

ASSESSMENT OF THE LEVEL OF UTILIZATION OF POULTRY MANURE BY MAIZE FARMERS IN OSUN STATE, NIGERIA

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ABSTRACT

Poultry dropping is the fresh perhaps decaying, faecal matter from birds which when decomposed to a stable condition becomes poultry manure. This study assesses poultry manure utilization among maize farmers in Osun state, Nigeria. The objectives of the study are to describe the socio-economic characteristics of the respondents, identify the sources of information on poultry manure, examine the level of utilization of poultry manure, determine the perceived benefits of poultry manure and evaluate the constraints to the use of poultry manure among maize farmers. Purposive sampling technique was used to select 180 registered maize farmers in Osun state. The data obtained were analyzed using simple frequency counts, percentages and Pearson Product Moment Correlation. The findings revealed that 68.3% of maize farmers were males with an average age of 57 years. More so, majority of respondents obtained information from fellow farmer ($X=2.6$), farmers group ($X=2.6$) and friends/relatives ($x=2.2$). It was further revealed that 44% of the respondents apply poultry manure on 50-75% of their farm. However, some of the limitations to use of poultry manure include odour of the manure ($X=2.7$), time spent in the application ($X=2.6$), cost of transporting the manure ($X=2.6$) among others. The study recommended that Private organization and Non-Governmental Organization in conjunction with Government should provide improved technologies to process poultry manure to dry form in order to improve the quality and quantity of poultry manure in Osun state, Nigeria.

Keywords: utilization, poultry manure, maize farmers

INTRODUCTION

One of the members of the cereal family that has added great value to man and animals is maize (*Zea mays* L). It ranks third following wheat and rice in world production (Food and Agriculture Organization, 2002). It is consumed roasted, baked, fried, boiled or fermented in Nigeria. Maize is a source of such industrial products as corn oil, syrup, corn flour, sugar, brewers' grit and alcohol (Dutt, 2005). As livestock feed, which serve as energy supplement, maize is cherished by various species of animals, including poultry, cattle, pigs, goats, sheep and rabbits (Directorate of Information and Publications of Agriculture, 2006). All over the world, there is a clamor for environment-friendly technique and practice for production activities and more developed countries are also taking bold steps in recycling their waste (Cabinet Office, 2002; Felipó, Huerta, Lopez & Soliva 2004; Mittelstrass, 2005; Grant Conservation District, 2006). With respect to agriculture, inorganic fertilizers which were once thought by agronomists to be the saviour of diminishing fertility of soils have been found to have dangerous effects on the soil, living organisms as well as the environment (Aktar, Sengupta & Chowdhury, 2009). The intense and inorganic fertilizer in Nigeria has also contributed to the destruction of the soil structure, leading to depressed yields as a continuous use of result of soil acidification, potassium deficiency and aluminium toxicity (Nigeria Strategy Support Program/International Food Policy Research Institute, 2013). Furthermore,

the use of inorganic fertilizer in Nigeria has also been faced with different problems: distribution (irregularity of supplies, non-uniformity of price and diversion of consignment), utilization (improper rate and time of application as well as the use of the inappropriate types) and high cost of the fertilizer, which has made it go beyond the financial capacity of most farmers (NSSP/IFPRI, 2013). The use of inorganic fertilizers alone may cause problems for human health and the environment that means the excess use of chemical fertilizers in agriculture can lead to nitrate accumulation into plant parts especially on edible parts.

However, Fertilizer Procurement and Distribution Division (2002) reported a significant difference in grain yield of maize due to application of poultry manure because of its richness in ammonium Sulphate. Moreover, mineral fertilizer and poultry manures both separately or combined have beneficial effects upon soil and crop, their combined use are expected to yield rewarding dividends (Rayar, 2000). Organic agriculture “includes all agricultural systems that promote the environmentally, socially and economically sound production of food and fiber (International Federation of Organic Agriculture Movements, 2005). Organic agriculture dramatically reduces external inputs by refraining from the use of chemo-synthetic fertilizers, pesticides, and pharmaceuticals. Instead it allows the powerful laws of nature to increase both agricultural yields and disease resistance. Organic agriculture adheres to globally accepted principles, which are implemented within local social-economic, geo-climatic, and cultural settings. The specific objectives are to: describe the socio-economic characteristics of the farmers in the study area, identify the sources of information on poultry manure used by maize farmers in the study area, examine the level of utilization of poultry manure among maize farmers, identify the perceived benefits of poultry manure to maize crop farmers and to identify the constraints to the use of poultry manure among maize farmers.

