Valuation of Cassava-Based Farmers Choice on their Commercialization Index and Adaptative Practices in Etche Local Government Area of Rivers State, Nigeria

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Abstract

This study valued cassava-based farmers' choice on their commercialization index and adaptative practices in Etche local government area of Rivers State. A simple random sampling technique was employed to select 80 cassava-based farmers with well-structured questionnaire. Data were collected from both primary and secondary sources. Descriptive statistics and a bivariate probit multiple regression model were employed in the assessment. The results revealed that majority (90%) cassava farmers were females with an age range of 55-64 years. Most (85%) of the respondents were married with household sizes of 8-11 persons with majority (52.50%) spent 6 years in formal schooling. Majority (42.50%) with 11-20years farming experience and most (67.5%) had income status of #500 -to-#700,000.00 per annum. The bivariate probit multiple regression results revealed that farming experience in years (0.013494), schooling (0.01776) and age (0.014376) in years were all statistically positive in influencing farmers choices on their commercialization index and adaptative practices of respondents while quantity of cassava harvested in kg (-0.003103) household size in numbers (-0.12798) and income status of respondents (2.15E -06) were all statistically negative as a result of poor market participation. It was established that insufficient funds to adopt new technologies were their major constraints while majority had a commercialization index of (50%). Farmers should consider investing in new technologies to improve their yields and profitability. Government and non-governmental organizations can provide support in terms of training or capacity development, access to credit, and technical assistance for adopting modern farming practices. The government should also implement policies and programs that provide financial support to farmers for adopting new technologies. This can help overcome the constraint of insufficient funds identified in the study.

Key Words: Valuation, Cassava-Based, Farmers, Choices, Commercialization Index, Adaptative, Practices, Rivers State.

