Scottish Journal of Arts, Social Sciences and Scientific Studies - ISSN 2047-1278
http://scottishjournal.co.uk

SCOTTISH JOURNAL OF ARTS, SOCIAL SCIENCES AND SCIENTIFIC STUDIES

VOLUME 21, ISSUE I
JULY 2014

Articles

Scottish Journal of Arts, Social Sciences and Scientific Studies - ISSN 2047-1278
http://scottishjournal.co.uk

Solid waste collection and management practices among community residents in varying population density areas in Ibadan, South West Nigeria

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Abstract
This paper presents the results of a study conducted in four socio-economic (three urban low-, medium- and high-density residential communities and one rural) areas of Ibadan. The study assessed the amount and nature of solid waste generated, the level and benefits of community participation in source separation and recycling potential and the factors responsible for poor solid waste management in the city. The study is cross sectional in design involving 153 households. A questionnaire survey and waste assessment were carried out in the selected households. Waste assessment included volume, weights and various segregated waste components over a period of seven days in the week. The waste generated (kg/c/day) was the highest in low density area (0.688) followed by rural (0.636), high density (0.452) and medium density area (0.303). The mean generation rate was 0.52 Kg/c/day. The recyclable dry waste was more than the wet waste. About 71.7% of the respondents were aware of and segregated some recyclables from the wastes and only 9.2% tried to convert wet waste into compost. The reasons for non-practice of source separation of waste at household level were bad odour, lack of capital, fear of disease-causing germs, pollution of surroundings, and need for much labour and time. The study suggested creation of more awareness along with demonstration/practice of waste assessment, regular segregation and recycling activities involving stakeholders in the communities.

Key Words: Solid Waste Management, Residential Density, Communities, Recycling, Compost

Introduction

The menace of municipal waste and its associated management problems in Nigerian cities are well documented (Sridhar and Ojediran 1983, Akpovi and Sridhar 1984, Sridhar et al 1985, Egunjobi 1986, Afon 2006, Nabegu 2010). The most enduring of all the urbanization – induced problems in the country is waste problem (Agbola and Jinadu 2006) and the problem is more pronounced in Ibadan, as heaps of garbage are seen in most parts of the expanding city particularly the high density core areas, road sides open spaces and drains (Adeniji and Ogundijo 2009). Historically, from 1960 to date, the assessment studies on waste types and generation were based on the needs of the ruling government with a view of pushing the problem to dump site management. The waste generations then varied from 0.37 to 0.53kg/c/day and 3.2 to 3.4 kg/household/day (Maclaren 1970, PAI Associates International 1982, Oluwande 1983, Egunjobi 1986).

Subsequently, a study conducted by Haskoning and Konsadem Associates (1994) revealed a per capita generation rate of 0.6kg/day with a density of 300kg/m^3. The city currently generates 0.52kg/capita/day of solid wastes with a density of 330kg/m^3.The waste collection rate in Ibadan currently stands at 10% (OYSWMA 2012). For an effective and sustainable management of solid waste, an important factor that was not given priority was the quantity of waste generated in various residential densities and the involvement of communities. This paper, therefore, addresses an update on the types and quantity of waste generated across varying residential density zones of Ibadan city with a population size of over 3.5 million and the benefits derivable from community involvement in source separation and recycling.

Waste governance is the conceptual framework for this paper. The European Commission developed and implemented the concept to address waste management problems in Azerbaijan, Georgia, Armenia, Belarus and Ukraine. The concept looks at waste governance from five different perspectives: partnership; ensuring transparency in decision making; information systems/use of indicators; relationship between different levels of authority; and financing (EC 2012).

Materials and methods

Study Locations

Ibadan, the capital of Oyo State, is located in the South Western part of Nigeria at an altitude generally ranging from 152 to 213m, with isolated ridges and peaks rising to 274m. The Ibadan Metropolis has 11 Local Government Areas (LGAs) of which 6 are inner city and 5 are peripheral to the city. Its projected population by 2010 using 3.2% growth rate was about 2,893,137 (Wahab 2011) and 3,191,339 by 2013 (Agbola 2013). During the 1980s and 1990s, the spatial growth of the city began to sprawl into the country side in the South and South East of the city that is Akanran – Ijebu Ode Road such that areas that were previously villages have now been engulfed by the city. Ashi, Aare and Ajibode are some examples. By 2006 the city covered a total area of 3,080 Km^2 giving a metropolitan density of 250/km^2 and regional density of 828/km^2 (http://en.m.wikipedia.org/wiki/Oyo_State). The satellite image of the city obtained from LandSAT 2013 in December, 2013 showed that the city has expanded to 5,388.3 km^2 (Taiwo, 2013). In 2003, high density residential landuse covered 86.81^{2}km, low density 115.05 ^{2} km, medium density 98.39sqkm (Fabiyi, 2006).

