

Original Research Article

VALUE CHAIN ANALYSIS OF PALM FRUIT PRODUCTION AND PROCESSING IN ABIA STATE, NIGERIA.

Abstract

This study analyzed the value chain of palm fruit production and processing in Abia state of Nigeria. The analysis was imperative because of the increased emphasis on value addition to improve the market value of agribusiness products. The objectives considered included the socio economic characteristics of the respondents, the cost and returns of the values addition stages in the value chain, the determinants of participation in the value chain and the effect of the value addition stages on the value chain. The tools used to achieve these objectives are descriptive statistics, gross margin analysis, probit regression analysis and polynomial regression analysis. Random samples of 40 palm fruit farmer were selected from the three agricultural zones of Abia state, to make up a sample size of 120 palm fruit Agribusiness operators. The analytical synthesis unveiled that most of the palm fruit Agribusiness operators were headed by females with highest education attainment as secondary education. A major constraints to the value chain includes credit as a limiting factor. The factors found to be significantly affecting the participation in the value chain were credit, farm size and education. The harvesting, cooking, digesting, clarification, extraction stages of value addition were found to be positive and significantly influencing the value chain. It is therefore recommended the education (training) and credit facilities should be made available and policies should be formulated to enhance the participation in the palm fruit value chain as it was found to be a profitable means of entrepreneurship and the proper management of the stages of value addition to enhance the palm fruit value chain.

Keywords: value, chain, analysis, palm, fruit.

I. Introduction

The value chain is a concept from business management that was first described and popularized by Michael Porter in his 1985 best-seller, *Competitive Advantage: Creating and Sustaining Superior Performance* (Porter, 1996 and 1985) [38][39]. The study of value chains comprises of two key concepts: value and chain. The term value is synonym to “value added” in the Value Chain Analysis (VCA) as it characterizes the incremental value of a resultant product produced from processing of a product. For agricultural products, value addition can also take place through differentiation of a product based on food safety and food functionality. Price of the resultant product shows its incremental value. The term chain refers to a supply chain indicating the process and the actors involved in the life cycle (from conception to disposal) of a product (Hawkes and Ruel, 2011)[30]. Kaplinsky and Morris (2001)[31] defines VCA as study of the “full range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use”. Sanogo (2010)[40] in addition to the movement of a product from one stage to another and identification of the actors, firms and their services, also adds analysis of the institutional support to production at various stages to VCA (Akanni et al, 2008)[1].

Farm products are undergoing rapid transformations and the emergence of integrated food supply chains is one of the most visible market phenomena in the world. Increasing concentration on processing, trading, marketing and retailing is being observed in all the segments of supply chains. The Traditional way of farm production is being replaced by practices more akin to manufacturing processes, with greater co-ordination across Agribusiness operators, processors, retailers and other stakeholders in the value chain (Anjani et al, 2011)[3].

Further, with increase in income, the pattern of farm production, marketing and consumption is changing. Demand for high-value farm produce like fruits, vegetables, livestock products, fisheries and edible oils is growing and

Agribusiness operators are trying to diversify their production systems accordingly. The situation in Nigeria, is a pathetic as Agribusiness operators lack storage and processing facilities to add value to their farm products, that 65 percent of the perishable unconsumed products spoil (Akanni et al, 2008).

On the other hand, consumers are becoming more demanding in terms of quality and safety of food commodities. In addition, demographic and income trends are inducing more enlightened consumers to demand convenience foods such as frozen, pre-cut, pre-cooked and ready-to-eat items, together with assurances of product quality and safety. Consequently, production, processing and distribution systems are adapting to such changes.

Organization of agriculture along the value-chain framework has been conceived as one of the strategies to bring more efficiency in the agricultural sector. The value-chain network may be defined as a range of activities that are required to bring a product from its conception, through its designing, sourcing of raw materials and intermediate inputs, marketing and distribution, to the final consumer. There has been an increasing emphasis on the development of efficient agricultural value chains and several innovative and successful value chains have emerged (Anjani, et al 2011).

These emerging trends though indicative of catering to the expanding consumer base with growing wealth, have generated concerns on the supply as well as demand side. In the case of modern integrated value chains, producers gain from increased knowledge, better quality and food safety, reduced costs and losses, higher sales and greater value-addition in production (Anjani et al, 2011).

However, there are apprehensions about the capability of smallholders to adjust to the emerging environment because of several operational constraints they face in production and marketing. Globally, one of the most controversial issues about the negative impact of the rise of modern value chains is on income equality. Globalization and expanding international markets as well as the fast-growing middle and high income classes in many developing countries offer opportunities for developing country producers to operate in emerging national and international markets. This means that producers must gain better control over production, trade and distribution in order to guarantee the quality and value added of their products and to operate in a cost-effective way. Moreover, these producers must adapt to stringent quality and safety standards and regulations in these markets (Dolan and Humphrey 2004)[17]. Several studies have suggested that the poor will suffer from this process (Elizabeth et al., 2000)[20].

