INTERNATIONAL JOURNAL OF BUSINESS EDUCATION AND MANAGEMENT STUDIES (IJBEMS)
A Peer Reviewed (Refereed) International Journal
Impact Factor 4.308 | http://www.ijbems.com | ISSN:2941-9638
Vol.6.Issue 1. 2020 (June)

Profitability of Converting Cassava to FUFU Value Chain in Nigeria: Implications for Sustainable Food Supply, Food Security and Job Creation

Iwuoha, Jude Chukwunyere[1]; Uba, Chiwuike2 & Awoke, Chigozirim Florence[3]
Email: jiwuohac@gmail.com
Phone: +234 803 3722 882; +234 0904 2725 722
[1]Department of Economics, Enugu State University of Science & Technology, Nigeria
[2]Department of Economics, Enugu State University of Science & Technology, Nigeria
[3]Department of Economics, Ebonyi State College of Education, Ikwo, Nigeria.

Abstract
An analysis was conducted of the profitability of converting cassava to its fufu value chain in Ikeduru local government area of Imo state, Nigeria as cassava and its value chains offers veritable alternatives to sustainable food supply, food security and have the potentials of creating jobs. The study was carried out using a sample of one hundred and ten (110) processors randomly selected from the twenty four towns that make up Ikeduru local government area. Feedback forms were administered and used to assemble data on processors socioeconomic characteristics which included age, education level, labour source, experience and constraints. Data were analyzed using descriptive statistics, inferential statistics and budgetary techniques. Results revealed that fufu has a profit margin of =N=1,542,650.00 (US$5142) indicating high profitability with low rate of turnover being the most constraint. We recommend for the Provision of access road and tackling the incidence of double taxation by government agencies. Encouragement of healthy living and cleanliness, strengthening of cooperative societies' and the efficient way of delivering the tradermoni initiative by the government and encouragement of investment in the cassava value chain.
Keywords: Cassava value chain, fufu, processor, profitability, Nigeria.

1.0 Introduction

Under the sustainable development goals, SDG, it is expected that poverty will be eradicated and there will be zero hunger (goals 1 & 2). In meeting these goals, they will in turn help achieve goals three and ten (3&10), good health and wellbeing and reduced inequality (Roorda, Corcoran & Weakland, 2012). For sub-Saharan Africa, achieving these goals remains a mirage unless they look inwards. One of the ways of meeting up the sustainable development goals is through backward integration of the agricultural value chains. It is unfortunate that agriculture in sub-Saharan Africa over time has agriculture as the driving force for its economic growth and development. However it is characterized by subsistence farming, low yield, poor output, poor performance obviously because of the over-reliance on traditional farm technology and poor investments even though it employs a greater percentage of the rural population (Fiszbein,

Kanbur, and Yemstov, 2014; Chriostiaensen, Demery, and Kuhl, 2011; Donkor, Onakuse, Bogue, and Carmenado, 2017), its value chains have not been explored vigorously. According to 2015 estimates of the FAO and IFAD, a greater percentage of the worlds malnourished people inhabits in Africa alone with its antecedent food insecurity sub-Saharan Africa is known with. Therefore, it can be inferred that rural poverty, food insecurity, and unemployment rates are high in these countries, thus they are yet to achieve sustainable food supply such as root crops and tubers, grains and cereal crops (Karfakis, Rapsomanikis, & Scambelloni, 2015). Agricultural growth on the average remains more potent in poverty reduction than any other sector outside of agriculture. However, there exists structural barriers that affect the relationship between agricultural growth and poverty reduction. The mechanisms in financing sectorial growth do have broad impact on poverty. This is done by looking beyond the traditional barrier or dichotomy between agricultural and non-agricultural growth, hence looking at the business aspect of agricultural production that emphasizes modernity instead of the subsistence production (Christiaensen and Martin, 2015).

Cassava is one of the major tuber crops produced in sub-Saharan Africa and is equally a staple food item in one of its value chains form. Over time cassava has been of great importance in Nigeria following the growing demand for it and its products. It can be processed in so many ways and forms in Nigeria. Cassava known as Manihot esculenta in its botanical name is a plant sometimes used as an herbal remedy. The root of the plant is used to make a variety of items in its processed form. Whether processed locally or industrially, it is processed either into garri, fufu, starch, tapioca, akara etc from a starch found in its puddings and other foods (Abolaji, Sinyanbola, Afolabi & Oduola, 2007; Sanni, 2008). According to the food and agricultural organization, FAO the starchy roots of cassava is a major source of dietary energy for more than 500 million people. Taking cassava in dietary supplement form is said to offer a variety of health benefits, including enhanced fertility. Cassava is known to be the highest producer of carbohydrates among staple crops. In most parts of Nigeria, cassava production seems to be simple as the plant is to be placed in trays filled with soil by sticking the cuttings or stems. They sprout and within six months they will grow and turn into pretty big bushes. The major states of Nigeria which produce cassava are Anambra, Delta, Edo, Benue, Cross River, Imo, Oyo, and Rivers, and to a lesser extent Kwara and Ondo. In 1999, Nigeria produced 33 million tonnes. As of 2000, the average yield per hectare was 10.6 tonnes (CBN, 2002). The supply of cassava offers prospects for great income generation not limited to the bakery and pharmaceutical industries demand for flour and starch, but the demand for other of its value chains such as *fufu*.

