

Environmental Impacts Of Waste Generation And Management In University Of Ilesa Campus Area, Ilesa, Osun State Nigeria

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Abstract: *This study investigated the nature of waste generation, assessed the waste management techniques and examined the impact of waste generation and management on the environment in university of Ilesa campus area. These with a view to providing baseline data for proper sanitation in the campus premises and the surrounding communities. Data for this study were collected from both primary and secondary sources. Primary data were obtained through the administration of structured questionnaire and also from field observation. The global positioning (GPS) receiver was used to capture the geographical co – ordinates of identified dumping sites across the study area and geographical information system software was also employed to classify land use types in the area. Major findings from the study showed that residential, offices and campus mini market land use area account for 92.7%, 58.0 % and 49 % respectively. The study further revealed that nature of wastes generated varied from one land use to the other. Pure water, nylon, paper and other nylon are clearly seen as the most common in office waste ranking, vegetative waste in residential sector while mini market waste is determined by the nature of product of each shop. The result of the assessment of collection, transportation and waste disposal showed that the existing techniques in the study area is poor 57% of the respondents confirmed that they were not satisfied with the method used. The study concluded that waste management techniques in the study area is very poor and has been subjected to the area to the risk of environmental hazards. Therefore, modern method of waste disposal techniques such as landfills, where waste will be buried at the out skirts of the study area should be embraced as it is the method practiced in some of the advanced countries of the world.*

Keywords: Waste generation, waste disposal, environmental impacts and management techniques.

INTRODUCTION

Waste management is a global challenge and the situation is worse in urban areas of the developing countries where in most cases, there are no data indicating how much waste is generated over a specific period of time. Worse still, wastes continue to grow and authorities are increasingly becoming unable to manage the waste. This calls for a means of anticipating the waste to be generated in order for the authorities to take proactive actions in managing the waste. Negative environmental impacts from improper waste dumping can easily be observed everywhere in the developing world. For instance, in Nigeria due to lack of proper planning and funding the waste management scenarios is becoming worse each day, in major cities environmental and sanitary conditions are becoming very complex. Due to lack of awareness and low income sources dwellers are forced to live with unhealthy and unhygienic conditioned Ejaz et al (2015). An improper solid waste management system may contribute to a worsening environmental degradation of any community in Nigeria

The history of waste generation dates back to ancient time. Humans began producing waste when they first settled down into small non – nomadic communities at around 10,000BC Worrel and Vesilind (2017). These small communities managed to bury solid waste generated just outside their settlements or disposed theirs in nearby rivers and water bodies. Marshall and Farahbakish (2013). As at that time, most of these waste produced was essentially organic not as the small communities evolved into large and sophisticated communities the waste produced also increase, both in quantity and type. Thus, burying and supporting them in rivers were no longer feasible hence, the need for waste management. Mariable (2020) defines waste management as an interrelated system of appropriate technologies and mechanisms involved in the generation collection , storage and processing, transfer and disposal of solid waste at the lower possible cost and risk to health of the people and their environment

With the increasing influx of migrants to the urban areas large areas with substandard living conditions are created to accommodate this influx, a huge amount of domestic solid waste is generated and it is on this background that this study examines the environmental impact of waste generation and management in university of Ilesa campus area, Ilesa

STATEMENT OF PROBLEM/JUSTIFICATION

All over Nigeria today people are becoming increasingly concerned about the quality of their environment. For instance, management of waste has become an endemic problem arising from rapid urbanization and lack of adherence to sound physical development practices in Osun State and particularly in Ilesa. Waste being generated daily is aggravated by the inefficient and unimaginative solid waste management strategies, this is incapable of keeping pace with the high rate of generation, but also by the disconnect between volume of waste generated and dwindling resource allocation to tackle the problem

AIMS AND OBJECTIVES

The aim of this study is to examine the environmental impacts of waste generation and management in University of Ilesa, Ilesa with a view to providing baseline data for proper sanitation in the area. The specific objectives are to;

- i. investigate the nature of waste generation in the study area,
- ii. Examine the impacts of waste generation and management techniques on the environment; and
- iii. Recommend options for improved waste management system in the study area.

