Analysis of Cassava Value Chain in Nigeria, From a Pro-poor and Gender Perspective of Farming Households in Southwest, Nigeria

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Introduction

- A **value chain** is a chain of activities that a firm operating in a specific industry performs in order to deliver a valuable product or service for the market.
- Value chains has been seen as a vehicle by which new forms of production, technologies, logistics, labour processes and organizational relations and networks are introduced.
- Value chain can be a very useful conceptual tool when trying to understand the factors that impact the long-term profitability of business and when developing a successful strategic plan for business.
- How can developing country producers become more efficient and value adding and collaborate with parties in value chains that are able to capture new market opportunities?
- How can value chains, as embedded in the international, domestic and local economic, legal and social-cultural environment, optimally use their business environment?
- What major upgrading opportunities are available and which parties are most suited to facilitate value chain upgrading?

Introduction

- Why Cassava?
  - Cassava has been transformed from a low yield famine reserve crop to a high yielding cash crop.
  - It has numerous alternative uses in feed, food and agro-industry (Value Chain).
  - Cassava plays a key role in the agricultural and food supply..
  - It is considered as the most widely cultivated crop in Nigeria and it is predominantly grown by smallholder farmers
- There is the need to promote value through chain processes of this crop.

Introduction contd..

- In most parts of rural Nigeria, division of labour within the household is gender-specific and according to age.
- Women play a prominent role in agricultural production. The extent of their involvement in agricultural production and their contribution to the household food basket varies from one ethnic group to another.
- 61% of the total agricultural labour comes from women (Apata, *et al*, 2013, Sewando *et al*, 2011, Lavenel *et al*, 2009, IFAD, 1994).
- Moreover, women are almost entirely responsible for processing and marketing of cassava products in most part of the country.
- In most cases, women buy agricultural produce from their husbands and other farmers, processed and market.
- Small-scale cassava processing is the domain of women, although most of the mechanized equipment (graters and grinders) are owned and operated by men (Tocco *et al*, 2012, Fries and Akin, 2011, Riisgaard, *et al*, 2008)

Study aims

- Evidenced has shown that cassava production has a lot of significant value chain processes and much of this processes remain untapped.
- Examine strategies and opportunities for increasing participation of cassava growers in value chain processes.
- Assess factors that influences participation in value chain processes
- Investigation of the relevant of gender participation in cassava value chain processes and it’s significant to pro-poor analysis.

Methodology

- Study was carried out in Southwest zone, Nigeria.
- Selection of the zone was based on evidenced that cassava is widely cultivated by virtually all the farmers in the zone.
- Gender perspective's analysis were incorporated in the selection process.
- 300 cassava farmers were selected through multi-stage sampling technique, but only 250 data (83.3% response rate) were useful for subsequent analysis.
- Qualitative and quantitative methods of analysis were applied to incorporate gendered perspective.
- Data were analyzed using factor analysis and Poisson model.

Methodology Contd./2

- A factor analysis was applied to identify factors with highest Eigen-value and was used to develop factor scores. Factor scores were then used to measure the identified attitudinal variables.
- Poisson model was used to capture the underlying factor analysis (Cameron and Trivedi, 2009, Greene, 2003).
- Discriminant analysis were carried out on the selected variables in the factor analysis
- In the build of the model, comparison of Poisson model with multinomial model analysis were carried for robustness of the study.
- Test for selection bias of the sample was also conducted.

Methodology Contd./3

Empirical Specification.

- Value chain processes and analysis in agriculture are modeled by an occupational choice model of factor analysis.
- This choice model focuses on the determinants of chain processes and labour flows out of the agricultural sector.
- These studies examined farmers attitudinal in the cassava products value chain and the significant of value chain on farmer's income.
- Reviewed of past studies on factor analysis indicated the relevance of factor analysis in measuring the attitudinal and attributes leading to preferential choice decisions of farmers in value chain processes.
- This study used factors analysis to measure the attitudinal and attributes leading to preferential choice decisions of cassava farmers in Nigeria in value chain processes.

Methodology Contd./4

- Factor analysis was used to categorize the responses on participation of cassava farmers on value chain cassava processes.
- To understand the underlying important factors influencing this decision.
- The categorical dependent variable takes the response on being participated in value chain processes.
- Evidence from literature revealed that the logarithm of the response variable is linked to a linear function of explanatory variables such that:

- $$Log_{\rho}\,(Y) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_n X_n \qquad (1)$$

Equation 1 can be interpreted as

$$Y = \left(\rho^{\beta_0}\right)\left(\rho^{\beta 1\, X1}\right)\left(\rho^{\beta 2 X2}\right) \ldots \left(\rho^{BnXn}\right) \qquad (2)$$

- Poisson regression model expresses the log outcome rate as a linear function of a set of predictors.

