ECONOMIC ANALYSIS OF CASSAVA PROCESSING IN YEWA SOUTH LOCAL GOVERNMENT AREA OF OGUN STATE, NIGERIA

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ABSTRACT

This study was carried out to investigate the determinants of cassava processing and economic benefits derived by the processors in Yewa South Local Government Area of Ogun State. The study was based on primary data obtained from 80 processors drawn through multi-stage sampling procedure. Data were analysed using descriptive statistics, Ordinary Least Squares (OLS), and Gross Margin Analysis. The results indicate that 80 percent of the processors were female with average age of 39 years. A high proportion was not educated (48.7%) and majority (76.3%) still used the traditional processing methods. Fufu, Gari and Lafun were the three main products from cassava processing in the study area. However, processors showed preference for Fufu. Insufficient funds constitute the major constraint to cassava processing (76%), followed by lack of infrastructural facilities such as electricity, storage facilities and good road network (66%) and cost of labour/fuel saving devices (57%). OLS estimates revealed that cost of cassava roots, age of processors, labour, processing technique and cost of factors such as firewood, transportation, frying pan, and knives were significant. The mean gross margin per processor per month was ₦39,830, mean total variable cost was ₦37,907.19 and average revenue was ₦77,736.88 with a rate of return on investment (ROI) of 2.05. This implies that for every ₦1 spent on processing cassava, the processor gets ₦2.05 in return, showing cassava processing as a profitable venture in the area. For more profitable returns, the study recommended among others, the use of labour and fuel saving devices by the processors. Also, provision of good road network used by cassava farmers may likely reduce the cost of the cassava roots.

Keywords: Cassava, Value addition, Budgeting, Regression analysis, Nigeria

INTRODUCTION

Cassava is one of the world most important food crops (Asogwa *et al*., 2013) with a total output of over 277 million tonnes in 2016 against 71 million metric tonnes in 1961 (Food and Agriculture Organization [FAO], 2018). Nigeria produces more than half of the total cassava output in the world, making it the largest producer in the world; a third more than production in Brazil and almost double the production of Indonesia and Thailand (FAO, 2004). Cassava is one of the most consumed foods in Nigeria (International Institute of Tropical Agriculture [IITA], 2010), and has a shelf life of 24 to 48hr after harvest (Andrew, 2002). Most frequently, cassava is traditionally consumed by processing the fresh roots into *Gari*, *Fufu*, and flour

(Adebayo *et al.,* 2003). Cassava can be processed into chips, pellets, starch, ethanol and high quality cassava flour (HQCF) which can be used in confectionery like baking. The need for cassava processing arises in order to reduce the bulkiness of the roots (as it contains 60-70 percent water), remove the toxicity (cynogenic glycosides) that make it perishable (Nweke, 2003; Sanni *et al.,* 2008; Ndaliman, 2008). Processing the roots to various forms of products will increase the shelf life and stabilize the price (Achem *et al.,* 2013).

According to the International Fund for Agricultural Development [IFAD] (2013), Africa is one of the continents of the world where some 600 million people are dependent on cassava for food. Cassava root is a good source of carbohydrates, and it is also a source for bio-fuel as well as animal feed (Adekanye *et al.,* 2013). It is produced in 24 out of the 36 states in Nigeria (Eguono, 2015) with an average yield per hectare of 10.6 tons largely by small-scale farmers (Omoregbee and Banmeke, 2014). Most of the cassava produced is consumed in processed form and also as livestock feed. Cassava per capita consumption is very high and provides about 80 % of the total energy intake of many Nigerians (Ani, 2010). As a food crop, cassava fits well into the farming systems of the smallholder farmers in Nigeria because it is available all year round, thus ensuring household food security. Compared to grains, cassava is more tolerant to low soil fertility and more resistant to drought, pests and diseases (Obisesan, 2013); while the roots deteriorate if it stayed too long in the ground after maturity (Ope-Ewe *et al.,* 2011).

Apart from livestock feeds, processed cassava serves as industrial raw material for the production of adhesives, bakery products, dextrin, dextrose glucose, lactose and sucrose. Food and beverage industries use cassava products in the production of jelly caramel; pharmaceutical and chemical industries also use cassava alcohol (ethanol) in cosmetics and drug production. Also, cassava peels are used mainly in the compounding of livestock feeds. There is a very high demand for cassava products both in local and foreign markets (Foundation for Partnership Initiatives in the Niger Delta [PIND], 2011; Abdul-Azeez, 2013). The growth in cassava production has been primarily due to rapid population growth, large internal market demand, complemented by the availability of high yielding improved varieties of cassava, a relatively well-developed market infrastructure, and the existence of improved processing technology (Onyinbo *et al*., 2011).

