THE CONCEPT OF VALUE CHAINS IN AGRICULTURE, CLIMATE ACTION AND ENVIRONMENTAL RESOURCES

GLOBAL ISSUES & LOCAL PERSPECTIVES

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Preface

This book adopts an exegetical approach as well as a pedagogic model, making it attractive agriculture and environmental economics teachers, professional practitioners and scholars. It is eschews pedantry and lays bars the issues in such clarity that conduces to learning. The book elaborates on contemporaneous ***The Concept of Value Chains in Agriculture, Climate Action and Environmental Resources*** issues of global significance and at the same time, is mindful of local or national perspectives making it appealing both to international and national interests. The book explores the ways in which climate change, food security, national security and environmental resources issues are and should be presented to increase the public's stock of knowledge, increase awareness about burning issues and empower the scholars and public to engage in the participatory dialogue climate change, food security, national security and environmental resources necessary in policy making process that will stimulate increase in food production and environmental sustainability.

The Concept of Value Chains in Agriculture, Climate Action and Environmental Resources: Global issues and Local Perspectives is organized in three parts. Part One deals with The Concept of Value Chains in Agriculture, Part Two is concerned with The Concept of Climate Actions and Part Three deals with the Concept of Value Chains and Environmental Resources.

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Chapter Six

Analysis of Cassava Value Addition and its Constraints in Emohua Local Government Area of Rivers State, Nigeria

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Introduction

In other to increase the shelf life of cassava and also add value, this study looked at the various products coming out from cassava, a major staple grown, eaten and traded in different forms in Emohua Local Government Area (LGA) by smallholder farmers to increase their income. Cassava (*Manihot esculenta*), which has its origin from Latin America (Agwu, Anyanwu and Kalu, 2015) has gained global attention as an important root crop in Africa with Nigeria producing the highest quantity (54 million metric tonnes annually) globally (FAO, 2013). This crop, as has been captured by several literatures is a crop that is flexible, withstands drought and diseases and has the ability to thrive on low quality soils (Meridian Institute, 2014). Its roots are good sources of ethanol (Ani, Agbugba, & Baiyegunhi, 2013; Agwu *et al.*, 2015) and are rich in minerals, vitamins, starch and protein (Akpan, Okon, Jeiyol, Nkeme, & John, 2013).

Cassava root is processed into granulated substances called *gari* that is consumed by almost every Nigerian (Akpan *et al.*, 2015). According to Ani (2010) the consumption in per capita is very high and it provides about 80% of the total energy intake of many Nigerians. It can also be processed to get other products such as: flour, chips, *Fufu, Tapioca, starch etc.* Cassava is important not only as food crop but as a major source of income for rural households in Emohua L.G.A. It has over

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the years been a permanent feature of the farming system in Emohua LGA, South-South of Nigeria being the first and most important tuber crop cultivated. Its frequent consumption (in different forms) in homes underscored its importance as there seem to be no substitute for the crop. Apart from *gari*, other forms into which it is processed in Emohua include *Fufu*, and *Tapioca* considered by this study. By processing into other products, there is value addition (which in effect increases the farmer's income) and increase of the shelf life of the crop. However, there are challenges: it is generally observed that there is low level of investment in small scale cassava processing to value added products because of the low return on investment. This is evident in the predominance of women most of whom are resource poor in cassava processing enterprises; use of manual means of slicing the cassava into *Tapioca*; income derived from other products of cassava is higher compared to gari and the challenges involved in the process. For these reasons, the study considers the following objectives: identify the socio-economic characteristics of cassava dealers; identify the various products from cassava; determine the costs and returns to cassava value addition and identify the constraints to cassava value addition.

