

Willingness to Pay for Improved Solid Waste Management in Commercial Area of Sango, Ogun State Nigeria

Onukogu Humphrey Francisco¹, Mohd Rusli Yacob^{1*}, Abdullahi Adamu¹, Nur Ain Izzati Mohd Zainudin²

¹Department of Environmental Management,
Faculty of Environmental Studies
Universiti Putra Malaysia (UPM) Serdang, Selangor D.E Malaysia²
Biology Department, faculty of Science,
Universiti Putra Malaysia (UPM) Serdang, Selangor D.E Malaysia
Corresponding Author: Mohd Rusli Yacob

Abstract : Solid waste management is one of the current major threats to most of the major cities of the world. The objective of this study is to determine the willingness of vendors to pay for solid waste collection in the commercial area of Sango, Ogun State, Nigeria. Simple Random Sampling technique was employed on 200 vendors in the commercial area, and single-bound dichotomous choice contingent valuation questionnaire was administered to them using face-to-face method. The result of the study showed that 76.5% of the respondents were willing to pay for the waste collection while 23.5% were not willing to pay. The estimated willingness to pay amount was N1500 per month, and from the Logistic regression model, the variables that were significant determinants of WTP were; gender, income, years of education, shop ownership and the bid price. This outcome has significant policy implications for ensuring efficient and effective management of solid waste in commercial areas by exploring the application of economic instrument as tool for managing solid waste. The WTP amount estimated can be used by policy makers to determine the socially optimal price for solid waste collection services in commercial/market areas in Nigeria and other neighboring countries.

Keywords : CVM, Solid Waste, Ogun, WTP

Date of Submission: 13-11-2017

Date of acceptance: 02-12-2017

I. Introduction

Solid waste management is a daily routine that is continuous and never finished. As each day passes, it brings new tasks of streets to sweep, waste to collect, waste loads to haul and safely to dispose. Urbanization and solid waste generation are closely interrelated. In Africa, it is estimated that currently, the rate at which solid waste is growing in urban areas is much faster than the urbanization itself (Hoornweg & Bhada-Tata, 2012). As evidence has shown that the global populations of urban residence continue to grow significantly within the last decades, it was reported that with the about 30% of world population living in urban areas in 1950s, the figure is projected to reach 66% by year 2050 (United Nations, 2015).

According to world bank report, it was estimated that in year 2002, urban residents who were about 2.9 billion, produce 0.64 kg of waste per person per day and by the year 2012, this quantity increases to 1.2 kg per person per day by the urban population of about 3 billion. At present, it is anticipated that by year 2025 the total population of urban residents will rise to about 4.3 billion, who on average will generate 1.42 kg of waste per day (Hoornweg & Bhada-Tata, 2012).

The UN-HABITAT, (2008) postulated that the growth of urban areas in most of the African countries has not been in concomitant with expansion of economic activities and social amenities. Many cities in the continent were struggling to provide basic services such as shelter and water as well as maintaining a cleaner environment in the face of rapidly growing urban population (UN-HABITAT, 2008). As local economies develop, per capita waste generation also intensify in proportion to increase in production as well as consumption. Unfortunately, until recently many people in African countries including Nigeria, regard the concern for effective strategies for managing urban solid waste as a less important issue which may distract attention from the most urgent and serious problem of achieving a fast rate of economic growth. This attitude stems in part from the belief that environmental degradation with urban solid waste generation is an inevitable price of development (Uwadiogwu & Chukwu, 2013).

In Nigeria, solid waste management is primarily the responsibility of local authorities (Oguntoyinbo, 2012). Usually, the collection is often from the source or temporary dumping sites and disposed off finally in an open dumping site outside the city (Ziraba, Haregu, & Mberu, 2016). The ever increase in solid waste generation leads to increase in demand on existing solid waste management services which in many countries in

Africa, happens to be the single largest item that consume higher share of the budgetary allocation of the local authorities (Hoornweg & Bhada-Tata, 2012). The budgetary requirement for solid waste management in municipalities of developing countries is considerably higher. These commonly range between 20 to 50% of total municipal recurrent expenditures (Cointreau, 2005). With the increase in contracting private sector to manage the municipal waste, the recurrent cost of managing the MSW goes up, because of the need for reimbursement of the contracting companies for the capital investment they made.