There are three major residential density areas well demarcated in the city consisting of high-density development (200 persons per hectare) in the inner core of the city surrounded by medium density (120 persons per hectare), and low-density residential zone (60 persons per hectare) majorly the GRAs and public housing estates. found at the outskirts. Approximately 70 per cent of the inhabitants live on an annual income of less than Nigerian Naira, NGN 2,000 (1USD=NGN 170).

Methodology

The study was conducted in 4 areas, three urban and one rural. The three urban areas fall within Ibadan South West LGA and have a population of 283,098 (NPC 2006). These areas were selected based on the population stratification: high, medium and low density. They include:

a) Oke-Foko (high density): It consists of 12 zones and has an estimated population of 36,225 While a majority of women engage in trading men are engaged in tailoring, automobile mechanics, welding and carpentry and small scale businesses such as plastic and metal recycling. The community depends mostly on any available water source and sanitation is poor as there are only a few toilets which are either public or pay and use type.

b) NTC (medium density): This area consists of 12 zones. Population figures were not available as it is a part carved out of Iyaganku GRA area. People engage in occupations such as trading, artisan activities and civil service. The water supply is from shallow wells and most of them use pit toilets.

c) Iyaganku GRA (low density): This is a government reserved area and the residents belong to high socio-economic group. It has a projected population of 8,377 of which only 2,681 people are currently resident whereas others reside occasionally. Most of the residents own private water supply like boreholes and enjoy individual toilets.

d) Ayegoro/Oyawe village (a rural area): This location was selected from Ido LGA on the periphery of the metropolitan city. Majority of people are engaged in farming, petty trading and small-scale business, while some are into civil service.

Sampling

Google Earth Map was used to count the number of houses in delineated survey areas and verified physically. Survey took place in Wards 5, 6 and part of 7 with a total of 1940 houses in Oke-Foko, 12 neighbourhoods (with a total of 543 houses) in NTC, and Iyaganku with 873 houses. The Ayegoro/Oyawe, had a total of 20 houses. Random sampling method was used to select houses in each area and one household was sampled from each of the selected houses in the following manner:

(a) Urban

Oke-Foko community -- 97 houses (5% of 1940) = 97 households sampled.

NTC-Oke Ado community -- 27 houses (3.1% of 864) = 27 households sampled.

Iyaganku GRA – 20 houses (2.3% of 873) = 20 households sampled.

(b) Rural

Ayegoro/Oyawe village -- 9 houses (45% of 20) = 9 households sampled.

The heads of the households or any available senior person were involved in the administration of questionnaire. Waste was assessed from every house sampled for seven days of the week to obtain the daily variations.

Study Instruments

The study used questionnaire survey involving the selected community members, and waste assessment from the selected households through measurement of volume, weights and various components through segregation.

(i) Questionnaire administration

The 27-item questionnaire was designed to address households' demographic characteristics, waste generation pattern, the knowledge, attitude and perceptions as well as perceived ideas and practices on waste minimization, recycling and segregation.

(ii) Waste Assessment

The waste generated in the sampled households was assessed for 7 days in the week Monday through Sunday with a view of finding the generation pattern, rate and the predominant components (biodegradable and non-biodegradable). Colour coded bags, viz. black plasticfilm bags (200 kg capacity for wet waste) and white jute bags (50 kg capacity used sacks for dry waste) were labeled with the house number and the day of the waste collected in the week. For example, a sample bag reads: House 2, Day 1 (this was done up to Day 7 to complete the week). Therefore, in a day, a house had one black and one white bag for collecting their wastes. At the end of each day, the bags were tied up and kept for collection. The designated Field Assistants (FAs) then went round and collected these bags. Trucks from the Oyo State Waste Management Authority (OYSWMA) were used to collect the bags with the wastes and then transferred to a central place, Pace-Setter Fertilizer Plant site in Bodija market for sorting and assessment.

For convenience and cost saving, wastes were collected every alternate day totaling three times in the week. The waste collection and clearance schedules for the four study areas were as follows: Saturday and Sunday generated wastes were picked up on Monday; Monday and Tuesday generated wastes were picked up on Wednesday; and Wednesday, Thursday and Friday generated wastes were picked up on Saturday. Sunday was a work-free day. The waste collected in each bag for a day was weighed using a sensitive balance and recorded on a data sheet specially designed. Then the non-biodegradable wastes were separated into different components – metal, glass, plastics etc., weighed and recorded. The mean weight of the wastes for each household was obtained. Adequate personal protective equipment (PPE) such as gloves, nose mask, apron and gum boots were given to all FAs. Community entry was carried out by the research team as per the procedure. Important leaders and members in the different communities were met and the project content was explained.

