



**IMPACT OF SOCIO ECONOMIC CHARACTERISTICS ON HOUSEHOLDS SOLID
WASTE STORAGE AND PRIMARY COLLECTION PRACTICE**

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ABSTRACT

Solid waste storage and primary collection should be expected to vary with different socio-economic characteristics due to many environmental and social factors. This paper reports the assessment of solid waste storage and primary collection practice based on four socioeconomic characteristics of respondents; education, occupation, income of the household head and household size. A questionnaire survey was conducted in the study area to 200 households by systematic random sampling technique to identify the four socioeconomic characteristics that may affect solid waste storage and primary collection practice at household level. Multiple linear regressions analysis was used via SPSS 25.0 to determine the impact of socio economic characteristics on solid waste storage and primary collection practice. Through this analysis the impact of a multiple independent variables (household size, educational level, occupation and income) on the dependent variable (solid waste storage and primary collection practice) was explored as well as the impact of each independent variable on the dependent variable. The study found that there is high positive correlation ($R = 96.8\%$, $R^2 = 93.6\%$ and $AR = 93.5\%$) between solid waste storage and primary collection from households which is the dependent variable and the four socio economic characteristics which are the independent variable. Educational level has a negative coefficient (-0.167) even though there is significant relationship between educational level and solid waste storage and primary collection ($p < 0.05$) while the income of the respondent has the highest impact (0.625). There is generally a significant relationship between the dependent and independent variables ($p = 0.01 - 0.00$). Recommendations for

considerations of income and household size in management of solid waste storage and primary collection system were given.

Keywords: *Socio economic characteristics, solid waste storage, solid waste primary collection.*

INTRODUCTION

After solid waste generation at household level, the next step is storage and primary collection of waste from the point where the waste is stored by the households; these collection points could be located outside each individual household or inside the house at a corner to a communal container serving a number of households or to a transfer station or final disposal site (Singh *et al.*, 2014). Primary collection is the emptying of storage containers in households and within or around the settlement area and transportation of the collected waste to the disposal facility or treatment plant (Batagarawa, 2011).

LITERATURE REVIEW

Solid waste collection is difficult, complex and costly, in fact collection of solid waste typically consumes 60-80 percent of the total solid waste budget of in most developing countries and have the greatest impact on human health (UNHABITAT, 2010: 11; Singh *et al.*, 2014). Collection rates across the continent range from 20 to 80% (ADB, 2002). Therefore, any improvement in the collection system can reduce overall cost and efficiency of a solid waste management system significantly (ADB, 2002). Much of the problems facing solid waste management in developing countries have to do with the methods of waste collection and disposal. Ineffective solid waste storage and primary collection systems often lead to waste accumulation, creating nuisance and odour problems, environmental pollution, fire hazards and generally threatening the physical well-being of the populace (Ezeah, 2010). Collection is a key link in the chain of SWM from the point of generation to ultimate disposal. In any initiative to upgrade waste management service sustainable and contextually, appropriate collection should be a major focus of attention (Ezeah, 2010).

The most common collection method is the communal collection method and door-to-door collection method in most developing countries (Ezeah, 2010; Singh *et al.*, 2014; Aliu *et al.*, 2014). The communal collection method is a system in which communal dumpsites are established and each household is required to transport and deposit their refuse there. From there, municipal vehicles load the waste and evacuate them to final processing and disposal sites (Imam *et al.*,

2008). The collection from the communal collection centers is the sole responsibility the municipal government (Agunwamba, 1998; Aliu *et al.*, 2014) and is mostly practiced in areas where access is constrained. The communal collection centers may be in built up structures or open space within the neighborhood or by the road side (Imam *et al.*, 2008; Ezeah, 2010). In many cases inadequacies in design and location of communal collection points compel some residents to either misuse or not to use communal collection facilities at all (Ezeah, 2010).