Agricultural production in Nigeria is very crucial as it employs over 70 percent of the Nigerian population. This agricultural population mainly practice subsistent agriculture, as most of the foods produced are consumed by the household and any extra for sale are sold at the raw stage without any form of value addition. A number of factors such as use of traditional technologies, limited supply of inputs (feed, breeding stock, artificial insemination and water), inadequate extension service, poor marketing infrastructure, lack of marketing support services and market information, limited credit services, absence of producers' organizations, and natural resources degradation (Lowenberg-DeBoer *et al.*, 2008)[32] have contributed to un-exploitation of potential. In addition, policy decision on assurance of quality and standards, product marketing, among others is taken in the absence of vital information on how they affect the entire value chain. It is observed that income generating capacity of agricultural value chain actors through collaborative work has not been exploited. Primary reason among others seems to be poor

collaboration among and between value chain actors, inefficient and products marketing characterized by high margins and poor marketing facilities and services. The lack of market access that many Agribusiness operators face is considered to be a major constraint to combating poverty (Best *et al.*, 2005)[7]. With this operation, it is believed that modern market competition scares Agribusiness operators away from the market, public support is shrinking or inefficiently governed, economists fail to provide incentives to Agribusiness operators; consequently Agribusiness operators rediscover the importance of collectivity (Gibbon, 2008)[27]. Current knowledge on farm produce value chains, performance and prices is poor for designing policies (Ayele *et al.*, 2003)[4]. Moreover, modern retail revolution is reshaping the way food is produced, procured and retailed. These rapid changes in these markets affect the entire value chain with enormous implications for the competitiveness and future viability of Agribusiness operators. As modern markets replace traditional markets, outlets for Agribusiness operators are reduced.

The importance of facilitating market access to Agribusiness operators as well as developing chain competitiveness and efficiency are valuable preconditions to improve their livelihoods (Lundy *et al.*, 2004; Padulosi *et al.*, 2004) in BerhanuKuma (2012)[9]. Therefore, Agribusiness operators need to adjust to the rapidly changing modern markets which are characterized by quality and food safety, vertical integration, standards and product traceability, reliability of supply, there will be a risk of competitiveness and inefficiency for the entire value chain (Vermeulen *et al.*, 2008 in BerhanuKuma, 2012). Systematic identification of constraints faced by value chain is increasingly seen by agricultural research as important component of any strategy for reaching the millennium goals (Giuliani and Padulosi, 2005 in BerhanuKuma, 2012). Given the zonal potential for production, processing, marketing and consumption, there is scanty information about value chain. Investigating value chain for products and availing pertinent information is believed to help policy makers, development practitioners and researchers use the information generated for intervention purpose or make informed decisions (Akanni et al, 2008). It is therefore imperative to analyze the value chain of palm fruit in Abia state, Nigeria. The overall objective of the study is to analyze value chain of palm fruit in Abia state.

The specific objectives include to examine the socio economic characteristics of the Agribusiness operators, analyze the farm produce value chain stages and the cost and returns, identify and prioritize constraints faced in the value chain, identify determinants of participation decision and level of participation in-farm level produce value addition and examine the effect of the value addition stages on the value chain of palm fruit.

II. Methodology

2.1 The study area

The research was carried out in Abia State of Nigeria. The climate of the state is tropical and with a relative humidity all the year round. It has an annual rainfall averaging between 2000mm up to 2500 mm. Abia State is bounded by Akwa Ibom and Cross River States in East, River State in the South, Imo State in the north and Enugu and Ebonyi States in the west.

The state has mineral deposits such as petroleum, salt, limestone etc. The state shares population density with other states in the region of 173 persons per square kilometer.

The inhabitants engage in various trades and occupation, like arable and tree crop production, sheep and oil palm rearing. Other trades and occupation include food processing, namely restaurant operations, cassava and palm oil processing, bakery, fast food enterprises etc. the agricultural zones of Umuahia, Bende and Aba was chosen for the high presence of agribusiness operators in the study area.

2.2 Population of the study

From the data gotten from a visit to the ministry of agriculture and cooperatives, it is estimated that Abia state have over 1000 small and medium mechanized palm agribusiness operators. These agribusiness operators are individual and cooperative agribusiness operators in form or nature.

2.3 Sampling procedure

The sampling procedure used was a multistage random sampling method leading to the selection of 120 Agribusiness operators involved in farming and processing of palm fruit from the three agricultural zones of Abia state. Forty palm fruit Agribusiness operators from each of the three agricultural zones. The choice of the agricultural zones is because of the high presence of agricultural activities in these zones.

2.4 Data collection procedure

Data for the study was obtained from primary sources only. This involved administering a well-structured questionnaire to the respondents.

2.5 Methods of Data Analysis

The tools employed in analysis include, descriptive statistical tools, such as means, average, percentages, and frequency distribution tables. Other tools are Gross-margin, polynomial lag model, probit regression analysis and descriptive statistics involving tables, frequencies and percentages.

Objective (1) which is ascertaining the socio economic characteristics of the agribusiness operators was analyzed through descriptive statistical tools. Objectives (2) which are to analyze the farm produce value chain stages and the cost and return, this will be achieved using descriptive statistics and gross margin. Objective (3) which involves identifying and prioritizing constraints faced in the value chain, this will be analyzed using tables, frequencies and percentage. Objective (4) which involves the level of participation in farm level produce value addition and the determinants of participation decision which will be achieved using tables, frequencies and percentages as well as probit regression analysis and objective (5) identify determinants of value addition by the Agribusiness operators will be achieved using polynomial regression model.

