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SOLID WASTE HERE AND THERE: THE EFFECTS ON PUBLIC HEALTH AND THE ENVIRONMENT

Forson Bekoe-Nketia

Department of Geography and Rural Development,
Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

ABSTRACT: In African countries including Ghana, where there is increasing urbanization, solid waste management constitutes one of the most crucial health and environmental problem in most towns and cities. The situation is similar in the Tain District, where the rapid pace of urbanization has come with a rapid increase in the volume of solid waste generated from production and consumption activities. In addition, the recent proliferation of polythene bags for packaging food, water and other packageable goods has seriously aggravated the situation in the district. This study examined the effects of improper solid waste management on public health and the environment in the Tain District. Interview schedule and field observation were the main tool and method respectively for gathering data from 152 households and 4 key informants which were selected through the convenient and purposive sampling techniques. Data gathered from the households was analyzed using Statistical Product for Service Solution and Excel software. In addition, content analysis was employed to analyze data gathered from the key informants. The findings indicate that air pollution, outbreak of diseases, flooding and river contamination are the major effects of improper solid waste management in the study communities. Based on these findings, the study recommends that the Waste Management Department and the Environmental Health and Sanitation Units should enforce the waste management legislations in the Tain District. In addition, an introduction of waste management into the school curriculum will enable the country have a generation with a new mindset towards the huge volumes of solid waste we generate in our neighborhoods.

KEYWORDS: Solid waste, Environment, Health, Urbanization, Effect, Threat.

1 INTRODUCTION

Events of the 20th and early into the 21st century show that waste in whatever classification whether solid, liquid or toxic has become a major consequence of urbanization and economic development [1]. Whilst in the past, solid, liquid and toxic waste disposal was perceived as problems of over development; [2] today the question of urban waste management poses a daunting task to developing countries. Correspondingly, when the governments of African countries were required by the World Health Organization (WHO) to prioritize their environmental health concerns, the results revealed that solid waste was identified as the second most important problem after water quality [3]. According to Ole Lyse, nine out of every 10 African cities are facing serious waste management problems [4]. Ghana is no exception [5] where solid waste management is a particularly critical issue that seems to overwhelm the authorities. In fact, the problem appears stubborn and can be likened to a 'monster' staring the authorities in the face while they look on helplessly [5]. Similarly, [6] has referred to it as "a nightmare" and it would seem that many of the Millennium Development Goals (MDGs) are far from achievable by the target year of 2015 in the waste-laden city environments. This is because the effects of improper solid waste management somewhat affects the MDGs, particularly including improving child health and mortality (Goal 4), maternal health (Goal 5), the incidence of malaria and other diseases (Goal 6) and environmental sustainability (Goal 7). Irrespective of the copious awareness creation exercises by the Environmental Protection Agency, the Waste Management Department, the Zoomlion Ghana Limited and Assembly Members all the districts in the Brong Ahafo Region of Ghana with the inclusion of the Tain District, the solid waste management situation in the district continue to worsen thereby posing serious threat to public

Corresponding Author: Forson Bekoe-Nketia

health and the environment. Besides, the environmental burdens including air pollution, bad odour from rotten organic materials and contamination of water bodies associated with the worsening solid waste management situation appears to fall more heavily on the poor even though waste removal and disposal are public funded and regulated. Despite the immensity of the problem, no in-depth research on solid waste management has been carried out in the Tain District. This situation creates a knowledge gap and makes it difficult to find answers to the worsening solid waste situation in the district. As such, the paper aims at filling the research gap on the effects of improper solid waste management and provides a baseline data that will stimulates further research on the subject matter.

1.1 METHODS

The study gathered data from both primary and secondary sources. The secondary source of data was obtained from both published and unpublished materials especially from thesis, articles, journals, internet sources, periodicals, and textbooks. Primary data was also collected through the use of interview schedule and field observation (photographic evidence). Non-probability methods of sampling were used in selecting the respondents for the study. The specific non-probability sampling methods used in this study included the convenient and the purposive sampling methods. The convenient sampling technique was used in selecting the 152 households for the survey. The criteria for selection of households were based on readiness and willingness to be interviewed. The interviewer visited and interviewed heads of households in the three selected localities who were readily available and willing to be interviewed. This procedure was followed until the required number of households for the study was reached. Also, in selecting the key informants for the study, the purposive sampling technique was used. The key informants identified and interviewed included the heads of the Environmental Health and Sanitation units, Waste Management Department of the Tain District Assembly, Zoomlion Ghana Limited and Assembly members. In this case, the above mentioned stakeholders had the necessary information, adequate knowledge and experience on solid waste management in the study area. Data analysis was done using both qualitative and quantitative methods. Quantitatively, descriptive statistical tools such as frequencies and percentages of the Statistical Product for Service Solution (SPSS) and Excel software were used. The results were presented in the form of tables and charts (bar charts). Qualitatively, content analysis was used, that is, aggregate responses from respondents were also analyzed manually by making summaries of the respondents' views and supported them with relevant quotations and my own field observations of the solid waste situations in the three selected communities.

