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Research Article

EVALUATION OF ORGANIC WASTE MANAGEMENT PRACTICES IN SELECTED ABATTOIRS ACROSS LAGOS METROPOLIS

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ABSTRACT

Evaluation of organic abattoir waste management, the associated challenges with the waste management as well as the perceived relationship between waste receptacles and pollution in the environment are the objectives for conducting this research. Both primary and secondary data were employed in this experimental survey. An estimated number of 826 abattoir workers constituted the sample frame and using the Taro Yamane formula, a sample size of 105was derived. Stratified random sampling technique was used because there were different category of workers in the abattoir, while the data presentation was both descriptive and inferential. Findings revealed that majority of waste generated in the abattoir are disposed in nearby open spaces or canal. Non separation of waste, government policies, illiteracy/awareness and lack of viable market for organic waste were the major challenges of organic waste management in abattoirs.R^2 value of .352 shows that absence of waste receptacle is 35.2% responsible for pollution in the environment and the P value of 0.001 (which is less than 0.5) attests that there is a relationship between organic management and the perceived effect on the environment.

Keywords: Organic Waste, Abattoir, Pollution, Challenges and Environment.

INTRODUCTION

The abattoir is a specialized facility approved and registered by regulatory authority for inspection of animals, hygienic slaughtering, processing and effective preservation and storage of meat products for human consumption (Bardaw and Herago, 2017). Therefore, they are needed primarily to serve the increasing large–scale demand for meat in settlements. However, various studies have shown that abattoirs are sources of pollution as they are characterized by highly organic solid and liquid wastes and fat (Magaji and Chup, 2012; Adeyemo, 2002; Osibanjo and Adie, 2007). Abattoir operations are meant to recover the edible portions of slaughtered animals for human consumption (Fearon, Mensah and Boateng, 2013). In the process, significant quantities of waste materials including organic and inorganic solids are generated (Bandaw and Herago, 2017). The solid waste consists mainly of bones, undigested ingest and occasionally aborted foetuses while the liquids comprises blood, urine, water, dissolved solids and gut contents. Some researchers point out that abattoir activities are responsible for the pollution of surface and underground waters as well as air quality which indirectly affect the health of residents living within the vicinity of abattoirs (Ubwa, Atoo, Offem, Abah and Asemawe, 2013; Fearon *et al,* 2013). Wrongful discharge of blood and animal feaces into streams may cause oxygen-depletion as well as nutrient over enrichment of the receiving system which could cause increased rate of toxin accumulation (Nwachukwu *et al.,* 2011). Humans may also be affected through outbreak of water borne diseases and other respiratory and chest diseases (Mohammed and Musa, 2012).Research works conducted on wastes suggested that wastes can be recycled or processed for conversion into useful products such as biogas and nutrient input for agricultural production including vegetable production, fish farming and even as feed for local chicken or goats reared under extensive system in rural households of these developing nation (Chaudhry and Narseer 1993; Banye, 2014). Therefore, this study explores organic waste management in abattoirs and its attendant effects.