Fufu is one of the processed forms of Cassava. *Fufu* is a staple food common in the West African countries and the Central Africa such as Cote d'Ivoire, Sierra Leone, Guinea, Senegal, and Cameroon. It is a starchy food that have been boiled, pounded using mortar and pestle. In eating it, usually it is first rounded into balls and is often dipped into sauces or eaten with stews of meat, fish, or vegetables. It is processed from cassava roots otherwise known as cassava tubers. Cassava roots are usually embedded into water usually in large bowls and allowed to ferment for some days. The fermentation is usually between 4–5 days. Before immersing the tubers, some prefer peeling the back exposing the whitish root. Because the tuber contains cyanide, the fermentation process detoxes it and makes it non-poisonous and edible. After fermentation, the tuber softens and is usually sieved using baskets or sieve, water is poured into it as it is swiveled

with the hand gradually until only the chaff is remaining in the sieve. The starch usually white in colour is allowed to settle, water removed and then they are bagged for sale or personal consumption.

Innovations is the mother of all inventions, hence the roles of agricultural innovations like processing of Cassava to its *fufu* value chain is eluding Nigeria. Adoption of innovations especially in converting cassava to *fufu* value chain in general is one of the corner stones to economic empowerment. In Nigeria and elsewhere in the world, the adoption of agricultural innovation has attracted much scholarly works. Scholars generally agree that socio economic and institutional factors affect agricultural innovation adoption. There is a positive and significant relationship between family size and adoption. Also education, size of holding and cosmopoliteness accounts for significant variation in adoption and behaviour of farmers. Access to credit and household income is also a positively significant factor with adoption (Arene, 1994; Oladele, 2005; Manyong, Alene, & Sango 2006). Available information shows that much work has not been done to establish the factor(s) determining or affecting the level of adoption of conversion of Cassava to *fufu* value chain in Nigeria. Therefore the broad objective of this study is to determine the profitability of converting cassava to *fufu* in Nigeria, with empirical evidence from Ikeduru Local Government area of Imo State. This study therefore hopes to explore the smallholder's decision as in processing Cassava into *fufu* value chain. However, every smallholder processor would achieve the objective of reducing constraints and use all resources available to (1) Increase income, efficiency and profitability. However, little attention has been made to measure profitability of cassava conversion to its *fufu* value chain in Imo State. The profitability of an enterprise in monetary terms could be in terms of gross margin or net profit. Past studies tended to concentrate more on the determination of profitability of cassava production and its processing to its *garri* and *lafu* value chains. No study to the knowledge of the researchers have been carried out on the profitability of cassava *fufu* value chain. (Okorie, 2012; Olagoke, 1990). Therefore the specific objective of this study is to determine (i) the socio economic characteristics of *fufu* producers in Imo State of Nigeria (ii) determine the profitability of *fufu* in Imo State of Nigeria (iii) identify major constraints to conversion of cassava to *fufu* in Imo State of Nigeria.

This study therefore makes significant contribution as it studies the profitability of converting cassava to its *fufu* value chain in line with the sustainable development goal, SDG, 1&2 which is Poverty eradicated and Zero hunger. The rest of this study is organized in four sections. Section 2 is a brief review of literature; section 3 presents the methodology; section 4 discusses the empirical results, while Section 5 concludes the paper.

2.0 Literature Review

2.1 Conceptual Literature

Inputs and outputs are main determinants in Agricultural production and are synonymous too (Itam, Ajah & Agbachom, 2014). Accordingly increasing Agricultural productivity reduces hunger, poverty alleviation via income distribution and savings, has the potential of creating prospects for national growth and competiveness in the agricultural market and reduction of rural-urban labour migration. Therefore Agricultural productivity and profitability are

inseparable. According to Obasi, Nwaiwu, Korie, & Tim-Ashama (2016) Agricultural productivity and profitability are two related but distinct concepts often used when analyzing several facets of farm's performance with a view to ascertaining how healthy the business is. Hence, farm business is more profitable and lucrative with efficiency of production transforming into more profitability (Ismam, Xayavong & Kingwell, 2011; Obasi, Nwaiwu, Korie, & Tim-Ashama, 2016). According to Wilson, Charry & Kemp (2005), the indicators of performance of the farm enterprise includes the measures of its physical and financial performances. While the physical performances measures the relationship between yields and inputs, the financial indicators measures the earning capacity, liquidity and solvency of the farm enterprise. Thus, in capturing productivity, monetary values of the output and the use of the final output measures is included. This is defined as the value of the gross output minus the value of the agricultural inputs (Kahan, 2013; Wilson, Charry & Kemp, 2005; Block, 1994; Machek & Spicka, 2014)

