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Comparative Financial Analysis among Two Actors of Cassava Value Chain in Oyo State.

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ABSTRACT

Value chain has been perceived as an efficient strategy and magic formula for development of sustainable agriculture in Nigeria. Unfortunately, the issue of finance specificity which is a paramount element in value chain development is left out in many studies on cassava value chain. This study thus comparatively investigated finance analysis among two actors of cassava value chain in Oyo State, Southwestern, Nigeria. Data were collected using structured questionnaire administered to respondents (150 farmers and 150 processors) selected by multistage sampling techniques across Agricultural Development Program (ADP) Administrative Regions in the state while analytical tools used were descriptive and Tobit regression. The result reveals that 79.3% of farmers in cassava value chain were male, mostly youth with average age of 35 years and secondary education while all the processors were female, middle aged with average age of 45 years and most having primary education. Also, variety in demand for financial needs exist among the actors as majority of farmers needed more than N200,000 while processors needed N50,000 or less. Experience as a cassava farmer (prob < 0.10), farm size (prob < 0.05), secondary occupation (prob < 0.01), monthly income (prob < 0.01) and disbursement lag (prob < 0.01) were found to have significant positive impact on the extent of finance accessibility by farmers while business size (Prob <0.01) and finance ration (Prob <0.10) were found to have significant positive impact on the extent of finance accessibility by processors. Thus, the study recommended that Finance should be made available at the right time preferably rainy season for the actors in all the stages of cassava value chain for more produce and Nigerian Agricultural Co-operative Bank, Commercial Banks and various Community Bank, etc. have a great role to play in this regard.

INTRODUCTION

Value chain framework has been perceived as an efficient strategy and magic formula for development of sustainable agriculture in Nigeria. It is defined as a chain of activities required to bring a product from production through delivery to final consumer and final disposal after use (Kaplinsky and Moris, 2001; Kumar *et. al*. 2011). These activities are interwoven as well as interdependent and aside from improving farmers' incomes, are best ways to address unemployment, poverty and food security issues in the country. Cassava being one of the major tuber crops grown for consumption in West Africa provides food to over 550 million people in most of tropical Africa where it contributes about 40 percent of food calorie intake and plays an important role in rural livelihoods (Aerni, 2006; Sanni *et. al.* 2009; Adenle et al, 2012; Kleih et al, 2012; Manyong and Ayedun, 2014; Odongo and Etany, 2018). It is the most cultivated root plant with double advantage of being both a food and cash crop. It supports limited soil fertility and has the potential to produce high yields under poor conditions (Nweke, 2003). Its drought-tolerance, resilience on marginal agricultural land, and ability to be stored in the ground up to three years make it an important food security crop for smallholder farmers (FAO, 2000; Sayre, 2011). Its importance in terms of food security, food nutrition, improving yield and soil fertility has resulted in the establishment of a number of projects and programs for the promotion of root and tuber crops in the country. However, it has to cope with financial problems which hinder its overall value chain development process in the country adjudged to be world leader in production but not an active participant in cassava international market due to weak segments in value chain (Henri-Ukoha *et. al*, 2015; Adewole and Omeye, 2018).

Poor financing of cassava value chain is one of the main challenges limiting actors from taking full advantage of their activities in the value chain. This is in part resulting from lack or little confidence of commercial banks and other financial institutions in providing loans, lack of update record on assets that are hard to use as collateral for seeking loans and policy-induced distortions in the rural financial markets (Miller and Jones, 2010; Shwedel, 2010; IFC, 2012;). Financial institutions often confront problems of information asymmetry leading to adverse selection, higher transaction costs and lending risks. Nevertheless, it is believed that some of these challenges can be ameliorated by developing holistic value chains approach that emphasizes on competitiveness and risk management of the entire chain. The chain-based financing or value chain financing is thus, considered an effective means for financial institutions to improve their business prospects in agriculture. The product market orientation of the value chain can be assumed as a substitute for physical collateral and also a means to overcome lending risks (Meyer, 2007; Casuga et al., 2008; Shwedel, 2010; Miller and Jones, 2010; IFC, 2012; Narayanan, 2012). The value chain actors, on the other hand, are better-informed about the businesses and relationships of one another, and the financial institutions can utilize this network to overcome the problem of asymmetric information, and also to design financial products and/or service for different chain actors (Miller, 2012).

