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Drivers of Households' Decision Making in Agroforestry Practices in Akwa Ibom State, Nigeria

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Abstract

The increased pressure on the world natural resources has resulted in unsustainable use of natural resources, environmental instability and soil degradation. This study investigated the drivers of agroforestry practices in Eket agricultural zone of Akwa Ibom State, Nigeria. Data were collected by the use of structured questionnaires. Simple random sampling was adopted in the selection of 102 farm households from Eket agricultural zone of Akwa Ibom State. Data were analyzed using descriptive statistics and probit model. The result showed that the average year of formal education was 11.86, with the mean age of 44.46. Also, the mean score of 2.61 suggest that majority of the respondents were aware of agroforestry practices. The probit analysis indicates that factors such as marital status, farming experience, educational level and land ownership status had positive and significant effects on their decision to adopt agroforestry practices. Conversely, total household income had a negative and statistically significant effect on farmers' decision to adopt agroforestry. Socio-economic characteristics such as marital status, educational level, farming experience and land ownership status were the major drivers of household's decision making in agroforestry in the study area.

Keywords

agroforestry, decision making, farm households, binary pobit, Nigeria

1. Introduction

The importance of agroforestry to the sustenance of mankind is an incontrovertible fact that should not be overlooked. Trees do not only provide livelihood for rural people, they are important ecosystem functions and sustainability as carbon sinks and oxygen pool. The World Bank reported that forests and trees outside forest contribute to the livelihood of more than 1.6 billion people worldwide (World Bank, 2008).

Agroforestry is a sustainable land use practice and system that can be implemented worldwide in any type of land cover and is able to fulfill any of the three pillars of sustainability: economic, environment and social by fostering green growth and creating jobs (Mbow, Noordwijk, Luedeling, Minang, & Godwin, 2014). Agroforestry has a positive impact on food and energy security, human nutrition, poverty reduction and it helps farmers to build resilience to climate change. Agroforestry practices take advantage of the interactive benefits (both environmental and productive) from integrating trees, shrubs with crops and/or livestock. It offers ways to take advantage of new and profitable product markets while applying specialized knowledge and skills to the development of stable, resilient and sustainable production systems.

Available literatures suggest that in a context of population growth and climate change, food insecurity still remains a challenge in developing countries. In Nigeria, the Federal Government has taken several steps over the years to use agriculture to alleviate poverty and attain food security. But the efforts faced significant constraints (Forum for Agricultural Research in Africa, 2018). Agricultural lands have been largely degraded due to continuous and/or intensive production leading to low soil fertility. Hence, the need to improve soil fertility and meet nutritional needs of the rapidly increasing population has become a very important issue in development policy. To meet nutritional needs, the productivity and efficiency of current agricultural land use must increase (Godfray, Beddington, Crute, Haddad, & Lawrence, 2010). Smallholder farmers are therefore faced with the challenge of attaining food security while at the same time ensuring sustainability of their natural resource-base, and struggling to cope with climate-related variability and change. Agroforestry practices have emerged as sustainable measures of addressing land degradation and loss of soil fertility (Lehmann, Peter, Steglich, Gebaure, Huwe, & Zech, 1998) as well as reducing the effect of climate change.

Agroforestry combines shrubs and trees in agricultural and forestry technologies to create more diverse, productive, profitable, healthy, ecologically sound, and sustainable land-use systems (Mbow et al., 2014). The insight that trees on farms provide livelihood benefits is not new, and diversity-based approaches to agricultural adaptation to climate variability have been adopted by many farmers (Thangata, Mudhara, Grier, & Hildebrand, 2007). Furthermore, in light of recurring food shortages, projected climate change, and rising prices of agricultural inputs, agroforestry has recently experienced a surge in interest from the research and development communities, as a cost-effective means to enhance food security, while at the same time contributing to climate change adaptation and mitigation.

