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**EVALUATION OF THE EFFECTIVE WASTE COLLECTION OF SOME  
SELECTED ESTATES AT IKORODU LAGOS, NIGERIA**

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***Abstract***

*It is critical to assess the current state of solid waste collection as waste has impacts on public health, the environment, and potential resources in the land. Lagos is seen to be indicative of other significant metropolitan cities in Nigeria with a very high population, waste collection is crucial. This study examines the effectiveness of waste collection in some estates at Ikorodu. Jakande Estate, Ayanusi Estate, Jubilee Estate, Akasoleri Estate, Radio, and Old Winners Estate in the Ikorodu community were purposely selected for this study. To satisfy the study's goal, structured interviews, first-hand observation, and a review of secondary data were all used. Additionally, descriptive statistics like bar and pie charts were employed to examine additional data in line with the goals. The findings reveal that a whopping 79% of residents in these estates expressed satisfaction with the level of cleanliness that had been achieved, thanks to local waste collectors' efforts of Ola Jendor Int'l company, Samelu company, Juvincos company, and Zero Waste company. This is explained by the fact that the resident also observed waste spilling out of bins or containers, bad odors, and littered areas due to infrequent or delayed waste collection in their region. It is concluded that no single waste collection option can be employed in isolation for Solid Waste in Lagos. Disposal on waste sites is the dominant means of managing waste in the state. Therefore, recommended that properly designed and*

*well-operated solid waste disposal sites are needed in the state, which would be sustainable. Key considerations should include proper siting and design.*

**Keywords:** *Solid Waste, Waste Collection, Maintenance, Housing Estate, Lagos*

## **Introduction**

Over time, there has been an exponential rise in the proportion of Nigerians living in cities and other urban regions. The amount of solid and liquid waste generated as a result of this ongoing expansion is immense. Lagos state is the most populous city in Africa (Adedayo, 2015). Twenty million people lived in Lagos in 2014, and each day, they produced 13,000 tonnes of rubbish (Anestina, 2016). Currently, the method used to handle general garbage is to transport it to dumpsites where scavengers collect recyclable goods for nearby manufacturers and sell them to vendors who roam the dumpsites to collect these items. Metals and plastics make up the majority of the items that scavengers normally find. Whole bottles are the only items made of glass that can be salvaged from landfills. The remaining solid wastes, which primarily consist of biodegradable materials and other items that evade the dump site's inspection, scavengers are left to deteriorate into landfills at dumpsites. Other categories of solid waste, including hazardous chemicals, e-waste, and medical waste, are retrieved from the sources of generation and treated specifically for recycling or disposal.

The Lagos State Environmental Protection Agency (LASEPA) has established criteria on how these wastes must be treated for each of the facilities that produce them. The agricultural sector of the economy and manufacturing facilities typically recycle biowaste from the processing of agricultural products, such as those found in marketplaces, abattoirs, and farms.

In Lagos state, the first significant effort at solid trash collection started in 1981. Around the state, the government constructed 5 incinerating facilities. In each local government region, one incinerating plant was to be constructed. Due to a lack of logistical research and a general reluctance on the part of the local authorities to change their established procedures and adopt the new system, the initiative was never successful. The debris was intended to be placed for processing in sorting facilities near the incinerating units. The consumers of the items will remove the reusable contents when sorting is completed, the remainder can then be burned.

The incinerators that were built were never used. The Lagos State Government requested suggestions for a "waste to wealth" program under the Ministry of Environment and Physical Planning in 2000 as part of their millennium ambitions. The exercise's results were not made public. The management of trash disposal has required more effort than recovery. To make sure that manufacturing facilities adhere to international standards for the disposal of their solid

wastes and effluents, LASEPA and the Federal Ministry of Environment in Lagos maintain a strong presence there.

In Lagos State, improvements have reportedly been made in the collecting of domestic rubbish. According to Oresanya (2015), about 30% of residents in the state now have bins that are used to store household waste, and approximately 17,000-wheeled bins have been distributed to places of residence based on payment of land use fees. This has made it easier to collect waste and to keep the environment clean. The number of residents who have access to these bins may be considered negligible given the size of the state's population. Longe & Ukpebor (2019) remark that while citizens are urged to bag their trash before placing it in trash cans (LAWMA, 2018), activities like the separation of solid waste in residential areas are non-existent in the state.

Once more, residents' usage of appropriate bins has been shown to enhance trash quality in terms of lower moisture content and a specific weight (Oresanya, 2015). According to a local newspaper's interview with a resident, the Nation (Odukoya, 2016), residents are supposed to buy the trash bags they use for disposal from nearby shops or waste collection trucks. However, full compliance with this practice doesn't appear to have been achieved because residents don't seem eager to hand over their trash bags to the waste collectors.

According to reports, the introduction of wheeled bins helped collection trucks collect home waste less frequently (to twice every seven days), using less fuel and causing less greenhouse gas pollution of the environment (Olubori, 2017). LAWMA had access to around 250 trucks in 2009 for waste collection (LAWMA, 2018). It is unclear, though, if these are merely for LAWMA's use or whether they will also be made accessible to private operators under some sort of agreement for waste collection.

LAWMA has suggested using tricycles for waste collection services in locations where waste collection trucks are unable to access them due to poor roads (LAWMA, 2018). Additionally, it appears that the state's coverage for garbage collection services has not yet been fully decided, although private operators appear to have been assigned to all local government districts. Despite LAWMA's promotion of the addition of around nine recycling banks, nothing is known about how well they work or how often citizens utilize them. According to reports, fees for the services of private operators are structured according to the size and type of buildings from which waste is generated (ranging from \$100 for residents of one-room apartments to \$1,000 for those in duplex buildings). The willingness of people to pay has been identified as a significant challenge in this regard (Odukoya, 2016).