Hypotheses

H₀₁; there is no significant relationship between some selected socio-economic characteristics of maize farmers and level of utilization of poultry manure

H₀₂: there is no significant relationship between constraints to the use of poultry manure and the level of utilization of poultry manure.

METHODOLOGY

The study was conducted in Osun state capital of Nigeria. Osun state came into existence on 27th August, 1991 with the creation of nine new states by the Federal Military Government. Osun State is located in the heartland of the Yoruba people and shares the distinctive high urbanization attributes of most parts of Yoruba land. Osun state carved out of the old Oyo State and occupies a land mass of approximately 8,602 square kilometers. Osogbo is the trade center for a farming region. Yams, Maize, cassava and tobacco are grown. Cotton is grown and used to weave cloth. Most of the populations are members of the Yoruba ethnic group. In 1988, about 27% of the population were engaged in farming as their primary occupation, 8% were traders and about 30% clerks and teachers (Osogbo city Web,2013)

A three-stage sampling procedure was used to select the respondents for this study. The first stage involved purposive selection of three (3) local government in Osun state which are Osogbo, Ede North and Olorunda, due to predominance of maize farmers in the local governments and availability of poultry farms in these locations. The second stage is the purposive selection of five (5) communities from each of the three selected local government areas based on the farmers' lists and availability of poultry farms. The third stage involved a random selection of twelve (12) farmers from the lists of OSSADEP contact maize farmers in

each of the identified three local governments. A total of 180 maize farmers were used for the study.

The data obtained was analysed using descriptive statistics such as: frequency counts, means and percentages, likert type scale while inferential statistics such as Pearson Product Moment Correlation (PPMC) was used to test the hypothesis.

Benefits of poultry manure was evaluated using a 5 point Likert-type scale of strongly Agree (5), Agree (4), undecided (3), Disagree (4), and Strongly Agree (1). 10 statements on the benefits of poultry manure were stated for the respondents. Any mean that is less than 3 will not be considered as a strong benefit while any mean that is greater than 3 will be considered as a very important benefit of poultry manure to the farmers. Sources of information on poultry manure accessible to the respondents: This consists of 10 information source. Respondents were asked to indicate their accessibility to these sources of information on a 3-point Likert-Type scale of Always accessible=3, sometimes accessible=2, never accessible=1. Level of utilization of poultry: farmers were asked to indicate the percentage of their farm size that use poultry manure on a scale of < 50% (1), 50-75% (2), >75% (3). Constraints in the use of poultry manure was determined using a 3 point Likert-type scale of very severe (3), Severe (2), Not Severe (1). List of constraints were stated for the maize farmers.

Table 1: Distribution of maize farmers according to their socio-economic characteristics

Variables	Frequency	Percentages	Mean
Age			
≤30	4	2.2	57years
31-40	21	11.7	
41-50	39	21.7	
51-60	83	46.1	
Above 60	33	18.3	
Sex			
Male	123	68.3	
Female	57	31.7	
Religion			
Christianity	83	46.1	
Islam	95	52.8	
Traditional	2	1.1	
Marital status			
Single	17	9.4	
Married	139	77.2	
Divorced	2	1.1	
Widowed	22	12.2	
Educational level			
Non-formal education	91	50.6	
Primary education	47	26.1	
Secondary education	25	13.9	
Tertiary education	17	9.4	
Household size			
≤5	72	40.0	8members
6-10	100	55.6	
11-15	4	2.2	
16-20	2	1.1	
Above 20	2	1.1	
Years of experience			
≤5	72	40.0	8years
6-10	100	55.6	
11-15	4	2.2	
16-20	2	1.1	
Above 20	2	1.1	
Farm size			
≤5	29	16.1	12hectares
6-10	41	22.8	
11-15	79	43.9	
16-20	30	16.7	
Above 20	1	0.6	

