

FARMERS PERCEPTION ON ORGANIC MANURE USAGE AMONG ARABLE CROP FARMERS IN JALINGO LOCAL GOVERNMENT AREA OF TARABA STATE, NIGERIA

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Abstract

The study analysed the perception of organic manure use among arable crops farmers in Jalingo Local Government Area Taraba State, Nigeria. Structured questionnaires were used to collect primary data from 114 respondents who were proportionately and randomly selected. The data were analyzed using descriptive and logit regression model. The results reveal that 86% of the respondents were males, 67.6% were between the ages of 32-50 years, 74.6% were married, 72.8% have house hold size of between 1-10 persons, 88.7% had one form of education or the other, 57% had 1-5 hectares of land, 51.8% have 1-10 years of farming experience and 52.6% have access to extension service. The findings also revealed that 92% of the arable crops farmers used organic manure. It also revealed that arable crop farmers in the study area have diverse perceptions on organic manure usage. Logit regression results revealed that farming experience, level of education, farm size, extension contacts and distance of farm from home contributed significantly to the use of organic manure in the study area. The findings also shows that odour, encouragement of high growth of weeds by the organic manure, preparation of the compost manure were the very serious constraints to the use of organic manure. Application of organic manure, transportation to farm, accessibility and availability of the organic manure are the serious constraint to the use of organic manure by the respondents. The study concluded that majority of the farmers in the study area were male, youth, married and educated. They are small holder farmers with ample farming experience. They have favourable perception toward the use of organic manure. The more the farmers increase their farm size, the more the tendency of using organic manure. So also, high level of education of farmers and extension contacts tends to influence their organic manure usage. The study recommended that Government should support farmers and introduce policies that will enable the farmers to own and cultivate large scale farms. Extension agents should intensify effort on educating the arable crops farmers on organic manure utilization.

Key words: organic manure, arable crops, farmers, Nigeria

INTRODUCTION

Increasing agricultural production to meet teaming population demand relies on the principles of expansion of land area for cultivation or improving the yield per land area. As a result of population pressure on land, among other factors, land expansion seems not feasible some times. In addition, soil fertility declines as a result of continuous cropping which is the most prevalent system of farming in Nigeria. Consequently, farmers skewed their attention more on intensification strategies to improve farm productivity. They use fertilizers to replenish soil nutrient lost due to poor soil management practices. Fertilizers are in the forms of inorganic and

organic. Inorganic (chemical) fertilizer are very expensive and beyond the reach of resource-poor farmers and not readily available as at when needed by the resource-poor farmers [5]. It has also been proven to have negative consequences on the environment and health aspect. Human survival demands that environmental considerations should underpin all aspects of development whether physical or social [4]. Organic Manures are fertilizers made from cattle dung, excreta of other animals, rural and urban composts, other animal wastes, crop residues and green manures. They are time tested materials for improving the fertility and productivity of soils, and vary widely in the amount of plant nutrients that they contain.

Compost is one of the less concentrated organic manures, but it is extremely valuable in adding extra body to soils especially the sandy ones. Compost can also help to lighten heavy clay soils.

Farmers' perception of a technology is a key determinant in the decision to use [8]. If farmers' perceptions are that the technology is not profitable, there will be low investment in the technology. To assess perception of organic manure use by farmers, so many factors should be considered and examined. These factors include: farmers' characteristics such as education, experience, age, household size; farm structure such as farm size, distance of farm from homestead; and institutional factors such as contact with extension agents and access to credit facilities [11].

The most prevalent widespread challenge in Nigeria is food insecurity and poverty [8]. The inherent poor soil fertility in both tropical and sub-tropical areas has become a major constraint to arable crops farmers in Sub-Saharan Africa. Evidence shows that most farmers in the area are not adequately compensating for soil nutrient loss caused by intensive cultivation practices. Hence, declining soil fertility has been highlighted as the major reason for slow growth in food production in the region [8].

On the other hand, population is increasing very fast while agricultural land remains constant or even decreasing due to development and the conversion of agricultural land to residential and industrial sites. With this scenario, the pressures on the need to feed the growing population at hand are immense. To increase production to its maximum within shortest possible duration while maintaining the ecosystem and without pollution seem an attractive solution to food shortage. With this threat, there is need to intensify organic farming in order to bring back soil fertility. The availability of inorganic fertilizers to farmers at appropriate time is not guaranteed, because, the commodity was politicized by government officials. Thus, the main constraints to fertilizer use are seen as high prices, low fertilizer quality and non-availability of fertilizer at the time required [7]. Various

studies were conducted on organic manure use in different part of Nigeria. For example, a study was carried out on economics of organic manure use by food crop farmers in ecologically vulnerable areas of Imo State, Nigeria [12]. However, there is little evidence of empirical study carried out in relation to perception of organic manure use in Jalingo Local Government Area of Taraba State. To fill this gap, the study answered the following questions:

- (i) What are the socio-economic characteristics of arable crop farmers in Jalingo Local Government Area?
- (ii) What type of organic manure do the respondents use?
- (iii) What is the respondents' perception of organic manure use?
- (iv) What are the factors that influence the use of organic manure?

