*Full Length Research Paper*

# Analysis of Cassava Value Chain in Ideato South Local Government Area, Imo State, South-East Nigeria.

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### Abstract
*This study analyzed the value chain of cassava in Ideato South Local Government Area. The specific objectives were to analyze the socio-economic characteristics of the cassava as it affects their production, processing,  and marketing, to ascertain the factors affecting profitability in the chain . Primary data were collected using a set of structured questionnaire from 60 farmers who were selected using multi-stage, random and purposive methods due to their cassava production, processing, marketing,  similar climatic and soil conditions .  Data were analyzed based on the 51 farmers using descriptive statistics and other appropriate statistical and econometric tools. The results showed that majority of the farmers in the study area were young and energetic, mostly female, and had some level of formal education. Furthermore, level of education, farm experience, and farm size positively affected the profits of the value chain actors. The study recommended that education of actors in the cassava value chain should be a continuous one through the introduction of adult education and skill acquisition programmes which will equip these actors and make their activities more profitable. It also advocated intensifying efforts by government and other stakeholders aimed at increasing farmers' access to more land for farming.*

*Keywords: Cassava, value chain, profitable, farmers*

### Introduction
Cassava, which originated from Brazil is widely grown in Sub-Saharan Africa with Nigeria being the world's largest producer producing 45.75 metric tonnes of the crop annually   (Food and Agricultural Organization FAO, 2007). Like yam, it is a root and tuber crop, which has underground roots that can be consumed by man and livestock after processing. The root is rich in carbohydrate (Iwena, 2002). The crop can be grown in relatively poor soil in low rainfall areas thus making it one of the most extensively cultivated crops in Africa. Cassava is Africa's second most important food staple, after maize in terms of calories consumed (Nweke, 2004). The crop ranks highly as a major staple food crop particularly for the low income earners and resource-poor farmers in the developing economies of Sub- Saharan Africa (Hahn *et.al.,* 1989 in Nwaiwu *et al* 2010).  According to Ibeagwa *et.al.,* (2012), the crop is regarded as a security crop and is often referred to as "famine fighter", that is, where the crop is grown, famine cannot be a problem. In Nigeria, the importance of cassava as a major food crop informed its inclusion in the Special Programme for Food Security (SPFS) with the aim of discovering early maturing and yield increasing varieties of cassava. Processing cassava into its various products in the country is as old as the crop itself (Ojuri, 1997). Cassava leaves and tubers go through one processing method or the other not only to reduce their bulkiness and moisture content but more importantly to reduce the hydrocynide content (Oyenuga and Amazigbo, 1990 as cited in Ibeagwa *et.al.,* 2012). This is necessitated in the fact that hydrocynide is toxic to the body and consumption of cassava with the chemical can lead to death.

In recent times, also, cassava is progressively gaining a strategic position in the global trade as a result of the efforts by various research and development stakeholders in developing value-added cassava-based products for human consumption and industrial uses (Onyeka *et al.* 2005).

The value chain and utilization of the crop has therefore been given prime attention by government and other stakeholders. The government of Nigeria also recognizes the important of value chain addition and therefore encourages a transition from the present status of usage to the level of industrial raw materials and livestock feed as a developmental goal that can spur growth with increase in the employment (Agric. Digest, 2012).

The value chain of a product describes the full range of activities which are required to bring a product or services from conception, through the different actors involve in the production, processing, and delivery to the final consumers (Adekunle *et al.* 2012). Value chain provides a unique way to manage risk by all actors (players).  It is the marketing aspect of production. Buyers are assured a supply of desired products and are able to trace the food back to the farm of origin, while suppliers are more assured of a market. A well-functioning value chain provides the means to effectively link production activities to market demand and market supply. A value chain analysis is therefore an assessment of the actors and factors that influences the performances of an

industry and relationships among participants to identify the main constraints to the increased efficiency, productivity and competitiveness of an industry and how these constraints can be overcome (Fries, 2007). In cassava sub-sector, the main value chains are flour, feedstock and baking. An analysis of value chain should examine what keeps the chain bond together. Therefore, in Nigeria, analyses of opportunities to adopt, diversify and promote cassava have been performed and four main chains have been singled out as those which offer much potential for commercialization. These include: Animal feeds, raw cassava tuber, peels, leaves and pellets and processed chips can be used in industrial feed stocks. Bakery products, utilizing varieties with high flour or dry matter content, incorporate into industrial baking, replacing established raw material like wheat. Starch industry, using large tuber varieties with high carbohydrate content to manufacture industrial starches, glue and glucoses. Food staple and relish, utilizing both raw sweet varieties and processed varieties offering flour and edible tops and cheap sources of carbohydrates and protein replacing maize meal and vegetables.

