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## WILLINGNESS TO USE POULTRY MANURE BY VEGETABLE FARMERS IN EGBEDA LOCAL GOVERNMENT AREA, OYO STATE, NIGERIA

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### ABSTRACT

Average Nigerian farmers depend on fertilizer application to enhance farm produce activities, and willingness to adopt and pay for organic fertilizer is yet to be widely and empirically investigated. The study evaluated vegetable farmers' willingness to use poultry manure for vegetable production in Egbeda Local Government Area, Oyo State. Primary data was collected from one hundred ten vegetable farmers under the Agricultural Development Program (ADP) of Oyo State with a well structured Questionnaire using multistage sampling method; data collected was analysed using descriptive statistics and logit regression *model*. The result revealed that majority (66%) of the respondents are male, 44% are greater than 51 years old, 74% married, majority (80%) had formal education, 27% had between 11 years and 20 years farming experience, 93% are members of an association, 66% earn less than ₦100,000.00, however, demand for poultry manure is low due to its foul odour. Educational status has a negative likelihood ( $\beta = -0.5302$ ) to pay for poultry manure, gender has a positive coefficient of ( $\beta=2.1720$ ), religion ( $\beta=2.1659$ ), tribe ( $\beta=4.4850$ ), quantity used ( $\beta=1.0423$ ) and ( $p<0.05$ ). The study therefore concluded that farmers willingness to use and pay for poultry manure instead of inorganic manure to enhance vegetable production was influenced by the farmers belief, gender, level of education and the tribes they belong among others and the demand for it was on the average, due to its odour and the availability.

**Keywords:** poultry manure, vegetable farmers, willingness to pay, organic manure

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### Introduction

Vegetable production and consumption increases the nutritional status of the farming community and plays an important role in the maintenance of good health due to the presence of mineral element and vitamins. It also serves as substitutes for valuable protein for those who cannot afford animal protein due to its relatively high price and an easy and quick source of income. For these reasons as well as its short growing period, vegetables are the most widely cultivated food crops in Nigeria (Makinde, 2012).

A plant that is loaded with that much nutrient will definitely require a rich and fertile soil as soil fertility; an important element of plant

growth and natural capital, is key to its livelihood and automatically the livelihood of the majority of the rural population of sub Saharan Africa (especially Nigeria) whose main source of economic activity is agricultural production. Decline in soil productivity, as a result of low organic matter coupled with low native nutrient in most arable soil therefore, means not only less food crops will be grown but also that production of cash crops and income are endangered (Egwu *et al.*, 2018). The reduced ability to use traditional soil fertility management practices such as fallow and crop rotation to restore soil fertility limit farmers' productivity, and organic manure which plays an invaluable role in



rectifying land degradation and enhancing productivity seems to be the major natural and sustainable means of resolving soil fertility issues.

Poultry manure is one of the richest organic manures obtainable if applied in its raw state. It is an excellent fertilizer containing Nitrogen, phosphorus, potassium and other nutrients. It also adds organic matter to the soil which may improve soil structure, aeration, soil moisture-holding capacity and water filtration (Preusch *et al.*, 2002). It is cheap in supply as it is the product of a rapidly increasing number of the poultry farms we have in Nigeria. Despite the importance of poultry manure, and its low cost, some vegetable farmers still feel reluctant to pay for it. Willingness to pay has been defined as how much an individual is ready to pay to have his/her production increase by using manure. The issue of willingness to pay has received renewed attention as a method of measuring the benefit of intensification (Magnus *et al.*, 1993). The willingness to pay is based on the assumption that there is a maximum amount of money an individual is willing to pay for a commodity. In assessing willingness to pay it is therefore hoped that the research will answer the following questions. How often/well do vegetable farmers demand for poultry manure? What are the factors influencing their willingness to *use* and pay for the manure? What are the problems militating against poultry manure usage amongst vegetable farmers and how can these problems be solved? Therefore the study examined vegetable farmers' willingness to use and pay for poultry manure in Egbeda Local Government Area of Oyo State, with the following objectives which are to: examine the socio economic characteristics of the farmers, examine the demand for poultry manure by vegetable farmers, evaluate the factors influencing willingness to pay for

poultry manure, identify the problem militating against the willingness of vegetable farmers to use and pay for poultry manure in the study.