Processing of cassava have also been reported to be affected by several factors in Nigeria which limit the contribution of the crop to the development of Nigeria's economy (Adebayo and Sangosina, 2005; Ntawuruhunga, 2010). This study attempts to find out whether Cassava processing is a profitable venture; examine the determinants of processing output and identify some of the challenges facing processors in the study area.

MATERIALS AND METHODS

Study area

The study was carried out in Yewa South Local Government Area of Ogun State which is one out of the twenty Local Government Areas of Ogun State. Yewa South is located in the West of Ogun State,

bordering the Republic of Benin. It has a land area of 629 km^2 and a population of 168,850 (National Population Commission [NPC], 2006). Yewa South has 10 wards which include Ilaro I, II, III, Iwoye, Idogo, Owode I, II, Ilobi, Oke-Odan and Ajilete. Yewa south people are predominantly farmers and traders while very few engage in crafts. The main crops grown include cassava, yam, palm kernel, maize, cocoa, kolanut, pepper, cocoyam, vegetables, and fruits. The people speak the Yewa and Egun dialects of the Yoruba language.

Sampling Procedure and Sample Size

A multistage sampling procedure was used in selecting 80 cassava processors in the study area. Stage one involved the random selection of five wards from the ten wards within the LGA. In stage two, from each of the five wards, two villages were randomly selected making a total of 10 villages. In stage three, 8 processors were randomly selected from each village for interview, resulting to a total sample size of 80 processors. Equal number was selected because the distribution of cassava processors is almost of equal population across the wards.

Method of Data collection

Primary data were mainly used in this study. These were collected with the aid of structured questionnaire; respondents were interviewed and their responses were recorded. Data were collected on socioeconomic characteristics of the processors, input costs and returns, processing methods, and constraints limiting the processing of cassava.

Analytical Techniques

Descriptive statistics and inferential statistics were used in this study. Descriptive statistics such as the frequency counts and percentages were used to describe the socioeconomic characteristics of processors, processing pattern and methods, and constraints to processing, while the multiple regression and the budgetary analytical techniques were respectively used to analyse the profitability of cassava processing in the study area.

Budgetary Analysis (Analysis of Costs and Returns)

Budgetary analysis estimates the financial outcome or profitability of a particular business. This was used to determine the costs and returns to factors of production involved in cassava processing. Ratio was used to measure the profitability.

GM = TR – TVC……(1)

TR = P × Q…… (2)

Where,

GM=Gross Margin

TR = Total Revenue accruable from the sales of cassava products

TVC = Total variable cost incurred in processing e.g. labour, firewood, water, cassava

P = price per unit of processed cassava products.

Q = quantity of processed cassava products.

Rate of return on investment (ROI) = TR/TVC…… (3)

Regression Model

Multiple linear regression model was used in determining factors influencing the quantity of cassava products by the processors in the study area. The explicit form is stated in equation 4:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \mu - - - - - - - - - - - - 4$$

Where,

Y = Quantity of cassava products (*Gari*, *Lafun* and *Fufu*) in Kg
X_1 = Cost of Cassava roots (₦/kg)
X_2 = Educational level of processor (years)
X_3 = Age of processor (years)
X_4= Labour (mandays)
X_5 = Processing technique (modern 1, otherwise 0)
X_6 = Other processing costs (fire wood, transportation, frying pot, knives) (₦)
β_0= constant term
β_1 ----- β_2 = parameters to be estimated
μ = random error

