVC is the total variable cost determined by the summation of all variable costs of processing cassava into the various output forms.

Multiple Linear Regressions

A multiple regression was estimated to determine the factors that influence the profitability of cassava processing. This is generally given as;

$$Y = \beta X_i + u_i$$

Where Y is the dependent variable, in this case profit, X_i is a vector of exogenous variables and β are the parameters that must be estimated. The u_i is a random error term that is normally distributed. Empirically, the profit function of cassava processing is given as;

$$Profit = \beta_0 + \beta_1 Age + \beta_2 Education + \beta_3 Farm\ size + \beta_4 Experience + \beta_5 Cassava\ source + \beta_6 Contracting + \beta_7 Purpose\ of\ processing + \beta_8 Dough\ Price + \beta_9 Training + \beta_{10} Income\ source + \beta_{11} Dewatering + \beta_{12} Children$$

Table 1: Variable Description, Measurements and a Priori Expectations

Independent Variable		Measurement	A priori Expectation
Age	X_1	Total years of a processor	-
Educational level	X_2	Level of education	+
Cassava farm size	X_3	Size of cassava farm in acres	+
Experience	X_4	Number of years in processing	+
Cassava source	X_5	Dummy variable: 0 if from own farm and 1 if otherwise	±
Contract on dough	X_6	Dummy variable: 1 if engaged in contract on dough processing and 0 if not	±
Dough purpose	X_7	Dummy variable: 0 if for cash and 1 if otherwise	±
Dough unit price	X_8	Price per bag (25kg) of dough	±
Training in dough processing	X_9	Dummy variable: 1 if engaged in training of dough processing and 0 if not	+
Any source of income	X_{10}	Dummy variable: 1 if engaged in other business and 0 if not	±
Dewatering price	X_{11}	Price charged per bag (25kg)	-
Main occupation	X_{12}	Dummy variable: 0 if farming and 1 if dough processing	±

Children	X_{13}	Number of children	±

Results and Discussions

Socio-Economic Characteristics of Cassava Processors

Table 2 shows the socioeconomic characteristics of the sampled processors. This shows that majority of the sampled cassava processors were females. Small scale agro-processing is generally the activity of women in Ghana. Therefore, the observed female dominance in cassava processing is consistent. Consistently, Lagat and Maina (2017) and Abong, Shibairo, Wanjekeche, Ogendo, Wambua, Lamuka, Arama, Okoth, Mulwa, Kamidi, Mcosore & Masha (2016) also observed that women are more involved in cassava processing activities than men.

The average cassava processor is 45 years, with minimum and maximum age of 29 and 70, respectively. It means most of the cassava processors fall in the active working age group in the study area. In terms of percentage distribution, majority (81.02%) of the cassava processors were between the ages of 36-65 years. Also, 15% of the respondents were between the ages of 16-35 years while the remaining 4% were above 66 years. This shows that most of the cassava processors are within active stages of their working age. This validates the findings of Inyada (2015), which revealed that the average age of cassava processors is within the economically active age.

On level of education, 49.6% of the cassava processors had no formal education whilst 50.4% had formal education. Thus, 32.6% had primary education, 13.3% had Junior High School education, 1.5% had Senior High School education and 3% had tertiary education. Like farming in general, cassava processing is mostly engaged in by the less educated in the society and this is confirmed in this study. This finding is in line with Inyada (2015) and Oluwasolo (2010) who found that about 19.3% of the cassava processors in Oyo state, Nigeria did not go to school at all, 64% had only primary education, 14.7% completed secondary education while 2% attended tertiary institutions. This is not surprising as the level of knowledge from formal education required under cassava processing is low (Inyada 2015)

Although the study purposively sampled cassava processors, the result showed that 3% of the processers do the processing as a secondary economic activity and farming as their primary economic activity.