Methodology

The study was carried out in Emohua L.G.A. of Rivers State, Nigeria. It is one of the twenty-three (23) Local Government Areas in the State and is divided into two geographical regions: Emohua Central and Emohua North respectively. The towns in Emohua Central are: Emohua, Evekwu, Rumuodogo, Rumuji, Rumuewo, Ovogo, Ibaa and Obelle. The towns in Emohua North are: Ndele, Rumuekpe, Elele-Alimini, Akpabu, Egbeda and Ubimini. The predominant occupation of the people in this area is farming, with cassava and yam being the predominant tuber crops cultivated. Apart from been processed into *garri* by the people, cassava is also boiled and eaten with palm oil,

prepared as *Tapioca,* in peeled and sliced form and prepared as a local delicacy called *African salad.* Emohua has a land area of 831km^2 (321 sq mile) and a population of 201,901 as at the 2006 census (National Population Commission – NPC, 2006).

The study population comprised of male and female cassava producers and processors/marketers operating in the L.G.A. A three-stage sampling procedure was used to select respondents for the study. At stage one three communities each were selected from the two geographical locations (Emohua Central and Emohua North) based on the volume of cassava processing activities. At the second stage, two villages were selected randomly from each of the three communities selected from the two geographical locations to arrive at the twelve villages. At the third stage, six respondents (which include 2-producers, 2-processors and 2-marketers) were identified and randomly selected from each of the 12 villages to arrive at seventy-two respondents. A structured questionnaire was used to collect primary data on the quantity of cassava that was used for each product, cost of processing the cassava into the various products like gari, *fufu* and *tapioca* and the cost of cassava that was used. Descriptive statistics such as frequencies and percentages were used to analyze the processing methods of selected cassava products (gari, *fufu* and *tapioca*) in the study area, the constraints associated with their processing and marketing. Rate of returns per naira on investment was used to analyze the returns on investment of marketing of the selected cassava products.

Data were analyzed using cost and return analysis, R/C ratio and value addition analysis.

Analytical Method

Data was analyzed using descriptive statistics such as frequencies and percentages to analyze the gender, age, household size, education levels attained, experience etc.

The Rate of Return on Investment (RRI) shall be specified as:

$$RRI = \frac{\text{Net Income (NI)}}{\text{Total Cost (TC)}}$$

Where:
N I = TR-TC
TR = Total revenue from the cassava products
TC = TFC + TVC = Total cost of cassava products
TFC = Total fixed cost such as cost of frying pan, sieve, bags, frying spoon, tripod stands, knives, etc.
TVC = Total variable cost such as cost of fresh tuber, cost of transportation, cost of firewood, labour cost, cost of oil, etc.
TC = Total Variable Cost (TVC) + Depreciation

$$\text{Depreciation} = \frac{\text{Total Cost of assets - Salvage value}}{\text{Useful life}}$$

Results and Discussion

Cassava processing was female dominated (table 1) with 69% processors while 31% were males. Reasons could be that most of the activities were feminine based. This suggests that females in the area are more engaged in the cassava processing activity than their male counterparts as have been observed from several studies Ezedinma *et al*, (2007); Muhammad-Lawal *et al*. (2013); Wilcox, Offor & Omojola, (2015) and Wilcox *et al*. (2016). Females are also engaged in the lighter work area that does not demand so much energy. The process of conversion of cassava to garri, *Fufu*, or *Tapioca* which are local diets, does not require much energy. That is the reason for having more females. Most of the respondents precisely 43.06% fall within the age range of 40-49years, while 27.77% are between 30-39years. This suggests that they belong to the economically active population category which is between 25-59 years (Muhammad-Lawal *et al*., 2013). They can therefore put more effort into cassava processing in order to increase their value addition. This is corroborated by the findings of Ebewore (2012) who made similar observation among cocoa farmers in Edo and Ondo States of Nigeria, and Wilcox *et al.* (2015) in cucumber production in Rivers State. The household size of 1-5 persons and 6-10 persons had higher percentages of 33%

and 38% respectively. This therefore suggests that respondents are likely to enjoy family labour readily that could help to reduce labour cost. The size of the family will thus influence the amount of hired labour employed in the process of value addition to cassava. The study showed that 84.72 % of the respondents had formal education and 15.28% had no formal education: 25% had primary, 40.28% had secondary and 19.44% had tertiary education (table 1). This implies that the processors are likely to readily adopt new technology and innovation if there is an opportunity (Muhammad-Lawal *et al*., 2013). The number of years of engagement of the respondents in one cassava processing business or the other is as high as 6-10 years (31.94%) to as low as 1-5 years (29.17%) and 11-15years (18.06%). The years of experience the processors have can help in better management practices that will enhance production in the value chain.