MATERIALS AND METHODS

The study was conducted in Jalingo Local Government Area Taraba State, Nigeria. The area lies between latitudes 6°30' to 9°36' north and between longitudes 8°50' to 11°25" east of Greenwich Meridian (www.maplandia.com, 2003). The local Government Area has a population of 139,845 people [9]. The climate is marked by two contrasting seasons; the rainy season which normally starts from April to October and the dry season which lasts from November to March. The average yearly rainfall is 1350mm, while the mean annual temperature is 25°C with a total land area of 1,380 km² [16]. Major crops grown are arable in nature the main farm produce are maize, rice also livestock farming.

Data for this study were obtained mainly from primary source; Semi-structured questionnaires were used for the collection of data.

Simple random sampling techniques were employed to select the respondents of the study.

To ensure effective coverage of the study area, respondents were randomly selected from each of the districts that constituted the study area (Majidadi, Kachalla sembe, Sintali A, Sintali B, Yelwa, Kona, Sarkin Dawaki

and Barade). Three villages were chosen randomly from each district because of the fair distribution of villages among the districts, making a total of 24 villages selected from the districts. Five respondents were selected at random from each of the selected 24 villages making a total of 120 respondents as the sample size of the study. Finally, 114 questionnaires were successfully retrieved and used for the analysis.

Descriptive statistics such as frequency distribution, means and percentages was used to achieved objectives i and ii and Likert scale was used to achieve objective iii, while Binary Logit regression was used to address objective iv.

Descriptive statistics

The mean of group data is expressed as:

$$\bar{x} = \frac{\sum fx}{n} \dots \dots \dots (1)$$

where: \bar{x} = mean

$\sum fx$ = sum of individual observation

n = sample size

The mean of ungroup data is given by:

$$\sum Xi/n \dots \dots \dots (2)$$

where:

$\sum Xi$ = Sum of observed values

n = Number of observations

Binary Logit regression model

The binary regression model was used to address objective vi. The explicit form of the Logit regression model is expressed as:-

$$\text{Logit}(Y_i) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_9 x_9 + \epsilon \dots \dots \dots (3)$$

where Y_i = Use of organic manure (1 = used, 0 = otherwise)

x_1 = Age of the household head (years)

x_2 = Sex (male 1, female 0)

x_3 = Household size (number)

x_4 = Educational status of the farmer (years in school)

x_5 = Farm Size (ha)

x_6 = Farming Experience (years)

x_7 = Contact with Extension agents (Yes =1, No = 0)

x_8 = Total income (₦).

x_9 = Distance of farm from farmers homestead (km)

β_0 = Intercept

β_1 8 = parameters to be estimated

RESULTS AND DISCUSSIONS

Socio-economic characteristics of Respondents

Result on Table 1 shows that majority (86.0%) of the respondents were male, while female constitutes only 14.0% in the study area. This implies that agricultural production especially arable crop farming using organic manure was dominated by males. This result could be because of the socio-cultural background of the people in the study area and also due to the fact that arable crop farming is intensively labour demanding. In addition, majority of the respondents 58.8% were between the age 21-40 while those that are within the age of 50 and above were only 6.1%. This means that the arable crops farmers in the study area are within their active age of agricultural production. Therefore, there is likelihood of high productivity and usage of organic manure [6]. The study furthers, shows that majority of the respondents are married (74.6%). This result is in line with the findings of [1] who opined that majority of the arable crops farmers were married. It may be because married people are more committed to farming activities because of their responsibilities.

About 73.0% of the respondents have house hold size of 1-10, and 18.4% of the respondents have house hold size of 11-20 and 0.9% of the respondents has house hold size of above 30 persons. This is highly indicative of extended family system in the study area. Farmers have advantage of family labour availability if many house-hold members participate in farms [4]. The result also shows that shows that 53% of the respondents have no formal education, only 9% of the respondents had tertiary education. This implies that farmers in the study area may likely adhere to old method of agricultural practices than to venture into new innovations and thus, give preference to organic manure usage instead of inorganic fertilizers.

