ASSESSING FECAL WASTE MANAGEMENT IN ILARO, OGUN STATE, NIGERIA.

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ABSTRACT

The study aims at assessing fecal waste management in households within Ilaro, with the view to suggesting better means of managing fecal waste for improved sanitary conditions requisite to meeting the Millennium Development Goal target for sanitation. The objectives of the study are to investigate the existence of sanitary facilities within buildings in the study area; assess the condition of the identified sanitary facilities; and investigate the methods households employ in evacuating and disposing accumulated fecal sludge. The study used cluster sampling technique in dividing the study area into 26 areas of divisions, each with relatively homogenous and distinct social-economic character. Further, two clusters were randomly picked as representative of each of the three zones that social-economic stratification dovetailed into. The study employed random sampling in administering questionnaires to 10% of the buildings in each sampling area. The total sample size of 199 in Ilaro derives from the 7,5, 32, 27, 58 and 70 buildings estimated as the 10% of total buildings in GRA; Bobado; Ikosi area; Surulere, Oju okeke areas; Oke ela, Oke ela titun area;and Pahayi areas, respectively. This represents 1.64% of the 12,129 buildings in the study area. Households were the unit of data collection. Data obtained from the questionnaires were processed and analyzed, using simple descriptive statistics and correlation analysis through the Statistical Package for Social Science (SPSS, version 16). 60.7% of the sampled buildings have toilets that were not connected with water systems, among other findings. Correlation between diseases constantly contacted around households, how respondents dispose fecal waste, and type of toilet at the P values of 0.00, using the significant level of 0.05, was significant. It finally recommended, inter alia, the need for increased investments in sanitation enhancement for environmental benefits and prevention of economic loses that unsanitary conditions bring about.

INTRODUCTION

The critical and most pressing challenge besetting most developing countries and their cities are the health impact of urban pollution that emanate from inadequate water services, poor urban and industrial waste management, air pollution, and poor fecal waste management (Napoleon et al, 2011). As reported by Business day (2012), a recent study carried out by World Bank (2012), on water and sanitation in Nigeria had it that Nigeria loses over 1 billion dollars to poor sanitation, and that 70 million Nigerians use shared latrines, while 32 million defecated in the open. The study also indicated that each person practices open defecation, spends almost 2.5 days a year finding a private location defecate, leading to large economic losses.

This study conforms with United Nations (2004), as quoted in Uwaegbulam(2004), which noted that developing countries are falling behind on sanitation goals. The report noted eerily that "about 2.4 billion people will likely face the risk of needless disease and death by the 2015 because of bad sanitation. It is recognized that of the over 280 million of under five children without access to improved sanitation facilities, 75 million are from sub Saharan African. Nigeria and the Democratic republic of Congo share an egregious profile of having the sub-Saharan African most sanitation and water deprived people

Bad sanitation- decaying or non-existent sewage system and toilets fuel the spread of diseases like cholera and basic illness such as diarrhea, which kills a child every 21 seconds (Uwaegbulam,2004). As noted by Bills and Melinda Gates foundation (2011), even while the level of awareness to own or use a toilet is increasing, fecal waste still remains a problem neither the government nor the communities are putting sufficient efforts in managing. Ilaro, the case study, being the head quarters of Yewa South Local Government and on account of the location of Dangote cement factory, expansion of programmes at the Federal Polytechnic Ilaro, and the establishment of various formal and informal businesses, had been experiencing rapid urbanization. Hence, the need to assess existing fecal production, disposal, and management level in the rapidly developing town, in a bid to suggesting better strategies for fecal waste management cannot be over-emphasized.

The study aims at assessing fecal waste management in households within Ilaro, with the view to suggesting better means of managing fecal waste for improved sanitary conditions requisite to meeting the Millennium Development Goal target for sanitation. The objectives of the study are to investigate the existence of sanitary facilities within buildings in the study area; assess the condition of the identified sanitary facilities; and investigate the methods households employ in evacuating and disposing accumulated fecal sludge.