2.2 Empirical Literature

Substantial literatures abound that favour profitability of cassava production and conversion into its value cahins. Ibekwe, Chikezie, Obasi, Eze and Henri-Ukoha, (2012) studied the profitability of *garri* value chain of cassava in Owerri North local government area of Imo state, Nigeria found that it is a profitable venture and therefore recommended for encouragement and support for adult education to improve the farmer's productivity. This is supported by Ojiako, Tarawali, Okechukwu, Chianu, Ezedinma and Edet (2018) who compared the actual and potential returns on investment in cassava productivity of cassava and found that cassava production is profitable but there exists a yawning gap in profitability and returns on investment between the actual and potential for the cassava enterprises in Southern Nigeria. Awerije and Rahman (2014) argued that extension contact significantly improves allocation efficiency, reduces technical cost and cost efficiency. They concluded that subsistence pressure reduces technical and cost efficiency in cassava profitability at the farm-level in Delta state of Nigeria.

Oladejo (2017) studied the profitability and marketing efficiency of women cassava processors in Oyo State, Nigeria using a multi-stage sampling technique to select one hundred and eighty (180) women cassava processors. She found that levels of formal education and enterprise experience acquired had significant effects on marketing efficiency of respondents. She recommended for the processors to form corporative groups or trade unions to enable them jointly invest in modern processing facilities and organize educational workshops for themselves. In studying the profitability of cassava value chain in Saki-West Local government Area of Oyo State using the cost-benefit ratio method, Daud, Amao, Ganiyu & Adeniyi (2015) by identifying farm size and family labour as having positive significant influence on the farmer's revenue concluded that cassava production in the area is of high profitability. The costs and returns on cassava production in Ekiti State is profitable as the farmers due to capital insufficiency used little or no insecticides and herbicides though there was low incidence of diseases' and insects attack on cassava farms (Toluwase & Abdu-Raheem, 2013). However in the study by Odoemenem & Otanwa (2011) carried out in Benue State of Nigeria, in which they analysed the economics of cassava production in the area. Though they excluded cost of planting materials and other post-planting costs, they however include transportation as a variable in the study and found that cassava production is a profitable venture.

In Akpabuyo local Government Area of Cross River State, Nigeria cassava production is profitable with education and farming experience positively impacting on the output while cassava cuttings and labour impacted negatively on output (Item, Ajah & Agbachom, 2014). This scenario is same for the productivity and profitability of cassava farming in Ika South and Ika North east Local Government Areas of Delta State (Ogisi, 2013).

Abila (2012) used family-hired-contract labour, family-hired labour, family-contract labour and family labour alone as variables in studying the profitability of cassava production in Oyo North Area of Oyo State, Nigeria and found that combining family and hired labour yielded the highest marginal return per unit man-day. They recommended efficient labour saving technologies to reduce labour cost in cassava production.

In assessing the economics of cassava production in Kwara state of Nigeria by looking at the rates of returns in investment in four major value chains: *garri, fufu, lafun* and *starch*, Muhammad, Omotosho & Oyedemi (2013) concluded that while processed cassava value chains are profitable, *lafun* has the highest potential for diversification.

Okeowo (2015) with the aid of questionnaires studied the profitability of cassava processing in Epe Local government of Lagos Sate, Nigeria. The findings of his study revealed the existence of variations in gross margins to the various products of cassava processing, but however fufu is of the highest margin with garri and lafun being equally profitable.

Obayelu and Ebute (2016) in assessing cassava supply response in Nigeria used vector error correction method (VECM) to analyse time series data from FAOSTAT 1966 – 2010. From their results it is evident that cassava output supply response in Nigeria depends largely on its own price and land area in the short-run, thus cassava supply response to price was inelastic both in the short-run and long-run. The findings further suggests that in the short-run increase in area cultivated leads to increase in cassava output and that cassava has a high price elasticity in the short-run. It is of their recommendation that government and extension agents shout make effort at increasing the area of cultivation thus improving the yield potentials in terms of productivity of the fields thereby maximizing output.

3.0 Methodology

3.1 *Theoretical Framework*

Since we want to establish a relationship between inputs and outputs of the Cassava value chain, the theoretical underpinning of this study is based on the production theory. The production function will define the relationship between inputs and outputs in the Cassava production process. According to Barkly and Barkely (2016), agricultural production is a physical process of different factor inputs transformation into outputs based on the use of certain technology. Cassava is a single agricultural commodity with various value chains (in processed form), thus if Q is taken to represent output, and X_1, X2, X_n to represent the inputs, hence a general production function that will represent the value chain can be written as:

$$Q = f(X_1, X_2, \dots, X_n),\ t = 1, 2, 3, \dots, T \quad \dots\dots(1)$$

Where Q is the Cassava *fufu* vakue chain output, X1, ……Xn is factor inputs used in the production function process; ***f*** is the functional relationship between output and input factors.