RESULTS AND DISCUSSIONS

Socioeconomic Characteristics of Respondents

The results in Table 1 indicate that half (56.2%) of the processors were within the age bracket of 31 to 40 years. This shows that the majority of the processors are still within the economic active age with an average age of 38 years. Also, majority (80%) of the respondents (cassava processors) were females while very few (20%) were males. This implies that cassava processing is primarily dominated by the women in the study area. This supports the findings of Adebayo *et al.* (2008); Inyanda, (2014); Odediran *et al.*, (2015); Adeniyi and Akande, (2015); Aminu *et al.* (2017), which reported that cassava processing is primarily dominated by women. In addition, the study revealed that (56.2%) of the processors were married. This corroborates the findings of earlier researches such as Odediran *et al.* (2015) on cassava processing among rural households in the Southwest, Nigeria. About half (48.7%) of the cassava processors had no formal education, while very few (25%) had primary school education and 26.3% had secondary education. The average household size was 7 with a standard deviation of approximately 4.9. This finding is similar to that of Adebayo *et al*. (2003) and Adebayo (2009) in Ogun State of Nigeria where the average household size was found to be 7 persons. About 41% of the cassava processors belonged to cassava processing association, followed by about 31% who belonged to co-operatives, and few (11.8%) belonging to community association. The findings also revealed that 48% of the cassava processors received credit between ₦31,000 and ₦40,000 from the co-operative society while very few (16%) received above ₦60,000 per month. These imply that the processors were faced with financial constraints to support their processing activities. Majority (76.3%) of the processors were involved in full time processing of cassava into various products while few (23.7%) process cassava as a part- time activity. *Gari*, *Fufu* and *Lafun* are the most common cassava products in the study area. However, results confirm that most processors prefer to process a large proportion of their cassava roots into *Fufu* followed by *Gari*. A possible reason for the processors' preference for *Fufu* may be economic, and for *Gari*, may be as a result of the ease in production, as pointed out by 63.8% of the processors.

Table 1: Socioeconomic Characteristics of Cassava Processors (N=80)

Variables	Frequency	Percentage
Age		
20-30	7	8.8
31-40	41	51.3
41-50	21	26.2
51-60	11	13.8
Average age = 38 years.		
Standard deviation = 34.3		
Sex		
Male	16	20.0
Female	64	80.0
Marital Status		
Single	13	16.3
Married	45	56.2
Divorced	9	11.3
Widow	13	16.2
Educational level		
No formal education	39	48.7
Primary	20	25.0
Secondary	21	26.3
Household size		
1-4	18	22.5
5-8	44	55.0
9-12	18	22.5
Average household size =7		
Standard deviation = 4.9		
Types of social group		
Co-operative	16	31.3
Religious association	8	15.7
Community association	6	11.8
Cassava processing association	21	41.2
Credit received (₦/month)		
20,000-30,000	19	23.7
31,000-40,000	38	47.6
41,000-50,000	5	6.2
51,000-60,000	5	6.2
>60,000	13	16.3
Average amount received = ₦38,000		
Standard deviation = N31,250.7		
Status of cassava processing job		
Full time	61	76.3
Part time	19	23.7
Types of Cassava products		
Gari	19	23.7
Lafun	6	7.5
Fufu	31	38.7
Gari and *Lafun*	4	5.0
Gari and *Fufu*	10	12.5
Lafun and *Fufu*	3	3.8
Gari,*Lafun* and *Fufu*	7	8.8
Ease of Products production		
Gari	51	63.8
Lafun	20	25.0
Fufu	9	11.2

Source: Field Survey, 2017

Cassava Processing Methods and Constraints

The results in Table 2 show that majority (76%) of the cassava processors used traditional methods of processing while few (24%) used modern methods (semi-mechanized methods) of processing. The traditional methods of processing of cassava had been noted to be tedious and time consuming. It includes peeling, washing, size reduction, fermentation, drying, roasting boiling and cooking depending on the intended products from cassava. Processors identified *Gari* as the easiest cassava product to produce followed by *Lafun* and *Fufu* respectively. Some of the challenges of processing cassava to *Fufu* are: time consumption during peeling, fermentation, offensive odour of soaked *Fufu* water by neighbours.