Value chain finance as a concept refers to financial products and services that flow to or through any point in a value chain in order to increase returns on investment, growth and competitiveness of that chain (UNIDO et al., 2010). A thorough analysis of value chain finance is important to address the constraints that limit productivity and development of value chains if Nigeria's agricultural sector is to evolve. Despite many development programs that support value chain development and in parts, deal with the issue of finance, the type of finance they provide is not sufficient to cover needs of the entire value chain. Concerning cassava products, their supply chain tends to begin with small-scale production units, followed by small-scale processing units for the drying and/or milling of cassava (ARC 2013). Thus, financial needs are particularly acute for farmers, who can rarely access sufficient amount of finance to operate their businesses profitably and there are many small agribusinesses in primary processing which can increase profitability through technological upgrading and organization, but also find it difficult to access finance for this. Moreover, quite a number of researches have been done on cassava value chain without regards to the issue of finance which is a paramount element in value chain development. Based on these facts, this study attempt to describe socioeconomic characteristics of selected actors in cassava value chain, profile their financial needs as well as determine factors for finance accessibility and extent of each actor.

METHODOLOGY

The study was carried out in Oyo State and the actors targeted were cassava farmers and processors selected through multistage sampling technique across ADP Administrative Regions in the state. Data collected using structured questionnaire from 150 farmers and 150 processors were subjected to descriptive and tobit regression. Tobit regression model which was originally developed by Tobin (1958) and used by many researchers such as Adejobi (2004), Austin and Edward (2003), Omonona (2000) and Rahji (1999) has been described as an extension of Probit model (Gujarati, 2004). The model was used to evaluate the extent of finance accessibility of selected actors in the cassava value chain. The stochastic model underlying Tobit may be expressed by the following relationship;

$Y_t = X_t\beta + \mu_t$ if $X_t\beta + \mu_t \geq 0$ and
$Y_t = 0$ if $X_t\beta + \mu_t \leq 0$

where Y_t is the dependent variable, X_t is the vector of independent variable, β is the vector of unknown coefficient, μ_t is the independently distributed error term assured to be normal with zero mean and constant variance σ^2 and t = 1,2,…….N. Thus, the model assumes that there is an underlying stochastic index equal to $X_t\beta + \mu_t$ which is observed only when it is positive and hence qualifies as an unobserved latent variable. The expected value of Y in the model as shown by Tobit is:

$E_Y = X\beta F(z) + \sigma f(z)$;

where $Z = X\beta/\sigma$, f(z) is the unit normal density and F(z) is the cumulative normal distribution function. Furthermore, the expected value of Y for the observations above the limit, here called Y* is simply Xβ plus expected value of truncated normal error term;

$$Y^* = E(y/y>0) = E(y/\mu > -X\beta) = X\beta + \sigma F(z)/f(z)$$

Consequently, the basic relationship between the expected value of all observations Ey, the expected value conditional upon being above the limit Ey* and probability of being above the limit f(z) is Ey = F(x)Ey*. The composition that we have found useful is obtained by considering the effect of a change in the ith variable of X on Y;

$$\partial Ey/\partial X_t = F(z)(\partial Ey^*/\partial X_t) + Ey^*(\partial F(z)/\partial X_t)$$

It is explicitly expressed as follow:

$$Yi = \alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \beta_7 x_7 + \ldots + \beta_{17} x_{17} + \mu$$