3.2 ***Study area***

The study is carried out in Ikeduru local government area of Imo state, Nigeria. Ikeduru local government area is one of the local government areas in Imo state of Nigeria with twenty four (24) autonomous communities, viz: Inyishi, Amaeke, Eziama, Amaimo, Umuofor, Umuiri, Okwu, Avuvu, Owuala-Avuvu, Amakohia, Umudim, Atta, Ngugo, Atta West, Owubinubi, Ikembara, Ugirike, Umuonyeukwu, Abazu, Akabo, Amatta, Iho-Dimeze, Ebikoro and Uzoagba.. The local government was created in the year 1991. Ikeduru is characterized by a small farm holding with yam and cassava as the dominant crops. A common feature of the study area is that as characterizes of every other southern Nigeria, it fell into an area having a minimum average annual rainfall that exceed 1000 millimeters. According to FEWS Net (2016), the rainfall trends and patterns in southern Nigeria have not recorded much change over the last 35years from 1981-2015.

The climate of the area can be described as the tropical type. Two raining and the dry seasons. The temperature of the study areas varies with seasons. The raining period which occurs between the months of April and October while the dry seasons occurs between November and March, with the temperature variation between the minimum of 10^{o}c and 35^{o}c with high relative humidity which lies below 60%. The soil type of the area is sandy – loam which favour mostly the cultivation of root crops such as yam, cassava, Cocoyam, and cereal like maize etc. the major occupation is farming and most of them produce cassava and yam. While the minor occupation trading.

3.3 ***Sampling Technique***

The target population for this research is all processing farmers "Akpu" in Ikeduru local government area. The respondents were from five groups out of the total number of selected processors. A multi- stage random and purposive sampling technique is used to select respondent for the study. In the first stage, five (5) towns in the local government was purposively selected through a simple random sampling techniques based on their relative importance in cassava roots processing into "fufu". Secondly twenty two (22) cassava processing farmers are randomly chosen from each selected towns with Amaimo and Umuri then Atta and Atta West taken as one town respectively. This will give a sample unit of 110 respondents for the study.

3.4 ***Method of data collection***

The study used primary data collected using pre-tested structured questionnaire. Data were collected on farmers' socio-economic characteristics, status of cassava conversion to fufu, quantity and cost of inputs, output quantity and price, and challenges to cassava conversion to fufu and marketing.

3.5 ***Method of data analysis***

Data were analysed using descriptive, inferential statistics and the budgetary techniques, including analysis of gross and profitability ration. According to Nandi, Gunn and Yurkushi (2011) the budgetary analysis allows for the estimation of the TC (total cost) as well as the TR (total revenue) accrued to an enterprise within a specified production period.

3.5.1 ***Gross margin***

Gross margin of productivity (GM) is a method for calculating the profitability of production, in this case cassava conversion to fufu. The gross margin is calculated as follows:

$$GM = TR - TVC \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where GM= Cassava processing gross margin
TR= Total revenue from sale of each cassava processed to fufu
TVC= Total variable cost of average operating inputs and labour in Naira.
And,

$$TVC = TOC + TLC \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..(3)$$

Where, TOC = Total operating cost
TLC = Total labour cost.
The total cost of production (TC) is defined as: $TC = TVC + TFC = TOC + TLC + TFC$……..(4)
Where, TFC = Total fixed cost,
TVC, TOC and TLC are as previously defined. = Total variable cost
The farm net margin (NM) and the return on investment (ROI) are calculated as:

$$NM = GM - TFC \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..(5)$$

And

$$ROI = \frac{NM}{TC} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..(6)$$

Where NM = Net margin
ROI = Return on investment
GM, TFC and TC are as previously defined.

3.5.2 ***Determining Revenue***

The gross revenue calculations were based on *fufu* output per tonne of cassava tubers per hectare of land and put as the product of quantity of *fufu* (Q) and its price (P). However it is of note here that *fufu* is sold in wraps.

3.5.3 ***Determining expenses***

A lot of producers may want to cut corners by deviating from the normal processing procedure to reduce cost and maximize profit. However, the main cost for processing *fufu* are:

3.5.3.1 ***Labour:*** Cassava processing in Nigeria is labour intensive at almost every step in the processing ((Ettah and Angba, 2016; Nandi, J.A., Gunn, P. and Yurkushi, 2011).

3.5.3.2 ***Transport and logistics cost:*** This is a challenge in the promotion and processing of cassava and its value chains in Nigeria. Inaccessibility of roads, increasing maintenance cost for the vehicles, motor cycles, Bicycles and Wheelbarrows is challenging to farmers in Nigeria. Government revenue collectors are not left out as they all contribute to the rising cost of transportation in Nigeria.

3.5.3.3 ***Processing expenses:*** The processing expenses is another expense that is not overlooked. The costs include purchase of cassava tubers, hiring of labour for the cooking, pounding and packaging (wrapping), cost of firewood or kerosene as the case may be and cost of nylons for the packaging (wrapping).

3.5.3.4 ***Fixed cost:*** Costs of basic tools such as mortar and piston, cooking pots, trays, basin, water etc that are considered infinitesimal since once purchased they are used for long period of time and for different purposes.