Nigeria for instance, and other developing countries are already experiencing low crop yields and altered animal compositions as a result of extreme weather and climate change. This is evidenced by the late arrival of rains, drying up of streams and small rivers that usually flow year round. It follows therefore that a well-performing agricultural sector is fundamental in addressing hunger, poverty and inequality through addressing climate variability. But there seems to be under appreciation of trees and forest resources by governments at all levels in Nigeria. Available report indicates that Nigeria losses about 350,000 to 400,000 hectares of land yearly to deforestation (Vanguard news editorial, 2016). The annual rate of deforestation in Nigeria is put at 3.5 percent per annum. As such, Nigeria is at the brink of losing it forest resources. Also, less than 5% of the country's total land area is afforested and even the sparse forest remainders are under threat with land use pressures from agriculture, infrastructure, housing and resource harvesting which are critical drivers to deforestation (Onoja, 2018), which is a major cause of climate variability. As climate variability increases and related extreme weather events become more frequent and severe, there is a need to assess the level of awareness of farmers on agroforestry practices in the area. This is important because most rural farmers are not aware of the benefits of agroforestry as a sustainable land use system which enhances farmers' ability to adapt to climate change.

Agroforestry systems has emerged as having the potential to enhance the resilience of smallholders to current and future climate risks including future climate change (Lasco, Delfino, Catacutan, Simelton, & Wilson, 2014). Previous researchers on agroforestry observed that factors such as farm size, land tenure, lack of planting materials perceived low fertility, and farm preparation methods and age influenced farm households' decision- making in agroforestry (Kwesgia *et al.,* 2003; Kiel *et al.,* 2005; Mwase *et al.,* 2015; Ajaji *et al.,* 2008; Wafukes, 2012). Furthermore, Rogers (2003) noted that the decision to practices or adopt any innovation is influenced by physical, socio economic and mental factors. Majority of farmers in the study area are not aware of the benefits of agroforestry practices (i.e., improved household income, employment generation and food security). This study therefore investigates the factors that influence farm household's decision to adopt agroforestry in Eket agricultural zone of Akwa Ibom State, Nigeria.

2. Materials and Methods

2.1 Study Area

The study was carried out in Eket agricultural zone of Akwa Ibom State, Nigeria. Eket is the second largest city in Akwa Ibom State, Nigeria. The name also refers to the indigenous ethnic group of the region and to their language. The city itself is an industrial city that in recent years has become a conurbation engulfing separate village, as a population of over 200,000 while entire Urban area, which covers Okon, Nsit-Ubium, Idua, Afaha-Eket Onna-Eket and Esit-Eket, has a combined population of 364,489. Farmers in the State are also experts in palm products especially palm oil production, kernels, yams, raffia products, raffia fibers, sweet wine, cassava, fluted pumpkin, maize, pepper, rice, garden egg, cucumber, and leafy vegetables. The cropping pattern in the area is dominated by mixed cropping, although sole cropping is also practiced. Some farmers keep livestock like goats, pigs, sheep rabbit and poultry.

2.2 Sampling Procedure and Data Collection

Multi-stage and random sampling techniques were employed in selecting the 102 farm households for the study. The first stage involves the random selection of three L. G. Areas (blocks) out of seven L. G. Areas (blocks) in the zone. Secondly, two communities (cells) were randomly selected from each of the three selected L.G.Areas (block) making six communities (cells). Thirdly, from each of the six communities, (cells) seventeen households were randomly selected making a total of one hundred and two farm households for the study.

Data for this study was obtained mainly from primary source with the use of structured questionnaire. The instrument for data collection focused on such information as socio-economic characteristics of farm households, level of awareness of agroforestry practices, types of agroforestry practices, drivers of farm household's decision on agroforestry and other vital information relevant to the study. Data were collected between March and June, 2018.

3. Data Analysis

Descriptive (frequency, percentage, mean and standard deviation) and inferential statistics, such as binary probit model were used for this study. Probit model is useful in situations where you have a dichotomous output that is thought to be influenced or caused by levels of some independent variable (Indiana State University, 2005). Abah (2011) used probit model to estimate the determinants of farmers willingness to pay for solid waste used for tomatoes gardening in Federal capital Territory, Abuja, Nigeria. Also, Oni, Oladele, and Oyewole (2005) also used probit to determine the factors influencing default in loan repayment among poultry farmers in Ijebu Ode Local Government Area of Ogun State, Nigeria. Brain Seveir and Won (2005) in their study on the precision farming Adoption by Florida citrus producers used the probit model in analyzing personal willingness to adopt technology in citrus production.