Also, processors reported that some cassava roots do not ferment readily and not all newly introduced cultivars are good for *Fufu* production. In general, insufficient fund was found to constitute the major constraint to cassava processing (76.3%), followed by poor infrastructure such as road, electricity and storage problem (66.3%) and cost of labour or fuel saving devices (57.0%). The perception of insufficient fund as the first constraint is in agreement to that observed by Okpeke and Onyeagocha (2015) in their study on processing cassava tubers into *Gari* in Isoko North Local Government Area of Delta State, Nigeria

Table 2: Cassava Processing Methods and Constraints

Variables	Frequency	Percentage
Processing methods		
Traditional	61	76.3
Modern	19	23.7
***Constraints to cassava processing**		
Insufficient fund	61	76.3
Cost of labour/fuel saving devices	46	57.5
Poor infrastructure	53	66.3
Unstable market price	27	33.8

Note:* is a multiple choice response

Source: Field Survey, 2017

Determinants of cassava processing

Out of the four functional forms (Linear, semi-log, exponential and double-log) estimated in the multiple regression analysis, the linear form was selected as the lead functional form. This was chosen based on the value of co-efficient of multiple determinations (R^2), the number of significant variables and the *a priori* expectations. The value of R^2 from the linear function of 0.640 showed the highest value of 64%, and highest number of significant variables with the signs in line with our *a priori* expectations. The estimated R^2 value shows that 64% of the variations in the quantity of cassava products are explained by the explanatory variables included in the model.

The results of the lead equation in Table 3 revealed that cost of cassava roots, age of the processors, labour used, processing technique and other factors such as fire wood, transportation, frying pan, and knives were significant variables affecting cassava processing output in the study area. They were significant at different levels and they conformed to *a priori* expectations. The age of the processor negatively influenced quantity of cassava products at 5% level of significance. This implies that, the older the processors become, the less active they are in processing, which reduces their productivity, probably because of diminishing returns. Labour use positively influenced output of cassava products at 1% level. This also implies that the more the labour use, the more the processed products from cassava. This however translates to higher labour cost and cost of processing.

The findings also show that although the use of semi-mechanized or modern techniques for cassava processing has a positive effect of cassava products as shown in Table 3, only few processors used these technologies with majority (76.3%) still using the traditional methods such as manual peeling of cassava roots using knives which is tedious and time consuming. There is an urgent need to develop better methods and or machinery for cassava peeling. Plant breeders could also aim at cassava roots with low peel densities.

Table 3: Determinants of cassava processing output

Functional form	**Coefficients**							
	Constant	Cost of Cassava roots	Educational level of processor	Age of processors	Labour used	Processing technique	Other processing cost	**R^2**
Linear form	2.80***	-1.058***	-0.004	-0.325**	8.48***	1.55*	2.65**	0.64
(t- values)	(3.25)	(-25.658)	(-0.24)	(-2.16)	(4.075)	(1.61)	(2.07)	0

*** Significant at 1%; ** Significant at 5%;* Significant at 10%

Source: Field Survey, 2017

Profitability of cassava processing

Table 4 shows the cost items that are involved in cassava processing and the revenue (income) as well as profit accruable to cassava processing in Yewa South local government area. The results show that the mean gross margin per processor per month was ₦39,829 while the mean total variable cost ₦37,907.19 and average total revenue ₦77,736.88. Although the 56.50% of the all the processing costs was on cassava roots which is the major input, the rate of Return on Investment was 2.05, indicating every one naira invested by cassava processors; a return of ₦2.05 was received showing that cassava processing is a profitable business in the study area. This is similar to the finding of Ani (2010) and Okeowo (2015) who also found that cassava processing is profitable in Enugu and Lagos States respectively.

Table 4: Result of Gross Margin Analysis (₦/Month)

Variables	Amount ₦	% of variable cost
Total Revenue (*Gari*, *Fufu* and *Lafun*)	77,736.88	
Variable Cost		
Transportation	6,345.40	16.74
Cost of cassava roots	21,416.39	56.50
Labour cost	4,545.40	11.99
Other processing costs (grating, peeling, firewood)	5,600.00	14.77
Total Variable Cost	37,907.19	100.00
Total Fixed Cost (depreciated cost of equipment, Basket, Knives, Stirring pot, Basins, Sacks, Sieves, Turning sticks and cost of land)	15,302.17	
Total Cost	53,209.36	
Gross Margin	39,829.69	
Net Profit	24,527.52	
Returns on Investment	2.05	