3.5.3.5 ***Others/miscellaneous expenses:*** Included here are the additional labour costs incurred for supervision of processing, resupply and general hitch-free processing.

4.0 Results and Discussion

4.1 Socio Economic Characteristics of *Fufu* Producers

Table 1: Socio Economic Characteristics of Fufu Producers

Variable	**Frequency**	**Percentage**
Gender		
Male	26	23.64
Female	84	76.36
Age		
20-29	12	10.91
30-39	52	47.27
40-49	28	25.46
50 years and above	18	16.36
Marital Status		
Never Married	7	6.36
Married	86	78.18
Widowed	14	12.73
Divorced	3	2.73
Educational background		
No Formal Education	16	14.55
Primary Education	38	34.55
Secondary Education	29	26.36
Tertiary Education	27	24.54
***Fufu* Processing Experience**		
1-9	20	18.18
10-19	30	27.27
20-29	43	39.10

30-39	11	10
40 and above	6	5.45
Household Size		
1-5	46	41.82
6-10	64	58.18
Processing Method		
Mechanical	0	0
Local Method	110	100
Source of Labour		
Family	64	58.18
Hired	46	41.82
Communal	0	0

Source: Field survey, 2019.

Table 1 above shows the distribution of the respondents according to their socio-economic characteristics.

Gender: From Table 1 the respondents showed that more females are involved in *fufu* processing than males. Out of the 110 respondents, 84 representing 76.36% are females while 26 respondents being 23.64% are males. This may not be unconnected with the fact that an average south eastern (igbo) man believes the cassava processing into *fufu* is all about women.

Age: The results in Table 1 (appendix) shows that the age of the processors range from 20 to 50 years of age and above. However, it can be seen that those in the age range of 30 to 39 are more involved in *fufu* processing as they had 52 respondents representing 47.27% of the population. By implication it is mostly those in their economic active age that are involved in fufu processing.

Marital Status: 78.18% from Table 1 are married representing 86 respondents. This is in line with the works of Oladoja, Adedoyin & Adeokun, (2008) who agreed that marriage comes with responsibility and hence an important factor in livelihood of individuals.

Educational Background: The result from Table 1 seems to support the study of Agbami, (1993) that there is a positive relationship between education and innovation. The result shows that 34.55% of the respondents had primary education, while 26.36% of them had secondary education, 24.54% had tertiary education while only 14.55% of the respondents did not have any formal education.

***Fufu* Processing Experience:** It is significantly obvious that majority of the processors (39.10%) have been involved in *fufu* processing for about 20 to 29 years indicating that most of the processors do have long experience in *fufu* processing.

Size of Household: Most respondents have large families (6 to 10), 58.18% as shown from the Table 1 (appendix) thus indicating that most processors are in the rural setting. The reason is not far-fetched as most African families see family size as an important index in rural development intervention as it affects the outcome of such interventions.

Processing Method: The result in Table 1 shows that all respondents (110), 100% do not use mechanized method, rather they use their normal known local method of processing *fufu*.

Source of Labour: The output in table 1 (appendix) shows that family labour (64), 58.18% use family labour while the remaining (46), 41.82% uses hired labour. This is in line with the findings of Rahman & Mali (2003) who observed that because most farmers in the rural areas are poor, the often use family labour in their subsistence farming.

4.2 Profitability of Conversion of Cassava to *Fufu*

The mean productivity of the processors is the total output of *fufu* per processor per tonne of cassava. This is calculated thus:

$\ddot{X}_{ij} = \sum X_{ix} / n$

Where

$\ddot{X}_{ij}$ = Mean output per processor
X_{ix} = Summation of processors output
n = Number of processors
$\sum$ = Summation

Therefore, $\ddot{X}_{ij} =$ 147,525/110 = 1,341.14 Wraps of *fufu*/bag of processed cassava
This means that the mean productivity of each *fufu* processor = 1,341wrapps of *fufu.*

But from (2) GM = TR - TVC
Where GM= *Fufu* processing gross margin
TR= Total revenue from *fufu* sales
TVC= Total variable cost of average operating inputs and labour in Naira.

Table 2: Profitability/Gross Margin Analysis of Fufu Production

Number of processors:	110
Mean wraps of *Fufu*/bag of processed Cassava	147,525/110 = 1,341.14 Wraps
Approx. mean	1,341 Wraps of *fufu*/bag
Approx. number of bags of processed cassava/ton	33 Bags
Average Wraps of *Fufu*/ton of processed Cassava	44,253 Wraps
Mean Price of *fufu*/Wrap in Naira	50.00
Revenue in Naira	**2,212,650.00**

Cost Item	Average Cost (=N=)
Labour Cost	
Transportation	10,000
Cooking/Pounding	132,000 @ 4,000/ton
Fire-Wood/Charcoal/Kerosene	165,000 @ 5,000/ton
Cost of materials	
Bag of processed cassava	330,000 @ 10,000/bag (33 bags/ton)
Wrapping Nylon	33,000 @ 1,000/ton
Total variable Cost	**670,000.00**
Total Revenue	2,212,881.00
Total Variable Cost	670,000.00
Gross Margin	**1,542,650.00**

Source: Researchers computation from field survey, 2019. Note: Naira 300.00 = USD1.00

From Table 2 above, the gross margin of *fufu* processors in Ikeduru Local Government area of Imo State, South East Nigeria. From the results so far, it is evident that *fufu* processing is a profitable venture.