This could be so because, when a new technology was introduced, the rate of its adoption is expected to be high among the educated farmers, while organic manure

utilization might be highly patronized by the less privileged economically and those that practice traditional farming system.

Table 1. Socio-economic Characteristics of the Respondents (N = 114)

Variable	Frequency	Percentage
Gender		
Male	98	86.0
Female	16	14.0
Total	114	100.0
Age		
21-30	30	26.3
31-40	37	32.5
41-50	40	35.1
Above 50	7	6.1
Total	114	100.0
Marital Status		
Married	85	74.6
Single	27	23.7
Widowed	2	1.8
Total	114	100.0
Household Size		
1-10	83	72.8
11-20	21	18.4
21-30	9	7.9
Above 30	1	0.9
Total	114	100.0
Educational Attainment		
No formal Education	60	52.63
Primary School	31	27.19
Secondary School	13	11.40
Tertiary education	10	8.77
Total	114	100.0
Farm Size		
< 1	6	5.3
1-5	65	57.0
6-10	19	16.7
Above 10	24	21.0
Total	114	100.0
Farming Experience		
1-10	59	51.8
11-20	37	32.5
21-30	11	9.6
Above 30	7	6.1
Total	114	100.0
Access to Extension Service		
Yes	60	52.6
No	54	47.4
Total	114	100.0
Usage of Organic Manure		
No	9	7.9
Yes	105	92.1
Total	114	100.0

Source: Field survey, 2016

The result of the study further, shows that majority (57%) of the arable crops farmers in the study area had 1-5 hectares of farm land. 16.7% has 6-10 hectare, and 21.0% of the respondents has more than 10 hectares. The findings revealed that more than half of the farmers in the study area were small scale farmers. The implication of the finding is that food production is at subsistence level in the

study area. Table 1 indicated that about 52% of the respondents have 1-10 years of farming experience. Experience brings above specialization and adherence to the use of technology, therefore the respondents may be specialist in the use of organic manure. 9.6% and 6.1% have farming experience of 21-30 years and above have 30 years respectively. This means that the respondents have long years of farming experience. More than half (53%) of the arable crops farmers in the study area had contacts with extension agents. Extension service is very essential to the improvement of farm productivity and efficiency among farmers [13].

Types of Organic Manure Used by the Respondents

Table 2 shows that 31.4% used cattle dung, 22.05% used sheep dung, 14.4% used goat dung, 12% used poultry droppings, 8.85% used Green manure, 3.3% used compost manure, 5.1% used Farm yard manure, 2.9% used Kitchen waste.

Table 2. Distribution of the Respondents by Type of Organic Manure Used

Type of organic manure Used	Frequency (No.)	Percentage (%)
Cattle dung	54	31.40
Sheep dung	38	22.05
Goat dung	25	14.40
Poultry droppings	21	12.00
Green manure	15	8.85
Compost manure	6	3.30
Farm yard manure (FYM)	9	5.10
Kitchen waste	5	2.90
Total	173*	100

Source: Field survey, 2016*Multiple responses

The most used type of organic manure is the cattle dung and this could be because of its availability due to large number of cattle being reared in many houses within the metropolis. It is also associated with the large number of cattle in the study area. Cattle manure has a significant amount of nitrogen [15]. According to [15] Cattle manure obtained during the rainy season when there is abundant green grass for cattle to graze has the highest percentage of plant nutrients than those obtained during the dry season.

Respondents' Perception towards Utilization of Organic Manure. Table 3 revealed crop farmers' perception on

utilization of organic manure, and was measured on five point Likert type scale of strongly agree which was assigned the value of five, to strongly disagree with an assigned value of one. The respondents indicated their responses to 22 statements on the rating scale provided.

The cut-off mean was calculated to be 3.0, while the mean for each statement was calculated and compared with the cut-off mean. Any mean that falls above the cut-off mean indicates that the respondent agreed to the statement, and any mean that falls below

the cut-off mean indicates that the respondent disagreed with the statement. Thus, the result on Table 3 shows that respondents agreed that; organic manure increases soil fertility ($\bar{x}=4.51$); improves water conservation ($\bar{x}=3.78$); increases production more than conventional fertilizers ($\bar{x}=3.68$); is relatively not easier to handle than inorganic fertilizer ($\bar{x}=3.82$); is easier to access than any other fertilizer ($\bar{x}=3.74$); is less capital intensive ($\bar{x}=4.31$); retains soil fertility over time ($\bar{x}=4.21$).