## Methodology

### Study area

The research work was carried out at Egbeda Local Government in Oyo State, Nigeria. It lies between longitude 7.07°N and latitude 4.08°E with a land mass area of about 410 sq km and a population of 281,573 as at 2006 census (NPC, 2006), the estimated population as projected by NPC, 2006 with 7,7340 increments per annum is 405,400. The postal code of the area is 200. Egbeda Local Government Area is subdivided into 11 wards which are Erunmu, Ayede, Alugbo, Koloko, Owobaale, Olodan, Ajiwogbo, Olodo, Kumapayi, Olode, Alakia and Olubadan Estate (Alabi and Ibiyemi, 2000). Egbeda Local Government was purposively selected for this study because of large concentration of vegetable farmers and availability of substantial numbers of poultry farmers in this area.

Primary data were used for this study and were collected through the administration of structured questionnaires to vegetable farmers in study area.

The questionnaire was administered to the vegetable farmers under Agricultural Development Programme (ADP). *Multistage and simple random sampling techniques* were adopted for the selection of the respondents for this study. There are 168 vegetable farmers registered under the (ADP), 116 were randomly selected for the study making a response rate of 69% of the sampled population.

The data collected was analysed using descriptive statistics such as frequency table,



percentage, mean and inferential statistics (logit) regression model.

Considering the broad objectives of this study which was to assess the vegetables farmers willingness to use and pay for poultry manure in Egbeda local government area of Oyo state with the following specific objectives were analysed thus: descriptive statistics was used to analyse objective 1, 2 and 3, which was to examine the socioeconomics characteristics of the respondents, assess the demand for poultry manure by vegetable farmers, and to identify the problem militating against the willingness of vegetable farmers to use and pay for poultry manure respectively while objective 4, factors influencing willingness to use and pay for poultry manure was analysed using logit regression analysis, this was due to the nature of the dependent variable.

The binary logistic models are very useful in situations where the dependent or response variable is binary in nature. This implies that they can have only two possible values. Distinct information provided by logit is the odds ratio and it is defined as the ratio of the odds of an event occurring in the group to the ratio of it occurring in another group (Bland, 2000)

The logit response  $p$  between 0 and 1 is given as:

$$\text{logit}(p) = \log\left(\frac{p}{1-p}\right) = \log(p) - \log(1-p)$$

The simplest form of logit model is expressed as:

$$\text{logit}(p_i) = \beta_0 + \beta_1 X_1 \dots \dots \dots \text{eq(1)}$$

Where,

$X_i$ = vector of prediction or independent variables

$a$  and  $b$ = regression parameters

In binary models, the two possible results will be assigned values of 1 or 0. Therefore, in this study, an affirmative response to a factor that would influence the respondent's willingness to pay for poultry manure is assigned a value of 1 but a 'No' to a factor is assigned a value of 0

The model is expressed as;

$$WTP = \beta^0 + \beta^1 X^1 + \beta^2 X^2 + \beta^3 X^3 + \beta^4 X^4 + \beta^5 X^5 +$$

Where WTP = willingness to pay for poultry manure

$X_1$  = Gender

$X_2$  = Age in years

$X_3$  = Marital status

$X_4$  = Educational status

$X_5$  = Religion

$X_6$  = Tribe

$X_7$  = Size of farm land in hectares

$X_8$  = Membership of any organization

$X_9$  = Years of experience

$X_{10}$  = Quantity of poultry manure to be used (kg)

$X_{11}$  = Total cost (₦)

$X_{12}$  = Availability of poultry

$B_0$  = Constant parameter to be estimated

### Results and Discussion

Table 1, revealed that 66% of the vegetable farmers are males while 34% are females. The modal age of the farmers was 51 years which constituted 44% of the population while 13% and 27% were between the ages of 31-40 years and 41-50 years respectively. This implies that majority of the farmers were males and still in their productive years. These conform to the work of Bongiwe and Micah (2013) and corroborated by Aderounmu *et al.*, (2019). *That majority of vegetable farmers was male and with mean years of 50 were involved in vegetable production in their studies.* Most (74%) of the respondents are married, while



17% are single, widowed (7%) and divorced (2%).