The door- to-door collection method on the other hand, is characterized by the use of vehicles to collect waste from house to house at regular intervals to disposal sites (Abdullahi *et al.*, 2008; Aliu *et al.*, 2014). This method needs a minimum disbursement of manpower and equipment as well as accessibility and where these are not readily available the system may readily collapse (Ezeah, 2010).

Other methods of solid waste collection available in literature, although not so commonly used are:

1. Block collection- The collection vehicles arrive at a particular place on a set day and time to collect waste from the households. Households bring their waste containers and empty directly into the collection vehicle. This method requires higher homeowner cooperation and scheduled service for homeowner cooperation.
2. kerbside collection – The homeowner is responsible for placing the containers to be emptied at the curb on the collection day and for returning the empty containers to their storage location until the next collection (Agunwamba, 1998; Abdullahi *et al.*, 2008; Imam *et al.*, 2008;).

METHODOLOGY

This study was carried out in Bauchi metropolis, the administrative headquarters of Bauchi state in north eastern region of Nigeria. The town which is located on latitude 9.3° and 12.3° North of the Equator and longitude 8.5° and 11° East of the Greenwich Meridian currently covers an area of over 44,259.01 km², representing about 5.3% of the landmass of Nigeria (Adada, 2006) and according to the 2006 National Population Census, (NPC, 2006), Bauchi metropolis is a home to over 421,187 residents of the 653,596 populations of Bauchi local government. Bauchi town is the home of Hausa and Fulani tribes who occupy the indigenous core area. Other tribes such as Yoruba, Igbo, Jarawa, Sayawa etc are also found in the metropolis. In Bauchi metropolis there are 12 wards, 6 wards

are high residential density areas, 3 are within medium residential densities while 3 are within low residential density.

Data for this study were obtained from primary source. The data were obtained through questionnaire administration; information was sought out on the socio-economic attributes of the respondents in the residential densities and existing primary collection, transportation and disposal. Relevant literature on solid waste generation, storage, primary collection, transportation and disposal were also reviewed.

The wards and indeed the house in the study area constitute the sampling frame. The metropolis was divided into residential densities namely high, medium and low residential density zones. The demarcation into wards was done with the aid of Urban Land use map of Bauchi urban development board. The metropolis is divided into 12 wards, out of which 6 wards are within the high residential density areas, 3 are within medium residential densities while 3 are within low residential densities. Two wards were randomly selected from high residential density zone and one ward from each of the medium and low residential density by tossing. A total of 4 wards were therefore, randomly selected. The wards selected are, Nassarawa and Dan amar, which are in high residential density zone. The other two are Fadaman mada and New GRA in medium and low residential density zones respectively. Similarly, systematic random sampling technique was also used for selecting the houses for the administration of questionnaire to the household head or his representative and one out of every ten houses was selected. 50 questionnaires were administered in each ward selected. In all, a total of 200 copies of questionnaire were administered to 200 households head in the study area.

The data collected through this medium was analysed by descriptive statistical analysis using table of frequency and inferential statistics (multiple regression) in SPSS 25.0 software.

RESULT AND DISCUSSION

Socio economic characteristics of respondents

The socio-economic characteristics of the respondents in the study area captured household size, educational qualification, occupation and monthly income. This to provide a background of the respondents and a basis for solid waste storage and primary collection practice.

Table 1 Socio Economic Characteristics of Respondents

<i>Socio economic characteristics</i>	<i>Number of Respondents</i>	<i>Percentage</i>
<i>Household Size</i>		
<i>1-5</i>	33	17
<i>6-10</i>	63	31
<i>11-15</i>	45	23
<i>16-20</i>	36	18

