

HOUSEHOLDS ATTITUDES AND WILLINGNESS TO PAY FOR SOLID WASTE MANAGEMENT IN TWO SOUTHWEST STATES, NIGERIA

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Abstract

This paper assessed solid waste management practices in urban Nigeria. It analyzed 783 household survey questionnaires administered and complemented with photographic evidence. Results indicated that waste composition in cities was largely of biodegradable waste such as food remnants, vegetables and fruits and non-biodegradable waste - paper, wood, rubber, leather, plastic, metal, glass, etc. It further found indiscriminate and illegal dumping of wastes in undesignated areas such as road verges, open spaces and alleys in cities. Most solid wastes are openly burnt, with no formal separation or recycling, except the unstructured reuse of some waste materials at the household level. However, an informal sector is involved in the collection of recyclable materials from solid waste. Results showed that households were dissatisfied with the service rendered by the local governments and private service providers recently engaged by the State government in the collection, disposal and management of solid waste. Over 65 percent of respondents expressed their willingness to pay, and perhaps pay more, for waste collection service if only there would be improvement in the service currently being provided. Findings showed that there are numerous challenges to solid waste management in the two focal States. These include: the proper collection and management of hospital, industries and commercial/market wastes. These calls for public education aimed at educating households and service providers on waste separation, reduction, recycling and reuse in order to optimize the waste collection system and effective institutional and policy framework.

Keywords: *Households, willingness, pay solid waste, attitudes, Southwest*

Introduction

Concerns for effective and proper management of solid waste generated especially in Nigeria urban cities have continued to increase like in most urban cities of developing countries because of its health and environmental implications (Amfo-Out, Waife, Kwakwa, Akpah-Yeboah, 2012; Boateng, Agyei-Baffour, Boateng, Rockson, Mensah, & Edusei, 2019; Ejaz & Janjua, 2012; Galgalo, Aga, & Endalkachew, 2019). Serious public health problems arise due to uncollected solid waste and waste often leading to many infectious diseases including water borne diseases such as cholera and dysentery. The disposal of hazardous and medical wastes with domestic wastes poses serious health threat. Exhaust fumes from waste collection trucks, dust from disposal practices, and open burning

of waste also contribute to overall health problems. Such incidence of diseases puts additional burden on the inadequate health services available in the country. The impacts of solid waste on environment is immense, from release of harmful greenhouse gases (GHGs) to contamination of ground water, improper solid waste can wreak havoc on the environmental health. The most serious environmental problem in terms of solid wastes is the emission of GHGs (Ngwuluka, Ochekepe, Odumosu, & John, 2009; Nwake, 2005; Osinowo, 2001; Walling, Walston, Warren, Warshay & Wilhelm, 2004).

The problems associated with solid waste management in Nigeria are enormous. Lack of financial resources and infrastructure to deal with solid waste create vicious cycle; lack of resources leads to low quality of service provision which leads to fewer people willing to

pay for said services, which in turn further erodes the resource base and so on (Longe, Longe & Ukpebor 2009; Nabegu, 2010; Ngwuluka, *et al.*, 2009). Rapid growth in population and urbanization had also greatly increased the volume of waste generated and thus the demand for waste collection service in urban cities. Another significant factor that contributes to the problem of solid wastes in Nigeria is the lack of proper collection and transportation facilities. Lack of good network of roads has prevented most waste collection trucks reaching some places and thus allowing filth to build up over time (Agunwamba, *et al.*, 1998; Onibokun & Kumuyi 1999; Osinowo, 2001).

Studies have shown that uncollected waste have contributed to flooding, breeding of insects and rodents, vectors and the spread of diseases such as cholera, malaria, typhoid fever in Nigeria. The composition of waste are often a combination of biodegradable and non-degradable, hazardous and non-hazardous, human and animal excreta dumped indiscriminately dumped in the streets, drainage and other unauthorized places. Collected wastes are deposited in open dumpsite and burn thus polluting the air and other resources such as water and land (Adebayo, Bamisaye, Akintan, and Ogunleye, 2006; Nabegu, 2010; Ngwuluka, *et al* 2009; Olufayo & Omotosho, 2007). Boateng *et al* (2019) assessed 1560 households' willingness-to-pay for improved solid waste management (SWM) services in four regional capitals in Ghana; Accra, Takoradi, Kumasi, and Tamale and reported that an average of 53.7% of the households were willing to make additional payment for improved services. The study further found educational level, marital status, type of employment, and region of residence were predictors of Willingness-to-pay for improved SWM.