4.3 Constraints of *Fufu* Processing in Ikeduru Local Government Area

Table 3 gives us a breakdown of the constraints that militate against *fufu* processing in Ikeduru Local Government area of Imo State. They are as follows:

Price of cassava: With a mean value of 3.36, is ranked third as a constraint in the processing of *fufu.*

Low profit: This constraint ranks fourth with a mean value of 3.32. The processors by this is not making as much profit as they desire to.

Low rate of turnover: This constraint ranked first with a mean value of 3.45. The reason for this is not far-fetched as almost everyone in the area processes at least for his/her household consumption.

Inadequate/Low patronage by wholesalers: According to the processors, at a mean of 3.29, they are not usually patronized by wholesalers. Though the lack of wholesalers is a dominant factor, exactly why most processors supply to canteens, hotels and restaurants.

Lack of credit: It obvious that most commercial oriented person complains of lacking credit of which the *fufu* processors are not left out. With a mean value of 3.44 the processors see inaccessibility to credits as a major constraint.

Inadequate Preservation Facility: Though this is a constraint (X=2.90), *fufu* processors do not see it as a major constraint even though it is still one. Improper or lack of preservation definitely leads to spoilage of both the processed cassava and *fufu.*

Table 3: Constraints of Conversion of Cassava to *Fufu*

Constraint	Standard Deviation	Mean	Rank of Mean
Price of Cassava	0.06	3.36	3
Low Profit	0.03	3.32	4
Low Rate of Turnover	0.16	3.45	1
Inadequacy/Low Patronage by Wholesalers	0.00	3.29	5
Lack of Credit	0.15	3.44	2
Inadequate Preservation Facility	0.39	2.90	6

Source: Field survey, 2019.
Likert Scale: 1= Strongly Agree, 2= Agree, 3= Disagree, 4= Strongly Disagree

5.0 Conclusion and Recommendations

This study analyzed the gross margin for small-scale cassava processors into the cassava *fufu* value chain. The results show the existence of a yawning gap in the processing as the processors still adopt the local or primitive ways of processing. To achieve self-sufficiency benefits and economic sustainability through investments in the *fufu* value chain of cassava, this gap must be closed. Price instability, transportation, lack of wholesale patronage, inaccessibility of credit facility and preservation problems were identified as major constraints to the conversion of cassava to its *fufu* value chain. Despite these challenges, from this study, we have been able to establish that cassava conversion to its *fufu* value chain in Ikeduru Local Government Area of Imo State is profitable. The value of the gross margin is high and as such confirms the profitability. We, therefore, recommend for the adoption of mechanized farming practices by the farmers to increase efficiency of cassava production and encourage investments, though, as this comes with increased cost, the cost will be transferred to the processors. Provision of access road and tackling the incidence of double taxation by the government agencies should be made a priority. Healthy living and cleanliness should be encouraged while the health officers should embark on routine supervision of the processing environments as this will encourage consumption, once consumers become aware of the hygienic processing methods and the environment. Strengthening of cooperative societies' and the efficient way of delivering the *tradermoni* initiative by the government will go a long a way to assist processors in terms of finance. Finally, to address the challenge of low turnover, low patronage by wholesalers and inadequate preservation facility, government should develop industrial clusters with necessary facilities (including processing and preservation facilities), while the processors should, as

cooperative societies establish relations with their product up-takers (hotels, restaurants, etc) through advertorials and one-one relationships. Evidently, this would reduce their operational cost while increasing their profit level. -Researches into efficient and effective ways of preserving processed cassava and *fufu* should be encouraged.

References

Abila, N. (2012). Labour Arrangements in Cassava Production in Oyo State, Nigeria. *Tropicultura, 30(1), 31-35. http://www.tropicultura.org/text/v30n1/31.pdf. Assessed 5th April, 2020.*

Abolaji D.D, Sinyanbola E.O, Afolabi O.O, Oduola I.A. (2007). Capacity Innovation in Cassava Production, Harvesting and Processing in Nigeria. *https://www.nigeriainvestment.com /story.php.* Assessed April, 2018.

Agbamu, J.U. (1993). Analysis of Farmers Characteristics Association with Adoption of Soil Management Innovation in Ikorodu Local Government Area of Lagos State, Nigeria. *Journal of Rural Extension and Development, 1(273): 34 – 41.*

Aigner DJ, Lvell, C.A.K. & Schmdt, P. (1977). Formulation and Estimation of Stochastic Frontier Production Function Models. *Journal of Econometric, 6(1):21-37. https://www.researchgate.net/publication/4857712_Formation_and_Estimation_of_Stochastic_Frontier_Production_Function_Models/* Assessed: 17th January, 2020.

