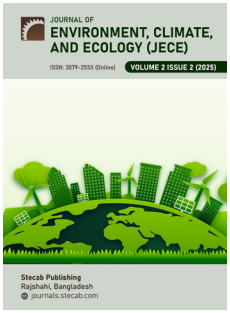

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Research Article

Assessment of the Willingness of the Public to Pay for Improved Solid Waste Management Services in Ghana

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About Article

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ABSTRACT

Ghana faces significant challenges in solid waste management, with inadequate collection services, poor disposal practices, and limited recycling infrastructure affecting urban and rural communities alike. This study investigates public willingness to pay (WTP) for enhanced solid waste management services across selected regions in Ghana, examining the economic feasibility of service improvements and identifying factors that influence household payment decisions. Using a mixed-methods approach, this research employs contingent valuation methodology through structured surveys administered to 200 households across Techiman Municipal. The study assesses current waste management practices, households' maximum willingness to pay for improved services, including regular waste collection, Tenancy agreement, proper disposal facilities, recycling programs, and community education initiatives. Key variables examined include household income, gender, and age, education levels, current service quality, academic qualification, amount of money willing to pay, and demographic characteristics. It was revealed that the predominantly working-age population 25 years and above capable of contributing to service delivery remains compromised by prohibitive collection costs and unprofessional conduct among waste collectors. The study also discovered that out of the 200 respondents, 56% were willing to pay for the services of waste collectors. The findings also became clear that there is a gendered dimension to waste management participation, with women assuming greater responsibility for household waste collection activities compared to their male counterparts. Significantly, the educated demographic also demonstrates understanding of the health and environmental consequences of improper waste disposal. The findings recommended the enforcement of sanitation laws, environmental education, and waste management strategies.

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1. INTRODUCTION

Solid waste management represents one of the most pressing urban challenges facing developing countries, with Ghana exemplifying the complex interplay between rapid urbanization, inadequate infrastructure, and limited financial resources. As Ghana's urban population continues to grow at approximately 3.4% annually, municipal solid waste generation is increasing proportionally, creating significant environmental and public health challenges (UNEP, 2024). The Global Waste Management Outlook 2024 projects that municipal solid waste generation will grow from 2.1 billion tonnes in 2023 to 3.8 billion tonnes by 2050, with developing countries in Sub-Saharan Africa experiencing disproportionate increases. The fundamental challenge in Ghana's waste management sector lies in sustainable financing. Traditional government funding mechanisms have proven inadequate to meet the growing demand for waste collection, transportation, and disposal services. This financing gap has resulted in irregular collection schedules, inadequate infrastructure, and reliance on informal waste management systems that often lack proper environmental safeguards. Understanding public willingness to pay for improved services is crucial for developing sustainable financing models that can bridge this gap while ensuring equitable access to waste management services.

People are therefore unable to know their role in the waste management practices. Participation, therefore, is unavoidable in the process of ensuring better solid waste management. A lot of research has been conducted on public participation in waste management, especially in the area of recycling (Barr, 2004; Cohen *et al*., 2000; Rubio-Romero, 2018). Findings from such studies have raised concern in support of public participation in SWM. Since the autocratic nature of managing waste is no longer viable, public inclusion in SWM cannot be avoided

Public participation in waste management is expensive and takes time to achieve better results. Many people see this approach as meaningless. However, it is almost impossible to talk about sustainable development and, at the same time, evade the need to have the people involved. This is because in contemporary development practice, growing awareness of the importance of people's non-expert experiences and knowledge has continuously led to a dire need for shared decision-making in various contexts (Barr, 2004). In any development milestone, the contribution of the public cannot be evaded because of their exerted influence on the direction of development. At face value, it may be difficult to see the importance of community participation in solid waste management. However, SWM practices must be assessed to identify areas where public participation can be successfully implemented.

Ghana's solid waste management sector faces numerous challenges, including inadequate infrastructure, limited financial resources, weak institutional capacity, and rapid urbanization (Gyimah *et al*., 2019). The National Environmental Sanitation Strategy and Action Plan (NESSAP) emphasizes the need for sustainable financing mechanisms to support improved waste management services across the country. Previous studies in Ghana have documented various issues affecting solid waste management effectiveness. Mensah and Whitney (2021) identified inadequate funding, poor planning, and a lack of public participation as major constraints. Similarly, Boateng *et al*. (2020) highlighted the need for innovative financing approaches, including user fees, to ensure sustainable service delivery.