<i>Above 20</i>	23	11
<i>Total</i>	200	100
Education	Number of Respondents	Percentage
<i>No Education</i>	10	5
<i>Non formal</i>	51	26
<i>Primary</i>	23	11
<i>Secondary</i>	59	30
<i>Tertiary</i>	57	28
<i>Total</i>	200	100
Occupation	Number of Respondents	Percentage
<i>Farmers</i>	18	9
<i>Civil servant</i>	124	62
<i>Trading/business</i>	34	17
<i>Private employee</i>	24	12
<i>Total</i>	200	100
income per month	Number of Respondents	Percentage
<i>Below N20,000</i>	60	30
<i>N21,000-N41,000</i>	45	22
<i>N42,000-N63000</i>	34	17
<i>N64,000-N84,000</i>	40	20
<i>Above N84,000</i>	21	11
<i>Total</i>	200	100

Source: Field Survey (2016)

The result in the table 1 shows that majority (73%) of the respondents had large household size (6 to above 20 persons) and this is similar to the findings of Bogoro (2011). With large household's size, it is possible to expect more waste generation that may require bigger storage containers and may affect the primary collection practice. Along the same line, a greater percentage (95%) of the population are literate with at least a non-formal education qualification to tertiary level. Good literacy level may ease the possibility of accepting new changes.

With regard to occupation majority of the respondents engage in white collar jobs because 50% are civil servants. The monthly income of the respondent is generally low, 52% are low income earners (income 4000 naira and below) and 11% are high income earners (above 84000 naira).

The house hold sizes, levels of education, types of occupation people engage in and the monthly income may all affect the waste management practices of individual households and subsequently the obtainable practices in the wards.

Impact of Socio Economic Characteristics On Solid Waste Storage and Primary Collection Practice

Table 2 shows the overall impact of socio economic characteristics of the respondents on their solid waste storage and primary collection practice. There is high positive correlation ($R = 0.968$, $R^2 = 0.936$ and $AR = 0.935$) between solid waste storage and primary collection from households which is the dependent variable and the four socio economic characteristics which are the independent variable.

Table 2 Impact of socio economic characteristics on solid waste storage and primary collection practice

<i>Material</i>	<i>Unstandardized Coefficients</i>		<i>Standardized Coefficients</i>	<i>T</i>	<i>Sig.</i>
	<i>B</i>	<i>Std. Error</i>	<i>Beta</i>		
<i>Hhold Size</i>	.175	.049	.246	3.539	.001
<i>Educational Level</i>	-.120	.035	-.167	-	.001
<i>Occupation</i>	.323	.047	.282	6.840	.000
<i>Income</i>	.418	.044	.625	9.420	.000

Dependent Variable: Solid Waste Storage and Collection. $R = 0.968$, $R^2 = 0.936$, Adjusted $R = 0.935$

This implies that an improvement in the socio-economic variable may make a positive impact in storage and primary collection practice. It should however be noted that educational level has a negative and least coefficient (-0.120) and it implies that the predictive power of educational level is reduced by -0.120 on the dependent variable even though there is significant relationship between educational level and solid waste storage and primary collection ($p < 0.05$) while the income of the respondent has the highest impact (0.418) at p-value 0.00. There is generally a significant relationship between the dependent and independent variables ($p = 0.01 - 0.00$). The higher the income and occupation the chances of better and sustainable solid waste storage and collection practice at household level.

CONCLUSION AND RECOMMENDATION

The results from this study revealed a significant relationship between socio economic characteristics of the respondents and solid waste storage and primary collection practices.

Three of the socio-economic characteristics (household size, income and occupation) examined in this study have significant statistical relationship with

the sustainability of solid waste storage and primary collection practice of households ($p < 0.05$) while educational qualification has the least and negative impact.

Therefore, for a sustainable solid waste management decision on storage and primary collection, the occupation, income and household size of the beneficiaries should be considered.

The respondent with higher income which could be as a result of better occupation may be more willing to use more sustainable storage containers and primary collection practice hence could be encouraged to patronize the private waste collectors who offer door – to-door primary collection system and provide bigger storage containers at a prize.

This could reduce the cost of solid waste management on the government and encourage private sector participation in solid waste management.

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