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ASSESSMENT OF THE WASTE MANAGEMENT PRACTICES AMONG PIG FARMERS IN ABOH MBAISE LOCAL GOVERNMENT AREA OF IMO STATE, NIGERIA.

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ABSTRACT

The study provided empirical evidence on waste management practices among pig farmers in Aboh Mbaise Imo State, Nigeria. The specific objectives were to describe the socio-economic characteristics of the respondents, identify various waste management practices used by the respondents, ascertain different sources of agricultural information available to the respondents, ascertain the extent of use of the practices by the respondents, ascertain the perceived effect of these practices in the production of pig and ascertain constraints that influences the use of the various waste management practices by the respondents. A multi stage sampling technique used in the selection of 120 respondents for the study. The data were collected with the use of structured questionnaire and analyzed using both descriptive and inferential statistics. The major results revealed that the major sources of information to the farmers were fellow farmers (100.0%), extension agents (99.2%), community groups (93.3%), waste disposal agencies (71.7%) and mass media (65.8%). A grand mean of 2.80 affirmed that the pig farmers to a high extent used waste management measures in disposing their waste products. A grand mean of 3.24 which affirms that waste management practices exerted strong effect on pig production in the study area. The result revealed with a grand mean of 3.27 that the respondents encountered several constraints in effectively managing their waste pig waste products. The multiple regression coefficients affirmed that years of education (1%), household (1%), flock size (1%) were the significant determinants of use of waste management practices. The simple linear regression coefficient revealed that the perceived effects of waste management practice was not statistically significant but negatively related waste management practices. The study concluded that pig farmers managed their wastes they used waste management measures in disposing their waste products such as utilized for crop and fish farming, composting, burying and burning to a high extent. Training and retraining programme was recommended to be very necessary for upgrading the capacity of pig farmers in waste management. Extension agencies are encouraged to train and retrain pig farmers on environmental and waste management practices.

Keywords: *Waste management practices, Pigs, Farmers*

INTRODUCTION

Pig farming is a major component of livestock especially in Southeastern Nigeria where there are no cultural or religious inhibitions to the production and consumption of pork. Pig meat (pork) is a good source of animal protein, skin, fat and provides materials used for clothing, ingredients for processed foods, cosmetics and other medical uses (Abiola, Omotosho, Adeniyi, Ayoade 2015). Ajala and Osuhor (2024) reported pig farming as a means to generate the country's GDP and also combat malnutrition of animal protein. with this and many other publications enlightening people on the benefits and profitability of pig farming, According to Nze (SIWES piggery Section Coordinator) Abia State has experienced a major hike in the production of pigs, over the past five years this affirms to findings of Osondu, Ijeoma, Anyiro and Obike (2024). Despite its profitability, there is a major problem associated

with pig farming, that is waste management, Industrial pig farming however poses numerous threats to the environment and human health as pig wastes and feaces often spread to surrounding neighborhoods, polluting the air and water with toxic waste particles (FAO 2019; Wendee, 2017). Pig manure, which includes faeces and urine contains: Water (about 90% by weight) and Organic matter (made up of complex carbohydrates) (Birchall, Dillon, and Wrigley, 2018). The three main types of pig manure are slurry, liquid manure and solid manure. Slurry is a mixture of urine, faeces and water; solid manure is faeces and litter scraped off the floor, and liquid manure is a combination of urine, faeces remaining after scraping and cleaning water (Arthur *et.al* 2021). Among the compounds making up liquid manure, there are compounds that mainly form the solid fraction e.g., organic compounds or phosphorus compounds, as well as constituents of the liquid fraction, such as nitrogen compounds and minerals in the form of oxides of sodium, potassium and magnesium (Lens and Hamelers, 2024). The content of these substances depends on the pig management and feeding. Piggery effluent, manure and compost can be valuable sources of nutrients and organic matter for improving soil properties and crop or pasture production. Pig waste management involves the safe and efficient treatment, storage and disposal of pig waste generated in the production of pigs. There are various methods of waste disposal including: land filling: which involves burying the waste in abandoned or unused quarries, mining voids or burrow pits and covering it with layers of soil; incineration: involves subjection of solid organic wastes to combustion at a very high temperature of about 1000^0C so as to convert them into residue or gaseous products; open dumping: whereby dumping can be done on open land or sea; composting: this is an aerobic, biological process of degradation of biodegradable organic matter; hog feeding: this involves feeding animals like pigs with left over materials of waste; mechanical destructor: this involves the use of machines to destroy waste materials (Wikipedia 2023), Recycling of waste which means taking waste materials and transforming them into raw products, results in saving natural resources, saving energy, reducing disposal costs, reducing harmful emission to air and water, saving money and creating jobs (Banga 2023). Good piggery waste management methods such as appropriate timing on land (applying pig waste on land at the right time with appropriate method), utilization of waste as livestock or fish feed, biogas production, composting, prolysis and gasification have not gained prominence in Nigeria probably due to low technical capacity, high cost of waste management technology, and availability of technology.