Probit analysis is very similar to logit and tobit, but is preferred when data are normally distributed (Kim, 2000). To estimate the drivers of adoption of agroforestry among farmers in Eket agricultural zone, a binomial or discrete dependent variable provides a good framework where there is a cluster of farmers who are adopting agroforestry practices and farmers who are not adopting. The discrete dependent variable *Y* was assigned 1 if farmers adopt and/or practiced agroforestry in the study area and 0 if otherwise.

The explicit form of the binary probit model is specified as:

$$Pr(Y = 1/X) = ß_0 + ß_1X_1 + ß_2X_2 + ß_3X_3 + ß_4X_4 + ß_5X_5 + ß_6X_6 + ß_7X_7 \ldots\ldots\ldots + e$$

Where:

Y = is dichotomous (discrete) dependent variable which can be explained as Y= 1 if a farm household adopt agroforestry practices, Y= 0 if otherwise.

$ß_0$ = Intercept

$ß_1 \ldots ßn$ = Coefficient of the independent variables

$X_1 \ldots X_n$ = The drivers of adoption of agroforestry in the study area

e = The stochastic error term.

3.1 Binary Probit Model

The hypothesised drivers of "agroforestry practices" in this study are X_1-X_n are explained thus:

X_1 = Gender of the Household Head	Dummy (1 if male, 0 otherwise)
X_2 = Ages of Household head (years	Continuous (in number)
X_3 = Marital Status	Dummy (1 if couple, 0 otherwise)
X_4 = Years of Farming experience	Continuous (in number)
X_5 = Membership of Organization	Dummy (1 if member, 0 otherwise)
X_6 = Educational level	Years of formal schooling (number of years)
X_7 = Household size	Continuous (in number of persons)
X_8 = land ownership status	Dummy (1 if owner of farmland, 0 otherwise)
X_9 = Land size	Continuous (in ha)
X_{10}=Total household income X_{11} = Extension visit	Continuous (in Naira) Dummy (1 if visited by extension agents, 0 otherwise)

3.2 Results

As presented in Table 1, majority (63.73%) of the farmers were male while the remaining (36.27%) were females with a mean age of 44.46 years. Similarly, Asa and Archibong (2016) reported that the study area is dominated by male household heads. About 86% of the respondents were married while the remaining 16% were single. Majority (about 65%) of the respondents were non-members of social organizations and most (56.86%) of the farmers fell within the household size of 5 to 8 persons, this is in line with the findings of Okon and Enete (2009) and Bassey *et al.* (2015). Also, the mean farming experience and mean household size were 17 years and 9 persons, respectively. These agreed with the findings of Udofia, Owoh, and Thomas (2010). A cursory look at Table 1 shows that majority (68.63%) inherited their farm land, 28.43% purchased their farm land and 2.94% acquired their farm land through contact farmers. The mean farm size was about 1.42 ha.

Table 1. Frequency Distribution of Farmers According to Their Socioeconomic Characteristics

Genders of Household Heads		
Male	65	63.73
Female	37	36.27
Total	**102**	**100**
Age (years)		
_<30	7	6.87
31-40	26	25.49
41-50	49	48.03

51-60	17	16.67
>60	3	2.94
Total	**102**	**100**
Marital Status of Household Heads		
Single	16	15.69
Married	86	84.31
Total	**102**	**100**
Educational qualification		
Primary education	5	4.9
Secondary education	46	45.1
Tertiary institution	51	50
Total	**102**	**100**
Household Size		
1-4	3	2.94
5-8	58	56.86
9 and Above	41	40.9
Total	**102**	**100**
Years of farming experience		
1-5	7	6.87
6-10	19	18.62
11-15	22	21.57
16-20	17	16.67
Above 20	37	36.27
Total	**102**	**100**
Land acquisition Status		
Inheritance`	70	68.63 lease
Purchase farm	29	28.43
Total	**102**	**100**
Membership of social Organization		
0	65	63.73
1	37	36.27
Total	**102**	**100**
Distribution of respondents based on Farm size		
<1ha	19	18.63
1-2ha	73	71.57

Above 2ha	10	9.8
Total	**102**	**100**

Source: Field survey, 2018.