Categorization of Products from Cassava Value Chain

Table 2 shows the categorization of respondents according to the types of products produced. The study showed that there are mainly three products from cassava in the study area. These are gari, *tapioca* and *fufu*. 36.11% of the respondents produce only gari, 30.56% only *tapioca* and 33.33% produce *Fufu*. The study showed that garri dominated the other cassava products. This shows that garri is the most predominant product of cassava from the study area. This is in agreement with previous studies by Ani, Agbugba and Baiyegunhi, (2013) which showed 40% of the processors producing garri majorly and Agwu, Anyanwu & Kalu (2015) had a record of 82.9%. This indicates that gari is the traditional food product in the area. Potentials in the new emerging market for other cassava products like starch and flour are yet to be looked into.

Estimated Cost and Returns to Cassava Processing into Garri, *Tapioca* and *Fufu*

The costs and returns to cassava processing into garri, tapioca and *Fufu* are as presented in Table 3. The result from the survey showed that an average of 100Kg of Cassava was processed into *garri* within a production cycle that took an average of five (5) days. The labour costs incurred included cost of peeling, milling, sieving, washing and frying. Milling was mainly done by men. The amount spent on labour on cassava to be processed into gari accounted for 18.18% of the total cost. 13.64% of the total cost was spent on the purchase of fire wood, kerosene and frying pot. The remaining 68.18% of the total cost were accounted for by other inputs. Also, some of the processors add palm oil to their garri in order to differentiate their product as well as enhance acceptability and preference. The average price of garri was ₦ 3,200.00/basin. The Net Returns was estimated at ₦ 1,600.00/100kg of cassava. The implication is that processing cassava to garri is profitable.

An average of 100kg of cassava was processed to tapioca over a production cycle of 2-3 days after soaking. While 69.77% of the total costs of processing *tapioca* were incurred on cassava tuber, 14.42% was spent on labour with the remaining 15.81% spent on other inputs. With an estimated price of *tapioca* at ₦3,500.00/basin, the total value was ₦14,000. The Net Returns for processing tapioca was therefore ₦3,250.00/100kg of cassava. This implies that processing cassava to tapioca is a profitable enterprise in the study area. An average of 100kg of cassava was processed to *fufu* over a production cycle of 7 days. While 73.53% of the total costs of processing *fufu* were incurred on cassava tuber, 9.8% was spent on labour with the remaining 16.67% spent on other inputs. With an estimated price of *fufu* at ₦4,000.00/bag the total value was ₦16,000. The Net Returns for processing tapioca was therefore ₦5,800.00/100kg of cassava. This implies that processing

cassava to *fufu* was a profitable enterprise in the study area as it brought more earnings than gari and *tapioca*. This is in agreement with findings from Muhammad-Lawal, Omotesho, and Oyedemi (2013) which shows net returns of garri ₦4,343.86; *fufu* ₦5,931.28 and *lafun* ₦5,038.84 respectively.

Constraints to cassava value addition

The results of the findings in relation to the constraints faced by the processors during the process of value addition to cassava for the production of garri, *tapioca* and *Fufu* are as presented in Table 4. It showed that bad road leading to high transportation cost and high costs of fire wood are serious problems encountered by the processors. This affected the cost of value addition in the area and is in line with the findings of Muhammad-Lawal *et al*. (2013) and Umeh (2013). High cost of kerosene and palm oil are not serious problems encountered by the processors for production of garri, *tapioca* and *Fufu*. However, the higher returns recorded for tapioca and *Fufu* are as a result of the reduction in labour costs as opposed to the processing of garri.