1.2 SAMPLING PROCEDURE

The research was conducted in three communities in the Tain District namely: Seikwa, Badu and Nsawkaw. Purposive sampling was used to select the communities because of proximity and the fact that they are the major urban centers in the district. A formula given by [7] was used to determine the sample size for the study.

$$n = \frac{\mathrm{N}}{1 + N(a)^2}$$

Where 'n' is the sample size, 'N' is the sample frame (5,627) and 'α' represented the margin of error which is 0.08, with confidence level of 92 percent. A sample size of one hundred and fifty-two (152) was arrived as follows:

$$n = \frac{5627}{1 + 5627(0.08)^2} \quad = 152$$

The household heads in each study locality were selected proportionally based on the population of each community. The household heads were covered using the convenient sampling technique. Also, to ensure that the number of households interviewed in each of the study community is proportionate, the simple proportion method was used. First, percentages were calculated by dividing the number of households in each of the study communities by the sample frame (the total number of households) which is 5,627 and then the figures obtained were multiplied by 100 percent. The percentages were calculated as follows:

$$\text{Seikwa} = \frac{1840}{5627} * \ 100 = 32.7$$

The same procedure was used to calculate for the remaining study communities. Furthermore, the percentages obtained for each study community was then multiplied by the sample size to attain the actual number of households which were interviewed in each of the study communities. The sample size for each study community was computed as follows:

$$\text{Seikwa} = \frac{32.7}{100} * \ 152 = 50$$

Table 1.1 captures the details of the calculations. Moreso the key informants such as the heads of the Environmental Health and Sanitation units, Waste Management Department of the Tain District Assembly, Zoomlion Ghana Limited were also chosen by means of purposive sampling whilst both the convenient sampling technique was use to select the Assembly members in the study localities.

Table 1.1: Proportionate sampling of households for each of the study communities

Community	Number of Households	Percent (%)	Sample size
Seikwa	1,840	$\frac{1840}{5627} * 100 = \mathbf{32.7}$	$\frac{32.7}{100} * 152 = \mathbf{50}$
Badu	2,859	$\frac{2859}{5627} * 100 = \mathbf{50.8}$	$\frac{50.8}{100} * 152 = \mathbf{77}$
Nsawkaw	928	$\frac{928}{5627} * 100 = \mathbf{16.5}$	$\frac{16.5}{100} * 152 = \mathbf{25}$
Total	5,627	100	152

Source: Fieldwork, March, 2012

2 FINDINGS AND DISCUSSION

2.1 EFFECTS OF IMPROPER SOLID WASTE MANAGEMENT

According to [8], improper solid waste management creates severe environmental problems that affect human health and cause serious economic and other welfare losses. Therefore in order to address the objective of identifying the effects of solid waste management in the study communities, respondents were interviewed and the following responses in table 2.1 were obtained.

Table 2.1: Respondents perceptions on the effects of improper solid waste management

Consequences	Frequency	Percent
Air pollution	52	34.2
Bad impression that the people who live in that area are dirty	34	22.4
Contamination of water bodies	17	11.2
Outbreak of diseases	41	26.9
Flooding	8	5.3
Total	152	100

Source: Fieldwork, March, 2012

From table 2.1, 34.2 percent (majority) of the respondents said the principal effect of improper solid waste management in the study communities is air pollution or the bad odour they inhale from rotten organic materials and smoke during the burning of solid waste at the dumpsites. This confirms [8] findings that fires on disposal sites can cause major air pollution, causing illness and reducing visibility, making disposal sites dangerously unstable, causing explosions of cans and possibly spreading to adjacent property. Again, it confirms finding of [9], [10] that solid waste is considered to be one of the dangerous causes of pollution; therefore this problem has to be treated in a wise manner to protect our environment. Plate 2.1 shows smoke emanating from a dump site in Nsawkaw, thus causing air pollution.