The specific objectives are to;

1. describe the socio-economic characteristics of the respondents
2. identify various waste management practices used by the respondents
3. ascertain the extent of use of the practices by the respondents;
4. ascertain the perceived effect of these practices in the production of pigs
5. ascertain constraints that influences the use of the various waste management practices by the respondents. Null hypothesis was tested in the study which states that;

$H0_1$: There is no significant relationship between the socioeconomic characteristics of the respondents and their extent of use of the waste management practices.

Aboh Mbaise is a Local Government Area of Imo State, Nigeria. Its headquarters is in the town of Aboh. It has an area of 184 km^2 and a population of 194,779 at the 2006 census. There are different towns in Aboh-Mbaise such as Nguru, Uvuru, Mbutu, Okwuato, Lorji, Amuzu, Enyiogugu. Aboh-Mbaise has rich cultural value. Nguru, in particular, celebrates its Itu aka Nguru Uboma ahia ise cultural festival every year in February. It aka Nguru Uboma Ahia Ise holds at Nguru Centre mostly last Saturday of February each year. The ceremonies start with the Ike Aka and continue with the Egwu Onwa. Itu aka Ngwuru Uboma Ahia Ise is a celebration that dates back in history. In the days when Nguru and his children settled in Nguru Land, farming was the main occupation of the people and was done by shifting cultivation, whereby the people will farm in one area in one year and move to another area another year. The population of the study included all farmers involved in pig farming in the study area. Multi stage sampling was used in the selection of 120 respondents for the study. The first stage involved a random selection 12 autonomous communities form the study area. The second stage involved the random selection of five villages from each of the 12 autonomous communities selected, making a total of 60 villages. In the third stage, two pig farmers were randomly selected from each of the 60 villages

selected. This gave a total of 120 pig farmers which formed the respondents for the study.

Objective 1: To describe the Socio-economic Characteristics of Respondents This involved personal, cultural, social and economic attributes of respondents that affect their behaviour. Socio-economic characteristics considered in this study will be measured as follows:

Age (number in years)

Sex (1 = Male, 0 = Female)

Educational status (years spent in school)

Marital status (Married = 1, otherwise = 0)

Household size (Number of persons living and eating from same pot)

Years of pig farming experience (absolute number in year)

Frequency of contact with extension agent (Always=3, Sometimes= 2, Never=1)

Flock size (absolute number)

Membership participation of cooperative society (Always = 3, Sometimes = 2and Never = 1)

Access to credit (1=Yes; 0=No)

Objective 2: To identify various waste management practices used by the respondents.

This objective was measured by frequency count and percentage of the responses for various waste management practices used by the respondents. Some of them include; Open dumping/fly tipping/bush dumping, Stream /riverbank dumping, Burying, Composting etc

Objective 3: To determine the extent of use of the practices by the respondents; This objective was measured by 4 point rating scale as used by Nwaekpe, Nwachukwu, Ekwe and Onyenma (2021) where very high =4, high =3; moderate=2; low=1. The score response was calculated to obtain the extent of use of the practices by the respondents. The values of the response were summed up (4+3+2+1=10) and divided by 4 to obtain a benchmark of 3.00. Thus, variables whose mean scores are above 2.50 were categorized as high while those below 2.50 were categorized low