Conclusion and Recommendation

The analysis of value addition in cassava processing in Emohua LGA showed that there were variations in the Net Returns to the various products of cassava processed. However, *fufu* had the highest returns this is in spite of the fact that all the products of cassava processing in the area namely garri, *tapioca* and *fufu* are profitable. To be able to derive the highest financial benefits to cassava processing, it is recommended that good roads be constructed in order to reduce the cost of transportation of cassava and its products, Processors be encouraged to go into cooperatives in order to harness their resources and provide themselves with technology that can improve value addition to

cassava and that Gari and *fufu* which are the major income earners serve as a comparative advantage over other items from cassava as this would help the women to improve on their income and socioeconomic status.

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Table 1: Socio-economic Characteristic of the Respondents

Variable	Frequency	Percentage
Gender		
Male	28	38.89
Female	44	61.11
Total	**72**	**100.00**
Age		
20 - 29	3	4.17
30 – 39	20	27.77

40 – 49	31	43.06
50 – 59	15	20.83
60 and above	3	4.17
Total	**72**	**100.00**
Marital Status		
Married	45	62.50
Single	9	12.50
Widow	10	13.89
Widower	8	11.11
Total	**72**	**100.00**
Household size		
1 - 5	33	45.83
6 - 10	38	52.78
11 and above	1	1.39
Total	**72**	**100.00**
Educational Level		
No formal Education	11	15.28
Primary Education	18	25.00
Secondary Education	29	40.28
Tertiary Education	14	19.44
Total	**72**	**100.00**
Years of experience		
1 - 5	21	29.17

6 – 10	23	31.94
11 – 15	13	18.06
16 - 20	9	12.50
21 – 25	3	4.17
26 - 30	1	1.39
35 and above	2	2.77
Total	**72**	**100.00**

Field survey: 2017

Table 2: Categorization of Respondents according to the value chain of Cassava products produced

Value chain products	Frequency	Percentage
Garri	26	36.11
Tapioca	22	30.56
Fufu	24	33.33
Total	72	100.00

Field survey: 2017.

Table 3: Costs and Returns to Cassava Processing

Item	Garri (₦)	*Tapioca* (₦)	*Fufu* (₦)

Revenue	**12,600.00***	**14,000.00****	**16,000.00*****
Average Cost of Cassava (100kg)	7,500.00	7,500.00	7,500.00
Peeling (Average cost/100kg)	600.00	600.00	600.00
Washing (Average cost/100kg)	200.00	350.00	400.00
Grinding	600.00	0.00	0.00
Frying (Cost for 4 basins)	600.00	0.00	0.00
Cutting/slicing	0.00	600.00	0.00
Fire wood (1 bike load)	1,000.00	1,000.00	1,000.00
Kerosene	200.00	200.00	200.00
Frying/Cooking pot (Depreciation cost)	200.00	500.00	500.00
Palm oil	100.00	0.00	0.00
Total cost of inputs	**11,000.00**	**10,750.00**	**10,200.00**
Net Returns	**1, 600.00**	**3,250.00**	**5,800.00**

*4 basins @ ₦ 3,200.00; **4 basins@ ₦ 3,500.00; ***4 bags@ ₦ 4,000.00

Table 4: Constraint of Cassava conversion to other value added products

Product	1	2	3	Σ F	N	Mean	Decision
Garri							
High transportation Cost	15	13	8	55	26	2.11	Serious
High cost of fire wood	22	11	3	53	26	2.04	Serious
High cost of Kerosene	21	14	1	32	26	1.23	Not Serious
High Cost of oil	20	4	34		26	1.31	Not Serious
Tapioca							
High transportation Cost	16	5	6	59	22	2.68	Serious
High cost of fire wood	26	4	1	50	22	2.27	Serious
High cost of Kerosene	19	2	1	26	22	1.18	Not Serious
High Cost of oil	16	4	2	30	22	1.36	Not Serious
Fufu							
Bad Road leading to high transportation Cost	15	8	1	65	24	2.71	Serious

High cost of fire wood	2	6	1 6	6 2	2 4	2.58	Serious
High cost of Kerosene	2 1	2	1	2 8	2 4	1.27	Not Serious
High Cost of oil	1 8	4	2	3 2	2 4	1.33	Not Serious

1=Not Serious; 2=Serious; 3=Very Serious, ΣF=sum of frequency, N=number of respondents