ENVIRONMENTAL AND SOCIAL IMPLICATION OF URBAN SOLID WASTE IN ABRAKA, ETHIOPE – EAST LOCAL GOVERNMENT AREA OF DELTA STATE, NIGERIA

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Abstract
This study is on the environmental and social implication of urban solid waste in Abraka. The study adopted cross sectional research design in which direct field observation and administration of questionnaires were utilized simultaneously. Thus primary data (data generated from the questionnaire administration) and secondary data (data generated from archive of hospitals and waste management department of the Ethiope East LGA) were utilised for the study. The multiple regression test was used for analysis of the data. It was found that; sources of solid wastes include households (83.3%); Market waste (95.3%); industrial waste (59.3%); establishment waste (68%); agricultural waste (50%). Frequency of solid wastes disposal by respondents shows that waste is discarded daily (22%), twice weekly (25.3%), weekly (44.7%), monthly (15.3%). The study also showed that the government is responsible for management of a smaller proportion of the generated waste (5.3%). While private agencies account for management of 24% of waste generated; individuals are responsible for the greater proportion of waste management (70.7%). Methods of waste management in Abraka include open dumping (44.7%), Land filling (5.3%), Incineration (21.3%), Dig and bury (2.7%), Recycling (14%), Composting (12%). More so, effects arising from improper waste management include, Environmental pollution (86%), Health hazards (78%), Economic (44.7%), Social (68.7%) problems. However, the regression model was found to be significant at p (.035) <0.05.It was therefore recommended that both the Government and stake holders must improve on current waste management practice so as to improve the physical and social environments in Abraka.

Key words: Environmental, Waste, Abraka.

1.0 Introduction

Solid waste can be classified into various types, conditional on their sources; household waste is generally classified as municipal waste; industrial waste as hazardous waste, and biomedical waste or hospital waste as infectious waste. The term ''solid waste'' means any garbage, refuse, or muck from a waste treatment plant, water supply treatment plant, or air pollution resistor facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations (US Law-Solid Waste Act 2, 1999 Agbola & Jinadu, 2006; Bogner, Ahmed, Diaz, Faaij, Gas, Hashimoto, Mareckova, Pipatti & Zhang, 2007; Efe & Ojoh, 2013; Sánchez-Rodríguez, Seto, Simon, Solecki, Kraas & Laumann, 2005).

According to Nguyen, Yasuhiro &, Takeshi (2011); Efe, Cheke & Ojoh, (2013), majority of municipalities in developing countries are bedevilled with serious environmental degradation and health risks due to the weakly developed

municipal solid waste management system. Several studies have been conducted in order to examine the health and environmental effects arising from waste dumps. Such studies showed that a link exists between the two (Aatamila, Verkasalo, Korhonen, Suominen, Hirvonen, Viluksela, & Nevalainen, 2010; Yongsi, Hermann, Ntetu, Sietchiping & Bryant, 2008). The conclusion from several studies has led to an increasing interest of researchers in the study relating to environmental pollution as well as its effects on plants and animals (Foday, Xiangbin and Quangyen, 2013; Yusuf & Oyewunmi, 2008; Sridhar, 2006; Babayemi & Dauda, 2009; Ogu 2000).

However, rapid urbanization in the developing countries of Africa (uncontrolled and unplanned development) has brought a serious environmental degradation. One of its most pressing issues is the management of solid, liquid and hazardous waste. A visit to any African city will be the evidence of this situation where litter lays besides the roads, streams blocked with junk and toxic waste polluting the environment and threatening human health (Onibokun & Kumuyi, 1999). A total of 80 percent of all diseases spread within a community in a developing country are believed to be connected to the poor waste management in small towns or cities (Public Health Officer, 2012). The aforementioned is an unnecessary and additional problem for people in these countries who often already struggle with inadequate drinking water and lack of food.

The situation in Abraka is not different from that mentioned above. In Abraka the presence of the state university (Delta State University) has served as a major pull factor of several anthropogenic activities and also the concentration of people and houses. However these houses are built without plan for waste management. Similarly the government does not have adequate plan that include enforcing that houses be built with a waste collector point and the consequent carriage to the waste dump site. The import of this situation is a dumping of waste indiscriminately. This has serious environmental and social impacts.