Objective 4: To determine the perceived effect of these practices in the production of pigs; This objective was measured by 4 point rating scale as used by Nwaekpe *et al* (2021) where Use Strongly agree =4, agree=3, disagree=2 and strongly disagree=1. The value of the responses for the perceived effect of the waste management practices in the production of pigs were summed up (4+3+2+1=10) and divided by 4 to obtain a benchmark of 2.50. Thus variables whose mean scores are above 2.50 were categorized as high while those below 2.50 were categorized low some of them include reduced odour, healthy pigs etc

Objective 5: To ascertain constraints that influences the use of the various waste management practices by the respondents; This objective was measured by 4 point rating scale as used by Nwaekpe *et al* (2021) where Very serious = 4; serious=3; slightly serious = 2 and not serious=1. The scored responses were pooled and calculated to obtain mean scores of the variables that are constraints that influences the use of the various waste management practices by the respondents some of them include; limited access to credit and funding, lack of capital, scale of production etc. The values of the responses were summed up (4+3+2+1=10) and divided by 4 to obtain a benchmark of 2.50. Thus, variables whose mean scores are above 2.50 are categorized as serious while those below 2.50 was categorized not serious.

Hypothesis one which stated that there is no significant relationship between the socioeconomic characteristics of the respondents and their extent of use of the waste management practices, will be tested using Tobith Regression Model as used by Ekwe *et.al* (2021). The model is specified implicitly thus:

Tobit regression model explicitly specified as;

$Ii = B^{T}X + ei \ldots (1)$

$Yi = 0 \text{ if } I = T$

$Yi = 1 \text{ if } I > T$

Where,

Y = represents a limited dependent variable which simultaneously measure the decision to use waste management practice

I^{x} is an underlying latent variables that indexes the dependent variable

T is an observed threshold

X_i = vector of the independent variables

The implicit model is specified as;

$Y = f(X_1,X_2,X_3,X_4,X_5,X_6,X_7,X_8,X_9,X_{10}\ldots\ldots..Xn, e)$

e_i = Error term

Where,

Y = Extent of use of the waste management practices (mean score)

X_1 = Age (Number of years)

X_2 = Sex of household head (Male=1; Otherwise= 0)

X_3 = Education status (years spent in school)

X_4 = Marital Status (Married = 1, otherwise = 0)

X_5 = Household size (Number of persons living and eating from the same pot)

X_6 = Years of pig farming experience (Naira)

X_7 = Frequency of contact with extension (Always=3, Sometimes= 2, Never=1)
X_8= membership participation of cooperative societies (dummy)
X_9 = flock size (absolute number)
X_{10} = Access to credit (1=Yes; 0=No)