LITERATURE REVIEW

Public sanitation aims at ensuring adequate disposal of unsightly wastes across towns and cities, and to enhance proper sanitary conditions, which will improve the health of the citizens.(Uchegbu,2002). A highly dangerous variant of waste is the human feces. Globally, and daily, about 500 million kg of feces is generated in urban areas, and about 600 million kg in rural areas (Bill Melinda and Gates foundation, 2011). Human feces are composed of chemicals like volatile solids (75%) ; cellulose (34%) ; hemi-cellulose (6.0%); crude protein (19.5%); crude fat(lipidi) 14%; and ash. As quoted in Bill Melinda and Gates foundation, (2011),Egbuniwe(1980) revealed that the amount of excreta generated in eastern Nigeria was about 500-900 per day. According to Bill and Malinda Gates foundation (2011), a large percentage of the population in Nigeria relies on sanitation systems such as septic tanks and pit latrines. However, less than 1 percent uses a flush toilet.

The foregoing, among others, may be intertwined with the substantial policy, institutional and financial challenge that the Nigeria Water, Sanitation, and Hygiene Sector (WASH) is faced with. Lack of autonomy, budgetary inadequacies, and low capacity has constrained Local Government Agencies saddled with the onus of water sanitation services, in carrying out their duties effectively (Water Aid, 2008). Of the more than 280 million children under five living in households without access to improved sanitation facilities, almost two-thirds live in South Asia (106 million), and sub-Sahara African (75 million) (Bill and Melinda Gates, 2011). Over the past decade, several water supply and sanitation policies have been drafted by Nigeria. However, the National Environmental Sanitation Policy (NESP) approved in 2005 comes across as the only one that specifically addresses fecal management (Water Aid, 2008).

PROBLEM STATEMENT

As reported by Business day (2012),a World Bank study done in 2012 reported that over 3.5 million Nigeria defecate in the open. This is linked to lack of or bad sanitary facilities in most households. According to the World Bank study, 70 million Nigerians use or share unsanitary facilities. Water, which is imperative to clean disposal of fecal waste, is also not adequate in most Nigerian households. This is corroborated by the finding of the World Health Organization (WHO)/United Nations Children Fund, as reported in Punch (2012) that over 66 million Nigerians lack access to potable water. This inadequacy of water is the major reason why the finding of Bill Melinda and Gates foundation(2011) that less than 1 percent use water flush toilet in Nigeria is not far-fetched. Also problematic, is the existing fecal waste evacuation and disposal means, which are at best crude, unsustainable, and such that exposes households to unpleasant odour, eyesore and production of unhealthy flies and pathogens.

There is no documentary evidence of current situation of sanitary conditions in the study area. But it is evident that like most Nigerian growing urban centers, Ilaro residents mostly live in buildings without adequate and good sanitary facilities. The

evacuation of accumulated fecal waste relies mostly on emptying means that exposes the labourers involved in emptying of pits/septic tanks and the households to health and environmental hazards. Disposal of the fecal waste in the study area is indiscriminate, and not regulated. It is also not deemed applicable for beneficial use. The need to properly present these issues in the study area in statistical and verifiable context justifies this study.

STUDY AREA

Ilaro,a predominantly Yoruba speaking settlement is the study's area of focus. Ilaro town is about 50 km from Abeokuta, the capital Ogun state, and about 100km from ikeja, the city of Lagos state. It is defined by co-ordinates $6.88333^oN\ 3.01667^oE$. Ilaro, the headquarters of Yewa south L.G, has an area of $629km^2$ and a population of over 100,000. With population growth and physical expansion occasioned by the establishment of growth poles like the Federal Polytechnic Ilaro and Dangote cement ibese ,which is within the study area's ecological footprints, and natural increase, urban problems of various forms are bound to evolve.