Table 2: Socioeconomic Characteristics of the Processors

Variable	Frequency	Percentage
Sex		
Females	117	86.7
Males	18	13.3
Age		
16-35 years	20	14.6
36-65 years	111	81.0
66 and above	6	4.4
Mean (Years)	45.03	
Level of education		
No formal education	67	49.6
Primary	44	32.6
J.H.S	18	13.3
S.H.S	2	1.5
Diplomat/Certificate	4	3.0
Mean (Years)	1.8	
Main Occupation		
Farming	4	3.0
Cassava processing	131	97.0

Perceptions on Economic Importance of Output Forms

Three major processed cassava output forms were identified in the study area. These are gari (75%), dough (93.1%) and pellets (75%). The respondents were therefore asked to rank the three common processed forms of cassava in terms of their economic importance relative to other output forms (Table 3). It could be seen from Table 3 that 75% of the gari processors

ranked gari as the second most economically important cassava output form, relative to dough and pellet. Surprisingly, only 12.5% ranked gari as the most economically important output form. Also, 75% of the pellet processors ranked pellet as the third most economically important cassava output form, relative to dough and gari. None of the pellet processors ranked pellet as the first economically important output form. Finally, nearly all dough processors (99.1%) ranked dough as the first economically important cassava output form, relative to gari and pellet. Only one dough processor ranked dough as second economically important output form of cassava processing. These results imply that the cassava processors in the study area have the perception that dough has more economic importance than gari and pellet. This could explain the high number of observed processors who were into dough processing in the municipality.

Table 3: Perceptions on Economic Importance of Cassava Processing

Rank	Gari Processors		Pellet Processors		Dough Processors	
	Freq.	%	Freq.	%	Freq.	%
First	2	12.50	0	0.00	114	99.13
Second	12	75.00	1	25.00	1	0.87
Third	2	12.50	3	75.00	0	0.00
Total	16	100.0	4	100.0	115	100.0

Perceptions on the Profitability of Cassava Processing

Table 4 shows the distribution of respondents based on their perceptions on the profitability of cassava processing and the trend of profit levels over the past ten years. The result indicates that 93.75%, 89.57% and 75% of gari, dough and pellet processors, respectively, perceived cassava processing into gari, dough and pellets as profitable ventures. Thus, overall, the processors perceived cassava processing as a profitable venture. On the other hand, 93.75%, 75% and 82.61% of gari, pellet and dough processors respectively indicated that the profit level of processing into the various output forms have increased over the years. It shows that not only does the majority of the gari processors perceive gari processing to be profitable but also, hold the opinion that the profit level from gari processing is increasing or has increased over the years. This is an important finding that justifies support for investing into cassava processing in order to reduce post-harvest losses of the crop.

Table 4: Perceptions on the Profitability of Cassava Processing

Processor	Cassava processing profitable?				Profit level increasing?			
	Yes		No		Yes		No	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Gari processors	15	93.75	1	6.25	15	93.75	1	6.25
Pellets processors	3	75.00	1	25.00	3	75.00	1	25.00
Dough processors	103	89.57	12	10.43	95	82.61	20	17.39

Gross Margin Analysis of Dough Processing

The results on the profitability of cassava processing into gari, dough and pellets are provided in Table 5. This indicates the components of the annual variable cost, total revenue and gross margin from cassava processing into the various output forms. This shows that the total annual variable cost of cassava processing into gari, pellet and dough were Gh₵ 78,816.63, Gh₵ 41,684.50 and Gh₵ 348,407.10 respectively. Similarly, the total annual revenue from cassava processing into gari, pellet and dough respectively were Gh₵ 185,153, Gh₵ 75,635 and Gh₵ 762,885. Therefore, the gross margin from cassava processing into gari, pellet and dough were Gh₵ 106,336.37, Gh₵ 33,950.50 and Gh₵ 414,477.86 respectively. It can be concluded from this analysis that processing cassava into dough is more profitable than processing into gari and pellet. This is consistent with the processors' perception that dough processing is the most profitable and profit margins of dough processing are increasing. These indicate the average gross margin irrespective of the average processed output quantity. Therefore, the analysis was further estimated based on 25kg bags.