RESEARCH METHODOLOGY

Data for this study were collected from both primary and secondary sources. Primary data were obtained through the administration of structured questionnaires and also from field observations. The questionnaires was used to gather information on the socio-economic characteristics of occupants of the University of Ilesa, Ilesa campus, neighbouring community and their pattern of waste generation. These include office or shop structure, types of items consumed, level of income, length of stay in the campus, time cost and frequency of the waste disposal facilities. Information on questionnaires was used to obtain various method of waste disposal. Field observation was conducted round campus territory to obtain supplementary to the information obtained from the questionnaire. Parameters of interest include waste disposal method by residents, distance of dumping sites to the office, shops or residential units as well as respondents awareness of the risk involve in keeping waste for long time in their neighborhoods.

The instruments used for collecting various coordinate points was a hand held GARMIN Terex global positioning system (GPS) receiver which was used to capture the identified point of interest in this study area which are Bolanle awe complex, bursary complex, Faculty of Social and Management Sciences Complex, Faculty of Basic Medical Sciences, Faculty of Arts, Faculty of Education, mini market security and maintenance unit. In each zone, three locations were selected to represent staff, student and shop owners using arc map 10.3, the three locations were subjected to a 200m radius. Also, a canon D90 digital camera was used to capture pictures of waste collection sites

Multi-stage sampling procedure was used in the selection of sample of the questionnaire. Data on historical ad socio – economic development of the campus was obtained from published documents in the University of Ilesa, Ilesa. Osun state. Both descriptive and inferential statistics was adopted data collected. The mean values of socio – economic data were calculated, this involves identifying cells with larger ratio and percentage values. The result were presented using tables, charts and diagrams.

RESULTS AND DISCUSSION

Demographic and socio – economic characteristics of respondents

Socio – economic characteristics of the urban and campus residents are important factors in the assessment of environmental impacts of waste generation and management. The socio- economic impacts of wastes generation and management, The socio- economic characteristics of the respondents in the residential offices and university mini market which were analyzed This includes their age, gender, educational background, marital status, ethnic group, religion, occupation

TABLE 1

AGE GROUP	FREQUENCY	PERCENTAGE
16 – 20	482	38
21 – 30	321	25
31 – 40	232	18
41 – 50	80	7
51 – 60	80	6
61 – 70	89	6

Source: Fieldwork 2023

Table 1 shows the analysis of the ages of the respondents covered in the study area. Age is an important factor in waste generation and management activities most especially in terms of awareness of its environmental impacts because it reflects the nature of waste generation and physical strength for its management hence, mature adults are expected to play an active role in waste generation and management. The age distribution of sample households offices and university mini market showed that 38% of the respondents are within the group 16 – 20, 25% between 21 – 30, 18% between 31 – 40, 7% between 41 – 50, 6% between 51 – 60 and another 6% between age 60 and above

TABLE 2

S/N	QUESTION	OPTIONS	RESIDENTIAL		OFFICES		MARKET	
1	GENDER	FEMALE	456	67	195	46	94	52
		MALE	225	33	228	54	86	48
		TOTAL	681	100	423	100	180	100
2	OCCUPATION	BUSINESS	211	31	102	24	59	33
		CIVIL SERVANT	334	49	262	62	103	57

		STUDENT	136	20	52	14	18	10
		TOTAL	681	100	423	100	180	100
3	MARITAL STATUS	SINGLE	245	36	139	33	48	27
		MARRIED	375	55	254	60	121	67
		DIVORCED/WIDOWER	61	9	30	7	11	6
		TOTAL	681	100	423	100	180	100
4	RELIGION	CHRISTIAN	347	51	220	52	83	46
		MUSLIM	211	31	161	38	83	46
		OTHERS	123	18	42	10	8	8
		TOTAL	681	100	423	100	180	100
5	ETHNIC GROUP	YORUBA	531	78	254	62	111	62
		HAUSA	20	3	21	5	13	7
		IGBI	48	7	97	23	45	25
		OTHERS	81	12	51	12	11	6
		TOTAL	681	100	423	100	180	100