It is always said that although all aspects of the environment usually impose some influence on human health and well-being, the part of the environment which impose the greatest and most immediate influence on people's well-being is the intimate environment of their home and neighbourhood (Songsore & McGranahan 1993, Owusu, 2010). While this is often supposed in health terms, it can be debated that this goes past health to capture other facets of human well-being. This is because the quality of housing and community spaces affects not only physical health and safety, but also emotional and social well-being (Bartlett 1999, Owusu, 2010). This study is therefore set out to examine the environmental and social implication of urban solid waste in Abraka.

1.2 Study Area

Abraka lies between latitudes 5^0 46' and 5^0 48' North of the equator and longitudes 6^0 05' and 6^0 08' East of the Greenwich Meridian. It is bounded to the East by Ukwani LGA, to the West by Edo State, to the North by River Ethiope, while to the South by Ughelli North LGA. Abraka has a total land area of about 164km square.

Abraka falls within the tropical environment that enjoys the tropical rain forest climate (AF) of Koppen 1918 classification and the West Equatorial climate of Strahler 1969 clasification. Its climate is influenced by two air masses (Tropical Maritime air mass and Tropical Continental air mass), and closeness to the two-river system and human activities. The mean monthly temperature is 32 degrees Celsius (82 degrees Fahrenheit) with very little variation. The Relative humidity is consistently high which is about 85% and the annual rainfall ranges from 25.4mm to 457.2mm.(Efe, 2006).The Vegetation found in the area is mixed forest, fresh water swamp near the River Ethiope and Grassland. The major trees are Iroko, Obeche, Mahogany, Opepe, etc. (Efe, 2006). see fig1.1 below.