Globally, over the last decades, numerous studies (Achi, Adeofun, Ufoegbune, Gbadebo, & Oyedepo, 2012; Amfo-Out *et al.*, 2012; Koushki, Alhumoud, & Alduaij, 2004) have been conducted on determinants of willingness of households to pay for solid waste management. In Islamabad, capital city of

Pakistan Anjum, (2013) indicated that majority of the surveyed households showed willingness to pay differing rates per month up to USD 1.85 for an improved solid waste management system in their respective areas. Gender, age, financial condition, levels of satisfaction, level of education, and level of environmental were identified as major factors that determine the willing to pay for solid waste.

Ezebilo (2013) reports a study regarding householders' willingness to pay for improved residential solid waste management. The data were collected from 236 households in Ilorin city in Kwara State, Nigeria. A binary logit model was used to account for some factors influencing the respondents' willingness to pay. The results showed that more than 80 % of the respondents were in support of the residential waste management. The respondents were willing to pay an average of 3,660 Nigerian Naira (US \$24) each year. Income, education, dwelling type and whether the respondent is satisfied with private sector participation in provision of waste management service positively influenced the respondents' willingness to pay. The price, gender, household size and activities of sanitary inspectors had negative influence. Galgalo, Aga and Endalkachew (2019) assessed households' willingness to pay (WTP) for improved solid waste management. The study revealed that largest proportion of households (76 %) was willing to support proposed improvement in residential solid waste management. Mean monthly willingness to pay is 21 Ethiopian Birr (ETB) with a minimum of 5 ETB and the maximum of 100 ETB, other were not willing to contribute. The logit regression analysis showed that sex and household size were statistically significant.

In Ibadan, Rahji and Oloruntoba (2009) conducted a study on the determinants of willingness-to-pay for private solid waste disposal systems by urban households. With 552 households selected through a multistage random sampling technique. The data collected were analysed using a logit model-based contingent valuation. Results from the logit model showed that seven variables had

significant influence on the households' willingness-to-pay. These variables include, income, asset owned, education, occupation and age were significant determinants of willingness-to-pay.

In a survey of solid waste from 201 households in Abeokuta, Ogun State, Babayemi and Dauda, (2009) found out that solid waste types include paper, nylon, wood, dust, cloth, metal scraps, electronic gadgets, bottles, food remnants and vegetables; saw dust, ashes, rubber, bones and plastics. They reported that open dump of solid waste is a common practice in among the respondents. Very few employ the service of private waste collectors to transport their solid wastes out of their compound; others directly dump their solid wastes by the road sides. The percentage of those who used other indiscriminate solid waste disposal methods like open dumping, open burning, and dumping in drainages was high.

Attitudes of households are very important to the success of solid waste management program. Generally, attitude is a positive or negative feeling toward specific objects; it exerts an influence on behavior. Intentionally or not, behavioral decisions are frequently based upon attitudes (Ajzen & Fishbein, 1980). Recent research on municipal solid waste management has focused on household participation and attitudes regarding recycling behaviour. Longe *et al* (2009) demonstrated that understanding behaviour is critical to minimizing municipal solid waste. They found that attitudes toward separation, reuse and recycling waste are one of the reasons for difficulties in waste management in Nigeria. However, in Nigeria, few studies have described and documented households' attitudes and practices toward solid waste management across States. Thus, this study examined the household attitudes and willingness to pay for solid waste management in the urban cities of Ogun and Oyo States, Nigeria.