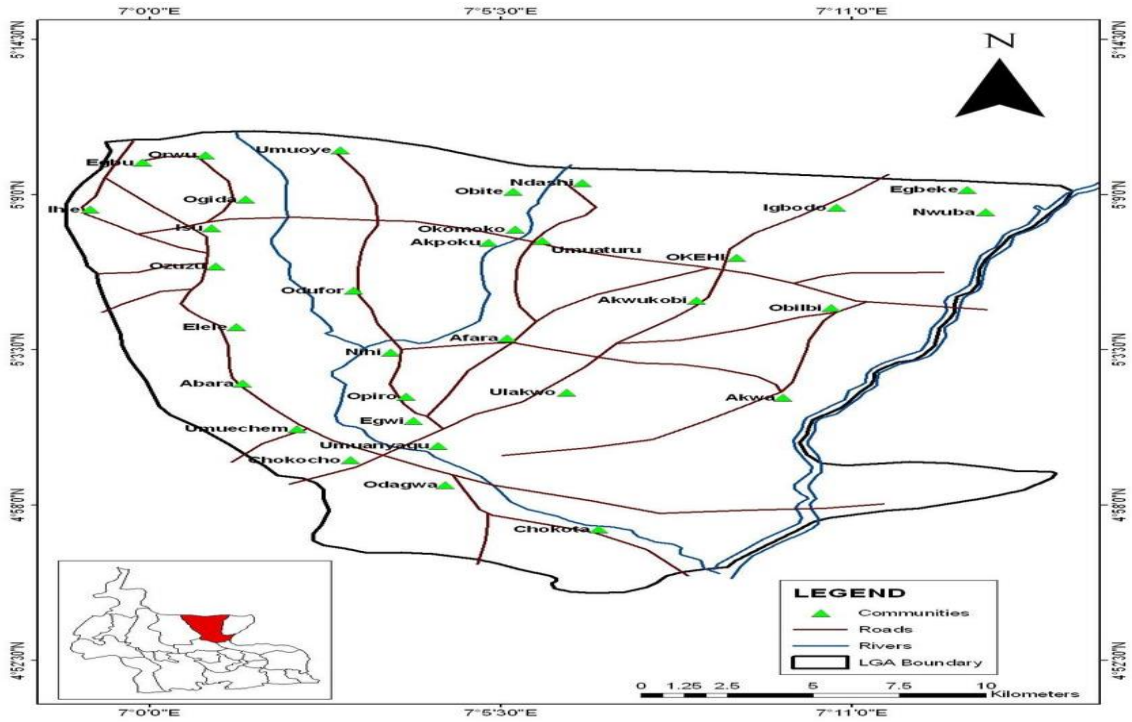
1. INTRODUCTION

Cassava (mahihot esculenta) is an important regional food crop in sub-Saharan Africa, providing a staple food source for millions of people. Africa produced about 159 million tonnes of cassava, accounting for 55% of global production (FAO 2020). Cassava is a resilient crop that can grow in poor soils and withstand drought, making it particularly important in regions where the climate is challenging and food security is an issue. It is believed that cassava is a native to south America. and was brought to African by Portuguese traders during the colonial period. In Africa, Nigeria retained the top spot as the highest producer of the crop in 2019, with about 59 million tonnes and a 19.50% share of the total production. (FAO, 2021; Otekunrin, 2021). Nigeria lead in cassava production has been achieved through expansion of land areas devoted to cassava cultivation (Angba & Hon 2020). Cassava in Nigeria is regarded as the most important crop by production and second most important by consumption (Otekunrin & Sawicka, 2019). Majority (90%) of the fresh cassava roots are consumed locally as food and about 10% is used for industrial purposes. Cassava is useful in the production of garri, tapioca, flour, animal feed, gum, fufu, starch. Nigeria is yet to tap the enormous trade potential of the crop because less than 1% of cassava produced in the country enters the international market (Oteku tinrin & Sawicka,2019). Among the many crop cultivated within Rivers state, especially in Etche local Government area, cassava has condescended out as a prominent staple crop, supporting the livelihoods of small holders' farmers and their families. The local government area (LGA) is one of the twenty-three local government area (LGA) in the state and host a significant number of cassava farmers. These cases not only contribute to the food security of the region but also play a crucial role in the local economy. Despite the prominence of cassava as a staple crop in Etche, numerous concerns underpin its cultivation and production. This concern hinge on environmental, socioeconomic and cultural factors which influence farmers' decision and adaptative practices in dealing with weather, pests, and other factors that might affect their crops. This adaptation practices are measures taken by farmers to cope with the challenges posed by environmental and socioeconomic factors. Since cassava is mostly cultivated in Etche in small quantities, either for family use or for sale to a limited range of consumers. With a significant percentage of the population relying on it as a primary source of food, commercializing cassava can help increase its production, improve the quality of cassava products, and make them more accessible to people. Ultimately, this will improve food security in the country. However, to better understand the decision-making processes of cassava farmers in Etche, researchers have employed the household commercialisation index (HCI). This index measures the extent to which a household engages in market-oriented activities, including the sale of crops. By analysing the HCI of cassava farmers in the area, it helps to gain insights into their production and marketing practices, their level of engagement with local markets, and their ability to adapt to changes in their environment. (Asare-Marfo, D., Turvey, C. G., & Malapit, H. J. L. 2021). It is also used to assess the degree to which a household depends on income generated from market sales of agricultural products, either from crops grown or livestock raised. (Makate, C., Makate, M., Mango, N., & Tambo, J. A. 2020). However, despite its importance, many cassava-based farmers in the study area face challenges in achieving optimal commercialization

and adaptive practices due to several factors such as poor market access, unfavorable production conditions, limited technical know-how, inadequate infrastructure, and unpredictable weather conditions. At this point, it becomes necessary to ask the following research questions: (1) what are the major socio-economic indicators of the respondents in the study area? (2) what is the major commercialization index (CI) of the respondents in the study area? (3) what are the major adaptation practices employed by the respondents in their farming practices? (4). what is the respondent's socioeconomic characteristics that affect their decision on commercialisation index and adaptive practices in the study area.? (5) what is the major constraint encountered by the respondent in the study area.? This study gave answers to these research questions.

2. Materials and Methods

The study area of this research was Etche Local Government Area (LGA) in Rivers State, Nigeria. It is located in the southeastern part of the state and has its administrative headquarters in Okehi. The LGA shares borders with several other LGAs in the State, including Omuma to the east, Port Harcourt to the south, and Etche to the north. The area of Etche LGA is approximately 500 square kilometers, and it has a population of over 180,000 people (The 2006 National Population and Housing Census). Etche Local Government Area (LGA) has a latitude of 5.0167° north and longitude: 6.75° east; its elevation is located in the low-lying areas of the Niger Delta region, with an average elevation of approximately 15 meters above sea level. The predominant language spoken in Etche Local Government Area (LGA) is Etche, a language classified as a member of the Igboid group of the Niger-Congo language family. However, due to its location in the southeastern region of Nigeria, English is also widely spoken and used as a language of formal communication. Etche Local Government Area (LGA) in Rivers State, Nigeria is made up of several clans which include, Ekpeye, Ogba, Umuoyima, Alakahia, Mba, Edeoha. Etche is known as the food basket of the state as farming is the predominant economic activity. The farmers in the area engage in subsistence and commercial farming, which provide food for both the local market and nearby urban centers. Cassava production is the most significant farming activity in Etche LGA. The crop is extensively cultivated in the area, and its products are widely consumed as a staple food by the people in the region. Other crops, such as yam, plantain, maize, and vegetables, are also grown on a smaller scale.