Municipal solid waste is divided into two basic categories; the residential or household waste and commercial. The residential/household waste generally includes that type of waste such as garbage generated from households, whereas the commercial waste comprises of waste generated from commercial centers such as markets, malls, and corner shops mainly from commercial activities (Badran & El-Hagggar, 2006). Commercial waste is any waste generated as a result of carrying out a business, including associated lawn and garden clippings from normal maintenance of the business premises. Commercial waste also includes rubbish produced by your customers such as; food wrappers and containers (Counsel, 2013).

Commercial waste consists of waste from premises used mainly for the purposes of a trade or business or for the purpose of sport, recreation, education or entertainment, but excluding household, agricultural or industrial waste Magutu et al., (2010), defined Municipal Solid Waste (MSW) as solid waste that includes all domestic refuse and non-hazardous wastes from commercial, institutional, street sweepings and construction debris. Badran and El-Hagggar, (2006), define municipal solid waste as a general term that encompasses all waste materials except hazardous waste, liquid waste and atmospheric emissions. According to (OECD, 2008), municipal solid waste is defined as that type of waste collected and treated by, or for municipalities. This includes waste from households, bulky waste, similar waste from commerce and trade, office buildings, institutions and small businesses, yard and garden, street sweepings, contents of litter containers, and market cleansing. Waste from municipal sewage networks and treatment, as well as municipal construction and demolition is excluded.

1.1 Solid Waste Management in Nigeria

Municipal solid waste management is a serious concern Nigeria. Right from the collection, transportation and disposing of municipal solid waste. This causes grave challenges to many developing countries. The problems faced result from inappropriate planning by waste management authorities, inadequate governance, lack of resource availability and ineffective management in rapidly growing cities of the developing countries (Nkansah, Dafor, & Essel-Gaisey, 2015). The imperfect strategies and measures commonly adopted for municipal solid waste management in most of the cities in Nigerian create the wrong impression that solid waste management problems are daunting and intractable task. This came from the simple fact that the rate at which solid waste collection and subsequent disposal is done is in no way closer to the rate of waste generation. This makes solid waste accumulation become a one of the major environmental nuisance in most cities in Nigerian (Uwadiogwu & Chukwu, 2013).

The huge volume of solid wastes that are commonly visible in most of the roads and streets of our major cities in Nigeria is an indication that the current adopted strategies to cope with the unavoidable byproducts of development appeared to be ineffective. However, most of the municipalities maintain the ineffective traditional solid management approach which does not provide visible result. Hence the need for new economically viable, socially acceptable as well as environmentally sound policy approach that would encourage the participation and involvement of the public as key stake holders in solid waste management. It has been observed from the existing literatures that little attention is given to the solid waste management in many major Nigerian cities. What makes matters worse is the fact that most of the studies on solid waste management in Nigeria have centered primarily on classification of municipal solid waste, its environmental impacts and consequences waste generation and recycling (Uwadiogwu & Chukwu, 2013). Unfortunately, little work has yet been carried out to address the key issues of effective waste management strategies in Nigerian cities, as solid waste management issue is commonly viewed as problem that appear to defy all policy options. This study is therefore aimed to bridge this identified literature gap by focusing on exploring the willingness of vendors to pay for solid waste management in a commercial area of Ota, Ogun state in south-western Nigeria.

1.2 Willingness to pay for solid waste management services and its Determinants

The CVM is a survey-based technique of monetary valuation used to elicit peoples preferences expressed in terms of willingness to pay (Venkatachalam, 2004). Willingness to pay (WTP) is the maximum amount a person would desire to pay, exchange or sacrifice for any commodity, good or item (Ahmad, 2014). CVM is an approach developed by economists to value non-marketed public goods and particularly to estimate the value of improvements or damage to environmental amenities. In contrast to private goods, public goods are not traded directly in any market and thus do not command a market price (Carson, Flores, & Meade, 2001).

The theoretical basis of CVM used in this study is the equivalent surplus (ES) measure of welfare, which measures the amount a person is willing to pay or accept to place him on a better utility or welfare level if changes in quality of goods in question do not occur (Mohd Rusli, Alias, & Shuib, 2009). CVM is a method that provides individuals with the opportunity to purchase public goods under hypothetical situations, especially in the absence of real market or existing information concerning the real market scenario (Adamu, Yacob, Radam, & Hashim, 2015). Furthermore, the absence of markets means that the quantity desired by consumers or their preferences cannot be directly observed (Mohd Rusli et al., 2009). The choice of suitable economic instruments like the CVM in measuring people's willingness to pay is often viewed as an ideal way of developing sound management policies that would help to generate more funds (Adamu, Yacob, Radam, Fallah, & Danladi, 2017).