Commercializing cassava and integrating producers and traders into commercial value chains is surmountable through challenging and slow proposition. This is because; each actor along the value chain devises means of showcasing its products to the customers. They ensure that quality products are delivered to their customers to earn more returns. The need for cassava value chain is to create additional markets for cassava products and more importantly, generate wealth to the farmers. (Obiefuna et al, 2009); (Nigeria Agricultural Digest, 2010).

However, the activities of value chain actors have not been recognized as a result, farmers concentrate on the value addition which was the common and traditional method of cassava production. Farmers due to post-harvest losses do not recognize that, there are other links in the value chain that can help them to regain the losses they encountered during the time of planting and value addition.

Meanwhile, one of the problems that lead to this non-continuation in the value chain is lack of market opportunities (FAO, 2012). They have little access to market so they tend to sell their produce in the farm even before harvesting unaware that they are just part of the value chain who could make enough profit by selling to other actors in the value chain like the processors who will now add value to the cassava tubers.

In other words, another problem is the low diversification of the cassava tubers; this is also a limiting factor to the farmers who stop the chain at production as he believes that production ends at value addition (FAO, 2012). Also, lack of improved processing and storage technologies resulting in high rate of perishability in cassava tubers; non-availability of efficient processing equipment which raises unit of processing and marketing cost, and unreliable power supply to power the storage equipment compel most processors to depend on the expensive alternative use of generating sets thereby making them incur very high processing (Ezedimma et al, 2003).

In the light of these challenges faced by the actors in the cassava value chain, this paper seeks to describe the socioeconomic characteristics of cassava value chain actors and estimate the factors that influence profit of actors in the value chain.

## Materials and Methods
The study was carried out in Ideato South Local Government Area of Imo State, Nigeria. The area lies between latitudes $5^{\circ}40'$ N and $6^{\circ}0'$N and longitude $6^{\circ}5'$E and $7^{\circ}10'$E. Dikenafai is bounded by Okwelle, Abba, Umudi, Isiekenesi, and Okwe communities of Imo state (Ijeomah et al, 2007). It has an area of 88 $km^2$ and a population of 1591879 as at 2006 census. Cash crops produced include: oil palm, raffia palm, groundnut, melon, rubber, maize etc. Fruit crops such as yam, cassava, cocoyam, breadfruit and three leaf yam are produced in large quantities.

The population for the study was drawn from the producers, processors and marketers of cassava along the value chain in the 23 Autonomous communities in Ideato South Local Government Area of Imo State. Multi-stage sampling, random and purposive sampling techniques were employed in the sample selection.

Moreover, for the purpose of this study, the value chain actors were limited to producers, processors and marketers. The farmer was assumed to play the role of the producer, processor and marketer. The data for the study were collected from two main sources, the primary source and secondary source. The primary data were collected through the use of structured questionnaire and personal contact with the farmers.

The cassava products considered were cassava tubers and garri that was processed from the tubers. The actual costs incurred in the chain were used. Other costs were imputed.

Descriptive statistics like frequency distribution, percentages and means were used to describe the socioeconomic characteristics of the respondents while the Ordinary Least Squares Multiple Regression techniques was used to estimate the factors that influence the profit of the actor in the value chain. The model is specified as follows;
$Y=f( X_1,X_2,X_3,X_4,X_5,X_6,X_7,e)$………………………………..eqtn1
 Where;
Y = profit (₦)
$X_1$= Age (in years)

$X_2$= Educational level (years)

$X_3$ = Household size (numbers)

$X_4$= Experience (years)

$X_5$ = Farm size (hectares)

$X_6$ = Occupation (farming as primary =1, farming as secondary = 0)

$X_7$ = Sex (1 for male, 0 for female).

e = error term.

## Results and Discussion

The socioeconomic characteristics of the respondents are presented in Table 1.