There is a significant difference between developed and developing countries in terms of public participation in solid waste management. In developed countries, most of the garbage generated at the household level is sorted before disposal. In other words, private waste collectors absorbed the burden of waste on the public by charging fees for their services. The situation is not the same in developing countries, where the majority of the people are poor and therefore cannot pay for the collection of their waste. Many people ignorantly dispose of waste carelessly without considering the imminent effects of their actions on their lives in the future. It appears the public thinks that the local authority is solely responsible for proper solid waste management at no extra cost to the public.

The increased level of solid waste in many cities is positively correlated with an increase in income level, population, and urbanization, and if not properly managed, solid waste can have a far-reaching effect on the environment and the economy (Hoornweg, 2012). Findings from different studies on SWM have proven that people are eager to pay money towards garbage discarding services; however, their willingness to pay for WMS hinged on many socio-demographic factors.

2. LITERATURE REVIEW

The application of contingent valuation methods to assess Willingness to pay (WTP) for improved solid waste management services has gained traction in developing countries. Studies across sub-Saharan Africa have shown varying levels of WTP, influenced by socioeconomic factors, service quality expectations, and environmental awareness. Education level often correlates positively with WTP, potentially reflecting greater environmental awareness and understanding of service benefits (Kofi *et al*., 2018). Household income emerges as the most consistent predictor of WTP across studies, reflecting budget constraints and ability to pay (Wang & Zhang, 2018)

Household received in exchange for providing a good or service from all available sources. Poor solid waste management services are a challenge compounded by clients' unwillingness to pay, especially in a developing country like Ghana, where a majority of people live on less than a dollar a day, making the central government more vulnerable to absorb the cost of waste management services (Awunyo, 2013). Currently, the most available option for SWM is the polluter pays or user pays. Waste management companies, however, do not realize enough from user payments to be able to provide quality services owing to the inability to collect revenues from households. The need to improve solid waste disposal services by waste collectors is dictated by its income level of households (Awunyo, 2013).

On the analysis of household willingness to pay for improved solid waste disposal services. Addai and Danso-Abeam (2014) observed that respondents who are females are more eager to pay for better waste disposal services than males. This is perhaps due to the traditional role of women as cleaners in the household. Ojek (2012) attributed differences in household attitudes towards payment for better solid waste management

services to sex.

According to various researchers, age also influences the individual's attitude towards payment for waste management services. Research on the influence of age on solid waste management has shown mixed results. Afroz (2009) established that older people are prepared to pay more money towards garbage disposal than younger people. Length of stay and family size are determining factors in the willingness of the public to pay for waste disposal services. Households that stay longer in a particular area understand and appreciate the problem of solid waste in the area and therefore participate in waste management services. The size of the households can have both positive and negative effects on their willingness to pay for better disposal services. The reason is that instead of paying for waste disposal services, households which has more children will prefer to use them to keep the environment clean. Nonetheless, the size of the household determines the amount of garbage produced; thus, the larger the size, the larger the volume of garbage generated (Niringiye, 2010). Addai and Danso-Abeam (2014) also found that the larger the household members, the better they come together and clean their environment. Aggrey and Douglason (2010) and Awunyo (2013) found that old age negatively affects willingness to pay for SWM services. They asserted that younger generations are more conversant with cost-sharing and are more willing to pay for disposal services than the older generation, who perceived waste management as government responsibility.

The variable intends to gather information concerning the number of years the respondent spent or the level of education of the respondent. Education, they say, is light, and for this reason, the respondent's level of education is expected to have a positive impact on solid waste management. Afroet (2009) emphasized that education provides a platform for a better understanding of the dangers associated with improper handling of waste. Aggrey and Douglason (2010) make the assumption that the degree to which an individual is prepared to pay for better disposal services is determined by their level of education.

Household willingness to pay for disposal service is enhanced by the quantity of waste generated. Household faces waste disposal challenges when a large amount of garbage is produced and do not have the capacity to dispose it. Households that do not have the capacity to dispose of their waste pay for disposal services when a large quantity of waste is generated (Aggrey and Douglason, 2010). People who live in their own house are expected to show more commitment towards payment of solid waste services than tenants. This is because landlords place a higher value on their properties. Also, houses that are far separated from other houses usually have space, which is often used as a temporary dump site. This situation discourages households from even looking for waste collection services. Payment for better waste disposal services also depends on the location of the household (Ekere, 2010).