Table 5: Annual Total Variable Cost, Total Revenue and Gross Margin

Variable cost	Gari (Gh₵)	Pellet (Gh₵)	Dough (Gh₵)
Raw cassava	30,436.9	18,183.6	180,591.1
Peeling	14,091.47	8,200	79,866.7
Water	1,269.26	738.29	7,024.69
Washing	1,282	750	7,024.11
Drying	-	8,994.61	-
Grating	1,282	-	7,082.11
De-watering	2,651	-	15,812.43
Sieving	2,391	-	-
Firewood	2,661	-	-
Roasting	14,055	-	-
Bag	5,774	3,306	34,040
Packaging	2,923	1,512	16,911
Total variable cost (TVC)	78,816.63	41,684.50	348,407.10
Total revenue (TR) = P × Q	185,153	75,635	762,885
Gross margin = TR – TVC	106,336.37	33,950.50	414,477.86

Table 6 indicates that the average total variable cost per bag (25kg) for gari, pellets and dough were Gh₵28.45, Gh₵25.39 and Gh₵21.82 respectively. Also, averagely the total revenue per 25kg bag was Gh₵64.80, Gh₵45.70 and Gh₵44.51 for gari, pellet and dough, respectively. Therefore, the average gross margin per 25kg of processed gari, pellet and dough were Gh₵36.33 Gh₵20.33 and Gh₵22.69, respectively. This shows that processing cassava into gari is most profitable. It can be observed that there is a direct relationship between the average total variable cost and the average total revenue as well as the average gross margin. This finding is in line with Adio and Ajetunmobi (2014), who revealed that additional increase in invested capital will lead to an increase in income. Consistently also, Inyada (2015) established that gari processing is more profitable than pellet.

Table 6: Average Total Cost, Average Total Revenue and Average Gross Margin per Bag (25kg)

Average	Gari (Gh₵)	Pellet (Gh₵)	Dough (Gh₵)
Total Variable Cost	28.45	25.39	21.82
Total Revenue	64.80	45.70	44.51
Gross Margin	36.33	20.30	22.69

Determinants of Gross Margin of Dough Processing

In this study, the observations for gari and pellet are low, hence, the regression was not fitted for these processors. But Gross margin analysis was done for gari, dough and pellet. On the other hand, since dough is processed by relatively a larger number of processors, the study examined the factors, both price and socioeconomic, that influences the profit margin of the dough processors. The result shows that age, educational levels, farm size, experience, cassava source, contract on dough, purpose of processing, price of dough, training and unit price for dewatering had significant effect on the profit margin of the dough processors. This is shown in Table 7. The adjusted square however showed that only 49% of the variations in profit margins were explained by the estimated model.

The coefficient of age is negative and significant. This implies that the gross margin for the youth is higher than the gross margin for the elderly. In other words, the gross margin of dough processing declines as the age of the processor increases. This is because the relatively younger processors are very eager to make more income in order to finance their increasing needs. Because the younger processors are also more energetic, they are able to control the expenditure on dough processing by doing most of the work themselves. This finding is consistent with Adio and Ajetunmobi (2014), who indicated that the older the processor, the less productive they become. According to Lagat and Maina (2017), as processors grow older their level of involvement in cassava activities reduce.

Nonetheless, Inyada (2015) found a positive significant effect of age on processed cassava income.

The coefficients of all educational levels are significant and positive. This implies that processors with any level of formal education have a higher profit margin from dough processing than those with no formal education. This can be due to the ability of the educated to understand the processing process and also, effectively lobby for high prices for their dough or negotiate for lower input prices. This finding is in line with Adio and Ajetunmobi (2014), who indicated that the more educated a processor is, the better the profit. Again, this finding of this study is in consonance with that of Ibekwe, Chikezie, Obasi, Eze & Henri-Ukoha (2012), whose findings showed that the level of education was significant and positively correlated with the profit of cassava processing.

The coefficient of farm size is positive and significant, implying that an acre increase in the cassava farm size of the dough processors would lead to an increase in the gross margin from dough processing. This may be due to the constant availability of raw cassava for processing and the low cost associated with own cassava for processing. Also, economies of scale play a vital role in this sense because as output is being maximized due to higher raw cassava input from the larger cassava farms, the production cost turns to decline. This in effect brings about the direct relationship between cassava farm size and gross margin of dough, ceteris paribus. This finding is in line with Awerije (2014), who indicated that there is direct relationship between farm size and cost efficiency, thus, large farms are more cost efficient.

