FARMERS ACCEPTABILITY AND WILLINGNESS TO PAY FOR ORGANIC FERTILIZER IN UYO LOCAL GOVERNMENT AREA, AKWA IBOM STATE, NIGERIA

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ABSTRACT

Recently, concerns about the negative impacts of synthetic fertilizers on human health and the environment have led to increased interest in organic farming as sustainable alternatives. The study assessed farmers acceptability and willingness to pay for organic fertilizer with the specific objectives of determining the level of awareness of organic fertilizer among farmers, the types of materials used as organic fertilizer by farmers, the accessibility of the organic fertilizer by farmers, the willingness to pay for organic fertilizer by farmers and the factors that influences farmers acceptability and willingness to pay for organic fertilizer. The study was conducted in Uyo LGA, Akwa Ibom State, Nigeria. A two stage sampling procedure was used to collect data from 200 farmers using a structured questionnaire which were analyzed using descriptive statistics, likert scale and logit regression model. From the result, majority of the respondents have high level of awareness of organic fertilizer in terms of components (75%), and about 85% of the respondents were willing to pay for organic fertilizer. The result showed that factors that have a positive significance on the willingness to pay for organic fertilizer includes availability of organic fertilizer, level of awareness of organic fertilizer and educational level but age, gender, household size and price of organic fertilizer have negative influence on the willingness to pay for organic fertilizer. It was concluded that farmers are more likely to purchase more of organic fertilizer if the benefits outweigh the cost and recommended that awareness campaigns should be created to educate farmers and consumers on the benefits of organic fertilizers, emphasizing their health advantages, environmental impact, and increased crop yields.

Key words: *Organic fertilizer, Acceptability, Willingness to Pay (WTP)*

INTRODUCTION

The modern organic farming movement gained momentum in the 1960s and 1970s with the rise of the environmental and health movements. Organic farming practices prioritize the use of natural inputs and techniques by avoiding the use of synthetic pesticides, herbicides and fertilizers, instead relying on biological pest control, crop rotation, and the application of organic matter like compost and manure. The demand for organic products has grown significantly over the past few decades, driven by consumer awareness of the environmental and health benefits of organic farming.

The use of organic fertilizer aligns with the principle of organic farming. Organic fertilizers are derived from natural sources and are used to provide essential nutrients to plants . They are an integral part of organic farming. The background of organic fertilizers can be traced back to ancient agricultural practices and the recognition of the importance of nutrient-rich soil for plant growth. One of the key advantages of organic fertilizers is their ability to improve soil health and long term fertility. Organic fertilizers contain a wide range of nutrients including nitrogen, phosphorus, potassium and micro nutrients along with organic matter. When applied to the soil, organic fertilizers release these nutrients slowly over time, providing a steady supply to plants and promoting healthy growth. Organic fertilizers also contribute to soil structure and water holding capacity (Ojeniyi, 2000). The organic matter in those fertilizers improves soil structure by enhancing its ability to hold moisture, promote aeration and prevent erosion. Furthermore, organic fertilizers help to foster beneficial microbial activity in the soil, which aids in nutrient cycling and plant nutrient uptake (Negi and Negi, 2018; Adesop and Matthews, 2012)). Aside compost manure, other organic fertilizer options include animal manures, bone meal, blood meal, fish emulsion, seaweed extracts and various plant-based products. These materials are often processed or combined to create balanced fertilizers that provide a complete range

of nutrients required by plants. This study will be conducted to explore the attitudes and behaviors of farmers toward the use of organic fertilizers as well as their willingness to pay for such products. The research sought to identify factors that influence farmers' acceptance of organic fertilizers, such as cost, perceived benefits, availability and ease of use. By understanding farmers' attitudes and preferences regarding organic fertilizers, this study also helped inform policies and initiatives aimed at promoting sustainable agriculture practices. It also provided valuable insights for agricultural companies and entrepreneurs seeking to develop and market organic fertilizers to farmers.