Where; Y = Farmers' extent of finance accessibility (value of finance received divided by value of finance needed) ; β_0 is the intercept and $\beta_1 - \beta_8$ are the regression coefficients; μ is the error term while $X_1 - X_8$ are the independent variables specified and defined below: X_1 = sex (male = 1, female = 0); X_2 = age in years; X_3 = education in years; X_4 = number of dependent;X_5 = experience in years; X_6 = enterprise size (dummy if small scale = 1, otherwise=0); X_7 = secondary occupation (if yes =1, otherwise = 0); X_8 = total income from farming per year (Naira); X_9 = Amount of credit needed in naira; X_{10} = Credit purpose (farming = 1, non - farming = 2, both = 0); X_{11} = Borrowing experience (if yes = 1, otherwise = 0); X_{12} = Credit ration (received amount applied for = 1, otherwise = 0); X_{13} = nature of borrowing experience (if satisfactory = 1, otherwise = 0); X_{14} = Interest rate in percentage; X_{15} = Collateral security (if yes = 1, otherwise = 0); X_{16} = Disbursement lags (if timely = 1, otherwise = 0); X_{17} = Repayment period in months; μ = Error term.

RESULTS AND DISCUSSIONS

Socio-economic characteristics of actors in cassava value chain.

Table 1 reveals that 79.3% of farmers were male and all the processors were female. This might be attributed to the fact that processing and preparation of foods were usually the role of women in the socio-cultural setting of the people under study; this is in line with (Sasson, 1991; Adegeye and Dittoh, 2002; Sodeeq et. al., 2016) who asserted that women are active in the cassava industry and that they are more predominant in the processing and marketing than male folks who dominate the production of cassava roots. This gave male farmers more access to finance than female farmers. Most (47.33%) of the farmers in cassava value chain were youths (21-40 years) with secondary education while 68.0% processors were middle aged people (41-60 years) with most having primary education. The average ages of the actors were 39years and 45years respectively. Similar result was reported by Adewole and Omoye (2018).The implication of this finding is that majority of the actors belong to youth and middle aged groups. This is an advantage since they are supposed to be physically able and more mentally alert in learning new technologies than the older actors. This is supported by FAO (2014) which reported that older farmers are less likely to adopt new technologies needed to sustainably increase agricultural productivity and ultimately feed the growing world population while protecting the environment. These groups also had highest access to finance in age (43.5% and 62.1%) and education (38.8% and 64.4%) categories of actors in cassava value chain. Moreover, most lived in nuclear family system as more than half (50%) had family size of less than 5 but the average family size was approximately 5. Composition and size of the family have been regarded as one of the most important factors conditioning the level of production and productivity of small-scale actors in cassava value chain (Okoye et. al, 2004; Salau et. al., 2017). Hence, the relatively small family size of the actors is an obvious disadvantage, since it may likely not enable them to use family labour in order to reduce labour cost required in their operations. This however didn't debar them from having access to finance as 56.5% of farmers and 49.4% of processors with this household number had access. Both actors were married with more than 5 years experience operating on small scale in cassava value chain except farmers who were relatively new with less than 5 years experience. Their small scale operation might be due to their level of finance accessibility and this is reflected in their monthly mean income of N46,000 and N106,000 respectively.