Results and discussion

Demographic Characteristics of the Communities

The gender distribution of the respondents in the communities indicates that in high density area female respondents were more in number and in medium and low density areas male respondents were more. In the rural area also, men were more in answering the questions (Table 1). Culturally, men as head of families play significant roles in household decisions. Considering the family size of the respondents, in Oke-Foko (high density area), the mean family size was 3-6 members among 46.4% of the respondents. About 24.7% of them had less than 3 members. The family size of 7-10 was also found particularly in low and medium density areas. The same trend was observed in medium and high density areas and the rural (Table 1). Family size influences the amount of waste generated. In the high density area, 43.8% lived in rented houses whereas 40.6% had inherited theirs. In the medium density area, 50% owned their houses followed by 36.1% who rented. In the low density, 94.4% owned their houses. Typical of rural, 75% of the respondents owned their houses. The rents ranged from NGN 500 to NGN 8700 per month. In high density area about 48.8% paid a rent of NGN 600 per month. In the medium density area, 25% rented their houses in the range of NGN 1000 – 2000 per month. Furthermore, in high density area 43.3% lived for over 20 years and 53.8% in NTC-Oke Ado were indigenous and lived for over 20 years. However, in Iyaganku GRA, many had moved to other places or out of the country or rent their houses for others. These people occupied the houses for over 3-6 years. In the rural area, 66.6% were resident for over 20 years (Figure 1). Occupations varied in each of the locations. In Oke-Foko 51.5% were traders followed by teaching and civil service. In NTC-Oke Ado, 29.6% were in civil service followed by trading and other miscellaneous occupations. Students were also found living in this area. In Iyaganku GRA, civil service and trading were predominant occupations. In the rural area, farming (55.6%) and trading (22.2%) were predominant (Figure 2).

Table 1: Demographic Characteristics of the Respondents

Gender	Oke-Foko	NTC Ado	Oke-Iyaganku	Ayegoro-Oyawe	Total
Male	42	20	12	9	83
% within gender	50.6	24.1	14.5	10.8	100.0
% within location	43.3	74.1	60.0	100.0	54.2
Female	55	7	8	0	70
% within gender	78.6	10.0	11.4	0	100.0
% within location	56.7	25.9	40.0	0	45.8
Total	97	27	20	9	153
% within gender	63.4	17.6	13.1	5.9	100.0
% within location	100.0	100.0	100.0	100.0	100.0
Family Size of Respondents					
Less than 3	24	0	3	2	29
% within gender	82.8	0	10.3	6.9	100.0
% within location	24.7	0	15.0	22.2	100.0
3 – 6	45	13	10	6	74
% within gender	60.8	17.6	13.5	8.1	100.0
% within location	46.4	48.1	52.6	66.7	48.4
7 – 10	22	12	7	1	42
% within gender	52.4	28.6	16.7	2.4	100.0
% within location	22.7	44.6	36.8	11.1	27.5
Greater than 10	6	2	0	0	8
% within gender	75.0	25.0	0	0	100.0
% within location	6.2	7.4	0	0	5.3
Total	97	27	20	9	153
% within gender	63.8	17.8	12.5	5.9	100.0
% within location	100.0	100.0	100.0	100.0	100.0

The mean family sizes of the communities are- Oke-Foko 5.66, NTC-Oke Ado 7.19, Iyaganku GRA 6.05, and Ayegoro/Oyawe 4.89.