Objectives of the Study

Based on the problem of interest of the study, the following objectives were formulated (1) describe the households' attitudes towards solid waste management in two southwest states,

Nigeria; (2) the households' willingness to pay for solid waste management.

Research Questions

- i. What is the level of awareness of solid waste management among households in the two South West States?
- ii. What is the households' attitude towards solid waste management in the two South West States?
- iii. What is the households' willingness to pay for solid waste management in the two South West States?

Methodology

A total of eight local government areas randomly selected from two states in the southwest Nigeria were used for the study. Ogun State is one of the federating thirty-six States in Nigeria. It is situated between Latitude 6.2°N and 7.8°N and Longitude 3.0°E and 5.0°E. It covers an area of 16,409.26 square kilometers of land area. It is bounded on the West by the Benin Republic, on the South by Lagos State and the Atlantic Ocean, on the East by Ondo State, and on the North by Oyo and Osun States. Four local government areas namely Ijebu-Ode local Government, Sagamu Local Government, Abeokuta South Local Government and Abeokuta North Local Government areas were randomly selected from the State.

Oyo State located on Latitude 8° and Longitude 4° East, like Ogun State was created in February, 1976 and covers a total of 28,454 square kilometers of land mass. Its capital at Ibadan is reputed to be the largest indigenous city in Africa, South of the Sahara. The State shares boundaries with Ogun State in the south and in the north by Kwara State, in the west is bounded partly by Ogun State and partly by the Republic of Benin while in the east it is bounded by Osun State. Its population was estimated at 6,617,720 (2005). Four local government areas carved out from the defunct Ibadan Municipal Government in 1991 namely Ibadan North Local Government, Ibadan North East Local Government Area, Ibadan North West Local Government and Ibadan South East Local Government areas were selected from Oyo State.

A structured questionnaire was used to collect the data. The questionnaire consisted of demographic information and items designed to measure attitude, and willing to pay for solid waste management. The attitude variable consisted of 13 items on 4-point Likert-type statements ranging from 1 (strongly disagree) to 4 (strongly agree) while the willingness to pay has 6 items on 3-point scale of Yes, No, don't know. The questionnaire was pre-tested on 30 households in a local government which are not within study area in order to determine reliability using the Cronbach alpha test. The results showed the scale to be reliable (13 items; $\alpha = 0.781$) for attitude sub-scale and the willingness to pay sub-scale (6 items; 0.712). This questionnaire was administered to eight hundred (800) households with one hundred per local government area. Only 783 were properly completed and were used for the analysis. Data collected were analysed using simple percentage.

The socio-demographic characteristics of respondents revealed that about 51 percent of the respondents are males while 49 percent are females. A deliberate attempt was made to balance the number of respondents' gender wise because the problem of solid waste management has no gender coloration. The mean age of the male respondents is 41 years. About 78 percent of the male respondents are less than 50 years. For the female respondents, the mean age is about 30 years and 85 percent of the female respondents are less than 40 years old. About 25 percent had no formal schooling. Less than 25 percent had at least completed secondary education. About 16.6 percent had post-secondary education/tertiary education. 5.5 percent completed primary education, while 2.7 percent of the respondents did not complete it. The indication is that there is low level of education among the people. On the ethnic composition of the respondents', the Yoruba's constitute 74.8 percent, while the other ethnic groups made up the rest of 25.2 percent. This is not deliberate but a clear reflection of the

composition of the states used. The two States are located in southwest, Nigeria which is predominantly occupied by the Yoruba ethnic group.

Results

All respondents expressed very serious concern about the problem of solid waste in their respective communities however only 40% of those surveyed perceived that the solid waste problem could be mitigated through its segregation at its point source. Majority of respondents (60%) surveyed strongly agree that the problem of solid waste can be mitigated better if segregation is accompanied with recycling. Fifty-six per cent of respondents' states that the community needs to practice waste segregation regularly. More than half (54%) of respondents perceived that instituting waste management measures are essential to help clean the community's environment.