Table 1: Socioeconomic Characteristics of Actors in Cassava Value Chain

	FARMER (n = 150)			PROCESSOR (n = 150)	
Variables	**Freq**	**(%)**	**Access (%)**	**Freq (%)**	**Access (%)**
Gender					
Male	119	(79.3)	74(87.1)	-	-
Female	31	(20.7)	11(12.9)	150(100.0)	87(100.0)
Age (yrs)					
≤20	5	(3.3)	2(2.4)	6(4.0)	5(5.7)
21-40	71	(47.3)	37(43.5)	35(23.3)	27(31.0)
41-60	58	(38.7)	36(42.4)	102(68.0)	54(62.1)
61-80	16	(10.7)	10(11.8)	7(4.7)	1(1.1)
Mean	39			45	
Education					
Primary	60	(40.0)	29(34.1)	73(48.7)	56(4.4)
Secondary	52	(34.7)	33(38.8)	70(46.6)	25(28.7)
Tertiary	38	(25.3)	23(27.1)	7(4.7)	6(6.8)
Household size					
≤5	82	(54.67)	48(56.5)	77(51.3)	43(49.4)
6-10	65	(43.33)	36(42.4)	70(46.7)	43(49.4)
11-15	1	(0.67)	1(1.2)	2(1.3)	1(1.1)
16-20	2	(1.33)	-	1(0.7)	-
Mean	5			5	
Marital Status					
Single	9	(6.0)	3(3.5)	8(5.4)	7(8.0)
Married	133	(88.6)	76(89.4)	126(84.0)	69(79.3)
Divorced	4	(2.7)	2(2.4)	2(1.3)	2(2.3)
Widow/widower	4	(2.7)	4(4.7)	14(9.3)	9(10.3)
Experience (yrs)					
≤5	62	(41.3)	44(51.7)	18(12.0)	12(13.8)
6-10	50	(33.3)	19(22.4)	41(27.3)	29(33.3)
11-15	16	(10.7)	8(9.4)	43(28.7)	30(34.5)
16-20	16	(10.7)	14(1.5)	29(19.3)	11(12.6)
≥20	6	(4.0)	-	19(12.7)	5(5.8)
Mean	5			12	
Business Size					
Small	73	(48.7)	34(40.0)	117(78.0)	71(81.6)
Medium	67	(44.6)	43(50.6)	29(19.3)	14(16.1)
Large	10	(6.7)	8(9.4)	4(2.7)	2(2.3)
Monthly Income(₦)					
≤50000	112	(74.7)	60(70.6)	53(35.34)	86(98.9)
51000-100000	22	(14.7)	14(16.5)	33(22.00)	-
101000-150000	11	(7.3)	8(9.4)	15(10.00)	-
151000-200000	2	(1.3)	2(2.4)	17(11.33)	1(1.1)
≥200000	3	(2.0)	1(1.2)	32(21.33)	-
Mean	46000			106000	

Source: Field Survey, 2018.

Financial Needs Profile of Actors in Cassava Value Chain

Different actors in value chain have different kinds of financial needs and this variety in demand cannot be met by the same suite of financial products, terms of service, or even formal financial service providers. Despite some improvement in their access to general financial services, relatively little progress has been made in financial services specific to their agricultural activities (Hazell, 2011). Table 2 therefore shows the financial needs profile of actors in cassava value chain. More than 80.0% of these actors needed long term loans (70.7%). There was however variety in demand as highest percentage (32.8%) of farmers needed more than N200,000 while highest percentage (36.0%) of processors needed N50,000 or less. Majority (95.3%) of farmers needed this finance during raining season and only 37.4% of processors considered raining season as appropriate time for finance. Both working and fixed capital took the lead on the use of finance for both actors.

Table 2: Financial Needs of Actors in Cassava Value Chain

	FARMER		PROCESSOR	
Variables	**Freq (n = 150)**	**%**	**Freq (n = 150)**	**%**
Need for finance				
Yes	150	100.0	121	80.7
No	-	-	29	19.3
***Form of finance needed**				
Overdraft	2	1.3	1	0.7
Short term loan	40	26.7	5	3.3
Long term loan	106	70.7	106	70.7
Supplier's credit	1	0.7	-	-
Advance payment	2	1.3	-	-
Asset finance	-	-	-	-
How much of finance				
≤ 50000	31	20.7	54	36.0
51000-100000	32	21.4	33	22.0
101000-150000	20	14.0	15	10.0
151000-200000	17	11.3	17	11.3
≥200000	50	32.8	31	20.7
Mean				
***When finance is needed**				
No response	-	-	23	15.3
Rainy season	143	95.3	56	37.4
Dry season	3	2.0	51	34.0
Both season	4	2.7	20	13.3
Use of finance				
Working capital	14	9.3	12	8.0
Fixed	15	10.0	18	12.0
Both	121	80.7	120	80.0