Plate 2.1: Burning of solid waste at a dumpsite in Nsawkaw

Source: Fieldwork, March, 2012

Also, 26.9 percent of the respondents claimed poor solid waste management in the study communities leads to the outbreak of diseases. According to the respondents, improper handling of solid waste provides habitat for flies and rodents (mice) who intern collects germs and deposit them on bowls, cups and tables in their homes, and create disease. The responses given however were not from individuals with technical understanding about diseases, but informal information. Furthermore, 34 respondents representing 22.4 percent of the sample size (152) stated that improper handling of solid waste creates bad impression that they are filthy. This is because in Ghanaian societal settings, cleanliness is generally embraced as a virtue and so if a particular household or community goes contrary to this norm, that particular household or community is regarded as dirty or filthy. Again, some respondents said plastic and paper blowing over fields or trapped by trees has an unwanted visual impression on the study communities. Moreso, 11.2 percent of the respondents pointed out that improper solid waste management leads to the contamination of water bodies in their communities. According to the respondents, when it rains, the run-off conveys solid waste into rivers and streams in the study communities making the water unhealthy to use. Finally, 5.3 percent of the respondents said the main effect of improper solid waste management is flooding. This could mean that improper solid waste management contributes to the clogging of gutters and leads to floods when there is torrential rainfall. Plate 2.2 shows a clogged gutter at the entrance of the Seikwa Health Centre which always leads to flooding whenever it rains.

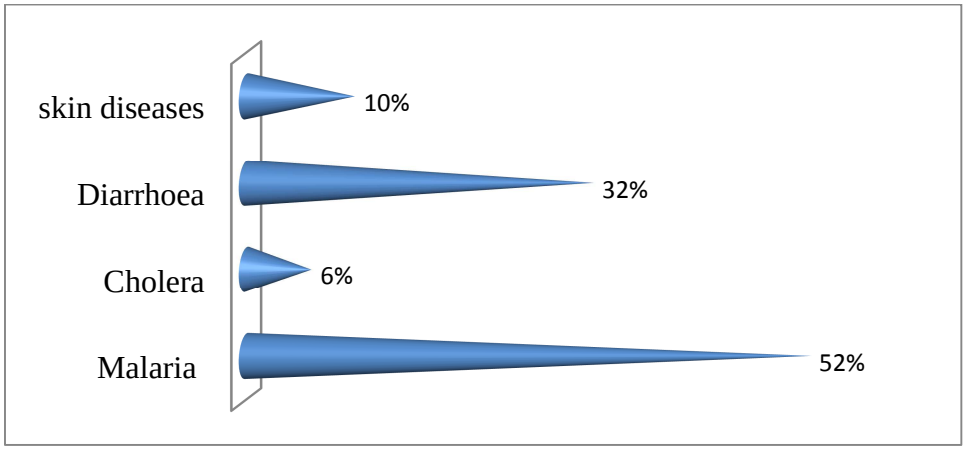
Plate 2.2: A clogged gutter at the entrance of the Seikwa Health Centre

Source: Fieldwork, March, 2012

2.2 COMMON ENVIRONMENTAL DISEASES IN THE STUDY COMMUNITIES

Reference [11] stressed that improper handling of solid waste does not only ruins an area's appearance but also provide comfortable breeding grounds for organisms that spread diseases. According to the environmental health and sanitation inspectors in the study communities' malaria, diarrhoea, cholera and skin diseases are the common diseases resulting from the improper handling of solid waste. Therefore in an attempt to ascertain the frequent diseases that affect the residents in the study communities a subsequent question was posed. The responses are displayed in figure 2.1.

Figure 2.3: Perceived environmental diseases in the study communities



Source: Author's fieldwork, March, 2012

From figure 2.1, majority of the households (52 percent) said the common environmental disease resulting from the improper management of solid waste in the study communities is malaria. It was revealed during the study that in the beginning of wet season when all the solid waste and faeces are soaked with water, it becomes ideal for insect breeding. The population of mosquitoes and flies increases tremendously resulting in diseases such as malaria, diarrhoea, cholera and other skin diseases. This also confirms finding of the data obtained from the Tain District Database which indicated that 76.8 percent of the people in the district suffer from malaria representing 50.8 percent of total out-patient departmental cases [12]. Thirty-two (32%) percent of the households said diarrhoea. Six (6%) percent claimed it is cholera while the remaining 10 percent said skin diseases. This could mean that if effective measures are not put in place to manage waste collection and disposal, there will be an increase in diseases like malaria, diarrhoea among others in future.

3 SUMMARY OF MAJOR FINDINGS

- The paper reveals that the taxonomy of the effects of improper solid waste management in the study communities are air pollution or the bad odour they inhale from rotten organic materials and smoke during the burning of solid waste at the dumpsites, outbreak of diseases, creates bad impression that they are filthy, contamination of water bodies and flooding.
- The common environmental disease resulting from the improper management of solid waste in the study communities as disclosed in this paper are malaria, diarrhoea, cholera and other skin diseases.

4 CONCLUSION

The study concludes that improper solid waste management has devastating adverse effects on the physical environment which consequently affects public health.

5 RECOMMENDATIONS

Based on the findings of the study, the following measures are recommended to minimize the devastating adverse effects of improper solid waste management on the environment and public health in the study localities (Seikwa, Badu and Nsawkaw).