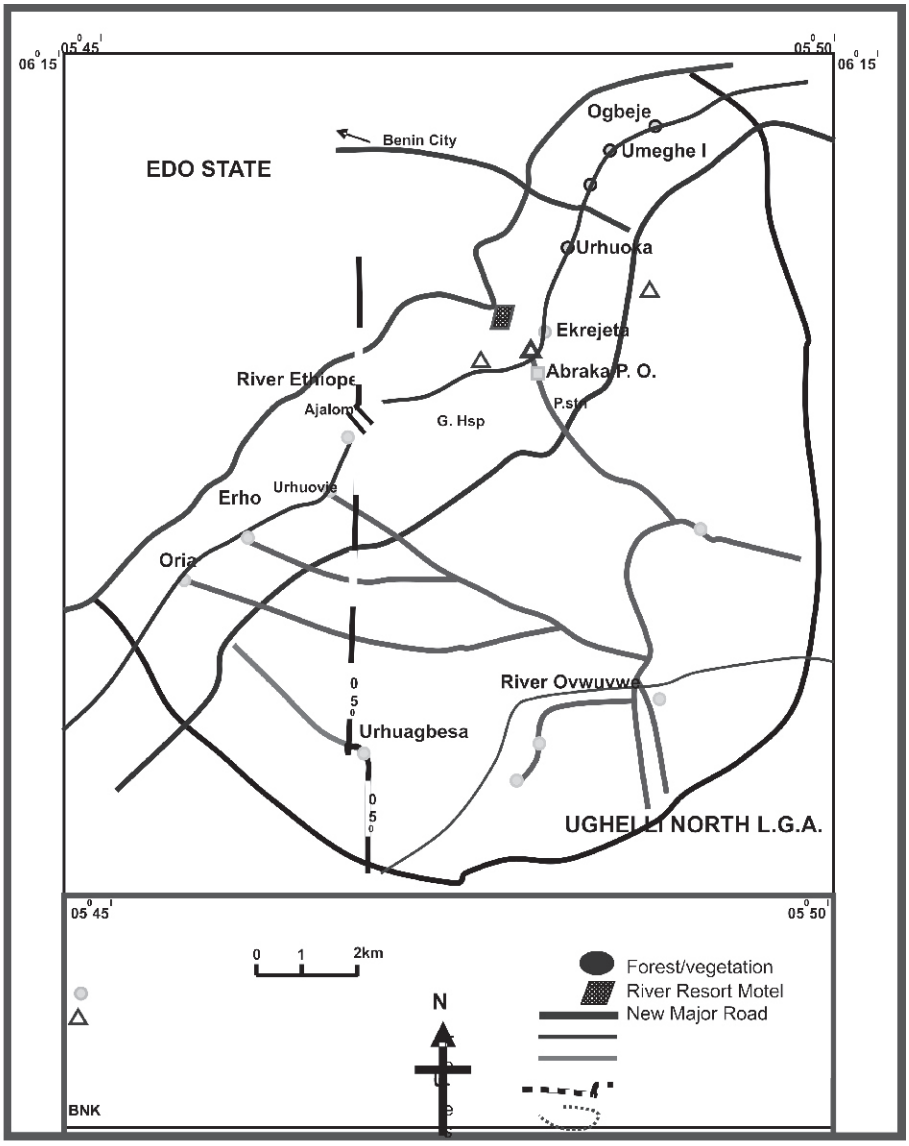

FIG1.1 MAP OF ABRAKA (ETHIOPE EAST L.G.A., DELTA STATE, NIGERIA)

Source: Ministry of Lands, Surveys and Urban Development, Asaba (2002)

The population of Abraka is estimated to be 25123 (www.populationmedia.org/, 2014), this estimate is without the student population. This large population size and the relatively poor management of waste are perceived to be causing huge health hazards in the area (Abraka).

The occupation of the people of Abraka includes farming, trading, transportation etc. They engage mainly in cassava farming and palm nut collection for palm oil production. Abraka is also an institution town that transited from College of Education to Delta State University with numerous primary and secondary schools. It attracts employment such as teaching, banking, postal service, trading and office work. There are a host of other businesses which

include computer centre, photography, laundry, hostel (student's accommodation) and housing (for lecturers). It has also brought information technology, business, and internet browsing, e-mail etc, as well as transport businesses on a large scale. And the most part of the developmental strides are not planned and these have meted serious environmental and social consequences on the people living in Abraka.

1.3 Materials and Methods

The study adopted field survey research design in which direct field observation and administration of copies of questionnaire were utilized simultaneously. Field observation was carried out by conducting a pilot field survey of the area under study (Abraka); observing refuse dumpsites along the major roads and street, house- hold refuse bins and the various methods adopted for their wastes disposal. This was augmented by the administration of 150 questionnaires in the area. The stratified/random sampling technique was adopted when the area (Abraka) under study was stratified into 5 zones based on population densities. And each of the zones was given alphabetic symbolizations for easy documentation. See table 1 below.

TABLE 1: THE STRATIFIED ZONES USED FOR THE STUDY

Zones	Name of quarter
A	Police station RD, NUT Area
B	Fringe Zones
C	Ekrejeta, bembo, urhuoka
D	Site 1, 2, 3.
E	General hospital area

Source authors fieldwork (2015)

Furthermore, the random sampling technique was used when 30 household was randomly selected in each of the strata, thereby making 150 households in all. On the bases of this selection 150 questionnaires were administered on the selected house-holds to generate information on the methods of waste disposal adopted; who is responsible for waste disposal; health impacts of waste etc. Furthermore, data on diseases associated with waste was collected from the hospitals that service the sampled population and this was regressed against the data on solid waste (that is the solid waste data generated from the achieve of the Ethiope East Local Government Area). The data obtained were presented in tables. Furthermore to test the hypothesis "cases of malaria, typhoid and diarrhoea are not significantly dependent on waste in Abraka", the regression test was used.

1.4 Findings And Discussion Of Result

Table 2 : Bio-Data of Respondents

Options (Sex)	**Frequency**	**%**
Male	80	53.3
Female	70	46.7
Total	150	100
Options (Marital Status)	**Frequency**	**%**
Single	12	8
Married	127	84.7
Divorced	7	4.7
Widowed	4	2.6
Total	150	100
Options (Educational Qualification)	**Frequency**	**%**
Primary	17	11.3
Secondary	49	32.7
Tertiary	84	56
Total	150	100
Options (Household Size)	**Frequency**	**%**
<4	72	48
5-10	63	42
>10	15	10
Total	150	100

In table 2 sex distribution of respondents is shown. From the table male respondents are 80 (53.3%) and the female respondents are 70 (46.7%).