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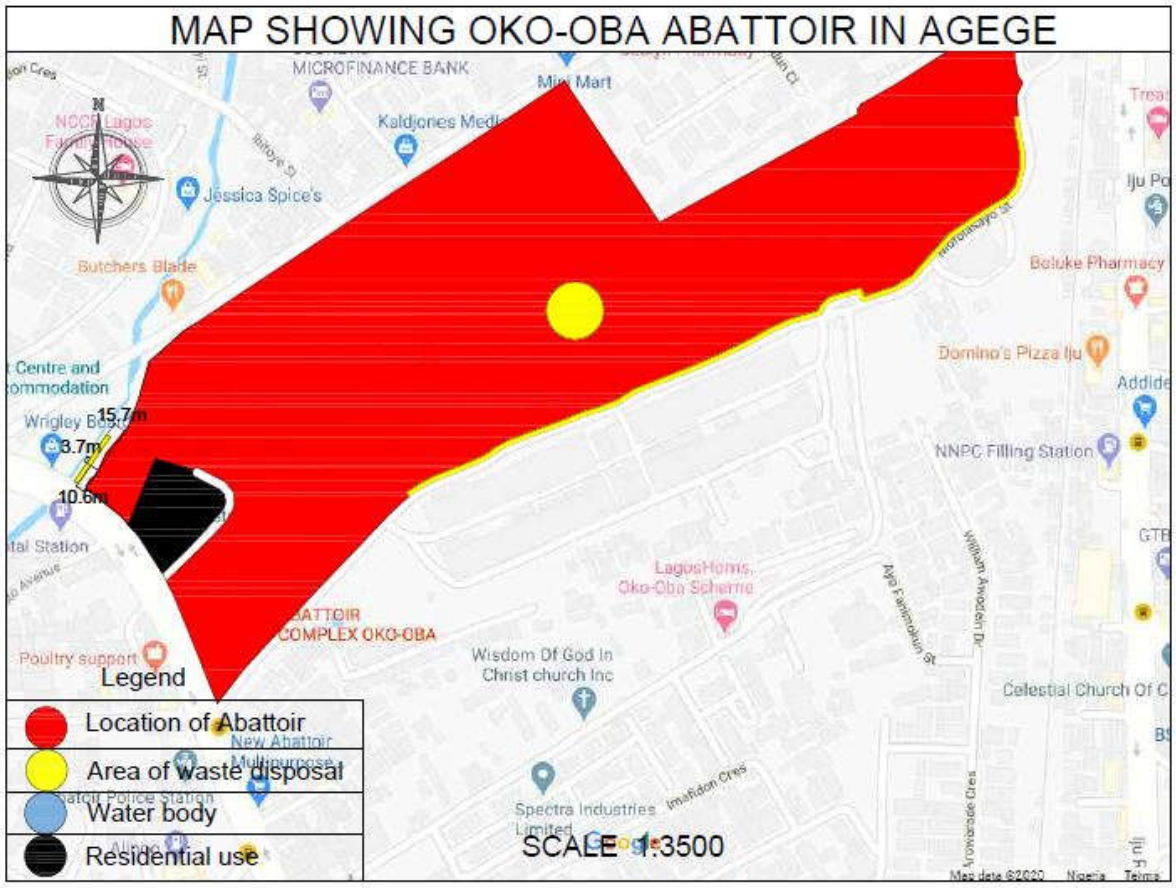
LITERATURE REVIEW

Organic waste management in abattoir

In a study titled "Abattoir operations' waste generation and management in Tamale (Ghana) metropolis: a case study of Tamale slaughterhouse", by Fearon *et al.* (2013), it was discovered that the abattoirs in Tamale do not fully adhere to the food and drug law/guidelines of Ghana to ensure safety and quality standards. The research was empirical in nature and assessed waste volume, waste handling, transportation and waste processing as variables. It was also discovered in the research that abattoirs were responsible for surface water pollution and bad air quality, which affects the health of residents within the vicinity. The study recommended a stringent punishment against sanitation defaulters in the abattoirs. Adewumi, Babalola and Adejuwon (2016) found out that animal dung was useful because it contains organic matter, but could also pollute water when it runs into water bodies. This was discovered in a research titled "Assessment of abattoir waste management strategy in Akure, Nigeria". The study also found out that most of the wastes were disposed indiscriminately into the environment. Variables examined were proximity to water bodies, waste receptacles, waste management authorities and scavenging. Among several recommendations, were off-site waste treatment and siting of abattoirs away from water bodies.