3.3 Drivers of Farmer's Decisions to Adopt Agroforestry Practices in Eket Agricultural Zone of Akwa Ibom State, Nigeria

Driver of farmer's decision on agroforestry was done using probit regression model as presented in Table 2. The result showed that five of the eleven explanatory variables were statistically significant. The chi-square result shows that the likelihood ratio statistics (18.207) is highly significant ($P<0.000$), suggested that the model has a strong explanatory power. The pseudo R^2 value of the model was 0.589. Thus the explanatory variables used in the model are collectively able to predict about 59% of the variations farmers' decision to adopt agroforestry practices. However, the parameter estimates of the binary probit model provided only the direction of the effect of the independent variables on the dependent (response) variable: estimates do not represent actual magnitude of the change or probabilities. The marginal effects were also estimated in order to derive the magnitude of the impact of the independent variables on the probabilities of a farmer adopting agroforestry practices. The coefficient of marital status (1.68195) was positive and statistically significant ($P<0.05$). The coefficient of years of farming experience (0.21960) was positive and highly statistically significant ($P<.0.01$). Years of formal schooling (Edu) had a positive and statistically significant ($P<0.05$) co-efficient (0.16954).Land ownership status had a positive and statistically significant ($P<0.10$) coefficient (1.64072). Conversely, the coefficient of total household income (-0.00024) was negativity related to the probability of adoption of agro-forestry practices by farmers.

Table 2. Binary Probit Model of the Drivers of Agroforestry Practices in the Study Area

Explanatory variables	Coefficient (Standard error)	Z-values	Marginal effects
Intercept	-2.78592 (1.57755)	- 1.77*	
Gender (X_1)	0.48254 (0.62825)	0.77	0.00775
Age (X_2)	-0573124 (0.0383745)	- 1.49	- 0.00073
Marital status(X_3)	**1.681954 (0.74438)**	**2.27****	**0.1137**
Experience (X_4)	**0.21960 (0.730317)**	**3.01*****	**0.00282**
Membership. of Org. (X_5)	0.474655 (0.61883)	0.77	0.00543
Education (X_6)	**0.1695498 (0.07362)**	**2.30****	**0.00247**
Household size (X_7)	0.03212 (0.109100)	0.29	0.000413
Land ownership Status (X_8)	**1.64072 (0.94490)**	**1.74***	**0.06063**
Land size (X_9)	0.01855	0.03	0.00023

	(0.58091)		
Total farm income (X_{10})	**-0.000241 (0.00001)**	**1.93***	**- 3.09e-09**
Extension Visit (X_{11})	0.21172 (0.579391)	0.37	0.0027211
Regression diagnostics			

Log likelihood ratio = 18.207121

LR Chi^2 = 52.21

Pseudo R^2 = 0.5891

No. of observations = 102

Source: **Field Survey, 2018** *** = significant (P<0.01),** = significant (0.05)**,** *= significant (P< 0.10) and a = dy/dx is discrete change of dummy variable from 0 to 1.

4. Discussion

The variables with significant influence to the adoption of agroforestry practices in the study area were marital status, farming experience, educational level, land ownership status, and household income. Majority (80.39%) of the farmers were of a primeage considered to be very productive in farm activities. However, age was found not to influence adoption of agroforestry technology. This is in line with the findings of Wafuke (2012) who found out that there was no significant relationship between age and adoption of agroforestry technology. The results could also mean that young people in the area were involved in formal employment and business activities that supplement household income than agroforestry. The large household size could mean regular supply of labour for agroforestry practices. Jamala, Shehu Yidau, and Joel (2013) also had similar findings. Years of farming experience was high, and this could make them to be more efficient in production through learning by doing. The mean farm size of less than 1.5 ha implies that the respondents were typically smallholder farmers possessing relatively small landholdings. Mwase *et al.* (2015) noted that small land holdings influenced adoption of agroforestry in South-Africa. Similarly, Ajayi *et al.* (2003) found out farm size have a positive association with farmers decision to continue with agroforestry practices. The marginal effect with respect to marital status showed that a unit increase in the numbers of married respondents will increase the likelihood of adopting agro-forestry by 11%. This implies that married respondents adopted agro-forestry in the study area.