Members of association		
Maize growers' association	78	43.3
Oke-osun evergreen agro farmers	48	26.7
Agbewumi fadama livestock farmers	26	14.4
National programme for food security	17	9.4
Oke-osun unique farmers multipurpose	11	6.1
Distance to poultry farms		
<2km	35	19.4
<5km	92	51.1
<10km	53	29.4
Total	180	100.0

Source: Field Survey, 2017

Table 1 shows that majority of the farmers (46.1%) were between the ages of 51-60 while 21.7% of the respondents were aged 41-50years. This implies that the farmers in the study area are quite elderly and acquired wealth of experience in the use of poultry manure for maize production based on their age. The average age of respondent is 57years. This result disagrees with the findings of Idrisa (2009), Kamara (2009), Akudugu, Guo & Dadzie (2012), that farming population in northern part Nigeria are young with a mean age of 44 years. It was revealed that 68.3% of maize farmers were males while 31.7% were females. The findings implies that men are involved in poultry manure usage to boost maize growth than female and this may be as a result of the fact that application of poultry manure is more tedious and energy consuming than inorganic. Therefore, men are stronger to face this task than women particularly at the onset of planting season when the land as to be prepared. This result agrees with findings of Dipeolu, Bello & Akinbode (2006) and Solomon (2008) that farming activities is mostly carried out by male which are done on field while females are usually engaged in post harvesting operations such as processing, bagging and marketing of agricultural produce.

Table 1 further show that 46.1% of the respondents were Christians while 53.8% were Muslims. This implies that poultry manure is not religion bias. Furthermore, it shows that majority of farmers (77%) in the study area were married. The reason for this large number of married respondents may be because of the cultural values placed on marriage and provision of additional labour by the family members who may assist in the application of manure. The table shows that about half of the respondents (50.6%) were not educated. This result contradicts Bonabana-Wabbi (2002) in Uganda, Jones (2005) in Togo-Benin, Kudi, Bolaji, Akintola & NasaI (2011) in Kwara (Nigeria) who reported high level of formal education among farmers in their study areas. It revealed that many (55.6%) of the respondents have household size ranging between 6-10 members with the mean of 8 members. This implies that the farmers have fairly large household which may readily supply labour for the application of poultry manure on the maize farm. This result is in line with the study of Mignouna, Abdoulaye, Kamara & Oluoch (2013) who reported an average number of seven and nine people per household for agricultural activities. It revealed that many respondents (40%) had farming

experience of 15-20 years. Moreover, the mean farming experience is 8 years. This implies that majority of maize farmers had long period of farming experience and therefore would be conversant with the use of poultry manure to improve maize crop yield. This is in line with Bello, Daudu, Galadima, Anzaku & Abubakar (2012) report that most (83.70%) of the respondents in Jenkwe Development Area of Nasarawa State, Nigeria had above 10 years of farming experience. It shows that many of the farmers (43.9%) had between 11-15 hectares. This implies that the farmers have fairly significant farm size and may need more poultry manure to improve their soil fertility.

Table 1 further shows that 43.3% of farmers belong to maize growers' association. This may be because the respondents in the study area were maize farmers. Caviglia & Kahn (2001) in Brazil & Oladele (2002) in Nigeria have shown the importance of farmers' associations and unions as one major sources of information available to farmers for collective decision making as it affects their agricultural production.

Table also shows that 51.1% of the farmers have their farm located less than 5km away from poultry base. This shows that there is proximity to the poultry house which will enhance the availability and utilization of poultry manure for maize production

Sources of information on poultry manure used by maize farmers

Table 2: Distribution of poultry farmers based on sources of information in the study area.