2.6 Model specification

Polynomial regression model was used in the analysis of data. Obtained data were analyzed by regressing the value added on the raw palm for each stage against the value of investment in the value chain.

The model used for the analysis is written explicitly, is as stated below:

$$Y_i = b_0 + b_1x_i^1 + b_2x_i^2 + b_3x_i^3 + \dots + b_kx_i^k + e_i$$

Where,

Y_i = value added on the palm

154 X_i = value of investment in stage ($t = 1, 2, \dots, k$ stage i.e investment/cost of the stages of value addition).

155 b_0 = Constant term

156 b_i = Investment coefficients

157 e = Error term.

158
159 Generally, the objective of using a polynomial model is, to construct composite variables, which are linear
160 combination of exogenous variables to capture the effect of each stage of the value chain on the value been added
161 (McDowel, 2004; Akanni et al, 2008; Oludimu et al, 2004)[34][1][36]. This model is regarded as a fairly
162 sophisticated model, which has been widely used in the estimation of polynomial relationships.

163 In order to estimate the determinants of participation in the value chain following probit regression

164 The model is implicitly stated as

$$165 Y^*_i = (x_1, x_2, x_3, x_4, x_5) + e_i$$

$$166 Y^*_i = \begin{cases} 1 & \text{if } y^*_i > 0, \\ 0 & \text{if } Y^*_i \leq 0 \end{cases}$$

167 The explicit form of the model is stated as

$$168 Y^*_i = b_0 + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + e_i$$

169 Where

170 Y^*_i = probability to participate (participating=1, non participating=0)

171 X_1 = level of education of the Agribusiness operators measured in years

172 X_2 = experience of the farmer measured in years

173 X_3 = farm size

174 X_4 = size of the farm labor force

175 X_5 = credit

176 X_6 = savings

177 B_i is the parameter

178 E_i is the error term

179 III. Data presentation and analysis

180 3.1 Socio economic characteristics of the respondents

181 This section considers the socio economic characteristics of the respondents, their age of experience, level
182 of education, income, marital status, household size etc.

183 3.1.1 Years of experience

184 The experience of the oil palm Agribusiness operators is based on the number of years the farmer has been
185 in the business.

186 **Table 1** Distribution of the respondents based on the years of experience

Age range (years)	Frequency	Percentage (%)
0-5	45	37.50
6-15	33	27.50
11-15	29	24.17
16-20	13	10.83
Total	120	100

Source: field survey, 2013

The result from data computation indicate that agribusiness operators which has their years of experience ranging from 0-5 years are 45 in number representing 37.50 % of the agribusiness operators studied. The result also show that agribusiness operators that have been in the business within 6-15 years have the frequency of 33 and a percentage of 24.15, while 13 agribusiness operators representing 10.80 % were established for over 16 year ago. This Study reveals that the palm oil value addition business does not require much experience since most of the agribusiness operators have experience ranging within 0-5 years.

3.1.2 Labor size of the Agribusiness operators

Table 2 Distribution according to number of workers

No of employee	Frequency	Percentage (%)
1-2	102	85.00
3-4	16	13.33
5 and above	2	1.67
Total	120	100

Source: field survey, 2013

The agribusiness operators in the study area are noted to engage the services of less than two workers. This is illustrated in the table above as 85 percent of the respondents had a labor size of 1-2 workers that assist that owner of the business in the preparation of the palm fruit at each stage of the value chain. 13.33 percent of the respondents had a labour size of 3-4 workers.

3.1.3 Level of education of the respondents in the study area

Table 3 presents the distribution of the agribusiness operators according to their level of education.

Table 3: level of education

Level of education	Frequency	Percentage
Non formal	69	57.50
Primary	41	34.17
Secondary	10	8.33
Tertiary	0	0
Post graduate	0	0
Total	120	100

Source: field survey, 2013

Table 3 above illustrates the distribution of the respondents according to the level of education of the respondents. Most of the agribusiness operators had non formal education representing 57.00 percent of the responses, 34.17 percent of the responses had primary education and 8.33 percent of the agribusiness operators had junior secondary education. This indicates that farming business is a business that does not much skill and training and is a viable business to be embarked upon either on part time or full time as education is no barrier to the business.

212 3.1.4 Source of capital for the value chain business

213 Table 4 gives a breakdown of how the agribusiness operators raise capital to fund their business.

214 **Table 4 distribution according to the sources of capital**

Source of capital	Frequency	Percentage (%)
Equity/owners capital	200	48.154093
Thrift/cooperative society	100	16.051364
Loan: Bank	189	30.337079
Other informal sources	34	5.4574639

215 Source: field survey, 2013

216 *multiple response

217 The composition of the source of the agribusiness operators capital comprise of equity, grants and loans.

218 All the agribusiness operators had part of their capital composed of equity, 189 Agribusiness operators obtained
219 their loans from bank, while 34 used other sources such as grants from relatives. 100 agribusiness operators are
220 funded with money from thrift and cooperative societies. This indicates that to start the oil palm business capital can
221 be raised from both informal and formal source, since the capital requirement is not huge.