The coefficient of experience is positive and significant. This implies that the higher the experience in dough processing, the higher the profit margin. This can be as a result of effective and efficient dough processing due to in-depth knowledge obtained over the years of processing. As a person stays longer in a business, the more experienced and efficient he/she becomes in handling the operations (Chikezie, Ibekwe, Ohajianya, Orebiyi, Oguoma, Obasi, Henri-Ukoha & Emeyonu, 2011). According to Lagat and Maina (2017), the longer a processor participates in cassava enterprise, the more they appreciate the benefits and hence increase their involvement in its processing. Again, this finding validates the finding of Inyada (2015), which indicated that there is a positive relationship between years in processing and gross margin.

The coefficient of cassava source is -0.16, this implies that dough processors who obtained raw cassava solely from their own farms earn more than those who obtained from both their own farm and market (bought). This is because, those who obtained from only their own farm spent less during the time of cassava production as raw material than those who partly produced and bought. Buying from other cassava producers increases the cost of processing to dough.

The coefficient of contract on dough is positive and significant. Thus, dough processors that were on contractual agreement earn more than those that were not. This is because, those on contractual agreement turn to have regular and stable market that prevent perishability of dough which those without contractual agreement lack.

Dough purpose had a positive significant effect on the profit margin of the processors. This means that dough processors with the aim of processing for cash earn more profit than those with the aim of domestic consumption. This validates the need for engaging in dough processing as a business other than a subsistence activity.

Dough unit price had a positive effect on the profit margin of the processors. This implies that when the unit price of a bag of dough increases, the gross margin of the dough processors also increases. This is consistent with the law of supply. Thus, as price of dough increases dough processors supply more and this contributes to the increase in the gross margin of dough, ceteris paribus. This finding is line with Oluwasola (2010), who reveals that the levels of demand and supply of cassava and its products influence their prices in the market. However, Shimp (2010), showed that customers respond better on price reductions, which can lead to an increase in sales volumes.

Training had a negative effect on the profit margin of the dough processors. This implies that dough processors who did not participate in training of dough processing had more profits than those who had some form of training in dough processing. This was however unexpected. Nonetheless, it is possible that those who participated in the training could either not implement what they have been taught or the training was not beneficial to their dough processing. This is contrary to Mustafa-Msukwa, Mutimba, Masangano, & Edriss (2011), who indicated that training increases the knowledge on how to maximize output.

The coefficient of dewatering price is positive and significant. Thus, an increase in the price of dewatering leads to an increase in the gross margin of dough processing. Even though, a priori expectation is violated, it is possible that the higher the dewatering price the higher the quality of dough processed, the market quality and this could translate into the positive effect of the higher price on profit margins.

Table 7: Multiple Linear Regression Results on Gross Margin of Dough

Variable	Coefficient	Standard Error	P-Value
Age	-0.0098	0.0058	0.092*
Educational level			
Primary	0.1934	0.1007	0.058*
Junior high school	0.2842	0.1467	0.055*
Senior high school	1.0302	0.5531	0.065*
Diploma/Certificate	0.5222	0.2841	0.069*
Cassava farm size	0.4006	0.0668	0.000***
Experience	0.0204	0.0072	0.006***
Cassava source	-0.1616	0.0938	0.088*
Contract on dough	0.2827	0.1058	0.009***
Dough purpose	1.8739	0.7287	0.012***
Dough unit price	0.0187	0.0104	0.075*
Training in dough processing	-0.7286	0.3475	0.038**
Any source of income	-0.1056	0.0949	0.268
Dewatering price	0.0008	0.0003	0.019**
Main occupation	0.3056	0.3192	0.341
Children	-0.0102	0.0194	0.602

NOTE: Adjusted R-squared = 0.49; ***, **, and * indicate significance at 1%, 5% and 10%, respectively.