METHODOLOGY

This study employed the primary and secondary sources of information in collecting data. Primary data were collected with the aid of questionnaires. The study used cluster sampling technique in dividing the study area into 26 areas of divisions, each with relatively homogenous and distinct social-economic character, viz: Pahayi area; Upper Leslie ,Musa, Otegbeye, Ona egbo areas; GRA area;ijado road area; Bobado area; Oke -Ola area; Ikosi area; Upper mission, Upper Leslie,Igbo -ewe area; Oke ibese, Ona osi, Ago isapa area; Gbogidi,School II area; Aiyegbami, Orita,100 4 area, Seriki, Ajumoun,Adeogun area; Sawmill,Ago efun, Sabo ; Sabo- ileba area; Ileba, Oke okuta areas; Surulere, Oju okeke area; Atewolara, Lower mission,Ogburu areas; Oke Alafia areas; Alaraba, Kumoye, lower leslie; Ilu ata, Idolumo, Isale-domo; Gbokoto area; Ona -ola quarters; Orita; Oke ela, Oke ela titun area;Dosunmu; and adeyemi area.

While GRA and Bobado, areas were considered high income resident clusters, Okeola, Ikosi, Oke-okuta and Ileba area, Ijado road and Ibokoto road were deemed as middle income resident clusters. The other areas were deemed low income residential zones. Further, two clusters were randomly picked as representative of each of the three zones that social-economic stratification dovetailed into. For the high income resident zone, GRA area with a building population of 66, and Bobado area with a building population of 50 were selected. Surulere and Ojuokeke area with a building population of 270 and Ikosi with 300 were selected as the sampling areas for the middle income residential zones. Pahayi area with 700 buildings, and Oke ela, Oke ela titun area with 578 buildings were randomly selected as the sampling areas in ilaro's low income residential zones.

The study employed random sampling in administering questionnaires to 10% of the buildings in each sampling area. The total sample size of 199 in Ilaro derives from

the 7,5, 32, 27, 58 and 70 buildings estimated as the 10% of total buildings in GRA; Bobado; Ikosi area; Surulere, Oju okeke areas; Oke ela, Oke ela titun area;and Pahayi areas, respectively. This represents 1.64% of the 12,129 buildings in the study area. Households were the unit of data collection. Data obtained from the questionnaires were processed and analyzed, using simple descriptive statistics and correlation analysis through the Statistical Package for Social Science,(SPSS, version 16).

DISCUSSION OF FINDINGS

Socio-Economic Characteristics of Respondents

The researchers assumed that the socio-economic characteristics of people somewhat determine the sanitary conditions of their buildings. Hence, socio-economic parameters such as age, occupation, monthly income, household sizes, family size, and building type were foremost investigated. The frequency distribution of these variables is summarized in Table 1. From the table, it is evident that all the respondents were within matured age-ranges that could guarantee the required wisdom and responsibility for responses to be valid. Majority of residents (37%) were traders, while a huge percentage of them earn less than N10,000 considered to be minimum wage. The prevalence of this income category could be borne out of the fact that about 16% of respondents were students that essentially still depended on other people. While majority(32.7%) of residents lived in buildings where resident households were   between 3-5,22.6%,12.6%,13.1%,and 15.1% resided where households were less than 2, between 5-7, between 8-10,and above 11, respectively. Family size within the range of 5-7 individuals dominated respondents' households (42.7%), while Brazilian type was the most prominent type of building that housed residents.

Table 1: Socio-Economic Characteristics of Respondents

Parameters	N	%
Age		
20-30 years	71	35.7
31-40 years	67	33.7
41-50 years	37	18.6
51 years and above	24	12.1
Total	199	100.0
Occupation		
Farmer	25	12.6
civil/public servant	52	26.3
Student	32	16.2
Trader	74	37.4
Artisan	16	7.6
Total	199	100.0
Monthly Income		
less than #10000	70	35.2

#10000-50000	65	32.7
#51000-100000	35	17.6
#100000 and above	29	14.6
Total	199	100.0
Household sizes		
less than 2	65	26.6
between 3-5	53	32.7
between 5-7	25	12.6
between 8-10	26	13.1
11 and above	30	15.1
Total	199	100.0
Family size		
less than 4	85	29.6
between 5-7	59	42.7
between 8-10	25	12.6
eleven and above	30	15.1
Total	199	100.0
Type of building		
Brazzilian	128	64.3
flat system	58	29.1
Traditional	9	4.5
Duplex	4	2.0
Total	199	100.0

Author's Field Survey (2013)

Assessment of Respondents' Sanitary Facilities, and Methods they Employed in Managing their Fecal Wastes