4 SAMPLING SIZE AND SAMPLING TECHNIQUE

This study employed, a simple random sampling method. A sample of 10 villages was selected using a simple random sampling method. Then 8 cassava-based farmers were selected from each of the 10 sample villages using the snowball sampling method. This gave a total of 80 respondents as the sample size for the study.

RESULTS AND DISCUSSIONS

5. SOCIOECONOMIC CHARACTERISTICS OF THE RESPONDENTS

The socioeconomic characteristic of respondents in the study area are summarized in the table 5.1 below.

Table 5.1, below asserts a significant gender disparity among cassava-based farmers in the study area. The table revealed that majority (90%) are female. This finding aligns with existing literature that highlighted the crucial role of women in agricultural activities, particularly in sub-Saharan Africa (Smith at al, 2019). Majority (50%), of the respondents aligned to age range of 55 to 64 years showing activeness and ability to adopt an innovation. These findings suggest that cassava farming is not limited to a specific age group but involves individuals from various age brackets (Tafesse, A. et al. 2021). Majority (85%) of the respondents are married which implies that majority of cassava farmers in the area operate within family unit, which may have implications for decision-making processes and resource allocation. Most (52.50%), completed six years of

formal schooling and could write and read, while a significant portion of farmers have acquired basic education, there is still a considerable number without formal schooling. This finding underscores the importance of promoting agricultural extension services and training programs to enhance farmers' knowledge and skills (Ajibefun et al, 2017). Moreover, most (56.30%) of farmers, have a household size ranging from 8 to 11 persons. These findings indicate that cassava farming is often conducted with larger family units, which may have implications for labor availability and resource management (Ogundari, K., & Bolarinwa, O. D. (2018). Majority (42.50%) of the farmers have 11 to 20 years of farming experience, indicating a relatively high level of expertise in cassava farming. Higher farming experience leads to increased knowledge and technological ideas, ultimately resulting in improved output and income. Consequently, these findings indicate that the majority of farmers in the area have gained significant knowledge and skills in cassava cultivation (Adeniyi et al, 2023). Most (67.50%) realized an income range of #500,000 to #700,000, annually This suggests that a significant percent of the farmers have realized a moderate level of income from their cassava-based commercial activities. General, assertion reflect a diverse range of income levels among cassava farmers, with a substantial portion earning a moderate income (Donkor et al, 2022). The study accentuated that farmers engage in diverse economic activities to supplement their income from cassava farming. So, majority (56.25%) noted that trading was the commonest alternative sources of income.

Table 5.1: Distribution of socio-economic characteristic of Cassava-based farmers in the study area.

Distribution of Socio-characteristics of Respondents in the study area		
Socio-economic Characteristics	**Frequency**	**Percentage**
Gender		
Male	8	10.00
Female	72	90.00
Total	**80**	**100**
Age		
0-14	0	0
15-24	10	12.50
25-54	21	26.30
55-64	40	50.00

Above 64	9	11.30
Total	**80**	**100**
Marital Status		
Married	68	85.00
Divorcee	5	6.25
Widow	4	5.00
Widower	**3**	3.75
Total	**80**	**100**
Years spent in formal Schooling		
0	10	12.50
6	42	52.50
12	26	32.50
16	2	2.50
Total	**80**	**100**
Household size		
1-3	5	6.25
4-7	20	25.00
8-11	45	56.30
Above 11	10	12.50
Total	**80**	**100**
Farming experience		
1-10	9	11.25
11-20	34	42.50

21-30	21	26.25
Above 30	16	20.00
Total	**80**	**100**
Income Status		
Less than ₦100k	0	0.00
₦200k - ₦400,000.00	20	25.00
₦500k- N700,000.00	54	67.50
Above ₦100,000.00	6	7.5
Total	**80**	**100**
Other Sources of income		
Hunting	7	8.75
Okada ridding	5	6.25
Petrol business	20	25.00
Trading	45	56.25
Others	3	3.75
Total	**80**	**100**

Source: Field survey, 2023.