Several studies have been conducted in different part of the world on willingness to pay for solid waste management service using CVM technique. The results of the studies revealed significant factors determining willingness to pay for improved solid waste management (collection and disposal). For instance, Nkansah, Dafor, and Essel-Gaisey, (2015) conducted study on solid waste disposal in Tema metropolis Ghana. Their study outcome indicated that age, educational level, number of dependents, income, size of household and distance to the refuse dump were important in explaining the willingness to pay for solid waste disposal. Another study conducted by Awunyo-Vitor, Ishak, & Seidu Jasaw, (2013), in order to determine Willingness to Pay for Improved Solid Waste Disposal Services in Kumasi Metropolis, Ghana, the logistic model result shows that income, age, number of children, quantity of waste generated, and education have significant effects on the willingness to pay.

The findings of Sizya, (2015), who examine Inter - Household Willingness to Pay for Solid Waste Management in Mwanza City , Tanzania indicated that the factors influencing WTP were; environmental knowledge, secondary education, post vocational, primary education and income of respondents. A study conducted in South-Eastern Nigeria also showed that WTP was influenced by marital status, house hold size and income (Oyawole, Ajayi, Aminu, & Akerele, 2016). Yusuf, Ojo, and Salimonu, (2007) conducted a study on WTP for improved household solid waste management in Oyo State, Nigeria. The findings revealed that the mean willingness to pay of households for improved solid waste management is N1240.92. Majority of empirical studies on the willingness to pay for improved waste collection and disposal system showed that the variables that mostly influence WTP for improved waste management are; age, household size, sex, marital status, education and household expenditure, quantity of waste generated, marital status and household size.

II. Methodology

2.1 Study area

Sango Ota in Ogun State is one of the major cities in the South Western Nigeria (Fig.1). Currently, it has an estimated population of 669,886 (based on the 2006 census data, with a growth rate of 3.5%). The Local Government Area is the most populated of all the 20 LGAs in the State. Ota is also one of the industrial hubs with the highest concentrations of industries in Nigeria. It accommodates several hundred industries which include food, beverages and tobacco; pulp and paper products; chemical and pharmaceuticals; metallurgy; gas; plastics; wood processing; and non-metallic mineral products (Omole, Emenike, Tenebe, Akinde, & Badejo, 2015).