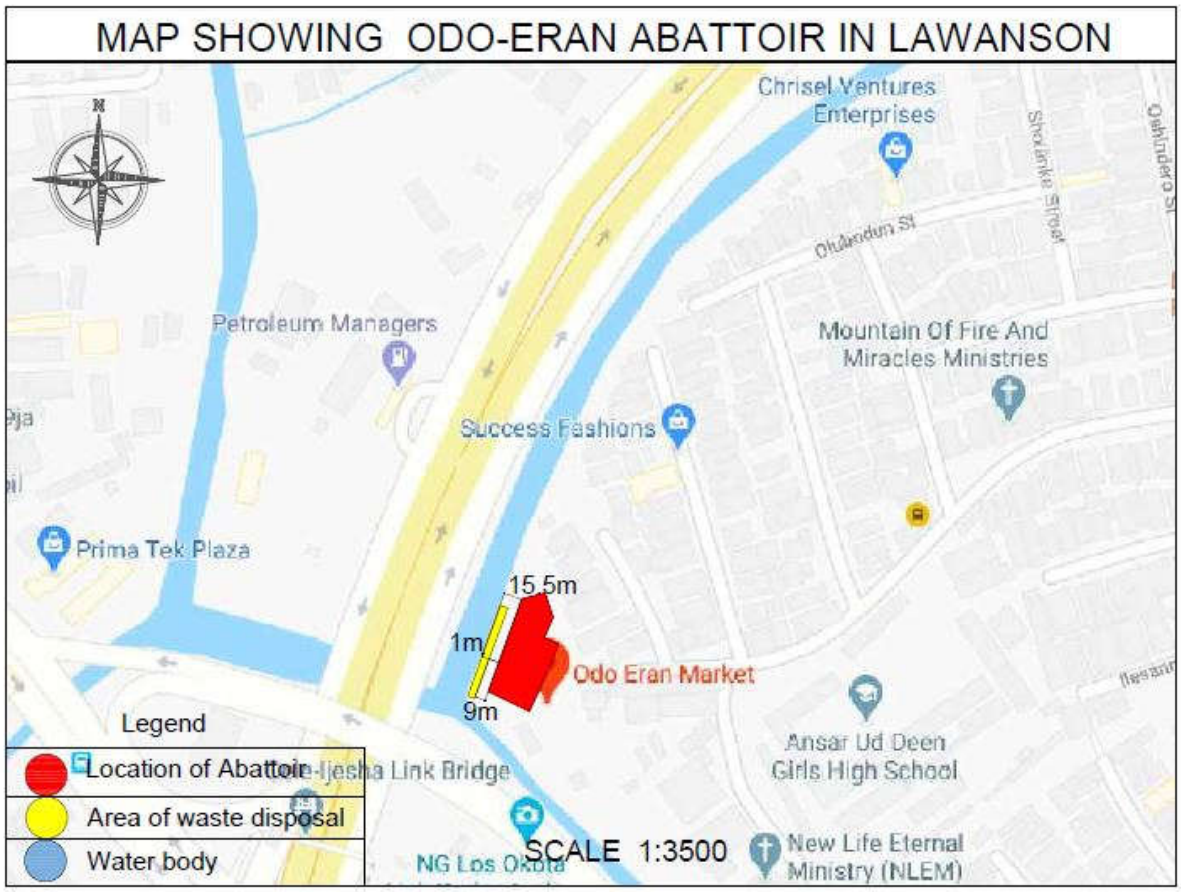
Challenges of organic waste management in Abattoirs

Abattoir waste is paid the least attention among all industrial wastes (Golbazl, Farzadkia, Vanani and Emamjomeh, 2017). This was discovered in a research titled "Livestock slaughterhouses waste management in urban environment".