Source: Field Survey, 2017

CONCLUSION AND RECOMMENDATIONS

The study was carried out in Yewa South Local Government Area to examine economic profitability of cassava processing. Cassava roots were processed into *Gari*, *Lafun* and *Fufu* in the study area, but a good number of processors processed the roots to *Fufu* for economic reasons despite the difficulty in *Fufu* production compared to the other two. Majority of the processors had no formal education. Insufficient funds, poor infrastructure and high cost of labour saving/ fuel saving devices were some of the challenges militating against cassava processing. The regression analysis revealed that cost of cassava roots negatively influenced the products. Also, age of processors, labour use, processing technique significant influenced the quantity of processed cassava products. The gross margin per processor per month was ₦39,729 while the mean total variable cost was ₦37,907.19, average total revenue is ₦77,736.88 with returns on investment of 2.05 showing that processing cassava roots to different products *(Fufu*, *Gari* and *Lafun*) is a profitable venture. For more profitable economic returns, it is therefore recommended that farmers should use modern technique of processing against the traditional methods such as manual peeling of cassava root using knives which are tedious, time consuming and not economical. Good road network along input subsidization may also reduce the cost of the roots used by the processors.

REFERENCES

Abdul-Azeez, I. (2013).Cassava Export and Local Utilization in Nigeria Top Secrets. *The Consulting*, Thursday May 30th, 2013. Retrieved online October 1, 2017 at:

http://cassavaexport.tripod.com/

Adebayo, K., White, J. L., Morris, M. J., Dipeolu, A. O., Ayinde, I. A., Wandschneider, T. S., Sanni, L. O., Oyewole, O. B., Tomlins, T., and Westby, A. (2003).“Innovativeness and stakeholdership in the *fufu* processing systems in Southwest Nigeria”. *International Journal of Agricultural Sciences, Science, Environment and Technology* Series A, 3 (4):15-27.

Adebayo, K., Fabusoro, E. and Fapojuwo, E. O. (2008). Factors determining selective adoption of the cassava grater and screw press in Southwest Nigeria Nigeria. *ASSET Series C*, 3(1): 40-51.

Adebayo, K. (2009). Dynamics of technology adoption in rural-based cassava processing enterprises in South-West Nigeria. *International Journal of Agricultural Economics and Rural Development*, 2(1):15-25.

Adebayo, K., and Sangosina, M. A. (2005). Processors’ Perception of the Effectiveness of some Cassava Processing Innovations in Ogun State, Nigeria. Paper Presented at the 19th Farm Management Association of Nigeria (FAMAN) National Conference *held at Delta State University*, Asaba Campus 18th- 20th October, pp. 234-235.

Adeniyi, O. R. and Akande. O. T. (2015). Resource Use and Technical Efficiency in Value Addition to Cassava: A Case Study on *Gari* and *Fufu* Processing in Ogun State, Nigeria. *American Journal of Experimental Agriculture* 5(2):139-147

Adekanye, T. A., Ogunjimi, S. I. and Ajala, A. O. (2013). An Assessment of Cassava Processing Plants in Irepodun Local Government Areas, Kwara State, Nigeria. *World Journal of Agricultural Research*, 1(1):14-17.

Achem, B. A., Mohammed, B. T., Aduba, J. J., Muhammad-Lawal, A. and Abdulquadri, F. (2013). A Comparative Assessment of the Profitability of Cassava Processing Enterprises in Kwara State, Nigeria. *Global Journal of Current Research*, 1(2):57-61.

Ani, S. O. (2010). *Comparative Economic Analysis of Selected Cassava Derivatives in Uzo-Uwani Local Government Area of Enugu State*. Unpublished MSc Dissertation, Department of Agricultural Economics, University of Nigeria, Nsukka.

Andrew, W. (2002). Cassava utilization, storage, and small scale processing. Natural Resource Institute, Chatham Maritime. United Kingdom. 14: 270-290.

Aminu, F. O., Rosulu, H. O., Toku, A. S. O., Dinyo, O. B., and Akhigbe, E. C. (2017). Technical Efficiency in Value Addition to Cassava: A Case of Cassava-Garri Processing in Lagos State, Nigeria. *Journal of Agriculture and Sustainability*, 10(1):97-115.

Asogwa, B. C., Ezihe J. A.C. and Ater, P. I. (2013). Socioeconomic analysis of cassava marketing in Benue State, Nigeria. *International Journal of*

Innovation and Applied Studies, 2(4): 384-391.

Eguono, I. (2015). A look at Cassava production in Nigeria. *International Journal of Agricultural Sciences*, 5(5):818-819.