222 3.1.5 Distribution of the Agribusiness operators According to Income Generation per month

223 The table 5 presents the distribution of the respondents according to the amount of money generated per
224 month.

225 **Table 5 Distribution of Agribusiness operators According to Income Generation per month**

Income range (N) 000	Frequency	Percentage (%)
Less than 50,000	78	65.00
51,000-100,000	32	26.67
101,000 and above	10	8.33
Total	120	100

226 Source: field survey, 2013

227 The table above shows the distribution of the respondents according to the amount of income generated by
228 the Agribusiness operators per month. 65.00 percent of the agribusiness operators earn less than 50,000 per month,
229 26.67 percent of the respondents earn an income that falls within the range of 51,000 -100,000 per month and 8.33
230 percent of the agribusiness operators earn an income more than 101,000 naira per month this result indicates that oil
231 palm processing and retail business is a viable income generating venture capable of alleviating poverty and
232 empowering especially the women.

233 3.1.6 Distribution of the Agribusiness operators' according to gender

234 Table six illustrates the distribution of the respondents according to the sex of the Agribusiness operators in
235 the selected study areas.

236 **Table 6 Distribution of the respondents according to gender**

Location		
Rural	Suburb	Total

	Frequency	Percentage	frequency	percentage	frequency	Percentage
Male	8	6.67	18	15.00	26	21.67
Female	52	43.33	42	35.00	94	78.33
Total	60	50.00	60	50.00	120	100

Source: survey data, 2013

Table 6 presents the distribution of the respondents according to the gender of the Agribusiness operators sampled in the study area. Majority of the respondents are female representing 78.33 percent of the entire sample size. 21. 67 percent of the sample size was males. The oil palm processing business as indicated in the table is mainly dominated by the females. This may be as a result of the fact that the oil palm business is mainly embarked upon by the women.

3.2 Analysis of the cost and return of the stages of palm value chain

The table 7 presents the cost and return analysis of the value chain considering the different stages of value addition in the palm fruit. The total revenue stood at N25909800, 000 and considering the expenditure in the harvesting stage threshing stage, cooling stage, digestion stage, and oil extraction stage, drying stage, storage/packing stage, kernel and kernel oil processing stage. The analysis considered the cost items in each of the value chain stage.

Table 7 analysis of the cost and return of the stages of the value chain

Item	amount(N)000	cost as a ratio of total cost
total revenue	25909800	
Expenditure		
HARVESTING STAGE		
Labour	400000	3.176
loading cost	100000	0.794
offloading cost	60000	0.476
fuel	100000	0.794
Transportation	589000	4.676
other input costs	300000	2.381
total revenue	1543000	
THRESHING STAGE		
Labour	40000	0.317
threshing equipments	1200000	9.528
fuel/fuel wood	45000	0.318
other input costs	234000	1.823
total	1519000	
COOKING/STERILIZATION STAGE		
Labour	45000	3.572
Water	23000	1.826
fuel/fuel wood	345000	2.739
other input costs	130000	1.03
Total	750000	
DIGESTION STAGE		

Labour	300000	2.381
fuel/fuel wood	123000	0.9766
Total	463000	
PRESSING/EXTACTION OIL STAGE	450000	3.572
Labour	300000	2.381
extraction equipments	3400000	2.69
fuel/fuel wood	250000	1.984
other input costs	1340000	
Total		
CLARIFICATION AND DRYING STAGE		
Labour	450000	37.29
Water	200000	1.59
fuel/fuel wood	450000	35.73
Total	3887000	
STORAGE/PACKAGING		
labour equipment	320000	2.54
Containers	50000	0.396
fuel/fuel wood	30000	0.24
other input costs	245000	1.95
Total	663500	
KERNAL RECOVERY STAGE		
Labour	40000	0.32
Water	200000	1.59
other input costs	180000	1.43
Total		
KERNAL OIL PROCESSING STAGE		
Labur	120000	0.95
Fuelwood	140000	1.11
other input costs	130000	1.03
Total	390000	
total variable cost	8194500	65.064
Fixed		
Rent	1000000	7.93
Levies	100000	0.79
delivery van	2800000	22.23
Equipment	500000	3.69
total fixed cost	4400000	34.93
total cost of production	12594500	
profitability indictors		
profit	13315300	
gross margin	17715300	
net earning	13315300	
gross return/naira invested	1.40659	

Source: survey data, 2013.

In the harvesting stage of the value chain analysis, labour accounted for 3.2 percent of the total cost, loading cost accounted for 0.794 percent of the total cost of the value chain, offloading costing was 0.476 percent to the total cost of value addition. Transportation accounted for 4.677 percent of the total cost of value at this stage of value addition while another inputs accounted for 2.382 percent of value chain analysis cost In the threshing stage of the value chain, the cost items are considered as a percentage of total cost of value chain. Labour and fuel wood contributed 0.318 percent, threshing equipment contributed to 9.528 percent of the total cost of the value chain while other inputs cost contributed to 1.823 percent. In the cooking/sterilization stage, labor contributed to 3.573 percent to total cost of the value chain, water contributed 1.826 percent, and fuel wood contributed 2.739 percent and other inputs cost contributed to 1.032 percent of the total cost of the value chain.