Arene, C.J. (1994). "Discriminant analysis of small holder farmer adoption potential and the Prediction of Extension Cost in Nigeria: A Comparative Enterprise Perspective. *Journal of Extension Sysytem 10(1): 46-58*

Awerije .B.O and Sanzidur Rahman .S. (2014). Profitability and Efficiency of Cassava Production at the Farm-Level in Delta State, Nigeria. *International Journal of Agricultural Management, 3(4), pp210-218*

Barkley, A., & Barkely, W. P. (2016). *Principles of Agricultural Economics* (2nd ed.). New York: Routledge Publishing Group

Block, S. (1994). A new view of agricultural productivity in Sub-Saharan Africa, *American Journal of Agricultural Economics, 76:619-624*

Christiaensen, L., Demery, L., & Kuhl, J. (2011). The Evolving Role of Agriculture in Poverty Reduction: *An Empirical Perspective. Journal of Development Economics, 96, 239-254. https://doi.org/10.1016/j.jdeveco.2010.10.006*

Christiaensen, L., and Martin, W. (2018). Agriculture, Structural Transformation and Poverty Reduction: Eight New Insights. *World Development 109. Pp.413-416. https://doi.org/10.10.16/j.worlddev.2018.05.027*

Donkor, E. Onakuse, S., Bogue, J., and Carmenado, I. (2017). The Impact of The Presidential Cassava Initiative on Cassava Productivity in Nigeria: Implication for Sustainable Food Supply and Food Security. *Cogent Food & Agriculture, 3. https://doi.org/10.1080/23311932.2017.1368857*

Ettah, O.I. and Angba, A.O. (2016). Analysis of Cost and Returns among Cassava Farmers in Cross River State, Nigeria. *International Journal of Science and Research (IJSR),* 5(11):111-114. Doi: 10.21275/ART20162150.

Etsuyankpa, M.B., Gimba, C.E., Agbaji, E.B. and Omoniyi, K.I. (2014). Determination of the Mineral Contents of Fufu, Garri and Lafun Produced Through Microbial Fermentation of Cassava Roots of Six Varieties in Relation to Soil Composition. *Nigerian Journal of Scientific Research, 13(2): 2014, pp. 4-13*

FAO. (2013a). *New Approaches to The Measurement of Food Security* (Statistics Division of FAO of the United Nations). Rome, Italy: FAO.

FAO. (2013b). *Save and Grow: Cassava, A Guide to Sustainable Production Intensification*. Rome: FAO.

FAO, IFAD, & WFP. (2015). *The State of Food Insecurity in The World 2015*. Meeting the 2015 International Hunger Targets: Taking stock of uneven progress. Rome: FAO.

FAO, Statistics Division (FAOSTAT). (2017). *Production Statistics*. https://faostat3.fao.org/download/Q/*/E Assessed 17the January, 2020.

FEWS Net Nigeria (2016). Visualizing trends in 1981-2015 rainfall in Nigeria. Nigeria Special Report. *Famine Early Warnings System Network (FEWS Net). https://www.fews.net/sites/default/files/documents/reports/FEWS%20NET_Nigeria%20Rainfall%20Trends%20Map%20Book_20160601.pdf 14 September 2019,pp. 1-7.* Accessed 15the August. 2019.

Fiszbein, A., Kanbur, R., & Yemtsov, R. (2014). Social Protection and Poverty Reduction: Global Patterns and Some Targets. *World Development, 6, 167-177. https://doi.org/10.1016/j.worlddev.2014.04.010.* Assessed 15the August, 2019.

Ibekwe U.C, Chikezie C, Obasi P.C, Eze C.C, and Henri-Ukoha A. (2012). Profitability of Garri Processing in Owerri North Local government Area of Imo state, Nigeria. *ARPN Journal of Science and Technology 2(4), pp. 340-343*

Ismam, N., Xayavong, V. and Kingwell, R. (2011). Broad Acre Farm Productivity and

Profitability in South Western Australia. *Paper to the 55th Annual Conference, Australian Agricultural and Resource Economics Soceity Melbourne, February 9-11, 2011.* http://ageconsearch.umn.edu/bitstream/100565/2/Islam_Xayavong_Kingwelll_Productivity_Paper%20AARES_Conf_2011.pdf, 1 September 2019. Accessed 15th August, 2019.

Itam, K.O., Ajah, E.A. and Agbachom, E.A. (2014). Analysis of determinants of cassava production and productivity in Akpabuyo Local Government Area of Cross River State, Nigeria. *International Business Research, 7(12):128-135.*

Kahan, D. (2013). *Farm Business Analysis Using Benchmarking*, Farm Management Extension Guide. A publication of the Food and Agricultural Organisation Room. http://www.fao.org/uploads/media/4-BenchmarkingInternLores.pdf, pp. 1-154. Accessed April 24th, 2019.