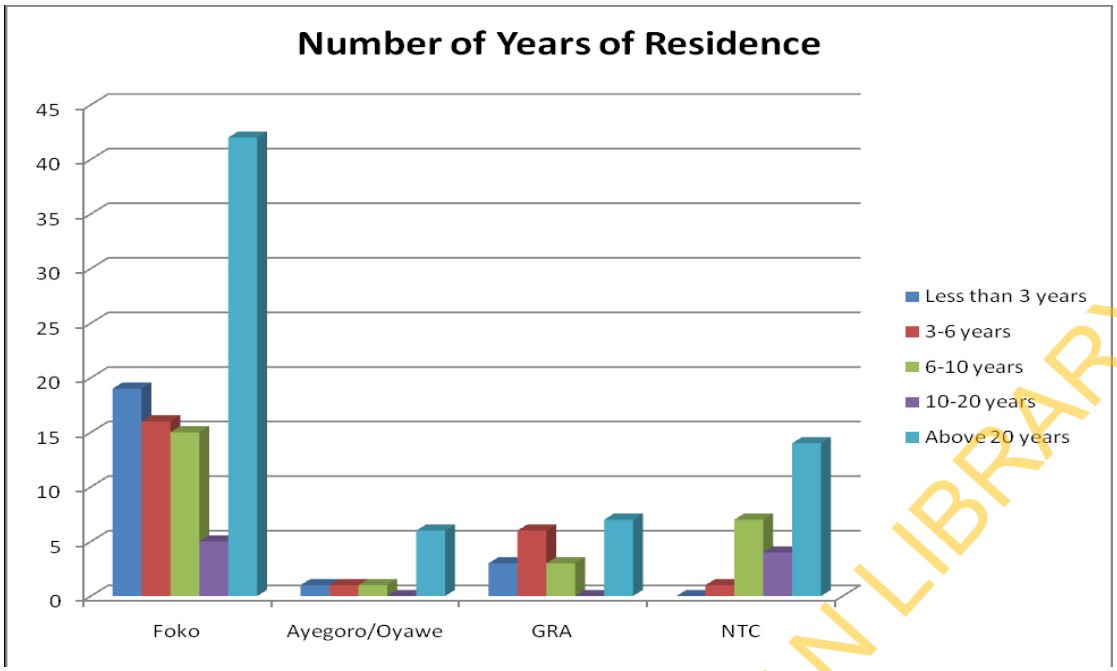


Figure 1: Number of years of residence by the respondents

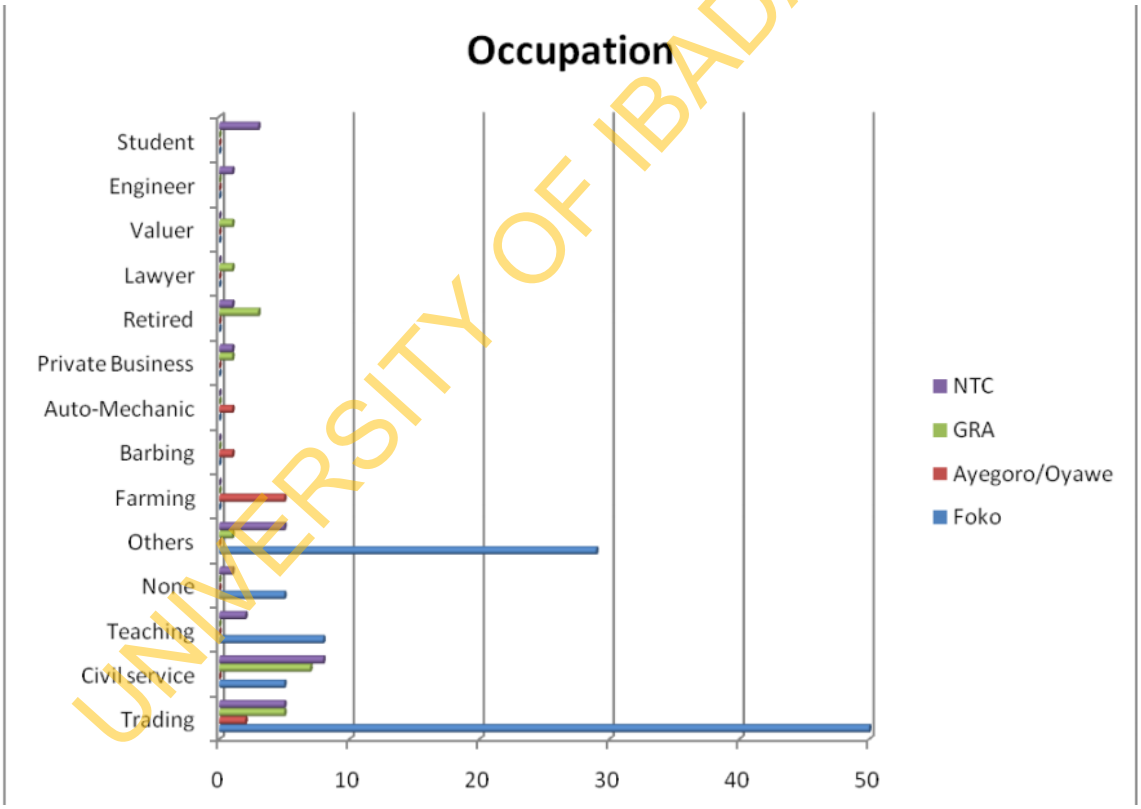


Figure 2: Major occupations of the respondents

Waste Generation and Composition

Waste generation trends in the study communities

The results (Table 2) indicate that the waste generation varied with the day of the week. In the high density area, the least generation was on Sunday while in the medium density, Friday, and in

the low density area, Wednesday. In the rural area, the least was on Monday. The total waste generated in each community projected for 1000 population is in the order: rural (Ayegoro-Oyawe) > low density area (Iyaganku GRA) > high density area (Oke-Foko> medium density area (NTC-Oke Ado). The increase in the waste observed in the rural and low income communities is possibly from farm activities as the people bring their farm produce to residential areas for processing. It is also to be noted that there is a growing trend in urban areas to have at least one meal outside the house every day for the employed. Fast food restaurants, more and more use of packaged water for drinking, engagement of private sector in disposing some of the recyclables have considerably changed the composition and quantity of wastes generated. The picture of total waste generated also showed more waste in the low density areas. The waste generation in rural area is also dependent on the farm produce brought home unprocessed and in some of the houses there was more of wet waste in the form of maize cobs or cassava peels etc.