In the digestion stage labour contributed to 2.382 percent of the total cost of the palm fruit value chain analysis while fuel wood contributed to 0.997 percent of the total cost of the value chain. In the oil extraction value addition stage labour accounted for 5.5724 percent of the total cost of the value chain, extraction equipments contributed 2.382 percent, fuel wood contributed 2.699 and other inputs contributed 1.99 percent of the total value chain. The drying stage, labour contributed to 3.729, water contributed to 1.58 percent while fuel wood contributed 3.572 percent to the total cost of value addition in the palm fruit value chain. In the storage and packing value addition stage, labour contributes to 2.541 percent; containers contributed 0.397 percent, fuel wood/fuel contributed to 0.238 percent, while other inputs contributed to 1.945 percent to the total cost of the value chain.

The total variable cost in the palm fruit value chain accounted for 65.1 percent of the total cost of the value chain, and fixed cost contributed to 34936 percent to the total cost of value addition in the value chain the total cost of value addition stood at N12594500,0000. The gross per naira invested stood at N1.4 indicating that each naira invested, N1.4 is been recouped with a profit of N13315200.000.

3.3 The Constraints facing the palm fruit value chain.

Table 8 represents the response of the agribusiness operators to the constraints identified by the agribusiness operators in the palm fruit value chain the study area.

Table 8 the constraints faced by the respondents

Constraints	Rating					
	High		Average		Low	
	frequency	Percentage	Frequency	Percentage	Frequency	Percentage
access to capital	35	58.33	16	26.67	14	23.33
marital obligation	40	66.67	8	13.33	12	20
lack of adequate labor	8	13.33	12	20	40	66.67
high cost of input	28	46.67	12	20	20	33.33
lack of experience	34	56.67	16	26.67	10	16.67

taxes and levies 25 41.67 15 25 20 33.33

Source: survey data, 2013

Table 8 presents the responses of the agribusiness operators to the constraints experience by them. Access to capital was highly rated by 58% of the respondents. Marital obligations was highly rated by 66.67% of the respondents, lack of adequate labour was lowly rated by 66.67% of the respondents while high cost of inputs was highly rated by 46.67% of the respondents.

3.4 Analysis of the factor inflecting the participation in the palm fruit value chain

From table 9 which present the regression result of the factors influencing the probability to participate in the value chain of palm fruit.

Table 9 factors affecting the participation in the value chain

	B	S.E.	Wald	Sig.
Edu	-0.594	0.317	3.512	*
Exp	-0.096	0.147	0.428	
Credit	0.002	0.001	3.597	*
Savings	0.980	1.208	0.811	
Farmsize	2.746	1.469	3.497	*
Constant	2.475	1.018	5.912	*
Wald	44.636*			

Source: survey data, 2013.

The probit regression model was found to be statistically significant at 1 percent based on the wald value which was 44.638. Education was found to be statistically significant at 10 percent and positively related to the probability to participate in the palm fruit vale chain. This indicates that as the agribusiness operators acquire more education in the firm of training and skill acquisition, he intends to participate in the value chain.

Credit was statistically significant at 10 percent and positively affecting the probability of participating in the palm fruit value chain. This indicates that as the farmer accesses more credit he will participate in the palm fruit value chain as these will increase his income. Farm size was significant at 10 percent and positively related to the probability to participate in the value chain this indicates that as the farmer's farm sizes increases, the probability to participate in the palm fruit value chain

3.5 Analysis of the effect of the value addition stages on the value chain of the palm fruit

From table 10 which presents the result of the polynomial regression analysis considering the effect of the value of addition states of the palm fruit value chain on the value of the product.

Table 10 Analysis of the effect of the value addition states on the value chain of the palm fruit

	B	STD.ERROR	T	Sig.
(Constant)	-66864	45530.87	-1.46854101	

Harvesting	5.482	1.137	4.821459982	***
Threshing	-1.78E-05	9.01E-06	-1.97558269	*
Cooking	2.03E-11	0.056	3.625E-10	
Digestion	23.433	11.504	2.036943672	*
Extraction	14.54	7.4297	1.957010377	*
Clarification	18.23	9.8011	1.859995307	*
Packaging	-9.75E-39	0.912	-1.0691E-38	
R	R Square	Adjusted R Square	F	
.859 ^a	0.737	0.728		80.617

Source: survey data, 2013.

The model was found to be statically significant at 1 percent based on the value of the f- statistics which was 80.617. The value of the R^2 was 0.732 indicating that 73.7 percent of the total variation in the dependent variable was accounted for by the independent variable including in model.

The harvesting stage was found to be significant at 1 percent and positively affecting the value chain. This implies that as more resource are been channeled in the harvesting of the more palm fruits the more value is added to the value chain this impels that there should be more investment in t he harvesting of the palm fruits. The excess harvested palm fruit can be stored temporarily to keep the value chain going.