The educational status of the households indicates that 51% of the farmers had primary education, while 18% had secondary education and only 11% had tertiary education (diploma and B.Sc.). This implies that majority of the farmers were able to read and write but not as expected since majority of them had of form of formal education. Been educated will grant them knowledge and willingness to be able to pay for poultry manure. The religion of most respondents was Christianity (73%), while 27% are Muslim. This may affect the farmers believe on the willingness to use and pay for the poultry manure. A very high percentage (93%) belongs to one or more social group(s) or association, while only 7% do not belong to any association.

This implies that majority of the farmers don't take steps or make decisions on issues relating to their farm or enterprise on their own but go with the decisions agreed upon by all the members (or the majority) of their association which in turn benefit the farmers since collective decisions are better than been personal. This conforms to findings of Umeh *et al.*, (2023). The table also shows that, more than half of the farmers (54%) had appreciable years of experience in vegetable farming (11-20 years) this is in line with Oyewo *et al.*, (2020) and 66% of the farmers earned less than ₦100,000 income accruing to them per annum on vegetable production. This implies that, a high percentage of the farmers were still living below the poverty line which could make them poor considering the amount of income available to them per annum.

**Table 1: Socio-economic characteristics of farmers**

Variables	Frequency	%
Gender		
Male	72	66
Female	38	34
Age		
Below 20 years	6	5
21-30 years	12	11
31-40 years	14	13
41-50 years	30	27
51 years and above	48	44
Marital status		
Single	16	17
Married	86	74
Divorced	2	2
Widowed	6	7
Religion		
Christianity	80	73
Islam	30	27
Tribe		
Yoruba	78	71
Igbo	32	29
Secondary occupation		



Yes	104	95
No	6	5
Educational status		
No formal	22	20
Primary education	56	51
Secondary education	20	18
Diploma	10	9
B.Sc.	2	2
Association		
Yes	102	93
No	8	7
Years of farming experience		
Below 5 years	8	7
6-10 years	26	24
11-15 years	30	27
16-20 years	30	27
21 years and above	16	15
Annual income		
Less than 100,000	72	66
100,000-200,000	30	26
300,000-400,000	4	4
500,000-600,000	4	4

The table 2 shows that 84% of the farmers are aware and know about the uses and importance of poultry manure in the study, 78% of the farmers make use of poultry manure for farming as a means of fertilizer application to enhance vegetable production, 33% of them made use of the poultry manure at three months interval, while 4% used it once in a year and 62% made use of the poultry manure within a month. This corroborates the result of Subedi and Dhakal (2015) that willingness to pay for processed poultry manure and raw poultry manure was higher among the farmers

in their study. Majority (43%) used between 6 and 10 tons of the poultry manure in its solid form, also 44% used below 5 litres of the poultry manure in its liquid form.

This implied that majority of the vegetable farmers are aware and utilized poultry manure in its solid form than the liquid form, this furthers indicated that the more the vegetable farmers had access to the manure, the more they will be willing to use and pay for the poultry manure and also increase farmers income in the study, this is in line with findings of Bamire and Amujoyegbe (2005)

**Table 2: Demand for poultry manure by vegetable farmers**

Items	Frequency	%
Awareness of poultry manure		
Yes	92	84
No	18	16
Use of poultry manure for farming		
Yes	86	78



No	24	22
Times used		
Monthly	68	62
Thrice per year	36	33
Once per year	4	4
Others	2	1
Quantity used in solid form per annum		
1-5 tons	34	31
6-10 tons	48	43
11-15 ton	14	13
16-20 ton	14	13
Quantity used in liquid form per year		
Less than 5litres	48	44
5-10litres	38	34
11-15litres	24	22

From the result of table 3, the pseudo  $R^2$  was 0.58 indicates that the model reveal a week goodness of fit of the analysis of the variable used. The chi-square test was significant at 1% and the log likelihood result was -32.9324 indicating the maximum possible value of the dependent variable in absolute terms. The result used the marginal effect (in odd ratio) in explaining the result, it was revealed that willingness to use and pay for poultry manure was positively influenced by gender, religion, tribe, quantity used and availability but negatively influenced by educational status. The result implies that an additional male farmer will increase the probability of the poultry farmers willingness to use and pay for poultry manure by 43%.

