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ECONOMIC FEASIBILITY OF PRIVATE EXTENSION AMONG SMALL SCALE CASSAVA FARMERS IN EDO AND DELTA STATE, NIGERIA.

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ABSTRACT

The study examined economic feasibility of private extension among small-scale cassava farmers in Edo and Delta States of Nigeria. Specifically, the study described the socio-economic characteristics of small-scale cassava farmers, examined farmer's willingness to pay for extension services for cassava production, examine farmer's perception on economic feasibility of private extension for cassava production and established the relationship between farmer's socio-economic characteristics and the economic feasibility of private extension delivery for cassava production. Multi-stage sampling procedure, comprising of purposive and random sampling was used to select 391 respondents sampled with the use of structured questionnaires. Data collected were analyzed using frequency, mean, percentage and probit regression. The result showed that the respondents were young (mean age 38 years), educated (98.48%), cultivated a mean farm size of 2.04 hectares and earned a mean income of ₦151534.53 per annum. The major extension services the farmers were willing to pay for were bulletins and handbills (mean=4.83), market price information (mean=4.72), information on pest and disease control (mean=4.72), input hiring services (mean= 4.69) and pay for advert for radio and television programmes (mean=4.56). It was equally revealed that 52.17% of the respondents (farmers) fell under the high feasibility status implying that about 52% of the respondents believed private extension services was highly feasible. Education ($b=-0.263$; $p<0.05$), farming experience $b=0.044$; $p<0.005$ and frequency of extension visit ($b=0.494$; $p<0.05$) were significant variables influencing the economic feasibility of private extension service delivery in cassava production among the respondents. It was concluded that private extension service for cassava is economically feasible in the study area from the farmer's point of view. It was recommended that private extension service providers should reach out to small-scale cassava farmers in this study area with the view of enhancing their production performance without conflicting with the existing extension services of the government operated extension system of the Agricultural development Programme (ADP) in the study area.

Keywords: Economic feasibility; private extension; cassava; small scale, Edo state; Delta State.

INTRODUCTION

Extensively, it is agreed that agriculture is fundamental to development of most African economies, as it employs over 70% Nigerians directly or indirectly despite of the neglect of the sector for the oil sector (World Bank, 2018) and accounts for one-third of Gross Domestic Product (GDP) (Uzokwe *et al.*, 2017)). The role of cassava in the fight against food insecurity and turning down famine has been emphasized (Obiazi, 2018). These roles manifest in its consumption in various form such as *garri* which is consumed in granules, *fufu/akpu*, which is assuming a national spread, tapioca and *usi* (starch) which is a delicacy among the Urhobo, Itsekiri and Ijaw tribes of the Niger Delta areas of Nigeria (Umeri *et al.* 2018). Cassava peels have also been seen as a possible replacement of conventional feed ingredients for feeding farm animals such as pig (Moseri, *et al.*, 2020).

With regards to the important role that cassava plays in the economy, there is need to intensify effort to improve its production both in quality and quantity. However, this is not possible without an effective and efficient extension system. Agriculture, especially crop production has been condemned for poor performance with regard to yield (Onyemekonwu *et al.*, 2019). In this regard, cassava is not an exemption (Onyemekihian, 2021). In the same line the public extension system of the ministry of agriculture has equally been criticized for not doing up to expectation in helping the farmers to enhance their production output. However, private extension which stands as a better alternative to the extension system of the ministry of agriculture, have not been embraced and fully utilized by cassava farmers in the study area. There is therefore, an urgent need for private extension delivery system to complement the services of the government owned extension system. Researchers

have advocated for a private sector driven extension system as alternative to the government owned public extension system which have not lived to expectation (Igene, et al, 2018). In this regard, it become necessary to embark on an economic feasibility of private extension delivery system of cassava production in two contingent states (Edo and Delta) in the Niger Delta area of Southern, Nigeria. The broad objective of the study was to examine the economic feasibility of private extension delivery system among cassava farmers in Edo and Delta States. The specific objectives include to:

- i. describe the socio-economic characteristics of cassava farmers in the study area.
- ii. examine farmers willingness to pay for extension services for cassava production
- iii. examine farmers perception on economic feasibility of private extension for cassava production
- iv. establish the relationship between farmer's socio-economic characteristics and the economic feasibility of private extension delivery for cassava production.