Results and Discussion

Socio-Economic Characteristics of Respondents

The result revealed that the majority (59.2%) of the respondents were male while 40.8% were female. The result implied that more men were more involved in pig farmers than their female counterpart in the study area. The result indicates that a fairly good proportion (37.5%) of the respondents were within the age range of 41 and 50 years. Furthermore, 22.5% and 15.8% fell within the age range of 51-60 years and 31-40 years respectively as against few (13.3%) that were between 61-70 years. The mean age of farmers in the study area was 42.8 years, indicating that the pig farmers in the study area were agile and still in their productive. This result conforms to the findings of Akinbile *et al* (2013) that majority of the farmers are still actively involved in farming activities and Ekwe et.al (2021) who posited that age determines the level of involvement in farming. The result reveals that a high proportion (69.2%) of the respondents were married, 8.33% were single, 16.7% were widowed and few (5.4%) were divorced. This implies that majority of the respondents in the study area were married. In agreement with the findings, Chukwuemeka *et al*., (2019) asserted that marriage is an important factor in the livelihood of individuals in our society as it is perceived to confer responsibility on individuals. This result also concurs with findings of Igwe, (2013) that rural farmers in South- Eastern Nigeria were married. The result indicate that a moderate proportion (45.0%) of the respondents acquired secondary education, 29.17% had primary education, while 16.67% and 9.16% had no formal and tertiary education respectively. The result implied that moderate proportion of the rural farmers in the study area attended secondary school. It will likely make them more responsive to many agricultural extension programmes and policies. Osahon *et al*., (2019) reported that increase in education of farmers positively influenced adoption of improved agricultural practices. This is encouraging because Imonikhe (2010) states that education enhances farmers ability to make accurate and meaningful management decision. The results revealed that large proportion (61.7%) of the respondents were farmers. About 16.7% were civil servants, 16.7% were traders and 5.0% were artisans. This showed majority of the respondents derive their livelihood from farming. This result is in agreement with the findings of Agada and Ajani (2014), that farming is the major occupation and source of income for rural dwellers in developing countries of the world. This also tallies with the research findings of Olayemi (2012) that majority of rural people were farmers. The result revealed that 41.67% and 40.83% of the women had farm income of between N101,000 – N 150,000 and N 51,000 – 100,000 respectively. Also 10.83% had between N 10.000 - N 50,000 as against few (6.7%) that had between N 151,000 – N 200,000. The mean farm income realized by the respondents from their farm was N 102,000. This result implied that the respondents had moderate income from their farms. Osaghale (2020) remarked that increase in income would enable poor households to save more financial resources and consequently gain the required financial ability to invest in farm production. As a result, the need for loan acquisition should not be neglected. Researchers like Birchal *et al.* (2018), and Ayodeji (2022) showed the significant effect of having access to credit facilities in reducing household poverty is as a result of the flexibility of using the credit for different activities in their households. The result reveals that majority (78.3%) of the respondents were not members to cooperatives while 21.7% belonged to different cooperative societies. Membership to cooperative societies have shown to increase the farmers access to farm input, information about new and improved technologies, credit/loan and increase in productivity. Through the formation of farmers' cooperatives, production output can be raised at minimized cost since the group would be able to take advantage of the scale economies, overcome barriers to assets and better management of available resource. Membership of cooperative society affords farmers the opportunity of sharing information on modern production techniques, purchasing inputs in bulk as well as exchanging labour (Ekwe *et al,* 2022).

Waste Management Practices

The result showed that the major management practices are: burying (70.0%), utilized for crops

and fish faming (54.2%), burning (52.5%) and composting 950.8%). This result implies the pig farmers converted their waste products into other uses. Composting biological waste with piggery manure can be an effective means of conserving the nitrogen in the manure, which not only improves the fertilizer value, but also reduces the potential for NH3 to contribute the environmental pollution (Mahimairaja, Bolan and Hedley 2021)

Source of Agricultural Information

The result revealed that the major sources of information to the farmers were fellow farmers (100.0%), extension agents (99.2%), community groups (93.3%), waste disposal agencies (71.7%) and mass media (65.8%). This result implies that farmers sourced their information on waste management practices from several sources.

Extent of Use of Waste Management Practices

The result revealed a grand mean of 2.80 affirmed that the pig farmers to a high extent used waste management measures in disposing their waste products in the study area. The result further showed that utilized for crop and fish farming composting burying were the waste management practices that were used to a high extent in the study area. The result implies that the respondents used some waste management measures in their pig production activities. Chukwuemeka and Kadurumba (2019) similarly found high extent of use of piggery waste management practices due to their environmental implications on human health in rivers state, Nigeria.

Effect of Waste Management Practices on Production of Pigs

The result revealed a grand mean of 3.24 which affirms that waste management practices exerted strong effect on pig production in the study area. The effects were improved pig productivity and reduced pollution The results affirms that waste management practices had positive effects on pig production in the study area. The result agrees with Ayodeji (2012) who found that proper waste management confers positive effect in agricultural production.

Constraints to Effective Waste Management Practices

The result revealed the grand mean of 3.27 affirmed that the respondents encountered several constraints in effectively managing their waste pig waste products in the study area. The result further revealed that the constraints to effective waste management were inadequate machinery and technology among others. This result implies that the pig farmers encountered several constraints in their efforts in managing waste products from their enterprise.

Hypotheses Testing

Ordinary Least Square (OLS) regression estimates of the socio-economic determinants of waste management practices in the study. Four functional forms were estimated and the semi-log function was chosen as the lead equation based on the magnitude of R^2 value and number of significant variables. The value R^2 thus provides line of best fit. The R^2 (coefficient of multiple determination) value was 0.75 which indicates that 75% of the total observed variations in the dependent variable (Y) were accounted for while 25% of the variation was due to error. F–statistics was significant at1% indicating the fitness of the model used.