In addition, more experienced farmers adopted agro forestry practices on their farmland. The marginal effects suggest that a one year increase in the respondent's years of experience will increase the probability of them adopting agro-forestry practices by about 0.2%. Educational status showed positive and significant coefficient, an indication that highly educated respondents adopted agro-forestry practices. The marginal effect showed that a one year increase in the level of education of the respondents increased the probability of adopting agroforestry practice by 0.02%. These findings lend credence from the findings of Jamala, Shehu, Yidau, and Joel (2015), who observed that education was a significant factor in facilitating awareness and adoption of agricultural technologies. Also, Adekunle

(2009), pointed out that the level of education of farmers could directly affects their ability to adapt to change and to accept new ideas. Land ownership status had a positive and statistically significant relationship, an indication that farmers who own land will invest on tree planting since he/she knows that whatever is invested on that land is fully owned by them, Wafuke (2012) had similar findings. Furthermore, the marginal effect of total farm income shows that a 1 naira increase in total household income will reduce the likelihood of a household adopting agroforestry practices. This is intuitive because as the household income increases, the farmers tend to diversify into non-farm activities, hence not willing to adopt agroforestry practices. This result is in line with the findings of Mwase *et al. (*2015)

4.1 Significance Statement

This study uncovered the drivers of agroforestry practices in the study area. Even though adoption of agroforestry practices could improve soil fertility, land quality and also help to suppress weeds. Agroforestry also ensures the provision of non-timber products such as fruits, fodder, energy and fiber. Majority of the farmers in the study are yet to fully adopt agroforestry. Understanding the drivers as well as the constraints to agroforestry adoption of agroforestry in the study area will help researchers and policy makers to develop policy that will reduce the barriers to adoption of agroforestry, hence, ensuring food security in the study area.

5. Conclusions

This study estimated the drivers of farmers' decision to adopt agroforestry in Eket agricultural zone of Akwa Ibom State, Nigeria. The study showed that the sampled farmers were mostly male, fairly educated, young and in their active/productive age. However, most households were aware of agroforestry practices and were willing to adopt. Socio-economic characteristics such as marital status, educational level, farming experience and land ownership status were the major drivers of household's decision making in agroforestry in the study area.

References

Abah, E. O. (2011). *Economics of Organic Solid Waste Utilization in Urban Tomatoes Gardening in Abuja, Nigeria* (An Unpublished M.Sc Thesis). Submitted to the Department of Agricultural Economics, University of Nigeria Nsukka.

Adekunle, V. A. (2009). Contributions of Agroforestry practices in to Environmental sustainability and sustainable agricultural production in Ondo State, Nigeria. *Africa Focus*, *22*(2), 22-40.

Ajayi, O. C., Akinifesi, F. K., Mitti, J.de Woif., & Matakala, P. (2008). Adoption, Economics and Impact of Agroforestry Technologies in southern Africa. In D. R. Batish, R. K. Kohli, Jose, & P. singh (Eds.), *Ecological basic of agroforestry* (pp. 343-360).

Ajayi, O. C., Franzel, S., Kuntashulla, E., & Kwesiga, F. (2003). Adoption of Improved fallow technology for Soil fertility Management in Zambia: Empirical Studies and Emerging Issues.

Agroforestry Systems, *59*(3), 317-326. https://doi.org/10.1023/B:AGFO.0000005232.87048.03

Asa, U. A., & Archibong, E. M. (2016). Social Capital and Food Security among Rural farming households in Akwa Ibom State, Nigeria. *Journal of Advances in Social Sciences-Humanities*, *2*(15-19). https://doi.org/10.15520/jassh20234

Bassey, N. E., Edet, M. E., & Okeke, C. C. (2015). Determinants of off-farm labour supply among Farming households in Akwa Ibom State, Nigeria. *Agricultural Science*, *3*(1). https://doi.org/10.12735/as.v3i1p31

Brain, J., Seveir, & Won, S. L. (2005). *Precision Farming Adoption by Florida citrus producers: University of Florida; IFAS Extension: First published February 2005*. https://doi.org/10.13031/2013.18840

Forum for Agricultural Research in Africa, FARA. (2018). Scaling strategies for Agricultural innovation in Nigeria. *FARA Research report*, *2*(1).