MATERIALS AND METHODS

The study was carried out in Edo and Delta States of Nigeria. The states are part of the states in the Niger Delta area of Nigeria and were created from the defunct Bendel State. Edo State has a land area of 19,281.93 square kilometers and is situated between Latitude 5° North and longitude 5°south, 6° West and 52° East while State Delta State lies roughly between longitudes 5°00' and 6°45' East and Latitude 5°00' and 6°30' North.

Given a population of four hundred and twenty nine (429) registered farmers in the study area, the representative sample size is three hundred and ninety nine (399), based on the Table of sampling proportion (Krejcie and Morgan, 1970) with a 95% confidence interval and 5% margin of error. This sample proportion was applied on the population of each selected LGAs (Table 1).

The study used the multistage, purposive and random sampling techniques in the selection of the target sample size. The sampling process carried out in Edo

and Delta States are described below. In both States, the three agricultural zones (Edo central, Edo North and Edo South; Delta North, Delta Central and Delta South Agricultural zones) in the States zone were purposively selected to give the study a wider coverage in the first stage. In the second stage, fifty percent (50%) of the local government areas (LGAs) from each of the agricultural zone were randomly selected to give a total ten (10) in LGAs in Edo State and 14 LGAs in Delta State (Table 1). The total farmers in the sampled LGA is 193 (Edo State) and 236 (Delta State) the target sample size is 180 (Edo State) and 219 (Delta State) according to sample size determination table (Krejcie and Morgan, 1970) given a total of 391. Random sampling was used in selecting this number of farmers from the chosen LGAs across the states as shown in Table 1. Structured questionnaires were used in Data collection while the collected data were analyzed descriptive statistical tools such as frequency, percentage and mean while Probit regression was used to test the relationship between farmers socio-economic characteristics and economic feasibility of cassava production in the study area.

Economic feasibility (farmers): Economic feasibility refers to farmers' resource base in paying for private extension services in terms of information supply and training. This was measured by asking farmers to indicate their willingness to pay for private extension services in terms of information supply and trainings. This was measured on a 5-point Likert-type scale of very willing (5), willing (4), undecided (3), less willing (2), and not willing (1). A weighted score of $3(5+4+3 + 2 + 1=15 \div 5= 3)$ was used in determining farmers' willingness to pay for private extension services. In order to determine respondent's status with respect to the economic feasibility of private extension service, they were dichotomized base on the total score obtained. The maximum score obtained, if respondent selected the very willing or willing option, which represent the feasibility status. On the 55(11x5) or 44 (11 x 4). The max score obtained from those who ticked: 33 (11 x 3) for undecided, 22 (11 x 2) for less willing and 11(11 x 1) for not willing at all of which respondent non feasibility status. Thus, any respondent whose total score ≥ 33 is consider economically feasibility or otherwise ≤ 33 .

Table 1: Population and sample frame adopted for the study

Agric. zone	Sampled LGAs	Population of registered cassava farmers (N)	No of sampled cassava farmers(n)
Edo North	Etsako West	9	9
	Owan East	7	7
	Etsako Central	6	6
Edo Central	Esan South East	58	51
	Esan North East	39	36
	Igueben	13	12
Edo South	Orhionwon	21	20
	Uhomwode	19	18
	Egor	13	12
	Ikpoba-Okha	8	8
Total	10	193	180
Delta North	Ika South	27	25
	Aniocha South	23	22
	Oshimili North	11	10
	Ndokwa West	12	11
	Ukwuani	14	13
Delta Central	Ethiope East	18	17
	Okpe	25	23
	Ughelli North	14	13
	Ughelli South	16	15
	Uvwie	11	10
Delta South	Isoko North	14	13
	Isoko South	27	25
	Patani	11	10
	Warri South	13	12
Total	14	236	219

RESULTS AND DISCUSSION

Socio economic characteristics of respondents

A distribution of the socio- economic characteristics of the farmers is presented in Table 1. The age of the farmers showed a modal class of 41-50 accounting for 50.90% with a mean age 38 years, suggesting that the farmers were young and in their active age of production; which places in a better situation to make relevant decision on private extension service delivery. Similar mean age of 40 years was reported by Mohammed et al, (2019) for farmers in Southern Borno State, Nigeria. The farmers were educated with 98.48% having formal education. This suggests that majority of the farmers can read and write, making them better placed to value private extension system. This result is in line with Onyemekonwu et al., (2018) who reported that 98.5% of farmers sampled in Delta State, Nigeria had formal education. The farmers were made up of mixed gender 54.22% female and 45.78% male. The farm size cultivated by the farmers reveals that 43.48% and 42.71% cultivated farm sized of 2.1-30 hectares and 1.0-2.0 hectares respectively. The