5.2 COMMERCIALISATION INDEX OF CASSAVA-BASED FARMER.

The commercialization index of cassava-based farmers in the study area are shown in table 5.2 below.

Commercialization Index (CI) of the respondents in the study Area = (s/P x 100/1).
Where: P = Quantity of fresh Cassava tubers harvested or produced by each respondent in kg
s= quantity of harvested cassava tubers brought out to sell in the rural market.
If the value obtained is zero it implies that fresh cassava tubers was produced for subsistence purposes, while the closer its value to 100 implies high degree of commercialization (Dube & Guveya, 2016). Looking at the commercialization index of 50% for 10 respondents

revealed lack of low market participation and land fragmentation as a result of land tenure system practiced in our communities (Unaeze et al,2013). Majority of the respondents could only produce commercialization index of (42.1 %), showing subsistence level of production witnessed in the study area. To promote commercialization and income generation, it is recommended that farmers receive support in terms of access to markets, rural infrastructural development, access to loans and input resources and training on adaptative /mitigative practices to combat climate change consequences. Additionally, policies should be implemented to address challenges such as post-harvest losses, inadequate storage facilities, and limited access to credit (Manganal.et al, 2023).

Table 5.2: Distribution of respondents according to their Commercialization index in the study area.

Number of Respondents	**Quantity Produced in kg (QTY) P**	**Quantity sold in the market in kg (qty) s**	**Commercialization index (CI) in percentage (%)**
5	50 kg	20 kg	**40%**
10	100 kg	50kg	**50%**
8	200kg	80kg	**40%**
12	300kg	110kg	**36.7%**
45	301kg	140kg	**46.5%**
80	951kg	400kg	**42.1%**

Source: Field Survey,2023.

5.3. ADAPTATION PRACTICES OF THE RESPONDENT

Table 5.3 below witnessed multiple responses recorded. It revealed that majority (32.72%), practiced intercropping, which involves growing two or more crops together in the same field. In this case, cassava is grown alongside other crops, which may help maximize land use and diversify income sources, while maintaining soil fertility. Only (3.03%) claimed to have adept mulching against excess heat. This technique was commonly used by those farmers who must have planted earlier february and beginning of march. This technique protects cassava plants from excessive heat. Mulching involves covering the soil around the plants with organic materials, such as straw or leaves, to retain moisture and regulate temperature. These findings provide insights into the different adaptive practices employed by cassava-based farmers in the study areaEtche Local Government area, highlighting the diversity of approaches used to improve cassava cultivation and productivity (Omodara et al, 2023).

Table 5.3. Distribution of respondents according to Adaptive Practices in the Study Area.

Adaptation Practices	Frequency	Percentages
Ridge making	32	19.39
Mulching against excessive heat	5	3.03
Planting of resistance varieties	21	12.72
Organic manuring	34	20.61
Planting of cover crops	11	6.67
Intercropping	54	32.72
Others	8	4.85
Total	**165**	**100**

Source: Field Survey,2023
Multiple responses recorded

5.4 RESPONDENTS SOCIO-ECONOMIC CHARACTERISTICS AS THEY AFFECTS THEIR CHOICES ON COMMERCIALIZATION INDEX AND ADAPTATIVE PRACTICES.

The bivariate probit multiple regression model analyzes how respondents' socioeconomic characteristics affect their choices on the commercialization index and adaptative practices in the study area. The dependent variable, denoted as Y, is a binary variable that indicates whether respondents agreed that their commercialization index improved as a result of employing adaptative practices in their farming operations to be 1 ,0 otherwise. Looking at table5.4 below, the probability of respondents responding to the fresh cassava tubers harvested from the farm in kg was statistically significant but negative (-0.03103). The negative responses or choices could be deduced from the fact that respondents are confronted with the problem of insecurity, lack of market participation, lack of adaptative practices, seasonal variation factors etc. (Wahab at al, 2022). It is also important to note that, land tenure system, which results to land fragmentation, gives lower output. The lower output, results to lower income realized which affects adaptative practices negatively in the study area. Respondents farming experience (0.013494) is statistically positive. The positive coefficient indicates a modest but positive choice or impact of farming experience on both the commercialization index and the adoption of adaptative farming practices. Farmers with more experience are somewhat more inclined to engage in commercial activities and adapt to changing conditions. Respondents household's coefficient (-0.127981) was statistically significant but negative. The negative coefficients show that larger household sizes are associated with reduced engagement in commercial farming activities as quantity harvested was low. Since