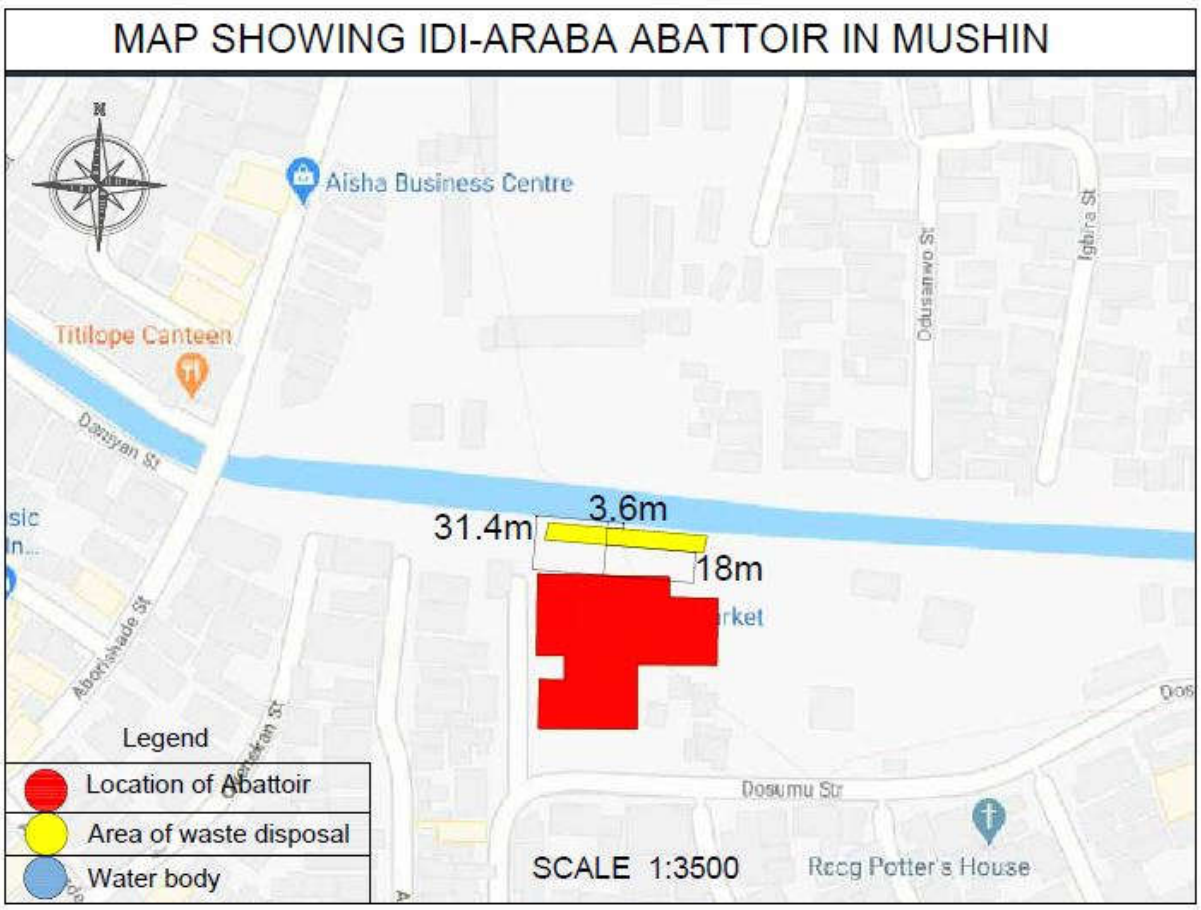
Source: Author's field work, 2019

Figure 1.1: Oko-oba Abattoir, Agege



Source: Author's field work, 2019

Figure 1.2: Odo-eran Abattoir, Lawanson



Source: Author's field work, 2019

Figure 1.3: Idi-araba Abattoir, Mushin

The research was empirical in nature and assessed the following variables; method of meat production, collection, storage, transportation, processing and disposal. It was also discovered in this research (conducted in Iran) that both organic and inorganic abattoir waste were disposed off together - no separation of wastes. According to Banye (2017), the major challenge of abattoirs at the volume waste generated and the absence of facilities to manage them. "Sustainable waste management systems in abattoir design" is the title of this paper that sought ways to improve waste management practices in abattoirs. The research also pointed out that most abattoirs in Nigeria use traditional/old methods of processing meat and waste disposal. Variables examined in this research were available technology, socioeconomic characteristics of slaughter house workers, finances and waste disposal facilities.

Organic waste management and effect on environment

Olawuni, Daramola and Soumah (2017), in the study titled "Environmental implications of abattoir waste generation and management in developing countries", confirmed that abattoir has polluting effect on the immediate environment and consequently capable of generating negative health effect. This conclusion was reached after examining waste management practices, level of satisfaction from neighboring residents and hygiene checklist. The study recommended enlightenment of slaughterhouse workers and periodic trainings.

Summary

The above reviewed literature has revealed the time, location and variable gap in research concerning the abattoir waste management generally.

This research fills that gap by concentrating on organic waste management practices in abattoirs in Lagos Metropolis, Nigeria. Additional variables were assessed in this empirical research.

METHODOLOGY

Research design: empirical (survey)

Source of data: Primary and Secondary

Research instrument: Questionnaire and observation

Study population: Abattoir (slaughterhouse) workers

Sample frame: 826 persons

Sample size: 105 (using Taro Yemane sample size formula)

Sampling Technique: Stratified random (Probability). Because of the different category of workers

Data presentation: Tables, texts and pictures

RESEARCH FINDINGS

Organic waste management in abattoir

Majority of the respondent are satisfied with the level of management, it was also observed that waste receptacles were absent in some sections of the abattoir. Wastes generated in the three abattoirs were disposed daily in the available waste receptacle or nearby open dump site.