Presented in table 2 are the summaries of the descriptive statistics of respondents sanitary facilities assessment, and methods they employed in managing fecal wastes. The variables under consideration are toilet' availability, position of available toilets, type of toilets, toilets connection with water systems, number of households sharing toilets, frequency of fecal waste evacuation, length of queue before accessing toilets, size of septic tanks, distance of pit/septic tanks from water sources, fecal waste disposal means, disposal sites of fecal wastes, and diseases constantly contacted within households. From the table, it is evident that about 8% of sampled residents lived in buildings without toilets. This category of residents would have no choice than to either defecate in contiguous neighbors' toilets, inevitably increasing the rate at which fecal sludge fills up their neighbors' septic tanks and pits, or in the bushes. This does not significantly vary from the findings of Bill and Melinda Gates Foundation (2011) that 32 per cent of households in Nigeria have no toilet facilities,

and the problem is more common in rural areas (42 per cent) than in urban areas (14 per cent). It is also an indication that development control has low penetration in the study area.

55.8% of buildings occupied by residents have toilets that are detached from the buildings. In the study area, pit latrines (53.8%) and water closet fitted septic tanks(36.2%) are common. Buildings with VIP latrines were about (4.5%), while residents that categorically claimed they recourse to the bush defecation system were about (5.5%).60.7% of the sampled buildings have toilets that were not connected with water systems. The absence of water flush systems in most of the toilets definitely exposes residents to offensive odour, flies, and other conditions that raise risks of health hazards. Toilets were majorly shared by majority of the respondents (51.5%). While toilet facilities were mostly shared by between 3-5 households in the study area(29.6%),1-2 households , between 5-7 households, and above seven households representing 27.1%,22.1%,and 22.1%,respectively,shared toilet facilities. This probably accounts for why a huge 22.1% of respondents queue for over 10 minutes before accessing toilets. This situation might make excessively pressed residents who cannot afford to queue at rush periods, mostly in the morning period, expediently seek other options like the open dumps, potties, use of papers on the floors ,and bushes for defecation. The time loss in waiting for turns at toilets was part of the variables quantified and associated with the huge 1 billion dollars that a recent study by Water and Sanitation Programme in 2012, as revealed by Business day(2012),reported Nigeria lost annually to poor sanitation.

It is noteworthy of mention that 74.9% of toilets within residents' buildings maintained a distance of less than 30 meters from water sources within buildings. This is highly sanitarily unacceptable in light of WHO standards, which puts setbacks between septic tanks/pits and water sources as 30 meters. The risk of groundwater contamination in the study area is high, if this is not checked by planning and environmental authorities. Majority of residents (42.7%) claimed that they employed chemicals in shrinking the fecal sludge. This is followed by 21% that use manual emptiers, 20.6% that sand fills filled pit, and digs another pit in the same compound, and 15.6% that employs mechanical evacuators. These practices have their disadvantages. The use of acids to shrink fecal sludge may affect underground water and modify the chemical constituents of underneath soil. Also, digging of additional pits is not sustainable, as the number of pits to be dug will only increase in time, further reducing the possibility of maintaining the required setbacks from septic tanks/pits to waters sources. The manual method of emptying pits/septic tanks exposes the service providers and households being serviced to offensive odour, flies, and pathogens. The mechanical emptying option is the most sanitarily friendly. However, its usage in the study area is constrained by monetary and accessibility factors. Interviews complementarily conducted to residents reveal that there are currently no privately operated mechanical emptiers in the study area. The mechanical emptying operation service being offered by the Local Government is too expensive. The alternative mechanical emptying operation service being offered by the Works Department of the Federal Polytechnic Ilaro has become defunct.

Moreover, disposal of fecal waste in the study area does not take cognizance of the need to convert fecal sludge to beneficial use. While 56.3% of residents claimed that evacuated wastes were disposed in the gorges, 28.7% claimed they were disposed in bushes. This is followed by 15.7% who buried their fecal sludge in pits within their compounds. 44.7% of residents in the study area claimed to have been diagnosed of diarrhea. Other poor sanitation related diseases residents claimed to have been diagnosed of are typhoid,(33.7%),dysentery(8.5%),syphilis(5.5),herpes and other Infections(5.0%),and hepatitis A(2.5%).