mean farm size cultivated by the farmers was 2.04 hectares, indicating that the farmers engaged in small scale production. The farmers operated a large household size with a mean of 8 persons, signifying the possibility for family members to assist in farm production. The income level of the farmers shows that majority (70.08%) of the farmers realized an income of ₦100,001- ₦200,000 with the mean farm income of the farmers being ₦151534.53 per annum. This suggests that the farmers earned a very low farm income compared the national minimum wage of ₦30,000. The implication of this result is that if nothing is being done to improve the farm earning of the respondents, there is the possibility for most farmers to go out production as interest in farming will be reduced for other alternative income sources. The farming experience of the farmers reveals that a higher proportion (48.45%) of the farmers had a farming experience of 16-20 years with the mean farming experience of the farmers being 13.91 years suggesting that the farmers have gathered reasonable experience that would aid them in making useful decisions

regarding the private extension service delivery in the study area. Mixed cropping is predominantly practiced by the farmers as indicated by 90.03% of the farmers.

This proposes the possibility of private extension being valued by the farmers for the various crops grown in their farms.

Table 1: Socio-Economic Characteristics of respondents (N=391)

Characteristics	Categories	Freq.	%	Mean
Age distribution (years)	30 & below	73	18.67	38
	31-40	119	30.43	
	41-50	199	50.90	
Education	No formal education	6	1.53	2.04
	Primary education	238	60.87	
	Secondary education	142	36.32	
	Tertiary education	5	1.28	
Sex	Female	212	54.22	2.04
	Male	179	45.78	
Farm size (- ha)	<1	22	5.63	2.04
	1.0-2.0	167	42.71	
	2.1-3.0	170	43.48	
	3.1-4.0	32	8.18	
	4.1-5.0	0	.00	
	>5	0	.00	
Household size	1-4	34	8.70	8.56
	5-8	151	38.62	
	9-12	177	45.27	
	>12	29	7.42	
Income level (per year) (₦)	100,000	60	15.35	151534.53
	100,001-200,000	274	70.08	
	200,001-300,000	51	13.04	
	300,001-400,000	3	.77	
	400,001-500,000	3	.77	
	>500,000	0	.00	
Farming experience (years)	10 & below	75	19.18	13.91
	11-15	125	31.97	
	16-20	191	48.85	
	21-25	0	.00	
	>25	0	.00	
Cropping system practice	Mixed cropping	371	94.88	
	Mono cropping	20	5.12	
	Total	391	100.00	

Source: Field survey data, (2021).

Farmers’ willingness to pay extension services delivery in cassava production (Economic feasibility)

The economic feasibility of agricultural extension services, measured by the farmers or respondents’ willingness to pay for extension services in cassava production in terms of information, supply and trainings are presented in Table 2. The result revealed that extension services with mean scores greater than >3.00 were services that the farmers were willing to pay for, while those below ≤ 3.00 represent services they were not willing to pay for. The result shows that the farmers were willing to pay for all the extension services presented to them. However, the major extension services the farmers were willing to pay for include

bulletins and handbills (mean=4.83), market price information (mean=4.72), information on pest and disease control (mean= 4.72), input hiring services (mean= 4.69) and pay for advert for radio and television programmes (mean= 4.56). This trend was observed in Delta and Edo States. The result suggests that the farmers were willing to pay for private extension services if brought to them. This result is in line with Matthew and Samson (2020), who reported that 43.0% of farmers studied were willing to pay some services such as personal visit to farm and information regarding how and where that can source fund. This is also in agreement with the finding of Shee at al., (2020) who found that famers to pay for improved agricultural technologies in Tanzania. The study further agrees

with, Kokoye et al. (2020), who reported that farmers in Northern Haiti were willing to pay soil testing services.

Table 2: Farmers’ willingness to pay for extension services (Economic Feasibility)

Services	Mean*	SD
Bulletin and handbills	4.83	.6
Market price information	4.72	.7
Information on pest and disease control	4.72	.5
Input hiring service	4.69	.7
Pay for advert for radio and television programme	4.56	.9
Information on processing and storage techniques	4.32	.8
Procurement of improved cassava stems	4.03	.9
Training on the use of tractor	3.88	.8
Procurement and maintenance of grating machine	3.82	.8
Training on fertilizer application	3.78	1.0
raining and demonstrations	3.50	1.1

Source: Field survey data, (2021)

Farmers’ status of economic feasibility of private extension services delivery in cassava production.