In table 2, marital statuses of respondents are shown. From the table single respondents are 8%, married are 84.7%, divorced are 4.7% while widowed are 2.6% of the total respondents. This therefore partly explains the reasons for high rates of waste generated in Abraka. This is because married couples are more likely to generate domestic waste than would be the case with the unmarried. Similarly, the unmarried would have less people in their houses than would be the case with the married.

In table 2 education qualification of respondents is displayed. From the table there seem to be a high level of literacy in the area under study. The table shows that respondents with primary education qualification are 11.3%, secondary education 32.7% and tertiary education 56%. The assumption ought to be that as educated as the people of Abraka, there would be no problem with waste generation and management. However a sharp paradox is observed.

In table 2 house hold size of respondents is displayed. From the table, the larger proportion of respondents falls within <4 (48%) and 5-10 (42%) persons per house-hold respectively. While >10 persons per house hold is 15 (10%).

Table 3: Solid Waste Management

Perceived Sources of Solid Waste	**Frequency**	**%**
Households	125	83.3
Market wastes	143	95.3
Industrial wastes	89	59.3
Establishment wastes	102	68
Agricultural wastes	75	50
Options(Frequency of solid waste disposal)	**Frequency**	**%**
Daily	22	14.7
Twice weekly	38	25.3
Weekly	67	44.7
Monthly	23	15.3
Total	150	100
Responses (Responsibility for collection of solid wastes)	**frequency**	**%**
Government agency	8	5.3
Private agency	36	24
Individuals	106	70.7
Total	150	100
Methods of solid waste disposal	**Frequency**	**%**
Open dumping	67	44.7
Land filling	8	5.3
Incineration	32	21.3
Dig and bury	4	2.7
Recycling	21	14
Composting	18	12
Total	150	100
Response (Availability of authorised dumpsites)	**Frequency**	**%**
Yes	12	8
No	138	92
Total	150	100
Perceived effects of solid waste	**frequency**	**%**
Environmental pollution	129	86
Health hazards	117	78
Economic	67	44.7
Social	103	68.7

In table 3 perceived sources of solid wastes by respondent is displayed. In the table, sources of solid waste include households (83.3%); Market waste (95.3%); industrial waste (59.3%); establishment waste (68%); agricultural waste (50%). This observation goes a long way to show that the area is of institutional use in terms of land use. This remark is made because, only 50% of the total respondents account for agricultural waste.

In table 3 the frequency of solid wastes disposal by respondents is shown. In the table waste are discarded daily (22%), twice weekly (25.3%),

weekly (44.7%), and monthly (15.3%). Looking at this finding it therefore follows that there are serious environmental and social consequences resulting from the periods waste stay before they are cleared from the environment. For example such waste would reduce playgrounds for children, produce smell which usually irritates and could also result in breeding pathogens that spread harmful diseases.

In table 3, those responsible for the collection of household wastes are displayed. From the table it is obvious that government is responsible for management of a smaller proportion of the generated waste (5.3%). While private agencies account for management of 24% of waste generated; individuals are responsible for the greater proportion of waste management (70.7%). It therefore implies that most of these waste generated are not well disposed (see table 3 below), which therefore leads to breeding of pathogens that spread diseases and the social problems that follow such as quarrels due largely to the problem of dumping waste on people lands etc.

In table 3 the methods of waste management in Abraka is displayed. In the table, Open dumping (44.7%), Land filling (5.3%), Incineration (21.3%), Dig and bury (2.7%), Recycling (14%), Composting (12%). With 44.7% of respondents openly dumping waste, it should be expected that diseases associated with indiscriminate waste disposal will be present in the area. This is because waste carry along with it bacteria which serve as breeding ground for mosquitoes (and the consequent malaria), Salmonella Typhi (and the consequent typhoid), etc, when they are not properly disposed.

From table 3, availability of authorized dumpsites in the neighbourhoods to respondents is displayed. From the table it is obvious that respondents don't even have an authorised place to dump waste. This also implies that both the waste managed by individuals, government and private agencies in the area are all dumped indiscriminately without taken into account the effects it will have on both the environment and the people near and around the places these wastes are dumped. This conclusion is reached because while only 12% of the total respondents agree that there is a government approved dump site in the area, a huge proportion of the total respondent (92%), disagree with the fact.