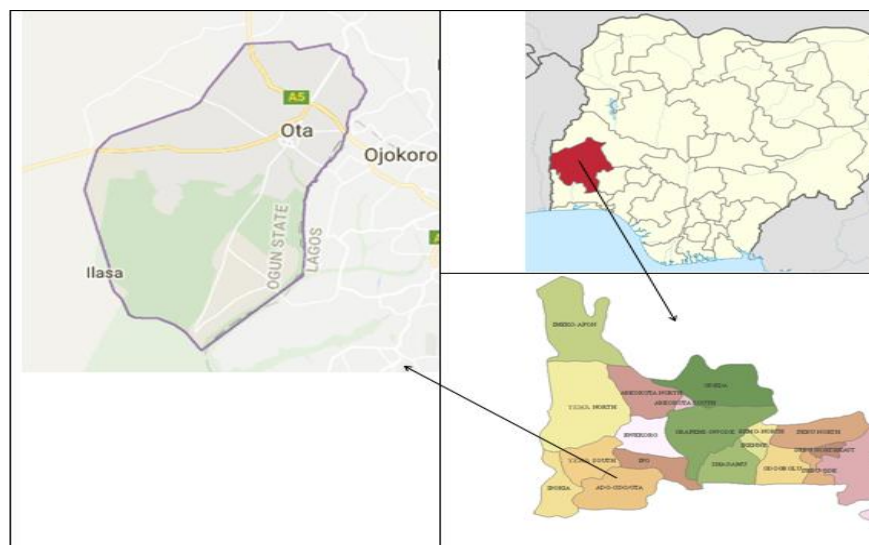


Figure 1Map of Ogun State showing Ado-Odo/Ota Local Government Area

2.2 Sampling Design

This study was carried in commercial area of Sango, Ogun State. The study population comprised of the vendors/traders in the commercial area. It is estimated that, there are more than 400 business premises in the area. This forms the population of the study in which the sample size was determined using Krejcie and Morgan, (1970) Table of Sampling size. Total of 200 samples were drawn using simple random sampling technique based on shop/ stall number. Questionnaire was administered to the shop owners or shop keepers by means of face-to face method of data collection, as it is recommended as the superior and reliable method for data collection (Arrow et al., 1993). The CVM hypothetical market scenario and the essence were explained to them in order to reduce strategic bias. The valid responses obtained were analyzed using econometric computer software (NLOGIT 4.0).

2.3 Econometric Model Specification and Procedures

The WTP of the vendors was determined by estimating their demand function that is based on the theory of utility maximization. In this case, the vendors are believed to have the option of accepting or rejecting a proposed waste collection service improvement fee offered to them as bid price so as to maximize their utility as seen in the equation;

$$u(1, Z - M; E) + \varepsilon_1 \geq u(0, M; E) + \varepsilon_0 \tag{1}$$

Where u is the indirect utility function, Z is the average annual income, M is the waste collection fee, E represents to the socio-economic features of the vendors. ε_1 and ε_0 are identically distributed random variables with zero means. The probability (P_i) that a vendor will accept a specified amount (M) can be represented in the following equation:

$$P_i = \frac{1}{1 + \exp\{-(\alpha - \beta \cdot M + \gamma \cdot x)\}} \tag{2}$$

Where α is a constant, β refers to the coefficient of the bid price variable F , x is the vector of other explanatory variables that influences the response and γ is the vector of the corresponding slope. And the mean WTP was estimated using the following equation:

$$\text{Mean WTP} = \frac{\beta_0 + (\sum \beta_n X_n)}{-\beta_1} \tag{3}$$

III. Result And Discussion

3.1 Socio-Economic Characteristics

The socio economic profile of the respondent as presented on Table 4.1 shows that based on gender, respondents' distribution shows that male were 77.5% while their female counter part were 22.5%. On respondents' age, it ranges between 18 and over 56 years old those who aged were 18-25 years old were 23.0% while the older respondents (56 years and above) were 8.0%, with mean age =35 years. In terms of education level, it was found that 24.5% have reported to have never been to school, 20.5% attended only primary, 40% secondary school while the remaining 15.0% had reported to have university degree. About ownership of the business premises, only 24.5% were the actual owners of the shop while the remaining 74.5% were only shop attendants. Percentage of respondent based on business type shows cosmetics has 21.0%, food items 37.0%, electronics 28.5%, fruits and juice 11.0% and others were 2.5%. Moreover, gross monthly income of the respondents was obtained as those with income within the range of 10,000-20,000 were 43.5%, 21,000-30,000 income bracket were 30%, while those who earn 31,000-40,000 were 20.5%. Only 4.5% earn between 41,000-50,000, while those who earn between 51,000 above constituted only 1.5%.

Table 1. Socio-Economic Characteristics of the Respondents

Element (n=200)	Freq.	Percentage (%)
Gender		
Female	45	22.5
Male	155	77.5
Age		
18-25 years	46	23.0
26-35 years	53	26.5
36-45 years	59	29.5
46-55 years	26	13.0
56 years above	16	8.0
Shop Ownership		
Not owner	151	75.5
Owned	49	24.5
Educational level		
Never been to school	49	24.5
Primary	41	20.5
Secondary	80	40.0

	Tertiary	30	15.0
Business Type			
	Cosmetics	42	21.0
	Food items	74	37.0
	Electronics	57	28.5
	Fruits and Juices	22	11.0
	Others	5	2.5
Gross monthly income (Naira)			
	10,000-20,000	87	43.5
	21,000-30,000	60	30.0
	31,000-40,000	41	20.5
	41,000-50,000	9	4.5
	51,000 above	3	1.5

3.2 The Contingent Valuation Results

This section deliberates on the CVM models used in order to estimate the mean WTP for solid waste collection. The study based its approach on the theoretical framework suggested by Cameron, (1988) on how to obtain the welfare estimates of willingness to pay. Also, a linear relationship between an individual’s WTP and the explanatory variables.