Food and Agriculture Organization [FAO] (2004). A cassava industrial revolution in Nigeria The potential for a new industrial crop. Food and Agriculture Organization of the United Nations, Corporate Document Repository. Retrieved online in August, 12, 2017 from http://www.fao.org/docrep/007/y5548e/y5548e00.htm#Contents

FAO (2018). "Food and Agriculture Organization Statistics: Production, Crops, Cassava, 2010 data". Retrieved online on 30 June, 2018 from: http://www.fao.org/faostat/en/#data/QC

International Fund for Agricultural Development [IFAD], (2013).Cassava: Turning a Subsistence Crop into a Cash Crop in Western and Central Africa, Rural Poverty Portal, BreadcrumbsPortlet, Powered by IFAD. Retrieved online June 23, 2016 from: http://www.fidafrique.net/rubrique554.html

International Institute of Tropical Agriculture [IITA], (2010). Post-Harvest Technology". Annual report. pp. 62-80.

Inyanda, A. E. (2014). Economics of Processing Cassava into *Gari* and Pellets in Kogi State, Nigeria. Unpublished dissertation in the Department of Agricultural Economics, University of Nigeria, Nsukka.

National Population Commission [NPC], (2006). "List of Nigerian States by landmass and population density". National Population Commission, Abuja, Nigeria, pp. 18-37.

Ndaliman, M. B. (2008). Development of Cassava Grating Machine. A Dual-Operational Mode. *Leonardo Journal of Sciences*, 9:103-110.

Ntawuruhunga, P. (2010). Strategies, Choices, and Program, Priorities for the Eastern African Root Crops Research Network. Unpublished Report from EARRNET Coordination Office, IITA Uganda.

Nweke, F. I. (2003). New challenges in Cassava Transformation in Nigeria and Ghana. Paper Presented at the Inn WENT, IFPRI, NEPAD and CTA conference on Success in Africa Agriculture. Pretoria; December 1-3, 2003.

Obisesan, A. A. (2013). Credit Accessibility and Poverty among Smallholder Cassava Farming Households in Southwest Nigeria. *Greener Journal of Agricultural Sciences*, 3(2): 120-127.

Odediran, O. F., Ashimolowo, O. R., Sodiya, C. I., Sanni, L. O., Adebayo, K., Ojebiyi, W. G. and Adeoye, A. S. (2015). Awareness of Cassava Peel Utilization Forms among Cassava Processors in Rural Communities of Southwest, Nigeria. *International Journal of Applied Agricultural and Apicultural Research* (*IJAAAR),*11 (1&2): 93-102

Okeowo, T. A. (2015). Profitability of Cassava Processing in Epe Local Government Area of Lagos State. *International Journal of Applied Research and Technology*, 4(9): 39–47.

Okpeke, M. Y**.,** Onyeagocha, S. U. O. (2015). Analysis of Processing Cassava Tubers Into Garri In Isoko North Local Government Area Of Delta State, Nigeria. European Journal of Agriculture and Forestry Research, 3(5): 15-25.

Omoregbee, F. E. and Banmeke, T. O. A. (2014). Information Needs of Cassava Farmers in Delta State of Nigeria. *Tanzania Journal of Agricultural Sciences*, 2(12):20-25

Onyinbo, O., Damisa M. A. and Ugbabe, O. O. (2011). An Assessment of the Profitability of Small-scale Cassava Production in Edo State: A Guide to Policy. Retrieved on 12 August, 2017 from:

http://www.academia.edu/1995184/an_assessment_of_the_profitability_of_small_scale_cassava_production_in_edo_state_a_guide_to_policy

Ope-Ewe, O. B., Adetunji M. O., Kafiya M. R., Onadipe O. O., Awoyale W., Alenkhe B. E. and Sanni L.O. (2011). Cassava Value Chain Development by Supporting Processing and Value Addition by Small and Medium Enterprises in West Africa – Nigeria. *Technical Report August2008 – August 2011*.

Partnership Initiatives in the Niger Delta [PIND], (2011). A Report on Cassava Value-Chain Analysis in Niger Delta. Retrieved online on 12 June, 2017 from www.pind foundation.net/ wp-content/pluggins/Cassava-Value-Chain-Analysis.pdf>.

Sanni, M. O., Sobminwa, A. O., Modupe-Eyinola, C., and Rolina, I. F. (2008). Safety Aspect of Processing Cassava to Garri in Nigeria. Proceeding of International Workshop on Cassava Safety. Hort. Org Book /375/375-22.