Table 2: Daily generation of total waste in each community (in Kg) Week Day

	Oke-Foko n=515 (97)	**NTC-Oke Ado n=194 (27)**	**Iyaganku GRA n=127 (21)**	**Ayegoro/Oyawe n=44 (9)**
Saturday	257.20	57.11	94.56	21.17
Sunday	203.20	49.95	43.35	24.26
Monday	306.62	61.19	45.13	24.58
Tuesday	200.81	75.43	77.97	25.89
Wednesday	282.28	41.98	80.00	31.19
Thursday	215.41	48.77	108.51	26.30
Friday	271.27	77.88	104.22	42.61
Week Total	173.68	412.31	553.73	196.01
Projection for 1000 population, Kg per week	**3372.38**	**2125.29**	**4360.05**	**4454.71**

Dry vs. Wet Waste Generation

The results on the proportion of dry (recyclables) vs. wet (biodegradable) wastes in the communities are shown in Figure 3. All the communities produced more recyclable dry waste than the wet waste. The rural (Ayegoro/Oyawe) and low density Iyaganku GRA communities produced highest amounts. It is to be noted that there is a change in the cooking and eating behavior of middle income communities. Significantly less wet waste was produced in the medium density area which is indicative of changing lifestyle as most of the employed took at least one meal a working day outside the house. Women were mostly traders or in business and they also ate at their workplace. When projected to 1000 population in each community, the low density high income area generated the highest quantity of wet waste reflecting their lifestyle.

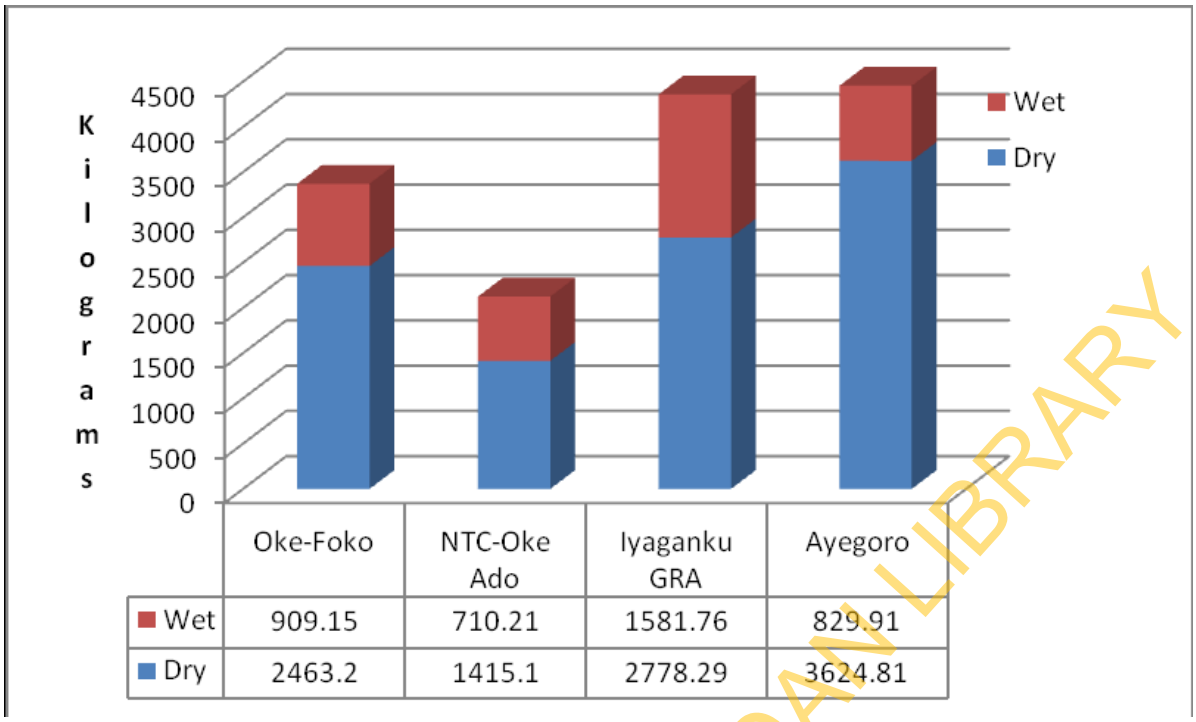


Figure 3: Proportion of dry and wet wastes in the communities (Projected for 1000 population in each community)