3.2.1 Probability of Willingness to Pay Response

Cross tabulation was done to examine the association between the willingness to pay responses (Yes or No) and the various bid prices used in the study (Table 2). From the total vendors interviewed, about (76.5 %) were willing to pay by responding “Yes” to the various bids price, while the remaining 72 (23.5%) responded “No”. For initial bid price, response to the initial bid price offered (₦ 1000) was that 36 (90.0%) respondents “yes”, 4 (10%) choose “No”. The second bid amount (₦ 1100) have 33 (82.5%) who chose “Yes” to it, and the remaining 7 (17.5%) chose “No” to the bid price. For the third bid price, (₦ 1200), “yes” responses was 31 (77.5%), whereas “No” response were 9 (22.5%). The fourth bid price offered was ₦ 1300 and 29 (72.5%) voted “yes” while 11 (27.5%) voted “No” to it. The last bid price (₦ 1400) had 24 (60.5%) as “yes” response and 16 (39.5%) selecting “No” option. The responses indicated that as the bids price increases, the willingness to pay decreases which is in line with economic theory of demand.

Table 2. Willingness to pay Probability of the Respondents

Bid Amount	Yes		NO		Total
	Freq.	%	Freq.	%	
1000.00	36	90.0	4	10.0	40
1100.00	33	82.5	7	17.5	40
1200.00	31	77.5	9	22.5	40
1300.00	29	72.5	11	27.5	40
1400.00	24	60.5	16	39.5	40
Total	153	76.5	47	23.5	200

3.2.2 The Logit Regression Model Result

The variables used in the model were evaluated for their statistical significance, using logit regression method. In order to ensure the best possible model, only those variables that were significant were reported. The best model was the model that all the variables in it were significant and with best fit.

The essence of Logit regression here was to investigate the influence of the explanatory variable on the mean willingness to pay. In accordance with many CVM studies, variables such as gender, respondents’ age, years of education, and income level were the usual and important determinants of WTP. In present study, (Table 3) shows that the variables that were significant includes; gender, income, years of education shop ownership and the bid price which has the expected priori sign. Respondents’ income is another important variable that influences respondent’s willingness to pay. It was significant at 1% confidence level and with positive sign as expected. The coefficient weight value was .00017, indicating an increase in probability of WTP as income increases. The respondents’ level of education (EDU) was also another important variable that has effect on willingness to pay. It was statistically significant at 5% confidence level. As expected, it has a positive sign, with weight value of .1311. The positive sign suggests that, the respondent with higher education had higher probability of willingness to pay compared to those with lower level of education. This outcome is in agreement with previously reported study such as Nkansah, Dafor, and Essel-Gaisey, (2015) and Sizya, (2015).

For respondents’ age (AGE), it was found to be statistically significant at 1% confidence level, with positive sign coefficient and weight value of .0986. This result implies that older respondent were more likely to pay than the younger ones. It means that as the age increase, the probability of WTP also increases Influence of

age on WTP was also reported by Awunyo-Vitor, Ishak, & Seidu Jasaw, (2013). Gender (GEN) also plays significant role in the model. It was statistically significant at 5% level of confidence but with negative sign coefficient. The weight of the coefficient was -1.7205, indicating the strength of the variable in predicting WTP. The result indicated that the negative sign here means women were more willing to pay than men, as men were coded 1, while women were coded 0 in the data set. Influence of gender on WTP was reported in several studies; however, the results are mixed.

The last variable in the model was the shop ownership. This variable was included in the model to see the effect of ownership in predicting WTP. As expected, it was found to be statistically significant at 5% confidence level and with coefficient weight value of 2.3324. This weight value is the highest in the model which means that it was the most important and strongest predictor of willingness to pay in the model. The variable was also used as Dummy in the model, where shop owners were coded 1 and sales representative (known as shop keepers) were coded 0. This result indicated that those who own the shops have higher probability of willingness to pay compared to those who were not the real owners of the shop. This can be prove as shop owners would be more likely to pay due to the feeling of sense of ownership than those who were just employed to work in the shop. The result of the model shows that the bid price variable was statistically significant at 1% level of confidence, but with negative coefficient and weight value of -.0103. As expected, the negative sign signifies that the variable had inverse relationship with the WTP. The outcome shows that the higher the bid amount offered, the less likely the respondent were to agree to pay for the waste collection.