3. METHODOLOGY

The research was conducted in the Techiman Municipality of Ghana, with Techiman as a regional capital, which is situated in the central part of the Bono East Region of Ghana, which lies between longitude 1049 east and 2030 west and latitude 8000 north and 7035 south. It shares common boundaries with four districts, namely, Wenchi in the Bono Region, Techiman North and Nkoranza Municipalities in the Bono-East Region, and Offinso-North District in the Ashanti Region. Techiman is a nodal town, where roads from the three regions of the north (Upper West, Upper East, and Northern regions) converge. The municipality faces increasing pressure on its waste management infrastructure due to rapid population growth and commercial activities. The current solid waste management system in Techiman is characterized by irregular collection services, limited coverage, and inadequate disposal facilities. Most waste collection is handled by private contractors under municipal oversight, with varying service quality across different areas of the city.

3.1. Research design and data collection

This study was a descriptive with a cross-sectional survey design using structured questionnaires to collect data from household heads or their representatives. A stratified random sampling technique was used to ensure representative coverage across different residential areas in Techiman. The sample size was determined using Yamane's (1967) formula with a 95% confidence level and 5% margin of error, resulting in a target sample of 200 households. The municipality was stratified into four zones (Central, North, North East, South, and East) with proportional allocation based on population density.

Table 1. Number of households at the ward level

Ward	Sample Size
Takofiano	62
Tunsuoase	47
Dwomor	35
Sabu-Nzongo	56
Total	200

3.2. Data collection tools, methods, and analysis

Different data collection tools were used to collect information for this research, including administering questionnaires to households and interview schedules for key informants.

Both primary and secondary sources of data were collected. The primary sources include the data obtained from respondents, whereas the secondary sources were a variety of published and unpublished written materials. The multiple methods used in data collection (questionnaire and interview).

The administered questionnaire willingness of the public to pay for public solid waste management was provided to respondents from sampled households in Techiman Township. Both closed and open-ended questions were used to collect data and other information relating to the research from respondents in a short period. The questionnaire looked at households' solid waste management practices and willingness to pay for waste management services.

In this study, structured interviews were used to assess respondents' views on the responsibilities of stakeholders in waste management practices. Interviews were used because of

the ease with which they allow the collection of information regarding facts, people's beliefs, feelings, motives, and standards of behavior. This method allows for probing and clarification of information.

Quantitative data were gathered for the study using questionnaires. Data from both the field and household questionnaire surveys were coded and fed into SPSS for analysis in order to generate descriptive data on such themes as the willingness of the public to pay for waste management services. types of waste generated.

4. RESULTS AND DISCUSSION

4.1. Gender of respondents

The respondents were asked to indicate their gender by ticking the appropriate column that they belonged. The purpose was to find out the number of males and females who actually participated in the study. Table 2 showed that out of the 200 respondents who participated in the study, the majority (128) of the respondents, representing 64% were males, while the remaining 72 respondents, representing 36% were females.

Table 2. Respondents based on gender

Gender	Frequency	Percentage (%)
Male	128	64
Female	72	36
Total	200	100.0

The study showed that female respondents were more than males in SWM in the Techiman Municipal area. In terms of gender, women more often than not championed the cause of collecting garbage in the above-mentioned research catchment areas. Female predominance in the waste gathering is somewhat emanating from the assumption that the role of women in the household is to clean the house. Evidence-based empirical study validates the foregoing perception. Poswa (2004) found in evidence-based research that women played a maximally vital role in the SWM in the Republic of South Africa.

4.2. Age of respondents

Table 3 depicts the age distribution of respondents who participated in the study. The purpose was to find out the average age of the respondents. Table 3 shows that 16 respondents, representing 8% fall under 18 years; 32 respondents, representing 16% fall within the age brackets 19-30 years. 52 respondents representing 26% fall within 30-45 years, again, 72 respondents forming 36% fall within the age bracket of 46-50 years, and the remaining 28 respondents representing 14% were above 50 years.