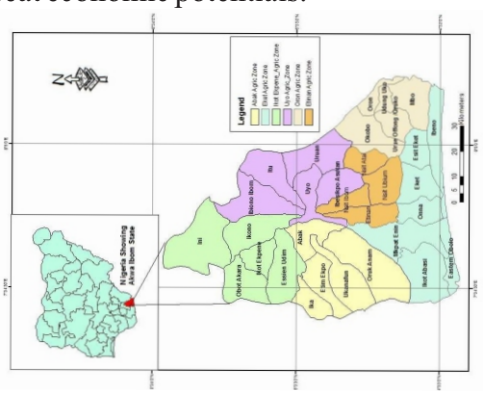
Despite the growing interest in sustainable agricultural practices and the use of organic fertilizers, there is limited understanding of farmers' attitudes and behaviors towards the adoption and use of such fertilizers. Moreover, there is little knowledge about farmers' willingness to pay for organic fertilizers and the factors that influence their acceptance of these products. There are several factors that may influence farmers' acceptability and willingness to pay for organic fertilizer, therefore, there is a need to understand the factors that affect or influence farmers' willingness to pay for organic fertilizer to promote the adoption and use for sustainable farming practices. For the production of organic fertilizer to be at a commercial scale such that it can substitute for inorganic fertilizer effectively, it is necessary to ascertain farmers' attitude toward the product, what quantity are they likely to buy, at what price per unit, and the factors that will affect their purchase habit. These are the objectives of the study which have to do with the concept of willingness to pay (WTP). Willingness to pay for organic fertilizer may be defined as the amount of money a farmer is willing to give up in exchange for a specific quantity of organic fertilizer without affecting his utility (Adeoye, 2005). Coulibaly, et al (2011) opines that willingness to pay (WTP) is the maximum amount of money that a farmer is willing to forgo in order to obtain a given quantity of organic fertilizer. WTP may be altruistic, instrumental or induced (Cranfield and Magnusson, 2003). The determination of farmers' WTP for organic fertilizer will provide necessary input to prospective entrepreneurs to enable them reach decisions as to how the product can be made more user-oriented, and thus facilitate the establishment and recognition of markets for the commodity.

The general objective of this study is to assessed farmers acceptability and willingness to pay for organic fertilizer with the specific objectives of determining the level of awareness of organic fertilizer among farmers, the types of materials used as organic fertilizer by farmers, the accessibility of the organic fertilizer by farmers, the willingness to pay for organic fertilizer by farmers and the factors that influences farmers acceptability and willingness to pay for organic fertilizer.

METHODOLOGY

Study Area

The study was conducted in Uyo Local Government Area of Akwa Ibom State. Uyo Local Government Area is situated between latitude 5° 01' North of the Equator and longitude 7° 56' East of the Greenwich Meridian with a total land mass of 985.6559km. Uyo Local Government Area is among the pioneer Local Government Areas in Akwa Ibom State. When Akwa Ibom State was created out of Cross River State in 1987, Uyo Local Government Area became the administrative site of the state. Uyo Local Government Area presently comprises of seventy-five (75) villages and made up of four (4) clans of Ikono, Etoi, Oku and Offot. Uyo Local Government Area is geographically bounded in the North by Itu Local Government Area, in the West by Etinan, Abak and Ibesikpo Asutan Local Government Areas, in the South by Uruan and in the East by Nsit Atai Local Government Area. The people engaged in the production of cassava, plantain, waterleaf, fluted pumpkin, cocoyam, maize etc. It is endowed with enormous wealth and great economic potentials.



Source of Data, sampling procedure and data analyses

Data for this study was obtained through primary source. The primary data were collected using a structured questionnaire which was given randomly to the farmers within the selected study area. The variables on which information were collected include; age of respondents, gender, marital status, educational level, household size, years of farming experience, level of awareness of organic fertilizers etc.