Table 3.3 Logit Regression Models

Variable	Coefficient	Standard Error	b/St.Er.	p-value
Constant	7.43360650	2.19638426	3.384	.0007
AGEYEAR	.09861977	.02402692	4.105	.0000
GEN	-1.72057628	.63135888	-2.725	.0064
EDUYRS	.13118790	.04920147	2.666	.0077
INCOME	.00017268	.386113D-04	4.472	.0000
SHOP_OWN	2.33246507	.96411856	2.419	.0156
BID PRICE	-.01026088	.00210026	-4.886	.0000
Number of observations	200			
Number of parameters	7			
Percentage Correct Pred.	83.5%			
Log likelihood function	-61.46901			
McFadden Pseudo R-squared	.436			

IV. Willingness to Pay Estimation

As earlier stated, the Cameron method was used in estimating the respondents' willingness to pay solid waste collection. This method produces individuals' mean value for willingness to pay which was derived using the following equations; Mean WTP = $\beta_0 + (\beta_{SHOP} * SHOP + \beta_{GENDER} * GENDER + \beta_{INC} * INC + \beta_{EDU} * EDU + \beta_{AGE} * AGE) / \beta_{BID}$ Substituting the values of the parameters into the equation, the mean WTP was estimated at ₦ 1490.54 per shop, approximately ₦ 1500.

V. Conclusions

The outcome of this analytical research study like many CVM studies have shown as interested result with policy implication on solid waste management systems in commercial areas. It provides a comprehensive analysis of key stakeholders' role (Vendors) in management of solid waste. It is undisputable fact that solid waste management involves a many different stakeholders, with different needs. They all play a role in shaping the solid waste management system. Understandings on the role of each stakeholder and the responsibilities they have formed an important component of efficient and effective solid waste management system.

Solid waste management is a multi-faceted task that requires multi-dimensional approach. This study indicated that an efficient waste management system does not only depend on technical, legal and institutional measures, but also linkages between them with social and economic solutions that would enable the overall system to function. This study provides a policy suggestion that the service charges for solid waste management should be based on respondents' willingness to pay amount. This means that service charges should be set at a level that would capture the real value placed by the respondents which will discourage illegal dumping. Finally, this study like many others is not without some limitations. As it was primarily conducted in commercial area of a municipality in Nigeria, the study outcome may not be a representative of the city, or the state as it focuses only on commercial area. Therefore, extending the study to the households in other parts of the state is highly recommended in future study for generalization.