- The Integrated Solid Waste Management (ISWM) should be adopted to ensure effective solid waste management in the study localities. Households should be encouraged by the Waste Management Department (WMD) and the Zoomlion Ghana Limited to segregate the solid waste generated into their various types before disposal. In this case metals, bottles and rubber cans can be reused while plastic wastes like polythene bags and pure water sachets can also be recycled. The rest like organic waste such as remnants of cassava, yam, plantain and cocoyam can be used to feed livestock and the rest composted. Finally, those (solid waste) that are combustible can be incinerated and landfilled those (solid waste) that cannot be subjected to any of the above mentioned methods.
- The research has shown that the people in the study communities have an unsatisfactory solid waste handling background which aggravates the solid waste management problem in the study areas. However, to avert this unsatisfactory attitude of the people, the stakeholders must firmly enforce existing regulations on solid waste disposal such as street littering and other crude methods adopted by the residents in the study areas. This can also be done by restraining under-aged children between the ages of 12-5 years who do not know the effects of indiscriminate solid waste disposal, from handling household waste in the study areas. Moreover, once dust or litter bins are placed at all vantage points within the communities, there will be no excuse for persons who engage in indiscriminate solid waste disposal practices. Appropriate punishment for waste disposal offences should include court fines, orders to clean up the streets and imprisonment depending on the severity of the offence committed. Also, nepotism should be disregarded when punishing offenders. Such measures could change the bad ways people in the study areas dispose of the solid waste they generate.
- Public education on solid waste management should be taken as a national assignment. The introduction of the Solid Waste Management into the School curriculum will enable the country have a generation with a new mindset towards the large quantities of solid waste we generate in our neighborhoods. Also, more sanitation clubs should be formed by all the companies or institutions who are into waste management and in the food and beverage industry to help clear the large quantities of solid waste they generate. The fact that all Ghanaians belong to the various religious groups (Christians, Muslims and traditional) means that religious organizations should be made important avenues for environmental education. Stakeholders must, therefore, build partnerships with religious leaders and encourage them to

educate their members on environmental sanitation and proper solid waste management practices such as solid waste separation, reuse, and recycling, composting and proper waste disposal. Besides, the Tain FM located in Nsawkaw, should be used to raise awareness among the general public on the importance of maintaining a clean and healthy environment.

REFERENCES

[1]. Tsiboe, I. A. and Marbell, E. (2004). *A Look at Urban Waste Disposal Problems in Accra.* Roskilde University, Denmark.

[2]. United Nations Environmental Programme (UNEP) (2009). Developing Integrated Solid Waste Management Plan Training Manual, Volume 2: Assessment of Current Waste Management Systems and Gaps Therein. Osaka/Shiga, Japan.

[3]. Senkoro, H. (2003). Solid Waste Management in Africa: A WHO/AFRO Perspective, Paper 1, presented at the CWG Workshop in Dar es Salaam March 2003. (http://www.skat.ch/sfweb/activities/ws/cwg/pdf/cwg-01.pdf). Accessed on 18/02/2011.

[4]. Lyse, O. (2003): Waste disposal haunts cities. *The Times of Zambia* (Ndola). Retrieved from, Allafrica.com/stories

[5]. Kironde, J. M. L. (1999). Dar es Salaam, Tanzania. *Onibokun, A. G. (Ed).* Managing the monster: urban waste and governance in Africa. Pp. 101-172. Ottawa, IDRC.

[6]. Baabereyir, A. (2009). Urban Environmental Problems in Ghana. A case study of social and environmental injustice in solid waste management in Accra and Sekondi-Takoradi. NTNU, Norway. Pp.5&6.

[7]. Gomez, B. and J. P. Jones III (2010). Research Methods in Geography: A Critical Introduction. A John Wiley & Sons, Ltd., Publication, the Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, United Kingdom.

[8]. Kolsch, F., and Ziehmann, G. (2004). Landfill stability risk and challenges. URL:http://www. Jxj.com/wmw/index.html

[9]. Al-Yaqout, A. E, Kouski, P. A and Hamoda, M. F. (2002). Public opinion and sitting solid waste landfills in Kuwait. Resources Conservation and Recycling 35:215-227

[10]. Vidanaarachchi, C. K., Yuen, S. T. S. and Pilapitiya, S. (2005). *Municipal solid waste management in Southern Province of Sri Lanka: Problems, issues and challenges.* Waste Management.

[11]. Goldsmith, B. (1988). Newsweek Magazine, June 2 issue, pp. 89 and 161.

[12]. Ghana Districts Database (2011), *the repository of all districts of the republic of Ghana.* [Online] http://www.ghanadistricts.com (accessed: September 27, 2011)