households with more members tend to consumed rather than to sale. The probability of respondents making choices or responding to commercialization index in relation to adaptative practices was statistically significant but negative(2.15E-06). The negative response could be that since higher income among farmers is strongly correlated with a higher degree of engagement in commercial farming activities and adoption of adaptative farm practices. Producing on a subsistence level will go contrary to higher commercialization index. Because as farmers earn more income, they are more likely to sell their agricultural products in the market or engage in commercial ventures and more inclined to adopt and invest in adaptive techniques and practices in response to changing agricultural conditions. Number of years spent in formal schooling (0.017767) by the respondents was statistically significant and positive in responding to their commercialization index and adaptative practices. The positive responses indicate that farmers with higher levels of education are somewhat more likely to participate in selling their agricultural products in the market or engaging in commercial ventures. Higher education can also contribute to an improvement in adopting and implementing these adaptative strategies (Gebre,2023). The age (0.014376) of respondents are statistically significant and positive. The positive response could be that older farmers, who have more experience and knowledge in farming practices, are more likely to engage in commercial activities and adopt new and innovative farming techniques (Rizzo, 2023). They may have established networks and market connections, allowing them to venture into commercial farming.

4.4.1 Bivariate Probit multiple regression model showing how respondents socioeconomic characteristics affects their choices on commercialization index in the study area.

Dependent Variable: Y
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 10/18/23 Time: 04:43
Sample: 1 80
Included observations: 80
Convergence achieved after 3 iterations
Coefficient covariance computed using observed Hessian

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-0.080621	1.146700	-0.070307	0.9439
CASSVQTY	-0.003103	0.001636	-1.896210	0.0579
FRMINGEX	0.013494	0.020881	0.646266	0.5181
HHSIZE	-0.127981	0.133215	-0.960709	0.3367
INCME	2.15E-06	1.80E-06	1.193078	0.2328
SCHLING	0.017767	0.070477	0.252093	0.8010
AGE	0.014376	0.019078	0.753531	0.4511

McFadden R-squared	0.081336	Mean dependent var	0.775000

S.D. dependent var	0.420217	S.E. of regression	0.415285
Akaike info criterion	1.154597	Sum squared resid	12.58970
Schwarz criterion	1.363024	Log likelihood	-39.18388
Hannan-Quinn criter.	1.238161	Deviance	78.36775
Restr. Deviance	85.30621	Restr. log likelihood	-42.65311
LR statistic	6.938464	Avg. log likelihood	-0.489798
Prob(LR statistic)	0.326576		
Obs with Dep=0	18	Total obs	80
Obs with Dep=1	62		

Source:Fieldsurvey,2023.

4.5. CONSTRAINTS ENCOUNTERED BY RESPONDENT

Table 4.5 below, recorded multiple responses and highlighted that majority (28.67%) of the respondents complained of insufficient funds to adopt new technologies or an innovation as their major constraints. This can hinder their ability to adopt and implement new techniques that could enhance cassava cultivation. The cost of acquiring and implementing new technologies can be a barrier for many peasant farmers. Only (1.79%) asserted other problems to be their constraints.
Only (2.87%) complained of pest and disease outbreaks as their major constraints. This can significantly impact cassava crops and lead to yield losses. Effective pest and disease management strategies are necessary to mitigate these challenges.

Table 4.5.1 Distribution of Respondents according to major challenges encountered in implementing adaptative practices in cassava cultivation in the study Area.

Challenges Encountered	Frequency	Percentages
Lack of access to information on modern farming practices.	**32**	**11.47**
Insufficient funds to adopt new technologies	**80**	**28.67**
Lack of availability of improved cassava varieties	**34**	**12.19**
Lack of technical support from Agricultural extension services	**56**	**20.07**
Climate change related issues	**43**	**15.41**

Land Scarcity	**21**	**7.53**
Pest and disease outbreaks	**8**	**2.87**
Others	**5**	**1.79**
Total	**279**	**100**

Source: Field Survey,2023
Multiple responses recorded

CONCLUSION AND RECOMMENDATIONS

To diversify Nigeria's economy and revenue sources, there is a need to promote and enhance the commercialization of cassava. Therefore, Farmers should consider investing in new technologies to improve their yields and to make profit. Government and non-governmental organizations can provide support in terms of training, access to credit, and technical assistance for adopting modern farming practices. The government should implement policies and programs that provide financial support to farmers for adopting new technologies. This can help overcome the constraint of insufficient funds identified in the study.

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