Correlation analysis of diseases constantly contacted around households, how respondents dispose fecal waste, distance of pit/septic tanks from water sources, frequency of fecal waste evacuation, and type of toilet is presented in table 3. The table shows that the correlation between diseases constantly contacted around households, how respondents dispose fecal waste, and type of toilet at the P values of 0.00, using the significant level of 0.05, is significant. However, at the P values of 0.93 and 0.265,respectively, diseases constantly contacted around households was not considered to significantly correlate with distance of pit/septic tanks from water sources and frequency of fecal waste evacuation. Further, Correlation between Age of Buildings and Respondents' toilets connection with water systems was significant at the P value of 0.01.

Table 2: Assessment of Respondents' Sanitary Facilities, and Methods they employ In Managing their Fecal Wastes

Parameters	N	%
Toilet' availability		
Available	183	92.0
not available	16	8.0
Total	199	100.0
Position of Available Toilets		
inside the buildings	88	45.2
outside the buildings	111	55.8
Total	199	100.0
Type of Toilets		
pit latrine	107	53.8
bush system	11	5.5
VIP latrine	9	4.5
water closet	72	36.2
Total	199	100.0
Toilets Connection with water systems		
Connected	79	39.7
not connected	118	60.3
Total	199	100

Toilet usage		
Shared	101	51.5
used independently	96	48.5.
Total	199	100
Number of Households sharing toilets		
1-2 households	54	27.1
3-5 households	59	29.6
between 5-7 households	42	21.1
above 7 house holds	44	22.1
Total	199	100.0
Frequency of fecal waste evacuation		
once in a year	33	16.6
twice in a year	40	20.1
once in two years	40	20.1
once in 3 years	60	30.2
thrice in a year	26	13.1
Total	199	100
Length of queue before accessing toilets		
less than 10 minutes	155	77.9
between 10-20 minutes	21	10.6
20-30 minutes	6	3.0
above 30 minutes	17	8.5
Total	199	100.0
Size of Pit/ septic tanks		
less than 5 cubic meters	53	26.6
5-9 cubic meters	95	47.7
9-12 cubic meters	51	25.6
Total	199	100.0
Distance of Pit/septic tanks from water sources		
less than 10 meters	62	31.2
between 10- 20 meters	87	43.7
between 20-40 meters	38	19.1
between 40-60 meters	9	4.5
above 60 meters	3	1.5
Total	199	100.0
Fecal waste disposal means		
employment of manual emptiers	42	21.1
employment of mechanical emptiers	31	15.6

employment of chemicals to destroy/shrink the fecal sludge	85	42.7
sandfilling of the filled pit,and the digging of another one	41	20.6
Total	199	100.0
Disposal sites of fecal wastes		
Disposed in the gorges	112	56.3
Disposed in bushes around	30	15.1
buried in pits within the compounds	57	28.7
Total	199	100.0
Diseases constantly contacted within households		
Diarrhea	89	44.7
Dysentery	17	8.5
Typhoid	67	33.7
Syphilis	11	5.5
herpes and other infections	10	5.0
hepatitis A	5	2.5
Total	199	100.0

Author's Field Survey(2013)

Table 3: Correlation analysis of Diseases constantly contacted around households, how respondents dispose fecal waste, distance of pit/septic tanks from water sources, frequency of fecal waste evacuation, type of toilet

		Diseases constantly contacted around household	How Respondents dispose fecal waste	Distance of Pit/septic tanks from water sources	Frequency of fecal waste evacuation	Type of Toilet
Diseases constantly contacted around households	Pearson Correlation	1	.249(**)	-.094	.045	-.252(**)
	Sig. (1-tailed)		.000	.093	.265	.000
	N	199	199	199	199	199
How Respondents dispose fecal waste	Pearson Correlation	.249(**)	1	-.069	-.156(*)	-.384(**)
	Sig. (1-tailed)	.000		.166	.014	.000
	N	199	199	199	199	199
Distance of Pit/septic tanks from water sources	Pearson Correlation	-.094	-.069	1	.188(**)	-.074
	Sig. (1-tailed)	.093	.166		.004	.150
	N	199	199	199	199	199
Frequency of fecal waste evacuation	Pearson Correlation	.045	-.156(*)	.188(**)	1	.046
	Sig. (1-tailed)	.265	.014	.004		.261
	N	199	199	199	199	199
Type of Toilet	Pearson Correlation	-.252(**)	-.384(**)	-.074	.046	1
	Sig. (1-tailed)	.000	.000	.150	.261	
	N	199	199	199	199	199