Table 1.1. Presence of waste receptacle

Presence of waste receptacle	Odo abattoir idi-araba Mushin		Lagos state abattoir Oko-obaAgege		Odoeran abattoir Lawanson, surulere.		Total	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Yes	3	14.3	42	100	32	76.2	77	190.5
No	18	85.7	-	-	10	23.8	28	109.5
Total	21	100	42	100	42	100	105	300

Source: Field Survey, 2019

Table 1.2. Frequency of waste disposal

Period of waste disposal	Odo abattoir idi-araba Mushin		Lagos state abattoir Oko-obaAgege		Odoeran abattoir Lawanson, surulere.		Total	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Daily	15	71.4	42	100	25	59.5	82	230.9
Weekly	6	28.6	-	-	17	40.5	23	69.1
Monthly	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Total	21	100	42	100	42	100	105	300

Source: Field Survey, 2019

Table 1.3: Place of waste disposal

Place of waste disposal	Odo abattoir idi-araba Mushin		Lagos state abattoir Oko-obaAgege		Odoeran abattoir Lawanson, surulere.		Total	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Nearby public bin	8	38.1	12	28.6	42	100	62	166.7
Open spaces	13	61.9	30	71.4	-	-	43	133.3
Beside the road	-	-	-	-	-	-	-	-
Stream side	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Total	21	100	42	100	42	100	105	300

Source: Field Survey, 2019

Table 1.4. Actions taken when the collectors fail to come for the waste

Actions taken when collector fails to show up for waste collection	Odo abattoir idi-araba Mushin		Lagos state abattoir Oko-obaAgege		Odoeran abattoir Lawanson, surulere.		Total	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Leave it	18	85.7	-	-	35	83.3	53	169
Seek other alt	3	14.3	42	100	7	16.7	52	131
Total	21	100	42	100	42	100	105	300

Source: Field Survey, 2019

Table 1.5. Waste sold for Manure or other things

Waste sold for manure or other things	Odo abattoir idi-araba Mushin		Lagos state abattoir Oko-obaAgege		Odoeran abattoir Lawanson, surulere.		Total	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Yes	21	100	42	100	42	100	105	300
No	-	-	-	-	-	-	-	-
Total	21	100	42	100	42	100	105	300

Source: Field Survey, 2019

Table 1.6. Available office responsible for organic waste management

Available office responsible for organic waste management	Odo abattoir idi-araba Mushin		Lagos state abattoir Oko-obaAgege		Odoeran abattoir Lawanson, surulere.		Total	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Yes	21	100	42	100	42	100	105	300
No	-	-	-	-	-	-	-	-
Total	21	100	42	100	42	100	105	300

Source: Field Survey, 2019

Source: Author's field work, 2019 Source: Author's field work, 2019

Plate 1, Showing the canal with stagnant water and blood

Source: Author's field work, 2019

Plate 2. Blood flowing through the drainage channel to the canal

Plate 2: Showing truck conveying unseparated abattoir Wastes (Oko-Oba, Agege)

Plate 3: Showing Lagos State abattoir (oko-oba) dumpsite

Table 1.7. Challenges of Organic Waste Management

Variables	S D			D			I			A			SA			Total	Mean Score
	M	A	L	M	A	L	M	A	L	M	A	L	M	A	L		
Government policy	0	0	0	10	16	34	48	0	0	0	0	0	0	170	125	403	3.84
Illiteracy/awareness	0	0	0	10	0	34	39	0	0	0	136	100	15	40	0	374	3.56
Hygiene	0	0	0	42	0	34	0	0	0	0	168	100	0	0	0	344	3.28
Finance	0	0	0	0	0	0	63	126	126	0	0	0	0	0	0	315	3.00
Animal scavengers	0	4	10	10	0	64	39	0	0	0	0	0	15	190	0	322	3.16
Human scavengers	0	0	10	6	0	64	54	12	0	0	120	0	0	40	0	306	2.91
Electricity	3	8	0	0	0	50	54	102	51	0	0	0	0	0	0	268	2.55
Transportation	0	0	0	32	60	0	0	0	126	20	16	0	0	40	0	295	2.81
Lack of market for recyclables	0	0	0	16	0	0	39	0	126	0	136	0	0	40	0	357	3.40
No separate collection for organic waste	0	0	10	0	0	14	0	0	0	0	16	100	105	190	0	435	4.14
Lack of monitoring and enforcement	0	30	10	42	8	0	0	0	0	0	32	128	0	0	0	250	2.38
Lack of manpower to service operation in this sector?	0	30	10	32	8	14	15	24	0	0	0	100	0	0	0	233	2.22
Inadequate equipment to manage the organic waste	0	30	0	42	0	0	0	0	0	0	16	128	0	40	50	306	2.91

Source: Field Survey, 2019

*Key: The scale was ranked as thus: Strongly Agree = 5, Agree = 4. Indifferent = 3, Disagree = 2, Strongly Disagree =1.