Sources of information	Always accessible	Sometimes accessible	Not accessible	Mean	Rank
1. Television	21(11.7)	89(49.4)	70(38.9)	1.7	6
2. Radio	28(28)	140(77.9)	12(6.7)	2.1	4
3. Extension agent	4(2.2)	131(72.8)	44(24.4)	1.8	5
4. News papers	7(3.9)	72(40)	101(56.1)	1.5	8
5. Mobile phones	12(6.7)	87(48.3)	81(45.0)	1.6	7
6. Friends/relatives	53(29.4)	105(58.3)	22(12.3)	2.2	3
7. Farmers group	126(70)	42(23.3)	12(6.7)	2.6	1
8. Fellow farmers	121(67.8)	41(22.8)	17(9.4)	2.6	1
9. Internet	19(10.6)	51(28.3)	110(61.1)	1.5	8
10. Text books	15(8.3)	56(31.1)	109(60.6)	1.5	8

Source: Field survey, 2017

Table 2 shows that majority of respondents get their source of information from fellow farmer (mean=2.6), farmers group (mean=2.6) and friends/relatives (mean=2.2). Agbamu (2006) reported that the source of information mostly used by farmer in developing countries are influenced by the farmer's age and level of education, available sources of innovations and the extent of modernization in the locality. Although, the respondents indicated that they obtain information from all the sources however, it is clear that major information use by the farmers is obtained or sourced from farmers group and fellow farmers.

Level of utilization of poultry manure among maize farmers

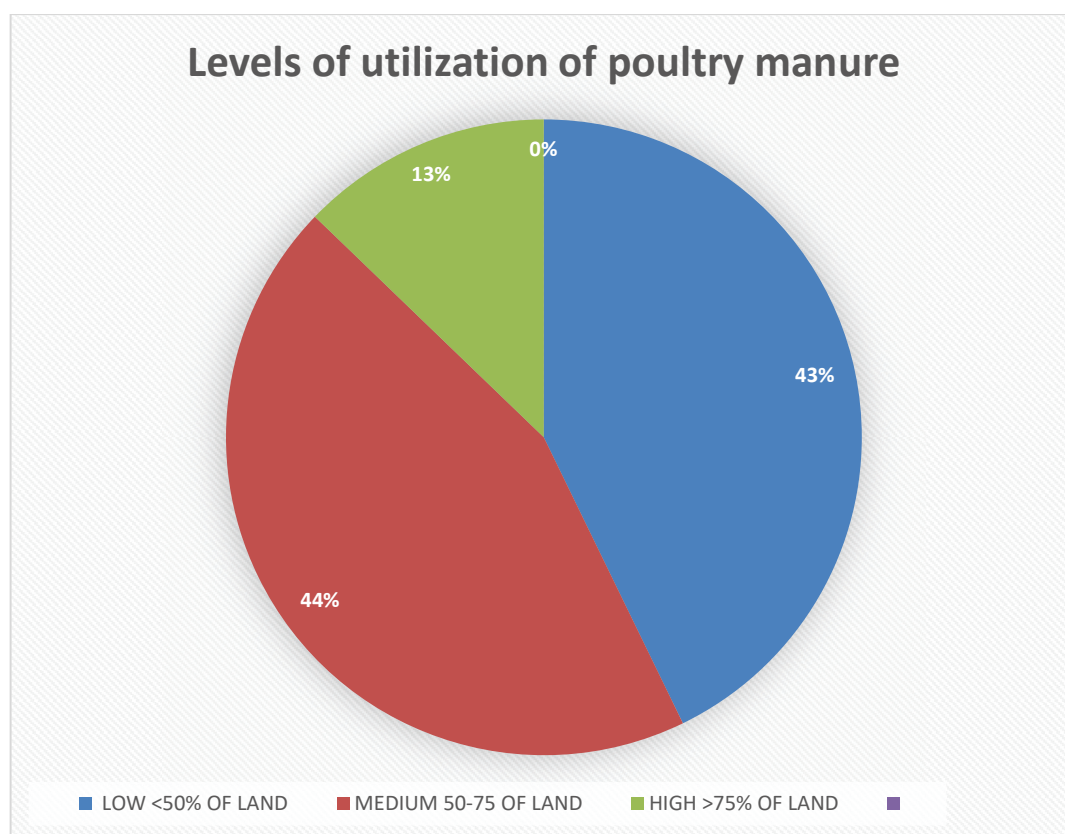


Figure 2: A pie chart showing the distribution of respondents by level of utilization of poultry manure

Figure 2 shows that 44% of the respondents apply poultry manure on 50-75% of their land. This implies a medium level of utilization of poultry manure. This may be because of the limited amount of manure or as a result of the fact that the application is labour intensive. The result is in line with the work of Lampkin & Padel (1994) noted that, in many countries, labour costs on organic farms are high.