The threshing stage was found to be significant at 10 percent and negatively influencing the value chain. This implies that as more is even invested in the threshing stage, the value chain is been affected negatively. The implication f this is that the threshing stage is delicate and if not properly handled and managed any excessive threshold palm fruit will spoil there by having a negative effect on the value of chain of the products. Less should be invested in the threshing stage as it determines other stages in the chain to avoid spoilage and loss in the palm fruit value chain.

The digestion stage was significant at 10 percent and positively influencing the value chain. This implies that as more money is invested in the digestion stage the more value is been added to the value chain. The investment in the extracting stage was statistically significant at 10 percent and positively relate to value addition in the value chain. This implies that as more oil is being extracted the more the value in the value chain increase.

Clarification/drying stage, this investment at this stage was found to be significant at 10 percent and positively related to the value addition in the value chain. This therefore implies that as more investment is been made at his stage the more good palm oil is been made and ore value added to the value chain.

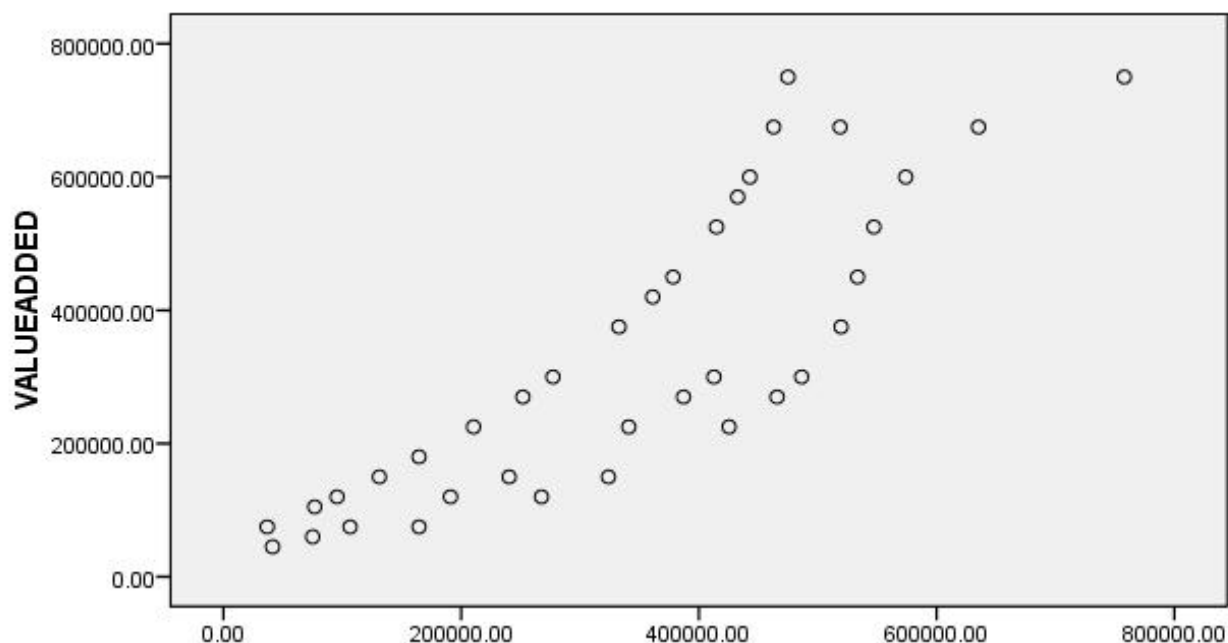


Figure 1 scatter plots of the effect of the stages of value addition

The effect of these stages of value addition of the value added in the palm fruit value chain is further buttressed by the scatter plot of figure 1. This shows that at this initial stage of the value chain which is the harvesting stage the value added is minimal at 0.00 – 200000, but as the stages of the value chain progressed the value add increases to its peak. The scatter plot assumes a curve at the point fall around a curve indicating that there are fluctuations in the effect of the value chain stages on the value added.

IV. Conclusion

This study analyzed the value of palm fruit in Abia state. The value chain analysis is very crucial issue facing the agribusiness sector of the Nigerian economy, as the Nigeria agribusiness is been noted for the sale of raw agricultural products palm fruit is one of the major cash crops in Nigeria. And have been noted to be under performing due to the challenges of value addition, it became imperative to analyze the value chain of palm fruit in Abia state. The specific objectives of the study include determining the socio economic characteristics of the famers analyze the cost and returns of the value chain, analyze the constraints facing the value chain, and analyze the factors influencing the participation in the value chain and an analysis of the factors influencing the value addition stages on the value chain. The tool employed in the study includes descriptive statistics, probit regression analysis and polynomial regression analysis. The study found that most of the respondents have been in the palm fruit value

chain for a time period of above 6 years, none of the respondents had education above the secondary level as most of the respondent got their credit for the value chain business through equity source as most of the participants in the value chain are females. The palm fruit value chain was found to be profit able with N1.4 return per naira invested. The harvesting stage, cooking stage, digestion stage, drying stages, and packing stage was found to be positively affecting the value chain while an increase in the investment in the threshing stage negatively affects the value chain. The polynomial regression was used considered that the investment in each stage of the value chain was continuous and assumes a curve fit. The factor found to be significantly affecting the Agribusiness operators participate in the value chain include education, credit and farm size was the factors influencing participation in the value chain. Access to credit facilities was one of the major constraints facing value chain. Based on the finding of this study the following recommendations are proffered.