Table 3. Respondents' Age

Age	Frequency	Percentage (%)
Below 18 years	16	8
19-30 years	32	16
30-45 years	52	26
46-50 years	72	36
50 years and above	28	14
Total	200	100.0

On the age distribution of respondents, the study revealed that 36% were aged between 46-50 years, 26% between 30-45 years, 16% between 19-30 years, 8% below 18 years, and 12% above 50 years. It posits that there is no gainsaying about respondents' suitability for the study because many of them fell under the working class (25 years and above), active enough to bolster the nation's economy. The majority of these respondents, falling within the working class, indicate that Techiman Township has a viable and economically active workforce. Research on demographic data has shown mixed results; older individuals are not reluctant relative to the contribution towards SWM and their willingness to pay for their waste as compared to the young individuals (Okot, 2012).

4.3. Academic qualification of respondents

The respondents were asked to indicate their educational background. The purpose was to find out the educational/academic qualifications of respondents in the study. Table 4 shows responses elicited from respondents. 76 respondents, equivalent to 38% had no education. Again, 48 respondents who constitute 24% have a Basic Certificate, 40 respondents, who constitute 20% have Secondary School Certificate, then 16 respondents, who constitute 8% have Diploma Degree Certificate, and 20 respondents, which constitute 10% have Degree Certificate.

Table 4. Respondents' academic qualifications

Qualification	Frequency	Percentage (%)
None	76	38
Basic	48	24
Secondary	40	20
Diploma	16	8
Degree	20	10
Total	200	100

The study revealed that many of the respondents are educated, thereby making them potentially understand the implications of inappropriate garbage disposal on the environment and human health. Research seemed to suggest that the level of education was strongly related to the willingness to pay for SWM services (Niringiye, 2010). Individuals with education understand the imperative need for all and sundry working to curb blood-borne pathogen disease due to an unclean environment.

There are high chances of individuals, by virtue of their educational level, participating in and paying for SWM services. Okot (2012) asserted that people with education ranging from secondary to university in Uganda were not unwilling to contribute towards SWM strategies and services. The finding is corroborated by another research (Douglason *et al.*, 2010; Rubio-Romero, 2018; Okot, 2012). It assures the target audience of the

replicability and the generalizability of findings. Although the educational level of an individual was positively related to the level of willingness to pay and contribute to SWM, some sort of heterogeneity was accentuated as the level of commitment from university graduates was stronger than secondary school leavers (Ojok, 2012). People without formal education are not committed to the task of contributing to waste disposal. An education sensitizes individuals to keep their environment tidy.

4.4. Income level of respondents

Table 5 describes the income of the respondents. 104 respondents who constitute 52% said they can realize less than GH¢600 a day, 48 respondents, forming 24% say they can raise between GH¢600-100. Also, 36 respondents, forming 18% said they can raise between GH¢110-1500, and then 12 respondents, forming 6% say they are also able to raise between GH¢75,000-110,000. Moreover, 16 respondents, who constitute 18% said they can raise more than GH¢1500.

Table 5. Income level in ghana cedis

Income		Frequency	Percentage
Valid	Less than 600	104	52
	600 and 100	48	24
	110 and 1500	36	18
	More than 1500	12	6
	Total	139	100

4.5. Willingness to pay for improved waste management

4.5.1. Amount of money willing to pay daily

To effectively ascertain public participation in solid SWM, respondents were asked to state the amount of money they are willing to pay on a daily basis for the collection of their refuse without providing them with a waste bin. The study revealed that out of the 200 respondents, 56% were willing to pay less than GH¢ 0.5 for the services of waste collectors, with only 24% willing to pay more than GH¢ 0.5. Only 3% of the respondents were willing to pay between GH¢ 3 and GH¢ 4 for their waste to be collected.

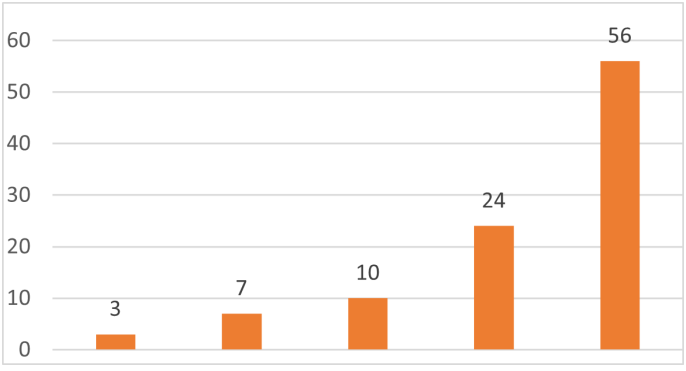

Figure 1. Amount of money willing to pay daily

4.5.2. Amount of money willing to pay every month

The study further investigated respondents' willingness to pay a waste collection agency for emptying their waste bins in the house every month. The study discovered that 52% of the respondents were willing to pay not more than GH¢ 20.00, followed by those willing to pay between GH¢ 20.00 - GH¢ 40.00(30%). Only 6% of them were willing to pay GH¢ 60.0.