Table 3. Distribution of the Respondents Based on Perception of Organic Manure Usage

Perception statements	SA Freq	A Freq	U Freq	D Freq	SD Freq	TPS	Mean
Organic manure improves soil fertility	75(65.8)	28(24.6)	6(5.3)	4(3.5)	1(0.9)	514	4.51
Organic manure improves water conservation	30(26.3)	44(38.6)	26(22.8)	13(11.4)	1(0.9)	431	3.78
Use of organic manure does not reduce cost of production	4(3.5)	8(7.0)	13(11.4)	59(51.8)	30(26.3)	239	2.10
Organic manure is not as effective as inorganic fertilizers	8(7.0)	16(14.0)	13(11.4)	48(42.1)	29(25.4)	268	2.35
Organic manure is not easier to handle than inorganic fertilizer	28(24.6)	56(49.1)	15(13.2)	12(10.5)	3(2.6)	435	3.82
It is easy to access the organic manure than any other fertilizer	26(22.8)	55(48.2)	16(14.0)	12(10.5)	5(4.4)	426	3.74
Using organic manure increases production than conventional fertilizer	25(21.9)	46(40.4)	28(24.6)	12(10.5)	3(2.6)	420	3.68
Use of organic manure pollute farm and it environment	10(8.8)	44(38.6)	22(19.3)	25(21.9)	13(11.4)	328	2.88
Mingling with organic manure is dangerous to health	8(7.0)	41(36.0)	22(19.3)	32(28.1)	1199.6	339	2.97
Organic manure is less capital intensive	42(36.8)	67(58.8)	3(2.6)	2(1.8)	-	491	4.31
Organic manure makes produce more nutritious than inorganic fertilizer	37(32.5)	59(51.8)	15(13.2)	3(2.6)	-	472	4.14
Produce from organic manure reduces health risk	22(19.3)	63(55.3)	18(15.8)	7(6.1)	4(3.5)	434	3.81
organic manure application does not require special skill	23(20.2)	68(59.6)	8(7.0)	8(7.0)	7(6.1)	434	3.81
Organic manure does not encourage commercial system of production	16(14.0)	52(45.6)	22(19.3)	18(15.8)	6(5.3)	396	3.47
Organic manure use increases farmers income	26(22.8)	56(49.1)	19(16.7)	12(10.5)	1(0.9)	437	3.83
Organic manure retain soil fertility over time	43(37.7)	55(48.2)	13(11.4)	3(2.6)	-	480	4.21
Organic manure reduces soil erosion	20(17.5)	50(43.9)	31(27.2)	9(7.9)	4(3.5)	415	3.64
Organic manure encourages weed growth	19(16.7)	57(50.0)	21(18.4)	14(12.3)	3(2.6)	417	3.66
Use of organic manure reduces environmental pollution in the cities	30(26.3)	45(39.5)	25(21.9)	11(9.6)	3(2.6)	430	3.77
Application of organic manure is technically easy	25(21.9)	64(56.1)	13(11.4)	11(9.6)	1(0.9)	443	3.89
Not all plant do well with organic manure	8(7.0)	36(31.6)	25(21.9)	26(22.8)	19(16.7)	330	2.89
Use of organic manure will attract more pest and diseases	13(11.4)	31(27.2)	27(23.7)	31(27.2)	12(10.5)	343	3.01

Source: Field Survey, 2016

Figures in Parenthesis indicate percentage

NB: SA = Strongly agreed, D= Disagreed; A= Agreed; SD= Strongly Disagreed; U= Undecided

On the other hand, respondents disagreed that: using organic manure does not reduce cost of production ($\bar{x}=2.10$); organic manure is not as effective as inorganic fertilizer.

Factors Influencing the Use of Organic

Manure.

The result of the logit model is presented in Table 4. The obtained log likelihood ratio is 21.541 and the Cox and Snell R^2 value of the model is 0.648. Thus, the overall model is

significant and the explanatory variables used in the model are collectively able to explain the factors influencing the use of organic manure. Nine variables were used to determine the factors that influence the use of organic manure in the study area. Five of the variables namely: age, gender, farming experience, extension contacts and distance of farm from home significantly influence the use of organic manure in the study area.

Gender X2, farming experience X6 and extension contact X7 were positively significant to the respondent's use of organic manure. Age (X1) and farm distance (X2) variables had negative effects on the use of organic manure and was significant at 5% and 1% respectively.

Gender of the farmers significantly affects the use of organic manure at 10% and had positive influence on the use of organic manure.