Source: Field Survey, 2018. * Multiple Responses Allowed

Financial institutions such as cooperatives (42.0%) followed by microfinance (19.3%) and commercial banks (18.0%) were the lead financial institutions available in the study area to farmers while microfinance (58.7%) followed by rotating saving and loan groups (48.7%) topped the list of financial institutions available to processors as shown in table 3. with the closest branch distance of 3km and this facilitated membership of actors in these financial institutions. Specifically, 54.6% of farmers were members of commercial banks or microfinance banks and 66.0% of processors were members of rotating saving and loan groups, but this is did not translate to access as more than 60.0% had no access to finance due to unfavourable conditions such as high interest rate, collateral and difficulties in loan processes. This result is in consonant with Adewole and Omoye (2018) who asserted that High interest rate charged by informal sources of credit, lack of collateral and administrative bottlenecks involved in getting loans from government are reasons why actors were having access to finance. However, more than half (50.0%) used personal saving as source of capital for their operation.

Table 3: Distribution of Actors in Cassava Value Chain Based on Sources of Finance

	FARMER		PROCESSOR	
Variable	**Freq (n = 150)**	**%**	**Freq (n = 150)**	**%**
***Available institution**				
Commercial bank	27	18.0	58	38.7
Microfinance bank	29	19.3	88	58.7
State agriculture	12	8.0	2	1.3
NGOs	12	8.0	1	0.7
Rural development bank	3	2.0	12	8.0
Cooperatives	63	42.0	62	41.3
Rotating saving and loan group	-	-	73	48.7
Money lenders	3	2.0	-	-
Family and friends	1	0.7	-	-
Closest branch distance				
≤3	127	85.4	121	80.7
4-6	19	12.7	22	14.6
7-9	1	0.7	1	0.7
10-12	3	1.3	6	4.0
Mean				
***Membership**				
Commercial bank	50	33.3	29	19.3
Microfinance bank	32	21.3	24	16.0
State agriculture	9	6.0	3	2.0
NGOs	4	2.7	2	1.3
Rural development bank	3	2.0	2	1.3
Cooperatives	32	21.3	42	28.0
Rotating saving and loan group	9	6.0	99	66.0
Money lenders	2	1.3	2	1.3
Family and friends	3	2.0	1	0.7
Access to finance				
Yes	85	56.7	87	58.0
No	65	43.3	63	42.0
Finance condition				
No response	65	43.3	63	42.0
Favourable	36	24.0	29	19.3
Not favourable	49	32.7	58	38.7
Source of capital				
Personal saving	65	43.3	63	42.0
Loan from formal institution	33	22.0	27	18.0
Loan from informal institution	52	34.7	60	40.0

Source: Field Survey, 2018. * Multiple Responses Allowed

FACTORS FOR FINANCE ACCESSIBILITY AND EXTENT OF ACTORS IN CASSAVA VALUE CHAIN

Table 4 reveals that sex, age, number of dependent, amount of finance needed, borrowing experience, finance ration, nature of borrowing experience and collateral had negative impact or influence on extent of finance accessibility of cassava farmers with number of dependent significant at 10% (prob < 0.10) while amount of finance needed and borrowing experience were found significant at 1% (prob < 0.01). This means that a unit increase in these variables will have a negative impact on (decrease) the probability of farmers to have finance. However, experience as a cassava farmer (prob < 0.10), farm size (prob < 0.05), secondary occupation (prob < 0.01), monthly income (prob < 0.01) and disbursement lag (prob < 0.01) were found to have significant positive impact on the extent of finance accessibility; This means that a unit increase in these variables will have a positive impact on (increase) the probability of cassava farmers to have finance. The log likelihood value of 73.253, sigma value of 0.147 which is less than 1 and chi-square value of 0.000 shows the acceptance of the model which

is statistically significant at 1% while pseudo R^2 value of -0.535 measured the goodness-of-fit.