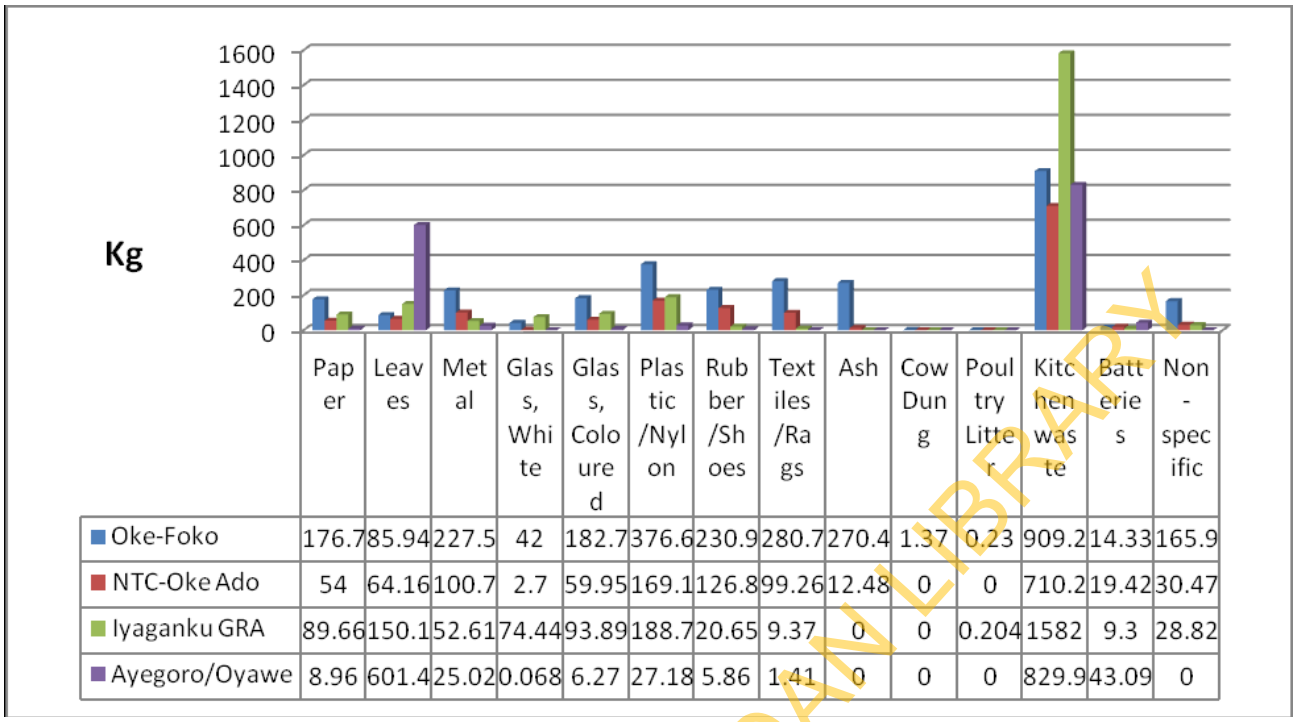
Daily variations in the wastes generated

The results in Table 2 indicate that day to day variations with extremes were more common in high density area. Waste generation was more on Mondays and less on Tuesdays. In low density area, the waste was less on Sunday and Monday but progressively increased until the week end. However, in the medium density and rural areas the generation was steady.

Waste Composition

The various components in the wastes are shown in Figure 4. Leaves, plastic film/nylon, rubber/shoes, textiles, glass (coloured) dominated the wastes. White glass is relatively low as it has an immediate resale value and rarely gets to the dustbin. The plastic found in the communities was mostly the thin plastic film type originating from the packaged water sachets. Metal scrap was also more in high-and medium density areas. One feature of the low density area is that most of the recyclables would be taken away by the domestic maids working in the houses for resale. Leaves were found in high amounts in rural community as most of these were from farms and the trees surrounding their houses. Similarly, the low density area, had relatively high amount of leaves as the area is characterized by trees and shrubs. Ash is only found in the high- and medium density areas indicating that these communities still used firewood, charcoal and kerosene (when available) for their cooking needs as they could not afford high cost of gas and other alternatives. Ash in the rural area is not collected in the waste as the households usually dispose off on the backyard or save it to make local soap.

Cow dung was only found in the high density area where the households kept cows for a few days before slaughtering. Poultry waste was found, however, in high density and low density areas as the households usually kept them for family consumption and occasionally for a little extra income.