Two-stage sampling procedure was adopted for the selection of 200 samples. The first stage involved purposive sampling of 5 communities that at practicing organic farming. The second stage was a modified random sampling method, known as random walk method to selected 40 organic farmers who practiced organic farming in each of the 5 communities.

The data collected were analyzed using descriptive statistics, customized nominal index, and contingent valuation method and logit regression model.

Model Specification

Logistic linear regression model was used to estimate farmer's willingness to pay (WTP) for organic fertilizer. The log linear model, which is based on cumulative probability function was specified because of it ability to deal with a dichotomous dependent variable (Etim and Benson, 2016, Loveth and Rodney, 2017). In order to identify factors influencing WTP for organic fertilizer, the farmers responses to WTP questions were regressed against some independent factors. The log linear model is as specified:

Considering the following choice alternatives: 1 = if farmers produced organic fertilizer by themselves and they do not have to buy it., 0 = if farmers buy formulated organic fertilizer and at what price are they willing to pay for it.

Where Latent variable (Y_i) = Farmers' acceptance of and willingness to pay for organic fertilizer.

b_0 - Intercept of the equation; X_1 - Age of respondent (years); X_2 - Gender; 1= male and 0 otherwise; X_3 - Educational level (years); X_4 – Household size (numbers); X_5 – Level of awareness of utilization of organic fertilizer; 1= yes and 0 otherwise (dummy variable); X_6 – Price of organic fertilizer (naira/kg); X_7– Availability of organic fertilizer; 1- readily available and 0 otherwise; e_i – stochastic error term.

RESULTS AND DISCUSSION

Socio – Economic Characteristics of Respondents

Table 1 presents frequency distributions of the farmers' socio-economic characteristics that are considered important in determining the willingness to pay for organic fertilizer. Generally, the results are in agreement with the study and findings of pervious works carried out in the same study area (Akpan, et al, 2016, Udoh, E. J., et al, 2017, and Nyong, I. E. et al, 2024).

Table 1: Socio-economic Characteristics of the respondents

Variables	Frequency	percentages
Sex		
Male	82	41.0
Female	118	59.0
Age		
20-30	36	18.0
31-40	54	27.0
41-50	80	40.0
51 and above	30	15.0
Educational qualification		
1-6	12	6.0
7-12	128	64.0
13 and above	60	30.0
Marital Status		
Single	36	18.0
Married	139	69.5
Widowed	25	12.5
Household size		
1-5	83	41.5
6-10	115	57.5
11 and above	2	1.0
Farming Experience		
1-5	45	22.5
6-10	60	30.0
11-15	67	33.5
16-20	12	6.0
21 and above	16	10.5
Incomelevels		
15,000-30,000	16	8.0
31,000-60,000	60	30.0
61,000-90,000	29	14.5
91,000 and above	95	47.5

Source: Field Survey (2023)

Sex of Respondents

The sex distribution of the respondents as seen on table 1 revealed that out of the 200 respondents, 106 respondents representing 53.0% were female while 94 respondents representing 47.0% were male. This implies that majority of the farmer are female.

Age of Respondents

The age distribution of the respondents revealed that out of the 200 respondents, 36 respondents representing 18% were 20-30 years of age, 54 respondents representing 27.0% were between 31 -40 years of age. Those between 41years and above were 80 respondents representing 40%.

Education Qualification of Respondents

The education qualification distribution of the respondents revealed that out of the 200 respondents, only 2 respondents representing 1.0% have no formal education, 45 respondents representing 22.5% have primary education, 120 respondents representing 60.0% have possess secondary education while 33 respondents representing 16.5% have tertiary education. This implies majority of the respondent were secondary school leavers and can at least read and write.

Married Status of Respondents

The married status distribution of the respondents showed that out of the 200 respondents, 36 respondents representing 18% were single, 139 respondents representing 69.5% were married, 25 respondents representing 12.5% were widowed. The high percentage of married respondents suggests that the majority of the surveyed population falls within this marital status. However, it's also noteworthy that a significant proportion of the respondents are single, while a smaller but still noticeable segment is widowed.