Benefits of poultry manure on maize production

Table 3: Benefits of poultry manure on maize production

BENEFITS	SA	A	U	D	SD	MEAN
1. It improves soil fertility and soil structure	3(1.7)	1(0.6)	3(1.7)	30(16.7)	143(79.4)	4.7
2. It reduces all forms of environmental pollution	60(33.3)	70(38.9)	14(7.8)	23(12.8)	13(7.2)	2.2
3. It is efficient in reducing pest and diseases infestation	12(6.7)	26(14.4)	132(73.3)	10(5.2)	-	3.2
4. It gives high-quality products	11(6.1)	106(58.9)	58(32.2)	5(2.8)	-	3.7

5. It reduces environmental degradation	3(1.7)	89(49.4)	78(43.3)	10(5.6)	-	3.5
6. It reduces farmers' exposure to health hazard	2(1.1)	22(12.2)	100(55.6)	55(30.6)	1(0.6)	2.8
7. It increases maize productivity	21(11.7)	90(50)	65(36.1)	4(2.2)	-	3.7
8. It is efficient in reducing climate change effect	33(18.3)	60(33.3)	78(43.3)	9(5.0)	-	3.7
9. It reduces input cost of production	113(62.8)	57(31.7)	7(3.9)	3(1.7)	-	4.6
10. It increases farmers' income with low cost	126(70)	42(23.3)	8(4.4)	2(1.1)	2(1.1)	4.6

Source: Field survey, 2017

Table 3 shows the cut off point for five-point Likert type scale is 3.00. The table shows that out of all the 10 benefits identified, eight of them were considered as very crucial benefits of poultry manure to the farmers. These are poultry manure improves soil fertility and soil structure (mean=4.7), it reduces input cost of production (mean=4.6) among others. Only two benefits were not considered as very strong benefits to the farmers which are poultry manure reduces all forms of environmental pollution (mean=2.2) and it reduces farmers' exposure to health hazard (mean=2.8). Adebayo and Oladele (2012) in their review of organic agriculture shows that it potentials include soil fertility and system stability, ecosystem service, food safety and quality, mitigating climate change, ecological health among others

Constraints to the use of poultry manure among maize farmers

Table 4: distribution of respondents by constraint to the use of poultry manure in the study area

	Very severe	Severe	Not severe	Mean	Rank
1. Unavailability of poultry manure	37(20.6)	133(73.9)	10(5.6)	2.2	12
2. Preference for inorganic fertilizer	97(53.9)	78(43.3)	5(2.8)	2.5	4
3. Bulkiness of poultry manure	88(48.9)	81(45)	11(6.1)	2.4	8
4. Cost of transporting the manure	110(61.1)	61(33.9)	9(5.0)	2.6	2
5. Method of application is tedious	99(55.0)	76(42.2)	5(2.8)	2.5	4
6. Distance covered to poultry farms	84(46.7)	87(48.2)	9(5.0)	2.4	8
7. Labour	87(48.3)	84(46.7)	9(5.0)	2.4	8
8. Time spent	117(64.4)	52(28.9)	11(6.1)	2.6	2
9. Odour	137(76.2)	36(20)	7(3.9)	2.7	1
10. Drudgery	97(53.9)	78(43.3)	5(2.8)	2.5	4
11. Larger quantity per hectare is high	93(51.7)	83(46.1)	4(2.2)	2.5	4

Source: Field survey, 2017

The result of the three-point Likert scale in Table 4 shows the constraints of poultry manure on maize production by respondents when a mean score of 2.5 and above indicate a constraint while a mean score of less than 2.5 indicate a not severe constraints of poultry manure. However, constraints of poultry manure that are severe and have great effects are preference for inorganic fertilizer (2.5), cost of transporting the manure (2.6), method of application is tedious (2.5), time spent (2.6), odour (2.7), drudgery (2.5) and larger quantity per hectare is high (2.5). Omiti, Freeman, Kaguongo & Bett, (1999) noted that animal manure compost is the most common source of soil amendment in organic agriculture in Nigeria and indeed Africa. However, Mafongoya, Bationo, Kihara & Waswa, (2006). reported that in Africa, though, animal manure is one of the mostly used organic inputs, but as the need for increased agricultural production rises; it has been found to be limited in quality and quantity. Williams (1999) reported similar result among farmers in semi-arid West Africa.