	Paper	Leaves	Metal	Glass, White	Glass, Coloured	Plastic/Nylon	Rubber/Shoes	Textiles/Rags	Ash	Cow Dung	Poultry Litter	Kitchen waste	Batteries	Non-specific
Oke-Foko	176.7	85.94	227.5	42	182.7	376.6	230.9	280.7	270.4	1.37	0.23	909.2	14.33	165.9
NTC-Oke Ado	54	64.16	100.7	2.7	59.95	169.1	126.8	99.26	12.48	0	0	710.2	19.42	30.47
Iyaganku GRA	89.66	150.1	52.61	74.44	93.89	188.7	20.65	9.37	0	0	0.204	1582	9.3	28.82
Ayegoro/Oyawe	8.96	601.4	25.02	0.068	6.27	27.18	5.86	1.41	0	0	0	829.9	43.09	0

Figure 4: Various components in the wastes generated weekly by the communities (per 1000 population projected in each community).

Batteries were more commonly used in the rural area and high and medium density areas as there was shortage of electricity and most of them used radios, torch lights and other appliances run on batteries. The batteries were not segregated and, therefore, entered the main waste stream.

Per capita generation of waste in the communities

Based on the data collected, per capita generation of waste is calculated in each of the communities. When viewed from community density perspective, the low density area produced the highest amount of 0.688 kg/c/day followed by rural 0.636, high density area 0.452 and medium density area 0.303. The total mean generation rate is 0.52 Kg/c/day. From the data, it is evident that there is no much change from the earlier reported rates. The variations seem to be the various components such as increased plastic/nylon, and some of the recyclables which were not very conspicuous in the past. The low amounts recorded in the medium density area was due to changing lifestyle of fast urbanization with increased fast food outlets, nature of job and keeping rural houses by the urban dwellers which they frequented during the weekends and holidays.

Projections of waste generation

Projected amount of waste generated in the LGAs

Based on the data from the sampled communities, a projection has been made to the city of Ibadan (with 11 LGAs) with 2006 population figures released by the National Population Commission. The results are given in Tables 3 and 4. The mean generation rate of 0.52Kg per capita per day is used for the projection. From this, the expected waste generated is 485,861 Tons per annum in 2009 and 544,164,031 Tons per annum in 2013 thereby showing considerable increase.

Table 3: Projected amount of waste generated in the city of Ibadan by LGAs (2009)

LGA	Population	Waste generated Per day Kg	Waste generated Per annum Kg	Remarks (Rank by volume generated)
Ibadan North East	331,444	172350.88	62908071.2	1
Ibadan North	308,119	160221.88	58480986.2	2
Ibadan North West	154,029	80095.08	29234704.2	9
Ibadan South East	266,457	138557.64	50573538.6	5
Ibadan South West	283,098	147210.96	53732000.4	4
Ido	104,087	54125.24	19755712.6	11
Lagelu	148,133	77029.16	28115643.4	10
Oluyole	203,461	105799.72	38616897.8	8
Ona-Ara	265,571	138096.92	50405375.8	6
Akinyele	211,811	110141.72	40201727.8	7
Egbeda	283,643	147494.36	53835441.4	3
Total	2,559,853	1,331,124	485,860,260	

Table 4: Projected amount of waste generated in the city of Ibadan by LGAs (2013)

LGA	Population	Waste generated Per day Kg	Waste generated Per annum Kg	Remarks (Rank by volume generated)
Ibadan North East	371217	193032.84	70457045	1
Ibadan North	345093	179448.36	65498651.4	2
Ibadan North West	172513	89706.76	32742967.4	9
Ibadan South East	298432	155186.64	56643123.6	5
Ibadan South West	317070	164876.40	60179886	4
Ido	116577	60620.04	22126314.6	11
Lagelu	165909	86272.68	31489528.2	10
Oluyole	227876	118495.52	43250864.8	8
Ona-Ara	297440	154668.80	56454112	6
Akinyele	237228	123358.56	45025874.4	7
Egbeda	317680	165193.60	60295664	3
Total	**2,867,035**	**1,490,860**	**544,164,031**	

Waste management practices in the communities

Waste collection and disposal

This section assessed some of the practices of the respondents with regard to the handling of the wastes, such as collection, segregation, knowledge of the recyclables and recyclables, modes of disposal and any perceived economic or health problems they faced during the practice. Since the sample size is small, they were combined together so as to obtain a general trend.

Container used for waste collection and frequency of collection

A majority of the respondents used baskets (46.7%) for collecting their wastes followed by standard dustbin (21.1%) and empty cartons (20.4%). Still 2.0% threw outside and 7.2% used anything available. About 63.3% of the respondents collected the wastes daily, 16.0% collected once a week and 11.3% twice in a week. Only 6.6% collected every alternate day and 2.0% once in two weeks.