Household size of Respondents

The household size distribution of the respondents revealed that out of the 200 respondents, 83 respondents representing 20.5% were 1-5 family size, 115 respondents representing 67.0% were between 6 -10 and those of 11 and above were 2 representing 1% of the respondents. This indicates that majority of the respondents are from moderately sized households.

Years of farming experience of the Respondents

The farming experience of the respondent revealed that out of the 200 respondents, 45 respondents representing 22.5% had 1- 5 years of farming experience, 60 respondents representing 30.0% had 6- 10 years of farming experience. 67 respondents representing 33.5% had 11- 15 years of farming experience, 12 respondents representing 6.0% had 16- 20 years of farming experience, 16 respondents representing 10.5% had 20 years and above of farming experience.

Income Level of Respondents

Further Table 1 presents the income distribution of the respondents in Naira, and it provides insights into the financial situation of the respondents. It is evident that the majority of respondents, a significant 47.5%, fall within the income range of 90,000 and above. The least income range falls within the range of 15,000-30,000 with 8%. The mean income of respondents was 94,550Naira. This disparity suggests some income inequality within the sample, as majority of the respondents enjoys a significantly higher incomes, while a small fraction is situated in the middle - income level.

Level of awareness of Organic Fertilizer

Table 2 presents the distribution of the respondents based on level of awareness of organic fertilizer. Six opinion questions were constructed to guide in determining the level of the farmer awareness as to the benefit of applying organic fertilizer to their crops. Responses on question 1 revealed that 75.5% of the respondents are aware that organic fertilizer can be used in farming while 24.5% of the respondents are not aware. Responses on question 2 revealed that 71.5% of the respondents are aware that crops grown with organic fertilizer are safer than those grown with inorganic fertilizer while 28.5% of the respondents are not aware. Responses on question 3 revealed that 72.5% of the respondents are aware that organic fertilizer are made from natural materials whereas inorganic fertilizer are made from synthetic materials while 27.5% of the respondents are not aware. Responses on question 4 on the table revealed that 75.5% of the respondents are aware that crops grown with organic fertilizer have better yield than those grown with inorganic fertilizer while 25.5% of the respondents are not aware. Responses on question 5 revealed that 69.5% of the respondents are aware that crops grown with organic fertilizer have good taste than that of inorganic fertilizer while 30.5% of the respondents are not aware. Responses on question 6 revealed that 71.5% of the respondents are aware that crops grown with organic fertilizer have a lasting shelf life than that of inorganic fertilizer while 28.5% of the respondents are not aware.

Table 2: Distribution of respondents Based on Level of Awareness of Organic Fertilizer

S/N	OPINION	Yes		No		Mean
			F	%	F	%
	Are you aware that organic fertilizer can be used in farming?	151	75.5	47	24.5	1.245
	Are you aware that crops grown with organic fertilizer are safer than those grown with inorganic fertilizer?	143	71.5	55	27.5	1.285
	Are you aware that organic fertilizers are made from natural materials whereas inorganic fertilizers are made from synthetic materials?	145	72.5	55	27.5	1.275

	Are you aware that crops grown with organic fertilizer have better yield than those grown with inorganic fertilizer?	149	75.5	51	25.5	1.255
	Are you aware that crops grown with organic fertilizer have good taste than that of inorganic fertilizer?	139	69.5	61	30.5	1. 305
	Are you aware that crops grown with organic fertilizer have a lasting shelf life than that of inorganic fertilizer?	143	71.5	57	28.5	1.285

Source: Field Survey, 2023

From the result, majority of the respondents have high level of awareness of organic fertilizer in terms of components, its effect and output. This suggests a generally positive level of awareness regarding organic fertilizers among respondents. However, there are some areas, such as taste improvement and shelf life, where awareness is slightly lower compared to other aspects like safety and yield. The mean awareness scores provide an overall understanding of the average level of knowledge among respondents for each aspect mentioned in the questions. The results reaffirmed the findings of Boateng, et al (2022), Edeoghon, et al (2008) and Edmeades (2003).