Waste Disposal and Management Practices

Solid waste

In the two States, wastes are open dumping; uncontrolled landfills and open burning were commonly practices. Dumps sites are located along or beside major roads. In Ijebu-Ode, Ogun State, the dump site is along the Ore-Benin express road. In Oyo State, refuse spreads into the road, blocking traffic and the wastes are burnt open on the side of the road. There are also indiscriminate and illegal dumping of wastes in undesignated areas such as road verges, open spaces and alleys in cities. These methods of waste disposal make very uneconomical use of the available space, allow free access to waste scavengers, animals and flies and often produce unpleasant and hazardous smoke from slow-burning fires. Another waste management practices that was observed in both States is the dumping and burning of refuse in front or beside houses or commercial stores by residents. This practice is not restricted to... but also in designated government residential area.



Figure 1: Open dumpsite in Ogun State and waste left uncollected on the road media

E-waste

There is no conscious effort by the state and local government to properly dispose of e-waste. E-waste were collected and disposed along with other types of waste on uncontrolled dump sites and openly burn. It is also not uncommon to see in these areas bulb of Televisions and Computer monitors and other components of these used electronic items popularly call "*Tokunbo*" in drainages and refuse dump site located in some of the markets where these items are repaired and sold. This has resulted in a whole range of toxic substances released, which heavily contaminate the soil and water resources. In an informal conversation with some of the respondents especially those in the markets, they expressed ignorance of the health and environmental danger of improper disposal of e-waste. They are also unaware of how e-waste and hazardous waste can be treated and disposed.

Waste Separation and Recycling

Solid wastes are not separated in any forms in the cities thus affecting the effectiveness and efficiency of solid waste management in both States. The lack of separation of wastes makes the composition of wastes on both legal and illegal dumpsite to contain all types of wastes

including hazardous waste from hospital and industries. Although people reuse items at household level but not because they recognized it as a waste reduction and minimization strategy rather to get maximum benefit from it. It was observed that people mostly do not separate wastes at home since there is no awareness, knowledge, facilities, nor incentives to do so. They mixed up all waste in nylon bag or drum. However, few households separate of recyclable wastes such as plastics, bottles and metals which are sold to interested people, who again sell it to companies that need them. Furthermore, scavengers moved from street to street and dumpsites across the cities to pick up reusable and recyclable wastes and sell them to the recycling business outlets.

Waste collection and transportation

Street sweeping, collection and disposal of solid waste are primarily the responsibility of local government, while State government is responsible for the protection and conservation of natural resources and environment through the state environmental protection agencies. However, results from this study revealed that these responsibilities are not carried out as expected. Large tons of garbage was always left uncollected on the street after monthly

sanitation exercise in the States. Majority of households were dissatisfied with the service rendered by the local governments and private service providers recently involve by the State governments in the collection, disposal and tenement of solid waste. Outside the government approved private service provider, some households still engaged the services of informal cart pusher waste collectors who collect from house-to-house. The fees of these informal collectors are cheaper than government

approved private service providers. The collected wastes are transported in open truck and tippers without cover or protective guard with waste spilling along the road to the dumpsite.

Attitudes towards solid waste management

Table 4 shows the result of the respondents' attitudes towards solid waste management services and practices.

Table 4: Attitudes towards Solid Waste Management

	Strongly agree	Agree	Disagree	Strongly disagree
Solid waste management is one of the major environmental burdens	50.4	11.7	27.0	9.9
Improper disposal and management of wastes brings problems to public's health	46.8	62.1 9.9	36.0	36.9 7.2
Wastes are properly disposed off in the local government	29.7	56.7 19.8	41.4	43.2 7.2
Waste prevention is not my responsibility	13.5	49.5 8.1	35.1	48.3 43.2
Waste prevention is beneficial for society and environment	28.8	21.6 13.5	43.2	78.3 12.6
The quality of solid waste disposal service provided by private waste collectors is satisfactory	24.3	42.3 8.1	57.5	55.6 8.1
Open burning of refuse is dangerous to human health and environment	54.0	32.4 21.6	17.1	65.6 5.4
The 3R – reduce, reuse and recycle are important to waste management	58.5	75.6 9.9	20.7	22.5 9.0
Households should be encouraged to bury the waste instead of burning	49.5	68.4 7.2	34.2	29.7 6.3
Re-use of materials make life easy and safe cost	52.2	56.7 17.1	22.5	40.5 8.1
Waste prevention leads to better environment for present and future generations	43.0	69.3 26.1	14.4	30.6 14.4
Everybody should be responsible for waste prevention and management	50.4	69.1 16.2	23.4	28.8 10.0
It is governments responsibility to look after the environment address solid waste problems	22.5	66.6 50.4	17.1	33.4 10.0
		72.9		27.1