**Table1.** Socio-economic Characteristics of the Respondents

| Age(year) | Frequency | Percentage (%) |
|---|---|---|
| 20-39 | 18 | 35.29 |
| 40-59 | 22 | 43.14 |
| 60-79 | 11 | 21.57 |
| Mean | 47 | |
| **Sex** | | |
| Male | 18 | 35.29 |
| Female | 33 | 64.71 |
| **Marital Status** | | |
| Married | 41 | 80.39 |
| Single | 10 | 19.61 |
| **Occupation** | | |
| Farmer | 39 | 76.47 |
| Trader | 7 | 13.73 |
| Civil servant | 5 | 9.80 |
| **Level of Education (no of years spent)** | | |
| 1-6 | 16 | 31.37 |
| 7-12 | 21 | 41.18 |
| 13 and Above | 14 | 27.45 |
| Mean | 10 | |
| **Year in Business** | | |
| Below 1 | 1 | 1.96 |
| 2-10 | 28 | 54.9 |
| 11-20 | 14 | 27.45 |
| 21-30 | 5 | 9.80 |
| 31 and above | 3 | 5.80 |
| Mean | 12 | |
| **Farm size(hectare)** | | |
| Below 0.5 | 5 | 9.80 |
| 0.6-1.0 | 9 | 17.65 |
| 1.1-1.5 | 23 | 45.10 |
| 1.6-2.0 | 3 | 5.88 |
| 2.1 and Above | 11 | 21.57 |
| Mean | 1.4 | |
| **Household size( no of persons)** | | |
| 1-4 | 5 | 9.80 |
| 5-9 | 36 | 70.59 |
| 10-14 | 10 | 19.61 |
| Mean | 8 | |

*Source: Field Survey Data (2014)*

Table 1 shows the age distributions among the actors in the value chain. More than 78 percent of the respondents were at most 60 years old. The mean age of the farmers was 47 years, this shows that the farmers are young, energetic and better positioned to contribute more to the value chain.

Table also shows that 64.71 percent of the cassava value chain actors were females while 35.29 percent were males. This result indicates that despite the gradual involvement of men in cassava value chain, women still dominate. This finding supports the view of Nandi (2009) that women are more involved in the cassava production and processing and men showed less interest in the production of cassava.

The result also shows that an over whelming proportion (about 63 percent) of the labour for cassava production and value chain activities was provided by women. This again supports the position that majority of the labour for agricultural production in general and cassava production in particular is provided by women. Apata *et al* (2013) reported that 61 percent of agricultural labour comes from women and this also supported by Ezedinma *et.al.,* (2007) who also asserted that cassava production and processing are a female dominated activity. Majority (80%) of the respondents were married and the rest (about 20 percent) single. This indicates that there were more married individuals engaged in the cassava value chain than single persons in the study area. It is not surprising that this is the case because married individuals are more likely to engage in economic activities that demand that they live sedentary or more settled live style that will enable them concentrate on these economic activities. They may also be able to reduce the cost of labour by deciding to use members of the household as source of labour for the value chain activities.

The results also show that farmers dominate the cassava value chain. About 77 percent of the respondents were farmers, with the rest being traders and civil servants. All of the value chain actors had some formal education. A significant number (27.45 percent) even attained tertiary level of education. 41.18 percent of had secondary education while 31.37 percent had primary education. The mean years of formal education of the value chain actors were 10 years. This finding goes to show the importance which even farmers give to education having realized the immense benefits and advantages it confers on them. This result somewhat agrees with the findings of Oluyole (2005) who asserted that high literacy level will enable farmers to understand the intimacies of factors and new techniques for production. Also, Henri-Ukoha, *et.al.,* (2011) posited that education is an important factor to facilitate the adoption of improved technology by increasing the farmer's knowledge and understanding of new farm practices. Majority of the respondents (about 71 percent) had large household size of between 5-9 persons. About 20 percent had household size of between 10-14 persons while about 10 percent had household size of between 1-4 persons. The mean size of household was 8 persons. The implication of these large household sizes is that there will be more hands to assist in the activities involved in cassava value chain thus having a positive effect not only in reducing the cost of hired labour but also enabling farmers form stronger bond through working in an activity with common goal. This result is supported by Ibekwe and Orebiyi (2012) who asserted that large household size provides most of the labour force for farming households.

Table also shows that more than half of the respondents (about 55 percent) had between 2-10 years of experience in business, 27.45% had between 11-20 years in business. The mean year of experience was 12 years. This indicates that the majority of the respondents have acquired some level of experience in production, processing and marketing of cassava which could be very helpful in combating the challenges that come with such activities. About 45 percent of the respondents had farm size of between 1.1-1.5 hectares of land, 9.8 percent had below 0.5 hectare of farm size. The finding shows that the mean hectare of farm size used in the study area is 1.4 hectares; this shows that majority of the farmers cultivated farm holding size of less than 2.0 hectares. This confirmed the findings of Obasi (2005), Anyanwu (2009), who stated that the average land holdings of small scale farmers were often too small for efficient land utilization. With direct correlation between farm sizes and gross income, it implies that small farm sizes will naturally lead to low cassava output and low productivity.