Source: Fieldwork 2023

Sex distribution of the sample population is shown on table 2 the tables revealed that more female than male were sampled in the residential while more male than female were sampled in the office. For instance, female respondents accounted for 67% in the residential places, 52% or market and 46% in offices against 54%, male in office, 48% in mini market and 33% in the residential area (table 2). This implies that a large proportion of the households have female heads, Adetunji (2009) discovered that the main reasons for a household being headed by a female are because the women were separated or discovered or the male partner had migrated out of the town in search for job. Another reason for this in ilesha is the fact that the Ijesa's are nationally and internationally known to be astute traders "osomalo" some of the head of households who were mostly females claimed that their husbands resides in another town to carry out their business transactions. Analysis of marital status of the respondents showed that majority of the respondents are married 67% in the mini market sectors claimed single. Also minority of the respondents (96.7%) and 6% in residential offices and mini market respectively are divorced. Religious affiliations of the respondents indicated that 51%, 52% and 46% are Christians in residential, offices and mini market sector respectively. Other tribes are Hausa 3%, 5% and 7% across the three identified landuse sector with igbo 7%, 23% and 25% (Table 2)

2.1 THE NATURE OF WASTE DISPOSED

The types of waste generated at the dump site varied from one sector to the other. This is revealed at a glance as observed across the available dumpsites in the study area. Plates 1, 2 and 3 shows the waste dumpsites at residential, offices and mini market respectively. A typical dumpsite in the residential area across the study area depicts the unplanned dumping of refuse in the illegal dumpsites. The type of waste disposal by household as observed at the dumping sites are leaves, paper, nylons, food waste, plastic, tin, glass cartoons, bottles, animal dung, human faeces, metal scraps, cloths, diapers and aluminum

The section of this survey was designed to determine what respondents saw as the major waste material, vegetative waste is clearly seen as the most common form of waste. While cloth and paper/cardboard packaging appear to be least abundant and with the difference between waste type 4 to 8 (bottles waste to others) the respondents for each cohort have a large standard deviation indicating a wide spread of responses (table 3)

Table 3: Household Waste Abundant Ranking

S/N	Waste Types	Mean	Standard Deviation
1.	Vegetable waste.	4.0	3.0
2.	Plastic bags	4.6	3.1
3.	Food scraps	4.9	3.5
4.	Bottles	5.3	3.8
5.	Tin cans	5.4	2.9

6.	Human faces	5.5	3.1
7.	Diapers	5.6	3.0
8.	Others	5.7	5.7
9.	Glass jars / Containers	6.1	3.3
10.	Aluminum cans	6.4	3.1
11.	Cloth	7.0	3.6
12.	Paper/ Cardboard package	7.2	4.5

Source: Fieldwork 2023

Table 3 represents household generation site selected in each of the eleven districts within the study area and their locations.

Table 4: SELECTED DUMPING SITES UNDER RESIDENTIAL LAND USE

S/N	Selected dumping site	GPS Coordinate	
		Longitude (x)	Latitude (y)
1.	Ajibade dumping site.	47306	76241
2.	Imola dumping site.	47342	76436
3.	Campus gate dumping site.	47685	76297
4.	Isua street dumping site.	47521	76233
5.	Ibodi dumping site.	47541	75957
6.	Micho Dollar	47424	76076
7.	Ido – Ijesa	47167	76146
8.	Arimoro dumping site.	47307	76293
9.	Ori – oke dumping site	47395	76511

Source: Fieldwork 2023

NATURE OF WASTE DISPOSED

The type of waste as observed at a glance and picture across the study area include paper, cardboard, Nylon, Tin, glass jugs, food scraps, plastic bags, aluminum cans and bottle. (Plate 2)



Mini mart



Office



Residential

The respondent in the public sector also acknowledge that most of the items observed in plate 2 in the public waste abundance ranking, pure water nylon is clearly seen as most common form of waste, Cloth and rags appear to be least abundance and with the difference between waste types 4 to 8 that is vegetative waste to others. The responses to each cohort have a large standard deviation indicating a wide spread of response (Table 5)

Table 5: public waste abundance ranking

S/N	Waste Types	Mean	Standard Deviation
1.	Pure Water nylon	4.3	3.1
2.	Plastic bags	4.9	3.1
3.	Food scraps	5.3	3.4
4.	Vegetable waste	5.4	3.6
5.	Tin can	5.6	2.7
6.	Waste papers	5.7	3.1

7.	Cardboard package	5.6	3.0
8.	Others	6.7	5.6
9.	Glass jars/Container	6.1	3.7
10.	Aluminum lens	7.0	3.1
11.	Cloths/rags	7.2	3.6
12.	Liquid waste	7.4	4.5

Source: Fieldwork, 2023

Table 5 represent the selected dumping sites under public land use and their geographical co-ordinates in the study area. These include dumping sites in the public markets, schools, hospital, hotels, local government secretariats, and so on.