People's attitudes and behavior towards waste management policy and programme is a function of their expressed concern and perception about waste and waste management. Public concern and attitudes to waste is poor. About (62.1%) of the respondents agree that solid waste management is a major environmental burden, while (36.9%) disagree. Just a little over half (56.7%) of the respondents agreed that improper disposal and management of wastes brings problems to public's health, while a sizeable minority (43.2%) disagree, it seems likely that this disagreement indicates a lack of knowledge of implications of improper disposal of waste affect the public health. Only 49.5% agreed that wastes are properly disposed off in the local government against 48.3% who felt the wastes are not properly disposed off. As demonstrated in Table 4, 78.3% disagreed with the statement that "waste prevention is not my responsibility". This indicated that respondents seem conscious of the role in waste prevention. A higher propone (75.6%) of the respondents agreed that open burning of refuse is dangerous to human health and environment, while a quarter (22.5%) disagreed with the statement. Majority (68.4%) agreed that reduce, reuse and recycle are important to waste management and

(29.7%) disagreed. This suggests that households in the study areas are aware of the 3R principles as component of effective and efficient waste management. Also, (69.3%) of the respondents agreed that re-use of materials make life easy and safe cost and (69.1%) equally agreed that waste prevention leads to better environment for present and future generations. Only about one third (30.6%) and (28.8%) respectively disagreed with each of the statement. Over half (56.7%) stated that households should be encouraged to bury the waste instead of burning it.

The majority of the respondents' (66.6%) agreed (agree or strongly agree) that it is the responsibility of all a sundry to prevent and manage waste and a higher percentage (72.9%) agreed that it is governments responsibility to look after the environment and address solid waste problems. This suggests that the respondents are not sure whose responsibility.

Willingness to pay for solid waste management services

The result of the respondents' opinion on willingness to pay for solid waste management services and practices is shown on Table 5.

Table 5: Percentage analysis of respondents' willingness

	Yes	No	Don't know
I would be willing to pay higher fee to cover the cost of waste collection service.	508 (65.0)	129 (16.5)	146 (18.6)
I would be willing to make changes to my lifestyle choices in order to help reduce waste generated.	423 (54.0)	152 (19.4)	208 (29.6)
I would be willing to make changes to my consumption pattern in order to help reduce waste generated.	456 (58.2)	222 (28.3)	105 (13.4)
I would be willing to sort my waste before disposing them.	596 (76.1)	137 (17.5)	50 (6.4)
I would be willing to take part in the recycling programme.	580 (74.1)	178 (22.7)	25 (3.2)
I would be willing to make changes to my lifestyle choices in order to help keep the environment healthy.	365 (46.6)	118 (17.1)	300 (38.3)

Sixty-five percent of respondents expressed their willingness to pay and perhaps pay more for waste collection service only if there is going to be improvement in the service currently being provided. Over fifty percent i.e. (54.0%) were willing to change their lifestyles in order to reduce waste generation. About fifty-eight percent of the respondents from both States indicated that they are willing to change their consumption pattern to help reduce waste generated while about 28.3% said that they are not willing to change the consumption pattern. 74% of the respondents indicated that they are willing to take part in the recycling programme while about 22.7% of the respondents said that they are not willing to take part in the recycling programme. About 76.1 of the respondents declared their willingness to sort waste. Forty-six percent of the respondents declared their willingness to change their lifestyle for the sake of healthy environment.