** Correlation is significant at the 0.01 level (1-tailed).
* Correlation is significant at the 0.05 level (1-tailed).

Table 4: Correlation Analysis of Age of Buildings and Respondents' toilets connection with water systems

		Age of Buildings	Respondents' toilets connection with water systems
Age of Buildings	Pearson Correlation	1	.240(**)
	Sig. (2-tailed)		.001
	N	198	197
Respondents' toilets connection with water systems	Pearson Correlation	.240(**)	1
	Sig. (2-tailed)	.001	
	N	197	198

** Correlation is significant at the 0.01 level (2-tailed).

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CONCLUSION AND RECOMMENDATIONS

This study has investigated socio-economic parameters such as age, occupation, monthly income, household sizes, family size, and building type that are likely to influence resident's sanitary characteristics. It also provided useful findings relating to variables such as toilet' availability, position of available toilets, type of toilets, toilets connection with water systems, number of households sharing toilets, frequency of fecal waste evacuation, length of queue before accessing toilets, size of septic tanks, distance of pit/septic tanks from water sources, fecal waste disposal means, disposal sites of fecal wastes, and diseases constantly contacted within households

Having distilled out the major challenges that make Nigerian cities' likelihood of meeting the MDGs target 7c almost like a tall order, there is need to suggest strategies that can be deployed to at least getting nearer to the target if not eventually met. First and foremost, there is need for the full implementation and monitoring of Nigeria's National Environmental Sanitation Policy of 2005, which is the most recent policy that specifically addresses excretal and sewage management at both the State and Local Government. One of the targets of the National Environmental Sanitation Policy of 2005 is the extension of water supply and waste service coverage to 80% of the population by 2007, 100% by 2011, and to sustain full coverage beyond 2011. It therefore behooves on not only Ogun state government, but also Yewa south L.G.A authority to consider water provisioning beyond political rhetoric, but an indispensable service that must reach the people for improved sanitation.

The manual or human powered method of evacuating feces exposes the service providers and households'clientele alike to environmental hazards and increases health risks. There is need for a more sanitation friendly mechanical emptying process that uses a motorized vacuum truck fitted with mechanical pump for emptying and transporting fecal sludge. This motorized empting process should be made a private sector driven activity. The vista for profit making is high in an emerging urban center of over 12,000 buildings, a significant portion of which fecal wastes are frequently evacuated. Another study may be required in order to determine the willingness of residents to pay for the service of private operators of mechanical emptiers. The researchers, however, have an opinion that with the new level of prosperity as manifested in the exorbitant house rents charged by landlords, as enhanced by the influx of Dangote Cement Factory workers into the study area, and the huge population of the Federal Polytechnic Ilaro Community, getting money from building owners to pay for such a relatively convenient and environmental hazard free service should not be difficult.

Across the study area surveyed, the fecal sludge evacuated was not converted to beneficial use. Rather a high percentage of households dispose their fecal waste in gorges and bushes. The potential application of fecal sludge in the generation of biogas and manure, are lost to such careless disposal. This therefore justifies the need for a central disposal within the study area. This will offer the triad advantages of discouraging indiscriminate discharge of fecal waste, encouraging sustainable energy generation, and providing adequate manure for the intra-urban food sufficiency. For the central disposal facility to perform its function, a regulation is needed to enforce the households and emptiers to dispose evacuated fecal waste in such authorized center point. Current sanitation investment in Nigeria is less than 0.1% of GDP. This is significantly lower than several estimates of what is required. Increased investments in sanitation enhancement are needed not only for environmental benefits, but also to prevent economic loses that unsanitary conditions bring about.

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