Methodology Contd./5

- The general econometric model of equations 1 & 2 can be stated as follow
- $$Log\ \rho\ (Y) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_n X_n + \mu \qquad (3)$$
- Where, *Y* = Dependent variable, *βo* = Intercept of the regression equation, *β1* ….. *βn* = Parameters to be estimated ranging from *ith* = 1 to *nth*,

  X1…..Xn = independent variables ranging from *ith* =1 to *nth*, *μ* = Error term.

Therefore the empirical model specification for this study is

$$Log_\rho(Y) = \beta_0 + \beta_1 Age + \beta_2 Gender + \beta_3 Educate + \beta_4 HHSize + \beta_5 Farmexp + \beta_6 Farmsize + \beta_7 Cassavafarm + \beta_8 Market\ access + \beta_9\ Extension\ access + \beta_{10} Marketinfo + \beta_{11} Credit\ access + \beta_{11} Cassavavaluechaininfo + \beta_{12} Coopsoc + \mu \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

Results and Discussions

Gender perspective in cassava value chain processes.

- 36.7% of male respondents were involved in cassava value chain processes, 79.3% of female were involved in cassava value chain processes.
- Women are more likely to manage their own work and income where capital barriers to entry are lower and where physical product transformation involves simple, relatively low cost equipment.
- Where and how men and women participate in value chains determines the extent to which they benefit.
- Women farmers have positive risk attitude towards participation in the alternative cassava value chain strands for commercialization.

Value Chain processes	Male (139)		Female (111)	
	Number	%	Number	%
Sold cassava in fresh form	88	63.3	23	20.7
Processed cassava to garri	12	8.6	72	64.9
Processed cassava to starch	28	20.1	37	33.3
Market cassava flour	17	12.2	45	40.5
Processed cassava into chips for animal feed	15	10.8	57	51.4
Other value chain processes	21	15.1	33	29.7
Total	181*		267*	

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Results and Discussions contd..

Gendered education systems of respondents in cassava value chain processes

- 71.6 % of the male who has low education were involved in the selling of cassava fresh tuber, 82.6% for female .
- Higher number of women who has relatively moderate education were involved in cassava value chain processes.
- This thus suggest that education attainment thus influence the way men and women participate in value chains.
- Factors such as access to assets, education and the nature and value of economic activities affect the way in which men and women participate and gain in value chains processes.

Value Chain processes	Low-level education		Moderate-level education	
	Male (%)	Female (%)	Male (%)	Female (%)
Sold cassava in fresh form	63 (71.6)	19 (82.6)	25 (28.4)	4 (17.4)
Processed cassava to garri	4 (33.3)	21 (29.2)	8 (66.7)	51 (70.8)
Processed cassava to starch	6 (21.4)	16 (43.2)	22 (78.6)	21 (56.8)
Market cassava flour	12 (70.6)	23 (51.1)	5 (29.4)	22 (48.9)
Processed cassava into chips for animal feed	6 (40.0)	18 (31.6)	9 (60.0)	39 (68.4)

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Results and Discussions contd…

Respondents Preferential Choice Decisions on Value chain processes

- Out of the seven listed scale only 2 had the study assumption disagreed by the respondents.
- The study hypothesized that profit is an important activity of farming practices as indicated in D1 that I am ready to sell cassava tuber in fresh form, if I do not make profit.
- findings disagreed with this assumption, but surprisingly, most farmers tend to agree with this statement.
- This thus negates belief of economist on profit making in every activity. Another point of reason might be that farmers might want to use the land for other uses (livestock farming).
- This evidence implies that farmers are ready to take risk even when they know that processed cassava can bring in more money.
- The same was also applicable for the statement D6 on readiness of buying cassava for processing to cassava flour (Garri) or animal feed that can improves household income.

Item	Researcher's hypothesis	Farmer's response	Factor coding
D1: I am ready to sell cassava tuber in fresh form, even if I do not make profit.	Disagree	Agree*	0.713
D2: Processing Cassava tuber and adding value to it makes cassava farming worthwhile	Agree	Agree	0.801
D3: Producing and selling fresh cassava provides quick cash to meet family needs and pro-poor agenda	Agree	Agree	0.694
D4: Processed cassava for Garri improves household income	Agree	Agree	0.801
D5: Acquisition/expansion of land for producing and processing cassava as pro-poor analysis	Agree	Agree	0.725
D6: Buying cassava for processing to Garri or animal feed improves household income	Agree	Disagree *	0.615
D7: Gender participation in the production and processing of cassava products is significant.	Agree	Agree	0.718

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Results and Discussions contd….

Measurement of Respondent Attitude towards participation in Cassava Value Chain Processes

- only two statements of the study did not match with the outcome from the respondents.
- On the other hand, where the study postulated that with the present well known market of fresh and local processed cassava, and support from government, farmers sometimes are lagging behind in adopting new technologies.
- This thus signifies their claim that they are discontented with the existing market of cassava, may be because of the tendency of selling fresh cassava to small traders who pay low prices for the products and use of unstandardized unit of measurement to cheats the farmers.