SWOT Analysis of Cassava Processing

The study analyzed the Strengths, Weaknesses, Opportunities and Threats (SWOT) of cassava processing into the various forms. The result is presented in Table 8. In each indicator from SWOT, at least two responses on each indicator were analyzed for each output form. For instance, majority of the gari processors indicated that it is time consuming (12.8%), labour intensive (61.5%) and heat stress (27.7%). Also, 83.7% and 3.7% respectively indicated that the major weaknesses of pellet processing are unstable market and difficulty in drying and gathering. Again, 92.6% and 7.4.0% of the processors revealed that cassava processing into dough is tedious in transferring and labour intensive, respectively. These weaknesses generally indicated that cassava processing is affected by a number of challenges, especially, due to the manual (human intensive) nature of the processing. This finding is in line with Oti, Olapeju, Dohou, Moutairou, Nankagninou, Komlaga, & Loueke (2010), who indicated that one of the constraints in gari processing is its labour intensiveness. Again, with the main opportunities of processing (opportunities) cassava into gari, 99.2% of the processors indicated that there is ready market while 18.5% indicated it is a good food commodity for home consumption. For pellets, 97.7% indicated that there is good sunshine for cassava processing into pellet while 13.3% indicated that it was easier to process than other output forms. For dough, 16.3% and 88.2% explained that there is ready market and can be used for home consumption, respectively. For this reason, it is accurate to conclude that gari was observed as the second most processed output due to the fact that majority of the processors perceived that there existed a ready market.

Also, on the existing conditions that could favour and promote (strengths) cassava processing into gari, 88.2% and 14.0% of the processors believed that there is ready market and it has a longer shelf-life compared to pellet and dough. For pellets, 91.2% and 16.3% revealed that pellets processing is not so much labour intensive and time consuming, respectively. For dough, 85.2% and 12.0% mentioned that there is ready market and it is easy to process compared to gari.

Finally, with the existing conditions that do not favour and encourage (threats) cassava processing into gari, 96.2% and 23.7% indicated that their capitals are insufficient while there are no external supports and that there is no intervention of government in terms of aid and support, respectively. For pellets, 89.5% mentioned that the market is unstable while only 3.7% mentioned that funds are not sufficient for pellet processing. For dough, 92.2% and 25.1% noted that their capitals are insufficient and absence of government intervention in terms of support and aid, respectively. These finding are in line with Oppong (2017), Okpeke and Onyeagocha (2015), who indicated that limited capital base for processors, is a challenge/threat to cassava processing. The report of Food and Agriculture Organization [FAO] (2012) revealed that some of the major constraints of cassava processors in West African countries include financial resource constraint.

Table 8: SWOT Analysis of Cassava Processing

Strengths		Weaknesses		Opportunities		Threats	
Response	%	Response	%	Response	%	Response	%
Gari processing							
Ready market	88.2	Time consuming	12.8	Ready market	99.2	Insufficient fund	96.2
Long shelf life	14.0	Labour intensive	61.5	Home consumption	18.5	Low government support	23.7
		Heat stress	27.7				
Pellet processing							
Less labour intensive	91.2	Unstable market	83.7	Easiest to process	13.3	Unstable market	89.5
Less time consuming	16.3	Drying and gathering	3.70	Good sunshine	97.7	Insufficient fund	3.70
Dough processing							
Ready market	85.2	Tedious in transporting	92.5	Ready market	16.3	Lack of government aid	25.1
Easy to process	12.0	Labour intensive	2.96	Home consumption	88.2	Insufficient fund	92.2

Conclusions and Policy Recommendations

This study examined the processors' perceptions on cassava processing into gari, pellets and dough, and estimated the profitability of these output forms and factors influencing the profit levels of the processors. This study established that the most preferred cassava output form by the processors is dough because the processors perceived dough to be more of an economic venture, thus, more profitable. However, the study showed that processing cassava into gari is more profitable, followed by dough and finally, pellets. Considering that gari can be stored for very long periods, this is a justifiable finding and also provided reasonable information to promote gari processing. The study established that the factors that significantly influenced the profit margins of dough processors were age, educational level, cassava farm size, experience, cassava source, contract on dough, dough purpose, price per bag (25kg) of dough, training in dough processing and price of dewatering. This study also established a number of challenges faced during processing of cassava into gari, dough and pellet as time consuming, labour intensive, unstable market and difficulty in drying. Opportunities of cassava processing are ready market, easily consumed at home and easy to process. The finding showed that gari processing must be given much attention and promoted among the processors. However, an innovative method in gari processing must be identified in order to reduce the associated bottlenecks such as heat stress, laborious processing and high demand of time.

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