Types of the material used as Organic fertilizer

With relatively high level of awareness of the agronomic and health benefits for the use of organic fertilizer, it was necessary to find out the most preferred material that the farmers use in their farms as organic fertilizer as shown in table 3. The table revealed that farmers make use of different organic materials to increase crop yields and to also add nutrients to the soil. This results corroborates the findings of France-Katyal and Randhawa,(1983), Heaton (2001) and Liebig and Doren (1999).

Table 3: Types of organic materials used in farming

Types	Frequency	Percentage
Compost	20	10.5
Pig dungs	27	13.5
Formulated organic fertilizer	30	15.0
Poultry droppings	64	32.0
Crop residues	43	21.5
Goat dungs	11	5.5
Cattle dungs	5	2.5
Total	**200**	**100**

Source: Field Survey, 2023

Respondents utilize a diverse range of organic materials, including animal manure (pig, goat, cattle), compost, crop residues, and formulated organic fertilizers. This reflects a multi-faceted approach to organic farming. Materials like poultry droppings (32%), crop residues (21.5%), pig dungs (13.5%), and compost (10.5%) known for their nutrient-rich compositions, appear to be more commonly utilized compared to others like cattle dungs (2.5%), indicating a preference for higher nutrient content in organic materials. The usage of various organic materials suggests a potential for sustainable agricultural practices among respondents, incorporating natural, nutrient-rich sources to enhance soil fertility and crop growth.

This distribution demonstrates a diversity of organic materials used in farming practices, with different sources providing various nutrients and benefits for soil fertility and plant growth. The predominance of certain materials like poultry droppings and compost indicates recognition of their effectiveness in enhancing agricultural productivity among the respondents.

Level of Accessibility of Organic materials

Table 4 presents the result of the accessibility of the organic materials by the farmers. As shown in the table, formulated organic fertilizer ranks first as the most readily accessible organic materials followed by compost material, poultry droppings, and pig dungs respectively. Mbah and Ikenyirimba (2020) and Morris et al (2007) had earlier opined that farmers in African nations would want to apply fertilizer in their farm if they have regular access.

Table 4: Distribution of the Respondents by Accessibility of organic materials

Types of organic materials	Accessibility of organic materials						Total	Mean	Rank
	Very easy		Easy		Difficult				
	F	%	F	%	F	%			
Crop residues	87.6	43.8	79.2	39.6	33.4	16.7	200(100.0)	1.61	6th
Cattle dungs	88.8	44.4	91.6	45.8	19.4	9.7	200(100.0)	1.51	7th
Goat dungs	115.6	57.8	62.6	31.3	22.2	11.1	200(100.0)	1.65	5th
Poultry droppings	107.6	53.8	56	28.5	36.2	18.1	200(100.0)	1.85	3rd
Formulated organic fertilizer	77.8	38.9	76.4	38.2	45.8	22.9	200(100.0)	2.09	1st
Pig dungs	90.2	45.1	59.8	29.9	50	25	200(100.0)	1.82	4th
Compost	82.4	41.0	76.4	38.2	41.6	20.8	200(100.0)	1.91	2nd

Source: Field Survey (2023)

Respondents' perceptions regarding the accessibility of different organic materials vary,

likely influenced by factors such as availability, ease of collection, transportation, and application in farming practices.

Willingness to Pay for Organic Fertilizer

With the high level of awareness of agronomic and health benefits of organic fertilizer and good knowledge of the materials that can be used as organic fertilizer, the idea of knowing if the farmers are willing to pay for organic fertilizer becomes imperative. Table 5 presents the response of the farmers of their willingness to pay for formulated organic fertilizer.