This implies that, being a male household head, increase the probability to the use of organic manure. This could be due to tedious nature involved in transportation and spreading on farm of the organic manure.

The negative sign of the coefficients implies that a unit increase in age and distance of the farm from homestead of the farmers decreases the probability to the use of organic manure. The more the farmers cultivates arable crops close to their homes the more they use organic manure.

This may be because of high cost of transporting of organic manure to the farms. According to [5] in a study conducted in Delta State, Nigeria revealed that decision to use organic manure were significantly determined by: farming experience, distance of farm from home, level of educational attainment, farm size and frequency of extension contact.

The result of the analysis also revealed that farming experience influence the use of organic manure at 5% level of significance with positive coefficient meaning that as farmers acquires more years of farming experience the probability that their level of organic manure use will increase. Similarly, extension contacts influence the use of organic manure at 5% level of significance with positive coefficients. This implies that

the more the arable crops farmers in the study area had contacts with extension agents the more the probability to use organic manure.

Table 4. Logit Regression Analysis on Factors Influencing the Use of Organic Manure

Variables	Coefficient	S.E	Wald	Df	Sig.	EXP (B)
Age (X ₁)	-.321	.140	5.244	1	.022**	.726
Gender (X ₂)	6.777	3.556	3.633	1	.057*	877.536
Household size (X ₃)	-.501	.327	2.340	1	.126	.606
Education level (X ₄)	.031	.191	.027	1	.871	.969
Farm size (X ₅)	.093	.628	.022	1	.882	1.098
Farming Experience (X ₆)	.225	.105	4.403	1	.036**	1.133
Extension contacts (X ₇)	12.083	4.816	6.293	1	.012**	176790.835
Total Income (X ₈)	-.488	1.461	.111	1	.738	.614
Farm Distance (X ₉)	-.229	.102	3.612	1	.004***	1.257
Constant	5.852	5.757	1.033	1	.309	348.031

Source: computer output (SPSS) analysis, 2015
 *** Significant at 1%, ** Significant at 5% and * Significant at 10%

Constraints to the Use of Organic Manure.

Table 5 shows that odour and physical composition, encouragement of high growth of weeds by the organic manure, preparation of the compost manure were the very serious constraints to the use of organic manure with mean of 3.81, 3.76, and 3.58 respectively.

Table 5. Distribution of the Respondents Based on Constraints to the use of organic manure

Constraints	Mean	Remark
Availability of organic manure	3.23	Serious constraint
Accessibility of organic manure	3.25	Serious constraint
Transportation to farm	3.37	Serious constraint
Preparation of compost manure	3.58	Very serious constraint
Cost of transportation	2.67	Not a constraint
Application of the organic manure	3.39	Serious constraint
Its odour and physical composition	3.81	Very serious constraint
Encouraged high growth of weed	3.76	Very serious constraint

Source: Field survey, 2016
 Likert Scale Midpoint Analysis ≥ 3.5 is Very serious constraint
 3.0 - 3.49 is Serious constraint
 2.0 - 2.49 Not serious constraints
 ≤ 2.0 is Very unserious

Application of organic manure, transportation to farm, accessibility and availability of the

organic manure are the serious constraint to the use of organic manure by the respondents with mean of 3.39, 3.37, 3.25 and 3.23 respectively.

The use of manure by vegetable farmers in Sissala, Birim and Shama districts, Ghana revealed that, bulkiness, odor, preparations, accessibility, application and problems of transporting the manure to the farm are the major source of worry to majority of the farmers. Most farmers also stated that manure may bring pest and disease to crops and they are also not readily available and attract a lot of insects and enhances weed growth [3].

CONCLUSIONS

It is concluded that majority of the farmers in the study area were male, youth, married and educated. They are small holder farmers with ample farming experience. Level of education of farmers and extension contacts tends to influence their organic manure usage. They have favourable perception toward the use of organic manure

Based on the findings of the study, the following recommendations were made:

- (i) Government should support farmers and introduce policies that will enable the farmers to own and cultivate large scale farms.
- (ii) Extension agents should intensify effort on educating the arable crops farmers on the advantages of organic manure utilization
- (iii) Government should device the means of making organic manure available and accessible to the farmers
- (iv) Awareness campaigns on the discouragement of inorganic fertilizers should be embarked by stakeholder, donor agencies and farmers organizations
- (v) Farmers are advised to use the local means of transporting the organic manure at their disposal to reduce cost of transportation
- (vi) Farmers should cooperate with livestock owners so as to have livestock stay on their farms for mutual benefit.

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