Item	Researcher's hypothesis	Farmer's response	Factor coding
M1: If I have the opportunity to process cassava to improve Household income, I will utilize it.	Agree	Agree	0.875
M2: Taking advantage of president initiatives on cassava programme to get government assistance	Agree	Agree	0.781
M3: Access to timely, current and correct information about Price and location to market products encourage business Activities	Agree	Agree	0.618
M4: Access to timely, current and correct information about Price and location to market products expand market Opportunities	Agree	Agree	0.557
M5: Taking advantage of president initiatives on cassava programme to increase production and processing	Agree	Disagree*	-0.835
M6: With the present information on known market for fresh and local processed cassava can encourage processing than production of cassava	Agree	Disagree*	-0.703

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Results and Discussions contd…..

Determinants of attitude towards alternative potential cassava strands

- The categorical dependent variable was preferences on participation in cassava value chain processes.
- Attitude towards marketing of the potential cassava products and scores were regressed against the predictors.
- Results revealed a moderately goodness of fit captured by G^2 of 59.8%, while the remaining 40.2% remained unexplained (future research).
- Poisson model results indicated that out of the 12 regressors only 7 were significant at various levels.
- These are gender, education, farm experience, farm size, cassava farms, access to market, and information about market were significant factors predicting respondent's preferences on participation in cassava value chain processes.

Results and Discussions contd……

- Gender variable is significant but negative, this explains the level of attitude towards possibility of going into cassava value chain processes.
- Total farm holdings and cassava farms are significant but negative. This means that there is the possibility of increase in participation to value chain processes among farmers with large size cassava farms compared to farmers with small farms.
- Significant and positive variables include market access and information about this market. these variables appeared to have a strong significance ($p<0.01$) and positively relationship towards participation to value chain processes.
- This suggests that access to market and information about these markets of cassava products goes a long way to improve participation in value chain processes.
- Farm experience also significant and positive, this indicates that experienced cassava farmers has edge of participation in chain processes of cassava and adding value along each line of the chain.
- These results suggest that awareness about market and experience of marketing about cassava value chain processes goes a long way to increase participation.

Results and Discussions contd……

- Smallholder women farmers had positive risk attitude towards potential cassava value chain strands.
- Poisson regression models results revealed that education of the male-headed household, farm area under cassava and the total land owned by the household are significant factors that negatively influenced probability of farmer's participation in cassava production,
- Female headed households and total land owned by the household are significant factors that affect negatively the probability of farmers to prefer alternative cassava strands in the study area.
- Furthermore, access to urban markets and experience of the household in cassava production are essential factors that can increase the probability of farmers to take risk to produce cassava for marketing through potential cassava strands.
- Study observed that most male cassava farmers sold cassava in fresh form without adding value, while female farmers processed cassava.
- Female cassava growers understand that there are markets of value added products like cassava flour and cassava chips e.g for animal feed.
- In order to exploit these markets there is a need to promote appropriate cassava processing technologies such as grating, chipping and crashing by educating farmers (especially women) on these technologies and facilitate acquisition of processing equipment.

Table 6: Results of the Poisson Model
Source: Computer Results from Field Survey, 2013
* 10% significant level, ** 5% significant level, *** 1% significant level

Independent variables	Estimated coefficients	β/Standard Error	Probability
Constant	4.015	11.310	0.000
Age	0.218	0.0191	0.711
Gender	-0.351	-2.716	0.001***
Household size	-0.226	0.1356	0.123
Education	0.164	0.6811	0.04**
Farm experience	0.061	1.873	0.054*
Farm size	-0.027	-2.254	0.035**
Cassava farm	-0.536	-2.315	0.041**
Marketaccees	0.308	3.958	0.074*
Extaccess	-0.207	0.3162	0.123
Marketinfo	0.514	2.013	0.088*
Creditaccess	1.105	0.3046	0.1676
Cassavavaluechaininfo	0.145	0.521	0.837
Coopsoc	0.118	1.381	0.173
Likelihood ratio	-183.310		
G^2	59.80		

Conclusion

- Participation in cassava value chain processes improves household income.
- Most male cassava farmers sold cassava in fresh form without adding value, while female farmers processed cassava by adding value.
- Improving the cassava value chain has the potential to result in pro-poor benefits for cassava growers.
- The study recommends areas of intervention with the potential to reduce gender inequalities and increase returns to the poorest, many of whom are women.
- In order to exploit these markets there is a need to promote appropriate cassava processing technologies such as grating, chipping and crashing by educating farmers (especially women) on these technologies and facilitate acquisition of processing equipment.
- This study revealed that women cassava farmers have positive risk attitude towards participation in the alternative cassava value chain strands for commercialization.
- The benefits of women's participation in agricultural value chains are determined by their control of productive resources and household level decisions.
- Concerted effort must, therefore, be made to ensure that women have better, cheaper and reliable access to land, credit, agricultural inputs, extension information and other resources.

- Thank you for listening