In the same vein, Table 4 indicates that Age, education, secondary occupation, monthly income, amount of finance needed, finance purpose, borrowing experience, nature of borrowing, interest rate, collateral and disbursement lag had negative effects on the extent of finance accessibility of processors. Nature of borrowing and interest rate were found significant at 5% (Prob < 0.05) and 10% (Prob < 0.10) respectively. This means that a unit change in these variables will have a negative (decrease) impact on the probability of processors to have access to finance as shown by their co-efficient values. However, Number of Dependents, farming experience, farm size, finance ration and repayment period had positive effects on the extent of finance accessibility of processors. Farm size and finance ration were found significant at 1% (Prob <0.01) and 10% (Prob <0.10). This means that a unit change in these variables will have a positive (increase) impact on the probability of processors to have finance. The log likelihood value of 63.239, Sigma value of 0.157 which is less than 1 and chi-square value of 0.006 shows the acceptance of the model which is statistically significant at 1% while pseudo R^2 value of -0.325 measured the goodness-of-fit.

Table 4: Tobit Result Showing Factors Influencing Actors' Accessibility to Finance

	Farmers	Processors
X_1	-0.015(-0.69)	-
X_2	-0.000(-0.66)	-0.003(-1.53)
X_3	0.002(0.98)	-0.005(-1.59)
X_4	-0.011(-1.75)*	0.009(1.01)
X_5	0.002(1.87)*	0.002(1.04)
X_6	0.007(2.28)**	0.078(2.71)***
X_7	0.054(2.49)***	-0.045(-1.42)
X_8	1.75e-06(10.21)***	-6.71e-07(-0.82)
X_9	-3.98e-07(-13.08)***	-2.20e-08(-0.26)
X_{10}	0.002(0.13)	-0.051(-1.34)
X_{11}	-0.012(-3.15)***	-0.002(-0.29)
X_{12}	-0.001(-0.06)	0.231(1.75)*
X_{13}	-0.006(-0.23)	-0.258(-2.07)**
X_{14}	0.014(0.63)	-0.005(-1.86)*
X_{15}	-0.036(-1.60)	-0.051(-0.68)
X_{16}	0.062(2.77)***	-0.063(-0.96)
X_{17}	0.001(0.56)	0.010(1.43)
CONST.	0.184(3.57)***	0.314(3.45)***
Sigma	0.147	0.157
Chi^2	0.000	0.006
Pseudo R^2	-0.535	-0.325
Loglilkelihood	73.253	63.239

Source: Field Survey, 2018. *** Significant at 1%, ** Significant at 5%, * Significant at 10%

CONCLUSION

The problem of food shortage in the country was due to high cost of input, scarcity of land and lack of finance to mention but few. In spite of these, most actors in cassava value chain still tried to minimize cost of production in attempt to maximize their profit. However, study had revealed that profit increases as business size increases. From the results of this study, it can be concluded that majority of actors in cassava value chain are not new in the business, middle-aged and operates small scale business due to lack of finance. They are thus limited in their scope of operation and needed long-term finance during the rainy season than other seasons for both working and fixed capital. More work is needed, however, to better understand the demand for and use of financial products in agricultural households, and how their total portfolio of financial services can be improved.

RECOMMENDATIONS

- Finance should be made available at the right time preferably rainy season for the actors in all the stages of cassava value chain for more produce and Nigerian Agricultural Co-operative Bank, Commercial Banks and various Community Bank, etc. have a great role to play in this regard.
- A minimum of ₦50,000.00 would be enough for the actors to start up business on small scale while

₦200,000.00 could be used to start up medium scale business.

- Government should ensure that all the necessary cassava production and processing equipments are made available at all times and if possible at subsidized rates.
- Government should ensure that farmers have access to long term loans to boost the cassava production in the state and Nigeria at large. Moreover, the form of finance (long term loan) should be targeted towards rainy season in carrying out activities involved in cassava value chain.

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