Test of hypotheses

Table 5: summary of correlation result showing the relationship between respondents' socio-economic characteristics and the level of utilization of poultry manure

Variable	Co-efficient	p-value	Significance status
Age (x ₁)	0.108	0.148	NS
Sex (x ₂)	-0.084	0.264	NS
Religion (x ₃)	-0.029	0.900	NS
Marital status (x ₄)	0.076	0.310	NS
Education (x ₅)	-0.101	0.178	NS
Household size (x ₆)	-0.020	0.787	NS
Years of experience (x ₇)	-0.111	0.139	NS
Farm size (x ₈)	0.183	0.014*	S
Members of association (x ₉)	-0.057	0.451	NS
Distance to poultry farm (x ₁₀)	0.158	0.035*	S

*-Significant at $P \leq 0.05$, **-Significant at $p \leq 0.05$, Source: Field survey, 2017

Table 5 shows the correlation coefficients of the relationship between selected socio-economic characteristics of respondent and the level of utilization of poultry manure. Out of all the variables used in the correlation analysis, only two were significant. These are farm size and distance to poultry farms. This means that the bigger the farm size, the more amounts the poultry manure utilized. Also, the closer the farmers farm to the poultry farm, the higher the amount of poultry manure being utilized. Adebayo and Oladele (2013) shows that farm size is one of the factors that influences adoption of organic farming practices in South West Nigeria

Table 6 shows the correlation coefficients of the relationship between constraints hindering the use of poultry manure and the level of utilization of poultry

Variable	Co-efficient	P-value	Remarks
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1. Unavailability of poultry manure	0.035	0.641	NS
2. Preference for inorganic fertilizer	0.053	0.479	NS
3. Bulkiness of poultry manure	0.190	0.011**	S
4. Cost of transporting the manure	-0.148	0.047**	S
5. Method of application is tedious	0.018	0.814	NS
6. Distance covered to poultry farms	-0.063	0.404	NS
7. Labour	-0.078	0.301	NS
8. Time spent	0.052	0.489	NS
9. Odour	-0.011	0.887	NS
10. Larger quantity per hectare is high	0.041	0.589	NS

Source: field survey, 2017, *-Significant at p0.001, **-Significant at p0.05
 $P \leq 0.05$ = There is significant difference (H_1)

Table 6 shows the correlation coefficients of the relationship between constraints hindering the use of poultry manure and the level of utilization of poultry. Out of all the variables used in the correlation analysis, only two were significant. These are bulkiness of poultry manure and cost of transporting the manure. The result shows that Bulkiness of poultry manure (0.190, $p < 0.05$) positive significant to the level of utilization of poultry manure. This implies that the bulkiness of poultry manure may hinder the use of poultry manure by farmers on their farms. Cost of transporting the manure (0.148, $p < 0.05$) have a negative significant on the level of utilization of poultry manure. This implies that, if the cost of transporting manure is high, then the farmers will not be encourage to use the manure and this will contribute to the reduction or negatively on the level of utilization of poultry manure. The study conducted by Adebayo & Oladele (2013) showed that education, farm size, membership of organization, distance to farm center among others are factors influencing adoption intensity of organic farming practices in South West Nigeria

CONCLUSION

The study revealed that most of the maize farmers agreed that poultry manure encourages the improvement of soil fertility and soil structure, reduces input cost of production and increases farmers' income with low cost. However, the level of utilization of the poultry manure is still low probably as a result of the bulky nature of the manure and the cost of transporting it to the farm site. Based on the result of the findings, it could be concluded that most of the respondents use poultry manure for their maize production based on the benefit it provides in Osun State, Nigeria.

RECOMMENDATIONS

Based on the findings, the following recommendations were made:

- i. Research institutes in conjunction with Government should provide improved technologies to process poultry manure to dry form in order to reduce the bulky nature of poultry manure
- ii. Poultry houses should be located close to farm settlement in order to reduce the distance covered to the farm site.
- iii. Government should make vehicles available to the poultry houses to transport the manure to the farm site thereby reduce the odour in the city but improve soil quality on the farm.

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