Karfakis, P., Rapsomanikis, G., and Scambellloni, E. (2015). *The Drivers of Hunger Reduction (*ESA Working Paper). Rome; FAO.

Machek, O. and Špička, J. (2014). Productivity and Profitability of the Czech Agricultural Sector After the Economic Crisis. *WSEAS Transactions on Business and Economics*, 11: 700-706.

Manyong, V.M, Alene, A.D, Sanago, D. et al (2006). *Achievements in Impact Assessment of Agriculture Research.* IITA Experience 2001-2006.

Muhammad-Lawal, A., Omotesho, O.A. and Oyedemi, F.A. (2013). An Assessment of the Economics of Cassava Processing in Kwara State, Nigeria. *An Invited paper presented at the 4th International Conference of the African association of agricultural Economists, September 22-25, 2013, Ham Mamet, Tunisia, pp,1-17/:* Accessed April 24th, 2019.

Nandi, J.A., Gunn, P. and Yurkushi, E.N. (2011). Economic Analysis of Cassava Production in Obubra Local Government Area of Cross River State, Nigeria. *Asian Journal of Agricultural Science*, 3(3): 205-209.

Obasi, P.C., Nwaiwu, I.U.O., Korie, C.O. and Tim-Ashama, A. (2016). Evaluation of Productivity and Profitability of Mixed Farming Enterprises in Imo State, Nigeria. *Sky Journal of Agricultural Research, 5(4): 056-063.*

Obayelu A.O and Ebute .S. (2016). Assessment of Cassava Supply Response in Nigeria Using Vector Error Correction Model (VECM). *Agricultura 13(1-2):Pp.79-86.* https://doi.org/10.1515/agricultura-2017-0010

Odoemena, I.U. and Otanwa, L.B. (2011). Economic Analysis of Cassava Production in Benue

State, Nigeria. *Journal of Social Sciences,* 3(5): 406-411.

Ogisi, O.D., Begho, T. and Alimeke, B.O. (2013). Productivity and Profitability of Cassava (Manihot Esculenta) in Ika South and Ika North East Local Government Areas of Delta State, Nigeria. *IOSR Journal of Agriculture and Veterinary Science, 6(1): 52-56*

Ojiako .I.A, Tarawali G, Okechukwu R.U, Chianu J, Ezedinma C and Edet .M. (2018). Profitability of Cassava Production: Comparing the Actual and Potential Returns on Investment among Smallholders in Southern Nigeria. *Journal of Biology, Agriculture and Healthcare. 8(16), pp.51-65*

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), pp.39 – 47.*

Okorie, O.J. (2012). Level of Adoption of Improved Cassava Vareities and the Profitability Of Cassava Production in Enugu State, Nigeria. *Unpublished Ph.D Thesis, University of Nigeria, Nsukka*

Oladele, O.I (2005). A Tobit Analysis of Propensity to Discontinue Adoption of Agricultural Technology among Farmers in SouthWestern Nigeria. *Journal of Central European Agriculture 6(3):249-254.*

Olagoke, A.M. (1990). Comparative Economics of Resources Use in Rice and YamBased Crop Production in Uzo-Uwani Local Government Area of Anambra State. *Unpublished Ph.D Thesis, University of Nigeria, Nsukka*

Oladejo, J.A (2017). Profitability and Marketing Efficiency Analysis of Women Cassava Processors in Oyo State, Nigeria. *Global Advanced Research Journal of Agricultural Science 6(3) pp. 78-83.*

Oladoja, M.A. Adedoyin S.E and Adeokun O.A. (2008). Training needs of Fishers Folk on Fishing Technologies. *Journal of Food, Agriculture and Environment Science and Technology. 6(1) WFL Publisher, Helsinki, Finland.*

Rahman, S.A. and Mali, J.N (2003). Price Responsiveness of Maize and Rice Farmers in Nigeria. *The Nigeria Journal of Scientists Research 4(1): 45 – 49.*

Roorda, N., Corcoran, P.B., & Weakland, J.P (2012). *Fundamentals of Sustainable Development.* Routledge, New York, NY 10017.

Sanni MO, Sobminwa AO, modupe- Eyinla. C Rosline H (2008). Safety Aspects of Processing Cassava to Garri in Nigeria ISHS Acta Horticulture 375. *International Workshop on Cassava Safety. http//www.actahort.*

Toluwase, S.O. and Abdu-Raheem, K.A. (2013). Costs and Returns Analysis of Cassava Production in Ekiti State, Nigeria. *Scholarly Journal of Agricultural Science*, 3(10): *454-457. ISSN 2276-7118.*

Wilson, R.H., Charry, A.A. and Kemp, D.R. (2005). Performance Indicators and Benchmarking in Australian Agriculture: Synthesis and Perspectives. *Extension Farming Systems Journal, 1(1): 45-57.*

DECLARATION OF CONFLICTING INTERESTS

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

FUNDING

The author(s) received no financial support for the research, authorship, and/or publication of this article.