The coefficient for years of education was positively related and statistically significant at 1%. This result implies that increase in years of education will lead to increase in the waste management practices in the study area. Several studies have found a positive correlation between education and managerial efficiency which is in tandem with this result. Abudu *et al*., (2014) reported that increase in education of farmers positively influenced adoption of improved agricultural practices.

The coefficient for household size was positively related and statistically significant at 1%. This result implies that increase in household size will lead to increase in the waste management practices in the study area. The result is in agreement with Mbawonku (2011) that rural households constitute a formidable and significant source of labour in small scale farming.

The coefficient for flock size was positively related and statistically significant at 1%. This result implies that increase in flock size will lead to increase in the waste management practices in the study area. In tandem with the findings, Onu *et al* (2016) found large farm size increases agricultural productivity and improves farmer's technical, allocative and resource use efficiency as well as enhances access to credit and other farm inputs.

Therefore, the null hypothesis which stated that

there is no significant relationship between the socioeconomic characteristics of the respondents and their extent of use of the waste management practices was therefore rejected at 5% alpha level.

Conclusion

The study provided empirical evidence on waste management practices among pig farmers in Aboh Mbaise in Imo State, Nigeria. The pig farmers managed their wastes they used waste management measures in disposing their waste products such as utilized for crop and fish farming, composting, burying and burning to a high extent in the study area. Consequently, the effects of using waste management practices were improved pig productivity, healthy pigs, low pig mortality, reduced complain and confrontations from neighbouring households and reduced pollution.

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

1. Since most of the pig farmers lack adequate knowledge and awareness on waste management practices, extension agents should launch vigorous awareness campaign on environmental and waste management practices for pig farmers in the study area.
2. Training and retraining programme is necessary for upgrading the capacity of pig farmers in waste management. Extension agencies are encouraged to train and retrain pig farmers on environmental and waste management practices.
3. Issue of land ownership and availability should be addressed by Government at all levels through the appropriate ministries. Specific policies targeted at livestock farmers should be instituted to enable pig farmers access land and other facilities to enable them manage their waste products.
4. Inadequate capital bedeviling the pig farmers should be adequately addressed. Government should address farmers' access farm credit as this enable them to effectively use waste management practices in the study area.

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APPENDIX 1

SOCIO-ECONOMIC CHARACTERISTICS OF RESPONDENTS

SEX	FREQUENCY	PERCENTAGES
Male	71	59.2
female	49	40.8
Total	**120**	**100**
AGE (YEARS)		
20-30	1 5	1 2 . 3
31-40	1 9	1 5 . 8
41-50	4 5	3 7 . 5
51-60	2 7	2 2 . 5
61-70	1 6	1 3 . 3
Total		**100.0**
		Mean 42.8%
MARITAL STATUS		
Single	10	8.33
Married	83	69.16
Widow	20	16.66
Divorce	7	5.38
Total		**100.0**
LEVEL OF EDUCATION No formal education		9.16
Primary education		29.17
Secondary education		45.0
Tertiary		16.67
Total OCCUPATION		**100.0**
Farming	7 4	6 1 . 6 7
Trading	2 0	1 6 . 6 7
Civil servant	2 6	2 1 . 6 6
Total FARM INCOME N		**100.0**
10,000-50,000	13	10.83
51,000 – 100,000	49	40.83
101,000 – 150,000	50	41.67
151,000 – 200,000	8	6.67
Total		**100.0**
		₦102,000.00
COOPERATIVE MEMBERSHIP		
Yes	26	21.66
No	94	78.33
Total		**100.0**

Source: *Field Survey, 2025*

WASTE MANAGE MENT PRACTICES

Table 4.2: Frequency distribution of waste management practice in the study area

S/N	Waste Management practices	Frequency	Percentages
1	Open dumping	34	28.3
2	Stream/riverbank dumping	02	1.67
3	Burying	84	70.0
4	Composting	61	50.8
5	Utilized for crops and fish faming	65	54.2
6	Burning	63	52.5
7	Biogas production	12	10.0
8	Vermicomposting	08	6.7