Table 6 Selected dumping sites under office and mini market Land use

S/N	District name	GPS Coordinate	
		Longitude (x)	Latitude (y)
1.	Bolanle awe complex	47301	76237
2.	Bursary complex	47332	76420
3.	Faculty of social and management sciences	47675	76280
4.	Faculty of basic Medical sciences	47510	76244
5.	Faculty of arts	47538	76941
6.	Faculty of Law	47420	76056
7.	Faculty of education	47169	76054
8.	Mini market	47300	76320
9.	Security and Maintenance unit	47401	76488

Source: Fieldwork, 2023

ENVIRONMENTAL IMPACT OF WASTE DISPOSAL METHODS IN THE STUDY AREA

Inadequate disposal of waste can pose serious threats to man biodiversity as well as ecosystem which provide various services to man. The dumping of waste in gutters drains and other water bodies have resulted into water pollution, blockage of drainages and flooding. Some of the domestic waste disposal indiscriminately has been transported into major streams in the study area. Arimoro and ajobade streams along the university campus have constantly been polluted with waste. According to Obafemi (2006) Arimoro stream drains a catchment of about 10 KM² which include Ido – Ijesa, GRA areas of Ilesa

HEALTH CHALLENGES WASTE MANAGEMENT IN THE STUDY AREA

The implication of waste generation and management is obvious on the health of people in Ilesa. Different types of health challenges are experienced by inhabitants of University of Ilesa Campus area Ilesa. It is evident from table 4.4.1 that 45% of the respondents indicated that they have experienced malaria infections within the last one year. This can be attributed to the fact that blockage of

drainage channels impedes the free flow of water (plate 4.4) thereby serving as breeding grounds for mosquitos which is malaria carrying agent and other vectors of diseases which are harmful to human health. Also, 40% of the respondents indicated that they have dysentery within the last one year, 13% of cholera and 2% cough (table 4.4.1). All these diseases are peculiar characteristics of unhygienic environment.

The organic fraction of wastes is an important component, not only because it constitutes a sizeable fraction of the solid waste stream in a developing country, but also because of its potential adverse impact upon public health and environment quality. A major adverse impact is its attraction of rodents and vector insects for which it provides food and shelter. Impact on environment quality takes form of foul odours and unsightliness. The present level of waste management in urban areas is a potential threat to public health and environment (Adeoye et al, 2016).

Table 7 Health challenges of Respondents

Diseases	Population	Percentage
Malaria	578	45%
Dysentery	514	40%
Cholera	166	13%
Cough	26	2%
Total	1284	100%

Source: Fieldwork, 2023

Inhalation of bio-aerosol and of smoke and fumes produced by open burning of waste, do cause health problems. Also, the exposure to air borne bacteria is infectious. Toxic materials present in waste are determinants for respiratory and dermatological problems, eye infections and low life expectancy (Adeoye et al, 2016). The carbonaceous fractions and toxic elements like Cr, Pb, Zn, and so on dominate the fine particle range. As most of the fine particles can possibly enter the human respiratory systems, their potency for health damage is high. Also these fine particles from open burning which constitute higher fractions of toxic are mostly released at ground level.

CONCLUSION

Waste materials and level of waste generation varies from on land use to the other depending on locational characteristics. Many waste collection sites were not properly managed and it poses various environmental and health impact on human being. Therefore, the need to engage in sustainable practices such as proper waste disposal for sustainable ecosystem services. Appropriate waste management play an important role towards promoting a sustainable urban development within human settlements, with that in mind and knowing that is most developing countries the highest urban growth rates occur in the low – income area. It is imperative to adopt the best waste management measures. People would be willing to apply for improved waste management if puts in place, if otherwise, the unsustainable dumping of refuse openly would continue to be the order of the day

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