M = Odo abattoir (idi-araba Mushin), A = Lagos state abattoir (Oko-obaAgege), L = Odoeran abattoir (Lawanson, Surulere)

The agents responsible for the waste management in the abattoir show-up for waste collection weekly except the Lagos state abattoir Oko-obaAgege where they come for the waste daily, however, qualitative data and observation revealed that the waste collectors often default or delay the pick up; in instances like this, they empty the waste in the open dump sites or nearby drainages/canal. The respondents claimed to sell organic waste to vendors, but the presence of waste scavengers was observed, picking the waste freely. Despite the respondents claimed to have a dedicated office for waste management, its effect was not felt, as the general environment was still littered with both organic and inorganic solid and liquid wastes. The organic wastes generated in the three abattoirs are disposed in a nearby open-space which constitute nuisance in the environment. In Odo abattoir idi-araba Mushin and Odo-eran Lawanson community, Surulere blood from the slaughtered animals run to the drainage channelled into nearby canal. The faeces generated ends up being scavenged by who is interested in it. It suffices to conclude that organic waste is not being properly managed in the abattoirs across Lagos metropolis.

Challenges of Waste Management Practices in Abattoir

The above Likert scale reveals that the non-separation of waste, government policies, illiteracy/awareness and lack of market for recyclables were the major challenges of organic waste management in abattoirs, amongst all variables examined. The Likert scale also revealed that irregular power supply, lack of monitoring and enforcement and manpower were the least of the challenges the abattoir operators encounter concerning organic waste management.

The relationship between organic waste management and perceived effects on the environment

To test the hypothesis, linear regression was built between the independent variable pollution in the environmenton dependent variable absence of receptacle.

Table 1.8. Summary of regression result by enter

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.593[a]	.352	.346	.359	.352	55.902	1

The R^2 value of .352 in table 1.8 indicates that dependent variable account for 35.2% of the variance in the independent variable. This means the absence of waste receptacles is 35.2 % responsible for pollution in the environment. The Anova and coefficient show the test hypothesis in simple linear regression that is, whether the independent variance is a significant predictor of the dependable variable. The Pvalue for the test shows the significance at 0.001 which is lesser than 0.5. Hence, the absence of waste receptacles is a significant predictor of pollution in the environment.

Table 1.9. Variance analysis of estimates (ANOVA)

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	7.224	1	7.224	55.902	.000[b]
	Residual	13.310	103	.129		
	Total	20.533	104			

Table 1.10. Estimated Beta Coefficients of the model by Enter

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.761	.076		9.995	.000
	pollution in the environment	.246	.033	.593	7.477	.000

Table 1.11. Coefficient Correlations

Model			Pollution in the environment
1	Correlations	Pollution in the environment	1.000
	Covariance	Pollution in the environment	.001

Summary

This study has revealed that waste is notwaste is not being properly managed in the abattoir. Observation also revealed that liquid waste is being channeled to the canal through the drainage, there is no obvious waste separation i.e. organic from inorganic. The organic waste is also often dumped in open dump site, encouraging animal and human scavengers in an unhygienic form. Conversion of organic waste into bio fuel is an option that is yet to be harnessed, nor considered. Findings revealed that the major challenges encountered by workers in the abattoir concerning organic waste were: non-separation of waste (organic and inorganic waste were assembled together), government policies, illiteracy/awareness and lack of viable market for organic waste were the major challenges of organic waste management in abattoirs. From the research findings, it has been proven that there is a relationship between the absence of waste receptacles and perceived pollution in the environment.

Conclusion

This study has revealed organic waste management practices in abattoirs across Lagos metropolis, revealed the challenges of organic waste management in those abattoirs and established a relationship between organic waste management and its perceived effect on the environment. Environmental scientist should continue in this line of research to recommend viable and feasible solutions to problems identified through the research findings.

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