1. Proper education of the Agribusiness operators as education through training is significant factors influencing participation in the value chain.
2. Adopting and formulating a good land tenure policy that enhances the availability of farm land for farming since it is a factor influencing the participation in the palm fruit value chain.
3. Affordable credit facilities should be made available to the Agribusiness operators as this was found available to the Agribusiness operators as this was found as a significant factor influencing the participation in the value chain and it is also a constraint.
4. Policies should be formulated to enhance the palm fruit value chain, since it is found to be profitable.
5. Proper management of the stages in the palm fruit value chain should be encouraged as these valued stages have effect on the value chain.

Bibliography

- [1] Akanni K. A. and H. A. Ibraheem (2012). Assessment of the Determinants of Value Addition in the Nigerian Leather Industry. *J. Soc. Sci.*, 16(1): 63-67 (2008).
- [2] Almazan, C., J. Trienekens, and J. Bijman 2011. Value Adding and Sustainable Contracts in the Bottled Tawilis Supply Chain of Lake Taal, Philippines. Forthcoming paper to be presented at IFAMA Symposium, Frankfurt, June 2011.
- [3] Anjani Kumar*, Harbir Singha, Sant Kumara and Surabhi Mittal (2011) Value Chains of Agricultural Commodities and their Role in Food Security and Poverty Alleviation – A Synthesis. *Agricultural Economics Research Review* Vol. 24 January-June 2011 pp 169-181
- [4] Ayele Solomon, Assegid Workalemahu, M. Jabbar, M. Ahmed and Belachew Hurissa, 2003. Livestock marketing in Ethiopia: A review of structure, performance and development initiatives. Socio-economics and policy research working Paper 52. ILRI, Nairobi, Kenya. 35 pp.
- [5] Bacon, C. 2005. Confronting the Coffee Crisis: Can Fair Trade, Organic, and Specialty Coffees Reduce Small-Scale Farmer Vulnerability in Northern Nicaragua? *World Development* 33(3): 497-511.
- [6] Baldwin, Carliss Y., and Kim B. Clark. 2000. *Design Rules, Volume 1, The Power of Modularity*. MIT Press, Cambridge MA.
- [7] Best, R., S. Ferris and A. Schiavine, 2005. Building linkages and enhancing trust between small-scale rural producers, buyers in growing markets and suppliers of critical inputs. In: F.R. Almond and S.D. Hainsworth (eds.). *Beyond Agriculture-making markets work for the poor: Proceedings of an international seminar, 28 February-1 March 2005*. Westminster, London, UK. Crop Post Harvest Program (COHP), Natural Resources International Limited, Aylesford, Kent and Practical Action, Bourton on Dunsmore, Warwickshire, UK. 176pp.
- [8] Berhanu Gebremedhin, Hoekstra D. and Samson Jemaneh, 2007. Heading towards commercialization? The case of live animal marketing in Ethiopia. Improving Productivity and Market Success (IPMS) of Ethiopian Farmers Project. Working Paper 5. ILRI (International Livestock Research Institute), Nairobi, Kenya. 73 pp.
- [9] Berhanu Kuma (2012) Market Access and Value Chain Analysis of Dairy Industry in Ethiopia: The Case of Wolaita Zone. A Dissertation Submitted to the School of Agricultural Economics and Agribusiness, School of Graduate Studies, HARAMAYA UNIVERSITY.