**Determinants of Factors affecting Profitability of Cassava Farmers along the value chain**
In determining the factors affecting the profit of cassava farmers in the chain, Ordinary Least Squares Multiple Regression technique was employed. Four functional forms of the model, linear, semi-log, double-log and exponential were fitted. The results of the multiple regression analysis as shown in Table 2.

**Table 2.** Results of multiple Regression Analysis on Factors affecting Profitability of Cassava farmers in the value chain in the study area

| Explanatory variables | Linear function | Semi-log function | Double-log function | Exponential function |
|---|---|---|---|---|
| Age($X_1$) | 28.489 | 1505.846 | 0.555 | 0.011 |
| | (1.647) | (1.570) | (1.955)[*] | (1.937)[*] |
| Level of Education($X_2$) | 18.089 | 148.139 | 0.026 | 0.003 |
| | (2.463)[**] | (0.330) | (0.193) | (0.219) |
| Household size($X_3$) | 94.133 | 543.715 | 0.138 | 0.024 |
| | (2.286)[*] | (1.787)[*] | (0.536) | (1.856)[*] |
| Farm Experience($X_4$) | 12.87 | 29.619 | 0.028 | 0.003 |
| | (5.551)[**] | (0.087) | (0.273) | (0.389) |
| Farm size($X_5$) | 593.06 | 2053.346 | 0.512 | 0.146 |
| | (8.756)[**] | (6.873)[**] | (5.797)[**] | (6.784)[**] |
| Occupation($X_6$) | 12.21 | 328.881 | 0.089 | 0.004 |
| | (0.374) | (1.742)[*] | (0.951) | (0.394) |
| Sex($X_7$) | -5.205 | -61.96 | 0.001 | 0.23 |
| | (-0.016) | (-0.164) | (0.012) | (0.214) |
| $R^2$ | 0.703 | 0.631 | 0.517 | 0.613 |
| F-value. | 14.570 | 10.257 | 8.50 | 9.735 |

*Source: Field Survey Data, 2014.*
*= significant at 5%; **= significant at 1%; **NB:** Figures in parenthesis are t-values

Table 2 showed that the linear functional form gave the best fit having the highest value of coefficient of multiple determination ($R^2$), highest number of significant variable, relative model of F-value and in conformity with the a priori expectation and was therefore selected as the lead equation. The value of coefficient of multiple determination ($R^2$) was 0.703 which implied that 70% of the variations in the profitability of the cassava value chain actors was accounted for by the explanatory variables while 30% were not. Variables such as level of education($X_2$), household size($X_3$), farm experience($X_4$) and farm size($X_5$) were significant and related to profit of the cassava value chain farmers in the study area.

The coefficient of level of education($X_2$) is significant at 1% level of significance and positively related to the profit of the cassava value chain farmers in the study area. This implies that the higher the level of education, the higher the profit of an actor along the cassava value chain. According to Orebiyi (1981), education is an investment in human capacity which is able to raise the skills and qualities of man, increase his allocative ability thereby leading to more productive performances.

Also, the coefficient of farm experience($X_4$) was significant at 1% level of significance and positively related to profit of cassava value chain farmers in the study area. This implies that the farmers have been able to bring to bear their wealth of experience in the cassava value chain thereby increasing efficiency, reducing cost and enhancing quality leading to an increase in profit.
The coefficient of farm size($X_5$) was significant at 1% level of significance and positively related to the profit of cassava value chain farmers in the study area. This implies that farm size increases production and profit.

The coefficient of household size (X3) was significant at 5% level of significance and positively related to the profit of the cassava value chain actors in the study area. This implies that the higher the household size, the higher the profit. This may be adduced to the provision of family labour by household members leading to a reduction in the cost of production and an increase in profit.

## Recommendations
The following recommendations are made based on the findings of the study
   1. *The education of actors in the cassava value chain should be a continuous one. Thus the introduction of adult education and skill acquisition programmes will equip these actors and make their activities more profitable.*
   2. *Efforts aimed at increasing farmers' access to more land for farming should be intensified by government and other stakeholders. This will increase output and ensure a steady supply of the raw material and the final product while also increasing profit.*
   3. *Special programmes targeted at bringing interaction and cross fertilization of ideas between experienced actors and younger ones in the value chain should be encouraged.*

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