Table 3 examines the economic feasibility of agricultural extension services from two dimensions. The first dimension was to dichotomize the respondents based on whether the private extension services was feasible or not. The results indicate that the private extension services in cassava production was economically feasible with all respondents falling under this category.

Table 3: Distribution of farmers’ based on their perception of the economic feasibility of private extension services in Delta and Edo States.

Variable	Categories	Total	
		Freq	%
Economic Feasibility (Status)	Not feasible (score ≤ 33)	0	.00
	Feasible (score>33)	391	100.00
	Total	391	100.00

Source: Field survey data, (2021)

Relationship between farmers’ socio-economic characteristics and the economic feasibility of private extension service delivery in cassava production (Probit)

The study tested the hypothesis below using probit regression.

H01: There is no significant relationship between farmers’ socio-economic characteristics and the degree of economic feasibility of extension services delivery in cassava production.

Probit regression was used to analyze the hypothesis and the result is presented in Table 13. The likelihood ratio test ($\chi^2= 28.65, P<0.05$) indicates that the combined influence of the independent or socio-economic variables on the dependent variable i.e. economic feasibility of private extension service is significant. The goodness of fit test ($\chi^2 = 202.68; df = 191; p > 0.050$) it is not significant, and means that the

model is a good representation of the real-life or observed data. The coefficient of determination (0.094) indicates that the independent variables in the model explained only about 9.4% of variation observed in the respondents’ economic feasibility decision. The t-test result shows that four explanatory variables had significant influence on the respondent’s perception of economic feasibility of private extension services. Based on this, the null hypothesis is therefore rejected. The results are discussed below.

Education: The coefficient for education is negative (b=-0.263) and significant, indicating that cassava famers having lower education were more likely to be more willing to pay for private extension services than the more educated farmers i.e. private extension service is more likely to be highly economically feasible among cassava farmers with low education. A reason for this may be that educated cassava farmers may be engaged in professional high paid jobs and as such may not give out much time and interest to cassava farming. It is

equally possible that women with less education receive little remuneration/salary, unlike the more educated ones, these remuneration/salary may be grossly inadequate, and therefore prompt them to increase their interest in cassava farming which is an alternative means of boosting their income. In a study, Ajah (2012) who reported that, the more level of education of farmers, the less interest he/she will pay to access to extension services while, the less farmers level of education the more attention that he/she pays to access to agricultural extension service for the purpose of production.

Farming experience: The coefficient for farming experience was positive (b=0.044) and significant at 5% level (P < 0.05). The implication of this result is that farmers with more farming experience tend to see private extension services in cassava production to be economically feasible. A reason for this could be that the more experienced farmers have discovered the need for private extension services in cassava production over the years as a result of their experience. It could also be that experience have shown them the public extension service have not impacted the needed

production practices in cassava as so desired by them and as such their interest in private extension service provider in cassava is high. It is also possible that farmers with high farming experience are committed to their farming operation and therefore hold a positive view of private extension services in cassava production.

Frequency of Extension Visit: The coefficient for frequency of extension visit was equally positive (b=0.494) and significant at 5% level (P < 0.05). This implies that farmers who are visited more frequently tend to view private extension service in cassava production as being economically feasible. A possible reason for this could be that farmers who frequently more visited by extension agents may have seen the relevance of extension services to their farming, as such they demonstrate more willingness to pay for extension service when brought to them by private extension service providers. This result is in line with Kokoye et al (2020), who found that farmers who had contact with extension agents were more willing to pay for soil testing services compared to those who do not have contact.