Discussion

The aim of this study was to investigate households' attitude and willingness to pay for solid waste management in two southwest states, Nigeria. One of the findings from the study was that biodegradable waste constituted the bulk of the waste generated by the respondents across the study areas. This is consistent with most previous researches (Banjo, Adebambo and Dairo., 2009; Fakere, Fadairo, & Oriye, 2012; Napari and Cobbinah ,2014; Amasuomo, Tuoyo, and Hasnain, 2015) all reported that organic waste constituted the highest proportion of the waste.

Although, the study observed that households have positive attitude towards solid waste management. Majority of the respondents were unhappy and dissatisfied with the level of unhygienic nature of the environment. Almost previous studies reported that waste collection service is poor and there is no designated dumpsite accessible to households as such majority burn or illegally deposit them in open spaces, drainages, flood during rainfall, undeveloped land, and along the streets or roadsides. However, this result is inconsistent with Banjo, Adebambo and Dairo (2009);

Napari and Cobbinah (2014) both reported poor attitudes of residents towards environmental sanitation by extension waste management.

The results also indicate that wastes generated during the exercise are dumped indiscriminately on road median and roadside, this is because the local governments did not provide waste bins. Many previous studies have also reported similar findings. For instance, Imam, Mohammed, Wilson and Cheeseman, (2008) in a study in Abuja reported wastes dumped along roads, underneath bridges, in culverts and drainages. In a study in Akure, Nigeria (Fakere *et al.*, 2012) reported that majority of the respondents did not dispose their wastes properly. The state of refuse disposal is in the city was absurd and an eyesore. The non-challant disposition of the people towards indiscriminate dumping of refuse and delay in collection by the waste management authority compounded the situation. Yoada, Chirawurah, and Adongo (2014) study in Accra, is also consistent with this finding. Although, indiscriminate dumping was frequently done, the community expressed interest in controlling waste disposal through regular collection to dump sites.

The study also finds that no separation of waste was practiced by households in the study areas. The explanations that can be provided are that of lack of awareness and understanding of the importance of separating waste as component of waste management. Separation of waste from the source is an important aspect of effective and efficient waste management scheme in order to achieve zero waste. This result corroborated the findings of Amasuomo, *et al* (2015) and Otitoju (2014) found out that majority of the respondents (65%) in their study in Abuja, Nigeria do not separate their waste.

It was also found out that households are willing to pay and change their lifestyle for improved solid waste management. The finding was not different from the conclusion of Ezebilo (2013) and Anjum, (2013) indicated that majority of the surveyed households showed willingness to pay differing rates per month up to USD 1.85 for an improved solid waste management system in their respective areas.

Conclusion

This study has demonstrated to be valuable and informative on households' waste management practices in Ogun and Oyo States, southwest Nigeria. The study has helped to establish the attitudes of households to waste and waste management. It has revealed that waste management has much desire. Solid waste comprises of domestic waste, business and industrial waste, hospital waste, electronic waste, mechanical equipment, vehicle waste, and debris from construction activities. The study had clearly indicated that waste is generated by all stakeholders and is managed by the Government agencies or private waste collectors and lies beyond their capacity. The results showed that the households are ill-informed about various aspects of waste collection, disposal, reduction and recovery. There is little reuse and recycling of waste materials among households. They also possess attitudes and practices that are environmentally unacceptable or unfriendly. These results throw up some important challenges to solid waste management in the two states which include; public education aimed at educating households and service providers on waste separation, reduction, recycling, reuse in order to optimize the waste collection system; and effective institutional and policy framework.

Recommendations

The findings and conclusion call for the promotion of public education which should be geared toward educating households and service providers on waste separation, reduction, recycling and reuse in order to optimize the waste collection system and effective institutional and policy framework. Proper disposal of waste and exhibit environmentally friendly behaviour among the people cannot be achieved through law enforcement and implementation of policy and regulations alone. There is need for adequate education on the existing regulations, byelaws and other extant laws on environmental sanitation and management. This will put the people on their toes to follow the dictate of the law as it should be done.

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