References

- [1]. Adamu, A., Yacob, M. R., Radam, A., Fallah, M., & Danladi, M. H. Local People's Attitude and Willingness to Pay for Conservation in Yankari Game Reserve Bauchi, Nigeria. *International Journal of Ecology and Environmental Sciences*, 43(2), (2017).143–153.
- [2]. Adamu, A., Yacob, M. R., Radam, A., & Hashim, R.. Factors Determining Visitors' Willingness to Pay for Conservation in Yankari Game Reserve. *International Journal of Economics and Management*, 9(s), (2015) 95–114.
- [3]. Ahmad, I. PAKISTAN INSTITUTE OF DEVELOPMENT ECONOMICS PIDE WORKING PAPERS Capturing Willingness to Pay and Its Determinants for Improved, (2014) (September).
- [4]. Arrow, K., Solow, R., Portney, P. R., Leamer, E. E., Radner, R., & Schuman, H.. Report of the NOAA Panel on Contingent Valuation. In NOAA Panel Report (1993) (pp. 4601–4614). Washington, DC: US Federal Register.
- [5]. Awunyo-Vitor, D., Ishak, S., & SeiduJasaw, G.. Urban Households' Willingness to Pay for Improved Solid Waste Disposal Services in Kumasi Metropolis, Ghana. *Urban Studies Research*, (2013), 1–8. <http://doi.org/10.1155/2013/659425>
- [6]. Badran, M. F., & El-Haggar, S. .. Optimization of municipal solid waste management in Port Said - Egypt. *Waste Management*, 26(5), (2006)534–545. <http://doi.org/doi.org/10.1016/j.wasman.2005.05.005>
- [7]. Cameron, T. A. (1988). A new paradigm for valuing non-market goods using referendum data: Maximum likelihood estimation by censored logistic regression. *Journal of Environmental Economics and Management*, 15(3), 355–379. [http://doi.org/10.1016/0095-0696\(88\)90008-3](http://doi.org/10.1016/0095-0696(88)90008-3)
- [8]. Carson, R. T., Flores, N. E., & Meade, N. F.. Contingent Valuation : Controversies and Evidence. *Environment and Development Economics*, 19, (2001)173–210.
- [9]. Cointreau, S.. Finance for Solid Waste Systems in Developing Countries(2005).
- [10]. Counsel, P.. Waste Reduction and Recycling Act 2011, (November), (2013)8–10.
- [11]. Hoornweg, D., & Bhada-Tata, P.. What a Waste: A Global Review of Solid Waste Management(2012).
- [12]. Krejcie, R. V., & Morgan, D. W.. DETERMINING SAMPLE SIZE FOR RESEARCH ACTIVITIES. *Educational and Psychological Measurement*, 38, (1970) 607–610.
- [13]. Magutu, P. O., Mbeche, I. M., Nyamwange, O., Mwove, N., Ndubai, R. E., & Nyaanga, R. O.. Formulation and Implementation of Operation Strategies Used in Solid Waste Management : Case Study of City Council of Nairobi, 2010, (2010)1–21.
- [14]. MohdRusli, Y., Alias, R., & Shuib, A.. A Contingent Valuation Study of Marine Parks Ecotourism : The Case of PulauPayar and PulauRedang in Malaysia. *Journal of Sustainable Development*, (2009)95–105. Retrieved from <http://ccsenet.org/journal/index.php/jsd/article/viewFile/3012/>
- [15]. Nkansah, E., Dafor, N. K., & Essel-Gaisey, F.. Willingness to pay for improved solid waste disposal in Tema metropolis Ghana. *UDS International Journal of Development*, 2(1), (2015)116–127.
- [16]. OECD. (2008). OECD Environmental Data - Waste.
- [17]. Oguntoyinbo, O. O.. Informal waste management system in Nigeria and barriers to an inclusive modern waste management system : A review. *Public Health*, 126(5), (2012)441–447. <http://doi.org/10.1016/j.puhe.2012.01.030>
- [18]. Omole, D. O., Emenike, C. P., Tenebe, I. T., Akinde, A. O., & Badejo, A. A.. An assessment of water related diseases in a Nigerian community. *Research Journal of Applied Sciences, Engineering and Technology*, 10(7) (2015).
- [19]. Oyawole, F. P., Ajayi, O. P., Aminu, R. O., & Akerele, D.. Willingness to pay for improved solid waste management services in an urbanizing area in South-East Nigeria. *Ethiopian Journal of Environmental Studies and Management*, 9(6).(2016)
- [20]. Sizya, R. R.. Analysis of Inter - Household Willingness to Pay for Solid Waste Management in MwanzaCity , Tanzania. *Journal of Resources Development and Management*, 4(70), (2015)57–67.
- [21]. UN-HABITAT, H. S. P. State of the World's Cities 2010/2011: Bridging The Urban Divide. London: (2008).Earthscan Publications Ltd, London.
- [22]. United Nations, of E. and S. A.. World Urbanization Prospects: The 2014 Revision.(2015)
- [23]. Uwadiogwu, B. ., & Chukwu, K. .. STRATEGIES FOR EFFECTIVE URBAN SOLID WASTE MANAGEMENT IN NIGERIA. *European Scientific Journal*, 9(8), (2013)296–308.
- [24]. Venkatachalam, L.. The contingent valuation method: a review. *Environmental Impact Assessment Review*, 24(1), (2004)89–124. [http://doi.org/10.1016/S0195-9255\(03\)00138-0](http://doi.org/10.1016/S0195-9255(03)00138-0)
- [25]. Yusuf, S. A., Ojo, O. T., & Salimonu, K. K.. Households' willingness to pay for improved solid waste management in Ibadan North local government area of Oyo state, Nigeria. *Journal of Environmental Extension*, 6.(2007)
- [26]. Ziraba, A. K., Haregu, T. N., & Mberu, B.. A review and framework for understanding the potential impact of poor solid waste management on health in developing countries. *Archives of Public Health*, 74(55), (2016)1–11. <http://doi.org/10.1186/s13690-016-0166-4>

Onukogu Humphrey Francisco" Willingness to Pay for Improved Solid Waste Management in Commercial Area of Sango, Ogun State Nigeria." *IOSR Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT)*, vol. 11, no. 11, 2017, pp. 82-88.