In table 3, the perceived effects of waste in the area under study is displayed. In the table effects arising from improper waste management include, Environmental pollution (86%), Health hazards (78%), Economic (44.7%), Social (68.7%). Although the respondent perceive that the environment (86%) is the most impacted, the proportion that responded that health is affected is also very high (78%) and enough to attract concerns from all stake holders in the area.

Table 4 Model Summary for regression test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.799[a]	.639	.503	1763.94652

a. Predictors: (Constant), diarrhoea, typoid, malaria

Source: Authors field work, (2015)

In table 4 , r value (.799), shows that there is a strong correlation between waste and the prevalence of diarrhoea, typhoid, and malaria in Abraka. However the r^2 value of .639 means that 63.9% of the cases of diarrhoea, typhoid, and malaria can be explained by improper waste management in the area, while 36.1% of the cases of diarrhoea, typhoid, and malaria can be attributed to weak immune system, restlessness, poor diet etc.

Table 5 test for validity using the regression test.

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	4.400E7	3	1.467E7	4.713	.035[a]
	Residual	2.489E7	8	3111507.317		
	Total	6.889E7	11			

a. Predictors: (Constant), diarrhoea, typhoid, malaria

b. Dependent Variable: waste

Source: author's field work (2015).

In table 5, test for validity of the earlier stated hypothesis ("cases of malaria, typhoid and diarrhoea are not significantly dependent on waste in Abraka",) is made. However, the model is significant at p (.035) <0.05. It therefore implies that the null hypothesis is rejected. Implication is that cases of malaria, typhoid and diarrhoea are significantly dependent on waste in Abraka.

1.5 Summary, Recommendation and Conclusion

The study expressly shows that house hold size of respondents falls within <4 (48%) and 5-10 (42%) persons per house-hold respectively. While >10 persons per house hold is 15 (10%). Furthermore the study shows that sources of solid wastes include households (83.3%); Market waste (95.3%); industrial waste (59.3%); establishment waste (68%); agricultural waste (50%). Frequency of solid wastes disposal by respondents shows that waste is discarded daily (22%), twice weekly (25.3%), weekly (44.7%), monthly (15.3%).

Again, the study shows that the government is responsible for management of a smaller proportion of the generated waste (5.3%). While private agencies account for management of 24% of waste generated; individuals are responsible for the greater proportion of waste management (70.7%). It therefore implies that most of these waste generated are not well disposed, which therefore leads to breeding of pathogens that breed diseases and the social problems that follows in the area. Similarly, methods of waste management in Abraka include open dumping (44.7%), Land filling (5.3%), Incineration (21.3%), Dig and bury (2.7%), Recycling (14%), Composting (12%). With 44.7% of respondents openly dumping waste, it should be expected that diseases associated with indiscriminate waste disposal will be present in the area. More so, effects arising from improper waste management include, Environmental pollution (86%), Health hazards (78%), Economic (44.7%), Social (68.7%) problems.

However, the regression model is significant at p (.035) <0.05 (see appendix A). It therefore implies that the cases of malaria, typhoid and diarrhoea are significantly dependent on improper waste disposal in Abraka.

Following from the above, there is an urgent call on all stake holders (both the government and private individuals) to improve the sanitation situation in the area. This can be achieved via the implementation of the following:

a). all houses built in the area must be built with a waste collector. This will help pile up the waste in a point and allow for the carriage of the same at agreed intervals.

b). this waste collected must be carried to dump site from the various compounds at near intervals (one to five days). This means that the government and private investors are here called upon to invest on waste management in the area so as to facilitate clean and habitable environment in Abraka

c). the government must also make sure that households key into the waste management scheme.

d). laws on improper waste disposal should be enforced in the area and offenders be punished when they are caught disposing waste indiscriminately.

In conclusion, this study has mirrored the environmental and social impacts of improper waste management in Abraka. The study found that the problem of poor waste management has had a serious environment and social (medical) impacts in the area. It was therefore recommended that both the Government and stake holders must improve on current waste management practice so as to improve the physical and social environments in Abraka.

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