Source: *Field Survey, 2025*
Multiple responses recorded

SOURCE OF AGRICULTURAL INFORMATION

Table 4.3: Frequency distribution of sources of information in the study area

S/N	Sources of information	Frequency	Percentages
1	Mass media (TV, Radio, Newspaper etc)	79	65.8
2	Waste disposal agencies	86	71.7
3	Posters/banners	17	14.2
4	Extension Agent	119	99.2
5	Fellow farmers	120	100.0
6	Community groups	112	93.3

Source: *Field Survey, 2025* **Multiple responses recorded**

EXTENT OF USE OF WASTE MANAGEMENT PRACTICES

Table 4.4: Extent of use of waste management practices in the study area.

	Management Practices	Very high	High	Moderate	Low	Sum	Mean
1	Open dumping	12(48)	33(99)	51(102)	24(24)	273	**2.28**
2	Stream/riverbank dumping	82(328)	38((114)	0(0)	0(0)	442	**1.68**
3	Burying	65(260)	41(123)	14(28)	0(0)	411	**3.43**
4	Composting	67(268)	53(159)	0(0)	0(0)	427	**3.56**
5	Utilized for crop and fish farming	77(308)	43(129)	0(0)	0(0)	437	**3.64**
6	Burning	60(240)	40(120)	12(24)	8(8)	392	**3.27**
7	Biogas production	12(48)	33(99)	51(102)	24(24)	273	**2.28**
8	Vermicomposting	10(40)	46(138)	48(96)	16(16)	290	**2.52**
	Total mean						**22.38**
	Grand mean						**2.80**
	Benchmark mean						**2.50**

Source: *Field Survey, 2025*
Keys: 1 = Low, 2 = Moderately high, 3 = High, 4 = Very high

4.5: EFFECT OF WASTE MANAGEMENT PRACTICES ON PRODUCTION OF PIGS

Table 4.5: Effect of waste management practices on pig production in the study area

	Management practices	Strongly agree	Agree	disagree	Strongly disagree	Sum	Mean
1	Low pig mortality	60(240)	40(120)	12(24)	8(8)	392	**3.27**
2	Healthy pigs	40(160)	80(240)	0(0)	0(0)	400	**3.33**
3	Reduced pollution	40(160)	60(180)	20(40)	0(0)	360	**3.00**
4	Improved pig productivity	65(260)	45(135)	0(0)	10(10)	405	**3.38**
5	Reduced complain and confrontations from neighboring households	25(100)	73(219)	33(66)	0(0)	385	**3.21**
	Total mean						**16.19**
	Grand mean						**3.24**
	Grand mean						**2.50**

Source: *Field Survey, 2025*
Keys: 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = strongly Agree

4.6 CONSTRAINTS TO EFFECTIVE WASTE MANAGEMENT PRACTICES

Table 4.6: Constraints to effective waste management practices in pig production in the study area

S/N	Challenges	Very serious	Serious	Slightly serious	Not serious	Sum	Mean
1	Inadequate capital	40(160)	80(240)	0(0)	0(0)	400	**3.34**
2	Inadequate access to credit	40(160)	60(180)	20(40)	0(0)	360	**3.00**
3	Inadequate technical know-how	65(260)	45(135)	0(0)	10(10)	405	**3.38**
4	Small flock size	25(100)	73(219)	33(66)	0(0)	385	**3.21**
5	Inadequate knowledge and awareness	62 (248)	33 (99)	16 (32)	9 (9)	388	**3.23**
6	Inadequate machinery and technology	65 (260)	43 (129)	33 (66)	39 (39)	494	**4.12**
7	Issue of land ownership and availability	65(260)	35(105)	18(36)	2(2)	403	**3.36**
8	Inadequate policies	35(140)	85(255)	0(0)	0(0)	395	**3.29**
9	Low contact with extension agent	47(188)	60(180)	13(26)	0(0)	394	**3.28**
10	Farm location	30(120)	60(180)	20(40)	10(10)	350	**2.92**
	Total mean						**32.68**
	Grand mean						**3.27**
	Benchmark mean						**2.50**

Source: *Field Survey, 2025*
Keys: 1 = Not serious, 2 = Slightly, 3 = Serious, 4 = Very Serious

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