Collection practices for disposal

The wastes generated from the houses were collected by female child (30.0%), male child (26.0%), mother (25.3%) or a maid (16.0%). In some 2.7% of the houses, any one from the house may collect. For final collection of the wastes for disposal, 20.0% engaged contractors, 18.0% engaged the services of the OYSWMA. About 5.3% threw wastes into nearby drainage, 6.7% burned and 2.6% threw into the bush. A very significant 40.7% of the respondents claimed "others" which is vague and we are tempted to feel that their wastes go into the surroundings unchecked. Some people also claimed that they used their cars to dispose their wastes which are apparently going into the bush or roadsides and drains. Some people claimed that they paid from N1000 to N2000 monthly to the private contractors and this depends on the number of containers and frequency of collection. The maximum amount paid was reported to be N3500 per month. Those who did not engage contractors, which accounted for 79.5% of the respondents, disposed of their wastes by various unhygienic means e.g. open dump, stream, open burning, bush and roadside.

Waste utilization

Recycling as one of the sustainable ways of managing solid waste has been variously advocated. Waste recycling facilitates waste reduction as well as income and employment generation. Thus, the survey sought to determine the knowledge and attitudes of the residents on waste recycling. About 71.7% of the respondents knew that there are some components in the wastes which have value if removed. About 94.0% of the respondents did not bother to collect and sell such recyclable materials from the waste while some 6.0% sold recyclables to scavengers. All the respondents except 1.3% reported that they did not throw faeces into the waste kept for collection thus making the recycling acceptable from health point of view. If given an opportunity, 73.2% of the respondents would like to keep the recyclables separate for sale. About 35.3% of the respondents knew some communities or people around who segregated the recyclables and sold them to scavengers. Only 9.2% of the respondents tried to convert wet waste into compost. Only 24.3% had some land for any recycling activities. Some 78.0% were willing to start segregation and recycling activities and 80.0% were ready to influence their friends in the community to embark on recycling activities. Some 83.8% of the respondents were also willing to contribute for conversion of organic waste into compost in various ways: cash 5.8%, labour 5.8%, food remnants and other raw materials needed. The recyclable materials identified from the wastes by the respondents were: animal dung, bags, batteries, bottles, cable, cans, cartons, clothes, empty water sachets, glass, iron, knives, leaves, meter scales, paper, pipes, pet bottles, plates, rubber shoes, sandals, scrap pots, spoons, and others. Also, the communities were aware of the people or agencies who could buy the recycled items from the waste.

Composting experience recalled by the respondents

Some of the respondents had some experience in converting the wet waste into compost. Some of their experiences which they recalled from 6 to 50 years ago are: dig ground and leave waste for some time to decay (practiced 20 years ago); put it somewhere to decay (practiced 6 years ago); use the manure produced to plant maize (6 years ago); collect the waste and put into a sack until it decays (6 years ago); after burning the waste, take the un-burnt waste to the farm and bury it (about 50 years ago).

Associated Problems of Source Separation / Recycling of Wastes

Some of the challenges of source separation of solid waste and recycling as revealed by the study include: bad odour; lack of capital to start the business of recycling; disease/germs infection; environmental pollution; after separation, irregularity of disposal may lead to problems; may displace some people from their jobs; it is labour intensive; vehicles needed which are expensive;

removal of the waste to the recycling facility is difficult; time consuming; lack of available space for operations; epileptic power supply may affect continuation of recycling.

Turning the challenges to opportunities

A number of benefits accruable from waste recycling business are: generation of additional income; leading to reduction of waste; cheaper products are manufactured from recycled wastes; enhances cleaner environment; generation of more employment opportunities; increase in food production with the manure produced; reduce poverty level through income generation; empowers the farmers; improves agricultural output; provides income for the government through tax; improves the standard of living; provides raw material; reduce the scavengers roaming the dumpsites; biogas can be obtained for cooking.

Conclusions and Recommendations

The paper has shown the rate of generation and characteristics of solid waste in different population density zones of Ibadan. Some of the benefits derivable from regular waste assessment, economic utilization of solid waste as well as the factors militating against waste recycling in the areas. Based on the identified problems, it is suggested that waste assessment should be carried out regularly in all the LGAs and efforts should be put in place to segregate the wastes into dry (recyclables) and wet (compostable) categories as a start. Once segregation is accepted in the communities, residents should be encouraged to initiate waste sorting centres (as initiated by the authors in Ayeye Community, Ibadan), and move towards recycling activities through integrated waste recycling centres (Sridhar et al 1999, Wahab et al 2010). Local Government Councils should play more active roles in making these activities sustainable through commitment, and participatory stakeholder approach- the Environmental Planning and Management (EPM) process.

Acknowledgement

The authors acknowledge the Oyo State Ministry of Environment and Water Resources which provided colour coded bags given to respondents to store waste generated in their households, the Oyo State Waste Management Authority for providing trucks for collecting the wastes from the communities to the sorting centre and finally to the dump site.

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