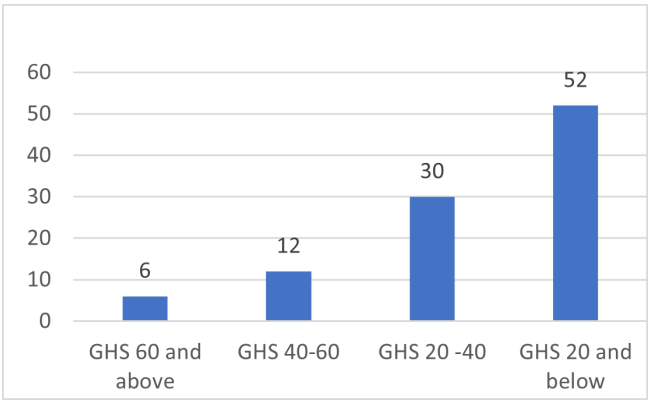

Figure 2. Amount of money willing to pay every month

4.6. Payment of solid waste management services

Researchers intimate that many of the inhabitants expressed interest in contributing to garbage disposal services. Awunyo *et al.* (2013) reported that about 57 percent of families were ever ready to pay more money for improved SWM services in Kumasi. Typically, garbage is normally dumped at collection sites, open gutters, or open spaces. Therefore, communities are not eager to pay more for proper SWM services (Yoada *et al.*, 2014). It means the quality of SWM services was a major determinant for willingness to pay for them. The basic fact is that people did not want to pay money for poor services, and thereby corroborating the findings of Oteng-Ababio (2010), Afroz *et al.*, (2009), and Kasim and Ali (2006) that eagerness to pay for garbage collection services was contingent on the quality of the services. It provides enough proof that in Techiman Municipality, communities are expected to participate in improved solid waste management services if the town authorities establish a mechanism that is functional and affordable.

5. CONCLUSION

This study concludes that solid waste management challenges in the Techiman Municipal area are fundamentally rooted in systemic deficiencies rather than public awareness or capability gaps. The research demonstrates that indiscriminate waste disposal, unauthorized burning practices, and inadequate collection infrastructure persist primarily due to residents' reluctance to finance waste management services. Despite the community's economic viability, evidenced by a predominantly working-age population (25 years and above) capable of contributing to national economic growth, and relatively high educational attainment that should theoretically foster environmental consciousness, service delivery remains compromised by prohibitive collection costs and unprofessional conduct among waste collectors. The findings reveal a gendered dimension to waste management participation, with women assuming greater responsibility for household waste collection activities compared to their male counterparts. Significantly,

while the educated demographic demonstrates understanding of the health and environmental consequences of improper waste disposal, this knowledge has not translated into widespread willingness to pay for formal waste management services. This paradox suggests that sustainable solid waste management in the Techiman Municipal area requires not merely public education campaigns, but comprehensive policy interventions addressing service affordability, provider accountability, and infrastructure adequacy to bridge the gap between environmental awareness and behavioural change among this economically active and educationally equipped population.

RECOMMENDATIONS

Per the findings of the study, the following were recommended for efficient and effective public participation in the SWM in the TMA.

i. Enforcement of sanitation bye-laws: Proper enforcement of sanitation bye-laws, and also reinvigorating the sanitation courts to sanction those who flout environmental laws

ii. Environmental education: The inhabitants must be sensitized to the urgent need for public inclusion in the garbage disposal business. Media, religious leaders, and opinion leaders must lead public education exercises.

iii. Waste reduction strategy: Home composting facilities (with low or no cost to the household) should be established for households to motivate home composting within the community. Private companies must be included in the SWM conversations.

iv. Service quality improvements: The relationship between service quality and willingness to pay suggests that sustainable financing requires credible commitments to service improvements. Households expressing willingness to pay expect tangible improvements in collection frequency, reliability, and environmental outcomes.

v. Institutional and regulatory reforms: Successful implementation of willingness-to-pay-based financing requires supportive institutional and regulatory frameworks. Municipal waste management companies need enhanced capacity for customer service, billing, and collection management. Technical assistance and training programs could help build these capabilities.

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