Godfray, H. C. J., Beddington, J. R., Crute, I. R., Haddad, L., & Lawrence, D. (2010). Food security: The challenge of feeding 9 billion people. *Science*, *327*(812). https://doi.org/10.1126/science.1185383

Indiana State University. (2005). *Analyzing Data in SPSS 13.0 Using Regression Analysis*. Indiana: Office of Information Technology

Jamala, G. Y., Shehu, H. H., Yidau, J. J., & Joel, L. (2015). Factors Influencing Adoption of Agroforestry among Smallholder Farmers in Toungo, South-eastern Adamawa State, Nigeria. IORS Journal of Environmental Science. *Toxicology and Food Technology (IORS-JESTFT)*, *6*(6), 66-72. https://doi.org/10.9790/2402-0666672

Keil, A., Zeller, M., & Franzel, S. (2005). Improved fallows in Smallholder maize production in Zambiaido initial testers adopts the technology. *Agroforestry systems*, *64*, 225-236. https://doi.org/10.1007/s10457-004-2410-0

Kim, V. (2000). *Probit Analysis: A Quick Overview*. Retrieved March 12, 2018, from http://home.gwu.edu/~soyer/mv1h.pdf

Kwesgia, F., Akinnifesi, F. K., Mafongoya, P. L., McDermott, M. H., & Agumya, A. (2003). Agroforestry research and development in southern Africa during the1990s: Review and challenges ahead. *Agroforestry systems*, *59*(3), 173. https://doi.org/10.1023/B:AGFO.0000005222.68054.38

Lasco, R. D., Delfino, R. P., Catacutan, D. C., Simelton, E. S., & Wilson, D. M. (2014). Climate risk adaptation by smallholder farmers: the roles of trees and agroforestry. *Current Opinion in Environmental Sustainability*, *6*, 83-88. https://doi.org/10.1016/j.cosust.2013.11.013

Lehmann, J., Peter, I., Steglich, C., Gebauer, G., Huwe, B., & Zech, W. (1998). Below-ground interactions in dryland agroforestry. *Forest Ecol. & Management*, *111*, 157-169. https://doi.org/10.1016/S0378-1127(98)00322-3

Mbow, C., Noordwijk, M. V., Luedeling, E., Minang, P., & Godwin, K. (2014). Agroforestry Solutions to address food security and Climate change challenges in Africa. *Current Options in Environmental Sustainability*, *6*, 61-67. https://doi.org/10.1016/j.cosust.2013.10.014

Mwase, S., Nyoloma, N., Manduwa, & Naika. (2015). factors affecting the adoption of Agroforestry and evergreen agriculture in southern Africa. *Environment and Natural resource Research*, *5*(2). https://doi.org/10.5539/enrr.v5n2p148

Okon, U. E., & Enete, A. A. (2009). Resource Use Efficiency among Urban Vegetable Farmers in Akwa Ibom State, Nigeria. *Tropicultura*, *27*, 4.

Oni, O. A., Oladele, O. I., & Oyewole, I. K. (2005). Analysis of Factors Influencing Loan Default among Poultry Farmers in Ogun State Nigeria. *Journal of Central European Agriculture*, *6*(4), 619-624.

Onoja, J. (2018). *Nigeria: Deforestation-National Conservation Foundation seeks Data base of indigenous trees*. Daily trust editorial April 6.

Rogers, E. M. (2003). *Diffusion of innovations* (4t ed.). New York free press.

Thangata, P. H., Mudhara, M. Grier, C., & Hildebrand, P. E. (2007). Potential for Agroforestry Adoption in Southern Africa: A. Comparative Study of improved Fallows &green Manure Adoption in Malawi. *Zambia &Zimbabwe Ehnobotory Research & Application*, *5*, 67-75. https://doi.org/10.17348/era.5.0.67-75

Udofia, S. I., Owoh, P. W., & Thomas, Y. K. (2010). Study on Agroforestry Practices in Abak Local Government Area, Akwa Ibom State, Nigeria. *Global Journal of Agricultural Sciences*, *9*(1), 9-16. https://doi.org/10.4314/gjass.v9i1.62780

Vanguard news editorial. (2016). Nigeria loses about 350,000 to 400,000 hectares of land per year to deforestation report. 19th April.

Wafukes. (2012). *Adoption of Agroforestry technologies among small scale farmers in Nzoia location, luari, District Kenya*. An MSC. Thesis submitted to the department of Environmental science, Egertion University, Kenya.

World Bank. (2008). *Agriculture for Development: Overview*.