Table 13: Relationship between farmers’ socio-economic characteristic and the economic feasibility of private extension service delivery in cassava production (probit)

	Coefficient (b)	Std. error	Wald χ^2	Df	Prob.
Constant	0.919	0.623	1.22	1	0.140
Age	0.010	0.009	4.32	1	0.268
Education	-0.263*	0.127	0.33	1	0.037
Sex	-0.077	0.132	0.29	1	0.561
Farm size	-0.570	0.106	2.74	1	0.590
Household size	0.041	0.025	0.20	1	0.097
Income level	-0.051	0.114	8.49	1	0.651
Farming experience	0.044*	0.015	1.08	1	0.004
Cropping system practice	-0.351	0.337	0.08	1	0.297
Frequency of extension visit	0.494*	0.245	4.08	1	0.043

Dependent variable (willingness): Less willing (47.8%); high willing (52.2%); Likelihood ratio test (X²): 28.65; df = 9; P<0.05 (Critical χ^2 = 16.92); Goodness of Fit (X²) = 202.68; df = 191; p>0.050 (Critical χ^2 = 24.25); Coefficient of determination = 0.094; *significant at 5%

Source: Field survey data, (2021)

CONCLUSION AND RECOMMENDATIONS

From the farmers ‘point of view, private extension service for cassava is economically feasible in the study area. However, the farmers’ economic feasibility or willingness to pay for private extension service in cassava production is influenced by some

socio-economic characteristics such as education, farming experience and frequency of extension visit. Based on the findings and conclusions of the study, the following recommendations are made:

- i. Workshop should be organized to enlighten farmers on the need to embrace private extension services. Such training should

particularly target educated farmers. These will help to awaken their consciousness on the need to welcome private extension service in cassava production.

- ii. Given the high level of economic feasibility of private extension services in cassava production in the study area, private extension service providers should be encouraged to embark on private extension service delivery in the study area.

REFERENCES

- Igene, C. A., Onyemekonwu, R. C. & Ehiwario, F. A. (2018). Willingness of non-governmental organizations (NGOs) to participate in agricultural extension service delivery in Edo State, Nigeria. *Nigeria Journal of Animal Production* 5(3): 102-111.
- Kokoye, S. E. H., Molner, J. J., Shannon, D. A. & Huluka, G. (2018). Farmer's willingness to pay for soil testing services in Northern Haiti. *Journal of Agriculture and Applied economics* 50 (3): 429-451
- Krejcie, R. V. and Morgan, D. W. (1970). Determining sample size for research activities. *Educational and psychological measurement* 30 (1): 607-610
- Matthew, A. O. & Samson, A. O. (2018). Willingness of farmers to pay agricultural extension services in Ondo State, *RA Journal of Applied Research* 4 (10): 2089-2096.
- Mohammed, U. S., Baba, K. M., Nmadu, J. N. and Olaleye, R. S. (2019). Technical efficiency in arable crop production under Goronyo irrigation project of sokoto State, Nigeria. *Journal of Agriprenuership and sustainable development* 2 (2): 156-164
- Moseri, H., Umeri, C. & Amaza, I. B. (2020). Influence of graded levels of cassava peels and palm kernel cake meal on performance of weaner pigs. *Nigeria Journal of Animal Production* 47 (5): 134-141
- Obiazi, C. C. (2018). Food and feed potentials of cassava: the challenges of Prussic Acid in the tuber. *Journal of Agriculture and Food Environment* 5 (3): 69-70.
- Onyemekihian, F. (2021). Analysis of the feasibility of private extension services in cassava production in Edo and Delta State. Unpublished PhD thesis, Department of Agricultural Economics and Extension, Ambrose Alli University, Ekpoma, Edo State, Nigeria
- Onyemekonwu, R. C., Ehiwario, F. A. & Igene, C. A. (2018). Socio-economic factors influencing the sustainability of farmers' membership in cooperative societies in Delta State, Nigeria. *The Nigerian Journal of Agriculture and Forestry*, 6 (1): 20-28
- Onyemekonwu, R. C., Belonwu, E. N. & Ehiwario, F. A. (2019). Analysis of small-scale farmers' income in melon production in Delta State, Nigeria. *Journal of Agriprenuership and sustainable development* 2 (2), 147-155.
- Shee, A., Azarri, C. & Haile, B. (2020). Farmers willingness to pay for improved agricultural technologies: evidence from a field experiment in Tanzania. *Sustainability* 12 (1) 216
- Umeri, C., Omoregie, A. U. & Moseri, H. (2018). The effect of Nitrogen and Potassium on the growth and yield of cassava (*manihot esculenta Crantz*) variety at Igbodo in Delta State, Nigeria. *Journal of Agriculture and Food Environment* 5 (3): 58-68
- Uzokwe, U. N., Dafe, O.D. & Ofuoku, A. U. (2017). Male and Female Participation in Selected Agricultural Development Programmes in Edo State. *Journal of Agricultural Extension* 21(1): 15- 26.
- World Bank (2018). World development indicators. Retrieved from <http://www.worldbank.org>