- [10] Bijman, J. 2007. The role of producer organisations in quality-oriented agro-food chains; an economic organisation perspective. In: *Governance for Quality in Tropical Food Chains*, edited by Ruben R., M. van Boekel, A. van Tilburg, and J. Trienekens, 257-278. Wageningen: Wageningen Academic Publishers.
- [11] Birthal, Pratap S., Joshi, P.K. and Gulati, Ashok (2007) Vertical coordination in high-value food commodities Implications for smallholders. In : *Agricultural Diversification and Smallholders in South Asia*, Eds : P.K. Joshi, Ashok Gulati and Ralph Cummings (Jr). Academic Foundation, New Delhi.
- [12] Bowersox, D.J., and D. J. Closs. 1996. *Logistical Management: The Integrated Supply Chain Process*, New York: Macmillan. Burt, R. S. 1997. The Contingent Value of Social Capital, *Administrative Science Quarterly*, 42: 339 – 365.
- [13] Coleman J.S. 1990. *Foundations of Social Theory*, Cambridge, MA: Harvard University Press. Cooper, M.C., D.M. Lambert and J.D. Pagh. 1997. Supply Chain Management: More Than a New Name for Logistics. *International Journal of Logistics Management*, 8(1):1-14.
- [14] David, R.J., and S. H. Han. 2004. A Systematic Assessment of the Empirical Support for Transaction Cost Economics. *Strategic Management Journal* 25(1), 39-58.
- [15] Daviron, B., and P. Gibbon. 2002. Global Commodity Chains and the African Export Agriculture. *Journal of Agrarian Change* 2:137-161
- [16] De Janvry, A., and E. Sadoulet. 2005. Achieving Success in Rural Development: Toward Implementation of an Integral Approach. *Agricultural Economics* 32 (1): 75-89.
- [17] Dolan, C., and J. Humphrey. 2000. Governance and Trade in Fresh Vegetables: The Impact of UK Supermarkets on the African Horticulture Industry. *Journal of Development Studies* 37(2): 147-176.
- [18] Dries, L., Reardon, T. and Swinnen, J. (2004) The rapid rise of supermarkets in central and eastern Europe : Implications for the agrifood sector and rural development. *Development Policy Review*, 22 (5) : 525-556.
- [19] Eisenhardt, K. M. 1989. Agency Theory: An Assessment and Review. *Academy of Management Review* 14 (1): 57-74.
- [20] Elizabeth, M., Farina, M. and Reardon, T. (2000) Agrifood grades and standards in the extended mercosur : Their role in the changing agrifood system. *American Journal of Agricultural Economics*, 82 (5) : 1170-1176.
- [21] Fitter, R., and R. Kaplinsky. 2001. Who Gains from Product Rents as the Coffee Market Becomes More Differentiated?: A Value Chain Analysis. *IDS Bulletin* 32(3): 69-82.
- [22] Fleury, A., and M. T. Fleury. 2001. Alternatives for industrial upgrading in global value chains: The case of the plastics industry in Brazil. *IDS Bulletin-Institute of Development Studies* 32(3): 116-126.
- [23] Francis, M., D Simmons, and M. Bourlakis. 2008. Value Chain Analysis in the UK Beef Foodservice Sector. *Supply Chain Management-an International Journal* 13(1): 83-91.
- [24] Gereffi, G., 1999. International Trade and Industrial Upgrading in the Apparel Commodity Chain. *Journal of International Economics* 48: 37-70.
- [25] Gereffi, G., J. Humphrey, and T. Sturgeon. 2005. The Governance of Global Value Chains. *Review of International Political Economy*, 12(1): 78-104.
- [26] Gibbon P. 2001. Upgrading Primary Production: A Global Commodity Chain Approach. *World Development* 29(2): 345-363.
- [27] Gibbon, P., J. Bair, and S. Ponte. 2008. Governing Global Value Chains: An Introduction. *Economy and Society* 37(3): 315-338.
- [28] Giuliani, E., C. Pietrobelli, and R. Rabellotti. 2005. Upgrading in global value chains: lessons from Latin American Clusters. *World Development* 33(4): 549-574.
- [29] Hartwich F; Kormawa P; Odufote B; Polycarp M; Devlin J; Godwin A and Tezera D (2010) Unleashing agricultural development in Nigeria through value chain financing. Draft Report UNIDO
- [30] Hawkes, C. and Ruel, M. (2011) value chains for Nutrition. Prepared for the IFPRI 2020 international conference “leveraging Agriculture for improving Nutrition and Health, “February 10-12, New Delhi, India.
- [31] Kaplinsky, R. and Mauris, M. (2001). A handbook for value chain research. Prepared for the IDRC. <http://www.acdivoca.org/>.
- [32] Lowenberg-DeBoer J and Germaine I (2008). A study of the cowpea value chain in Kano state, state, Nigeria, from a pro poor and gender perspective. A paper commissioned by the GATE project.
- [33] Maertens, M. and Swinnen, J. (2006) Trade, standards and poverty : Evidence from Senegal, *LICOS Discussion Paper No. 177*, LICOS, Leuven.
- [34] McDowell, A. 2004. Polynomial distributed lag models. *The Stata Journal*, 4(2): 180-189.
- [35] Minten, B., Randrianarison, L. and Swinnen, J. (2007) Global retail chains and poor Agribusiness operators : Evidence form Madagascar. *LICOS Discussion Paper No. 164*, LICOS, Leuven.
- [36] Oludimu ,O.L. and K. A. Akanni. 2004. “A polynomial lag formulation of price response in Nigerian foodcrop production.” *Journal of Agricultural Management and Rural Development (JAMRD)*, 1: 193-200.
- [37] Olukosi, J.O. and S.U. Isitior. 1990. *Introduction to Agricultural Marketing and Prices; Principles and Applications*. Abuja: Living Books Services, GU Publications, FCT Pp.105-112.
- [38] Porter, M.E. (1996) "What is Strategy", *Harvard Business Review*, Nov/Dec 1996.
- [39] Porter, M.E. (1985) *Competitive Advantage*, Free Press, New York, 1985.
- [40] Sanogo, I (2010). Market analysis tool-how to conduct a food commodity value chain analysis? World food program and VAM food security analysis.
- [41] Shehu, B. 1980. *Proceedings of the National Seminar on the current problems facing the leather industry in Nigeria*. Zaria: Leather Research Institute, Pp.24-29.
- [42] Trienekens Jacques H (2011). **Agricultural Value Chains in Developing Countries.A Framework for Analysis**. *International Food and Agribusiness Management Review Volume 14, Issue 2, 2011*.