Table 5: Willingness to pay for organic fertilizer

Question	Yes	No	Mean
Are you willing to pay for formulated organic fertilizer?	170 (85.0%)	30 (15.0%)	1.85

Researcher's field survey,2023

The result in the table indicates that farmers are willing to pay for organic fertilizer at a premium price. Eighty five (85% of the respondents were willing to pay for it. This high willingness to pay for formulated organic fertilizer among respondents highlights the potential significance and acceptance of this specific type of organic input in farming, possibly indicating a shift towards sustainable and eco-friendly agricultural practices. This indicates a positive attitude and a significant level of interest among respondents in investing financially towards the use of formulated organic fertilizer in farming activities.

Factors influencing WTP for Organic Fertilizer

Table 6 presents the result of the logit model used to assess the determinants of the farmers' WTP for organic fertilizer. The result shows that the model produced a good fit of the data with statistical significance of the chi-square value.

Table 6: Factors influencing farmers acceptability and willingness to pay for organic fertilizer

fertilizer
Model 1: Logit, using observations 1-200 (n = 199)

	Coefficient	*Std. Error*	*z*	*Slope*	Prob.
Constant	2.30094	2.43959	0.943167	–	0.3456
AGE	−0.03867	0.01992	−1.941056*	−0.00102	0.0780
GEN	−1.35564	0.96818	−1.400201	−0.05038	0.1984
EDU	0.09221	0.02007	4.595341***	0.00150	0.0002
HHS	−0.18688	0.07620	−2.45246**	−0.00309	0.0362
AWAR	0.43200	0.09634	4.484077***	0.01823	0.0015
PFER	−0.03019	0.01020	−2.958402***	−0.00676	0.0075
AVAIL	0.98738	0.23705	4.165282***	0.05451	0.0096

Mean dependent var	0.949749	S.D. dependent var	0.219014
McFadden R-squared	0.478924	Adjusted R-squared	0.4522833
Log-likelihood	−36.52214	Akaike criterion	89.04429
Schwarz criterion	115.3907	Hannan-Quinn	99.70737

Likelihood ratio test: Chi-square(7) = 6.25896 [0.5099]

Out of the seven variables included in the model, six were significant at various levels of statistical significance. Age, household size and price of organic fertilizer have negative relationship with WTP while availability of organic fertilizer, education and level of awareness of organic fertilizer have positive relationship with WTP. Expectedly, farmers' willingness to pay for organic fertilizer will decline as price of the organic fertilizer increases, implying that under normal situation, organic fertilizer can be considered as a normal goods. Education is a major driver of WTP for organic fertilizer. This implies that the more years in formal education a farmer attains, the likely his willingness to demand for organic fertilizer. This result corroborates Adepujo, et al (2012).

Concluding Remarks and Recommendations

This study examined farmers' acceptability and willingness to pay for organic fertilizer in Uyo LGA< Akwa Ibom State, Nigeria. This was done through studying the socio-economic characteristics of organic farmers and factors that influence their willingness to pay. From the results, it was established that organic fertilizer has gained popularity among farmers due to its numerous benefits. The result also showed that farmers are willing to pay a premium price for organic fertilizers, but their willingness to pay is influenced by a number of factors, including the cost of organic fertilizers, the awareness of the perceived benefits, the availability of the organic fertilizer and education.

To promote the adoption and usage of organic fertilizers, the following recommendations are made;

1. Government relevant MDAs should mount special agricultural extension program to promote the production and use of locally produced organic fertilizers.
2. Awareness campaigns should be created to educate both farmers and consumers on the

benefits of organic fertilizers, emphasizing their health advantages, environmental impact, and increased crop yields.
3. Farmers should be encouraged to use a combination of organic and inorganic fertilizers, as this can help to optimize crop yields and soil health.
4. Training and support should be provided to farmers on how to use organic fertilizers effectively.
5. Research and development should be supported by government to develop new and more affordable organic fertilizers.
6. Government and non-governmental organizations should encourage local farmers to adopt organic farming methods and provide support in the form of training and resources.

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