An increase in years of education will decrease the farmers' probability of using and paying for poultry manure by 10%, additional member being a Christian will increase the probability

of using and paying for the poultry waste by 48%. This may be due to the religion belief of the majority of the respondents been Christian, also been a member of a particular tribe will increase the probability of using and paying for the poultry manure by 79% this may be due to the vast awareness and nature of these tribes most especially in the Northern part of the country who practice organic farming, while an increase of 1 ton in the quantity of solid waste used will increase the probability of the vegetable farmers in using and paying for poultry waste by 20%. This conform to the findings of Boateng *et al.*, (2006) that poultry manure is a valuable fertilizer and can serve as a suitable alternative to chemical fertilizer and corroborated by Bongiwe and Micah (2013) but not in line with the finding of Adelalu *et al.*, (2021) that reported about 85% of vegetable farmers adopted inorganic fertilizer for vegetable production in their study..





**Table 3: Logit Result of Factors that Determine the Willingness of Farmers to Pay for Poultry Manure**

Explanatory Variables	Marginal Effect	Z-Statistic	Probability (Z)
Constant	1.8719	2.9011	
Gender	2.1720**	1.0228	0.4355
Age	-0.0633	0.399	-0.0119
Marital status	-1.5981	1.3741	-0.3485
Educational status	-0.5302**	0.1721	-0.0993
Religion	2.1659**	1.1238	0.4759
Tribe	4.4850**	1.7620	0.7940
Size of farmland	0.1416	0.1277	0.0265
Membership of any association	-1.0123	1.2133	-0.1564
Years of experience	0.1220	0.0786	0.0229
Quantity used	1.0423**	0.4477	0.1952
Total factor cost	1.4497	0.9534	0.2879
Availability	1.2255	0.7030	0.2296
Pseudo R <sup>2</sup>	0.5815		

Source: Author's computation, \*\* = variable significant at 5%

Log likelihood: -32.932,

LR Chi-square: 6116\*\*

From table 4; it was revealed that unavailability of the poultry manure and its odour were the major problems militating against the use of the manure by the farmers as stated by 62% and 86% of the farmers respectively while the right way of application, labour cost and understanding seems to be minor problems as stated by 36%, 36% and 53% of the farmers respectively. Akintobi *et al.*, (2019) also reported that inadequate and high cost of labour to poultry production aids

the unavailability of poultry waste. This implies that poultry manure was not readily available and that the odour which was considered as bad may not allowed the vegetable farmers the willingness to use and pay for the manure and also there is no standard measures to the use and application of the manure by the farmers in the right quantity needed for the vegetable production in the study area

**Table 4: Problems militating against poultry manure usage**

List of problems	Major	%	Minor	%	Not a problem	%
Availability of the manure	68	62	32	29	10	9
Understanding	8	7	58	53	44	40
Labour cost	6	6	40	36	64	58
Right application	18	16	40	36	52	47
Increased expenses	10	9	32	29	68	62



Run off nutrient	10	9	28	26	72	66
Bad odour	94	86	10	9	6	6

**Conclusion and Recommendation**

**Conclusion**

The study concluded that; majority of the farmers are aware of the importance of poultry manure to soil fertility, but their demand for it is on the average, due to its odour and the availability. The study also proved that, willingness to use and pay for the poultry manure was largely influenced by farmers tribe, religion, gender, education and the quantity to be used or applied for vegetable farming in the study area.

**Recommendations**

Based on the result of the research findings, the following recommendations are made;

Government should encourage cottage industries that will process the poultry manure, so as to reduce or eliminate the odour, without necessarily reducing its chemical contents or potency. There should be an aggressive campaign on the use of poultry manure for farm production in order to embrace organic farming. Farmers’ enlightenment should be carried out on the usefulness and viability of poultry manure to vegetable farming and standard measurement for the use of poultry manure should be established and also, transformation and better packaging of the poultry manure will encouraged vegetable farmers to be willing to adopt it.

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