Lagos State was chosen as the case study due to its special circumstance of being both Nigeria's smallest and most populated state. Since it is the nation's commercial hub, the state also acts as a major hub for business activity. It is critical to assess the current state of solid waste collection in Lagos and alternatives for long-term improvement given the city's sizeable population and anticipated growth over time. This study is relevant to issues with public health, the environment, and potential resources acquired if the state implements more effective management practices. Since Lagos is seen to be indicative of other significant and metropolitan cities in Nigeria, this study will evaluate the effectiveness of waste collection on some estate maintenance using Ikorodu as a case study, we will also assess the existing level of waste management in some estate in Ikorodu, Lagos as well as investigate the existing waste management practices used by the estate and determine the effective and sustainable measures taken to upgrade the estate waste management system.

## **Literature Review**

### **- Waste and Waste Management**

Any item or material that is produced and disposed of, by the person who has custody of it, or that is meant to be disposed of, is considered waste. However, there are several definitions of waste based on the circumstances under which they arise in addition to legal constraints and the site of generation (Williams, 2015). Waste management is a procedure that strategically combines measures to effectively regulate waste from the source of creation up to the final disposal point to maintain an environment that is always safe and healthy at the lowest possible cost (Igbinomwanhia, 2017). A correlation has been observed between accelerated urbanization, population explosion, industrial growth, and the rate of waste generation in cities found in such countries. Waste management has been noted as an issue in many countries around the world, particularly in developing countries (Narayana, 2019; UNEP, 2015).

### **- Solid Waste**

Solid waste is any undesired or useless stuff that is produced by a human population (Kaseva & Mbuligwe, 2015). SW is waste that is generated from various sectors of society, such as households, educational, health, and commercial institutions, public places, etc., and which is handled either directly or indirectly by the municipal or local authorities. Over time, consumption practices and economic activities have led to the generation of SW (Cointreau, 2016). (Williams, 2015). According to EEA (2019), Solid waste is:

"..waste from homes and other rubbish that, by nature or makeup, resembles waste from homes". Some of this garbage, such as paper and cardboard, food scraps, and garden debris, is

biodegradable. According to the landfill directive, "biodegradable waste" is defined as "any waste that can undergo anaerobic or aerobic decomposition, such as food and garden waste, paper, and paperboard".

Due to differences in resources, climatic circumstances, resident habits, and style of living, the components of such garbage, which are frequently a diverse mix, are rarely the same for different regions. SW is frequently produced in urban areas and contains both organic and inorganic materials, with the former being more frequently found in developing nations than in the latter. The opposite is typically true in the developed world, and this is viewed as a highly distinguishing characteristic from the waste produced in their developing counterpart (Oteng-Ababio, 2016; United Nations Programme, 2015).

#### - **Ecology of Sound Management of Solid Waste**

The idea of sustainable development spans generations. It has been described as a development that meets the requirements of the current generation without obstructing the ability of future generations to meet their own (Idowu, Omirin, & Osagie, 2016). Solid waste management (SWM) refers to the entire process of gathering, moving, treating, recycling, recovering resources, and disposing of solid trash in urban areas (Ogwueleka, 2019). Sustainable SWM should involve managing waste (from collection to treatment and disposal) in a way that maintains public and environmental safety (Adewole, 2019).

#### - **International Solid Waste Management Frameworks and Methodologies**

Solid waste is regarded as a crucial part of the contemporary infrastructure in any society because of its substantial contribution to ensuring a safe environment and resolving public health issues connected to waste generation (Nabegu, 2016). Designing waste management systems should take into account and promote waste reduction, recycling, and recovery, as well as the use of appropriate waste treatment techniques more environmentally friendly technologies, and proper final disposal (Kofoworola, 2017). In most industrialized countries, Solid waste management has progressed and improved over time to reach its current level; along with these improvements, concomitant statutory requirements have also emerged (Williams, 2015). As a result, the majority of countries have devised modern national policies for effective and sustainable waste management; the United States created the 1965 Solid Waste Disposal Act as its initial effort to improve the country's solid waste disposal. The Resource Conservation and Recovery Act was used to change this. The latter illustrated how the nation handled issues relating to solid waste disposal; although updated to meet current standards, it also serves as a channel for the development of a framework for environmentally friendly solid waste management through federal programs in the nation.

Policies and frameworks have also been introduced in an Asian nation like China as a way to address the problem of managing SW. For instance, the 1989 Waste Disposal Plan, which placed the use of three sizable landfills at the center of its waste disposal techniques, was adopted in Hong Kong to improve upon an earlier management system. Subsequently, the Waste Reduction Framework Plan was created (Ko & Poon, 2019). An SWM policy framework for the region was prepared by the Hong Kong government in 2005. (A Policy Framework for the Management of SW in Hong Kong). By using the strategies outlined in the framework, it is intended to reduce the quantity of SW produced in the city by 1% annually, lower the amount of SW dumped in landfills by 2014 (below 25%), and increase the overall rate at which SW is recovered, first to 45% in 2009 and then to 50% by 2014. (ibid).

In Europe, several acts and treaties have been passed, each with a different set of ideas and methods but all aiming to protect and improve the environment. The first, second, and third Environmental Acts (E.A.) focused on containing pollution caused by waste and pollution avoidance, which focused on avoiding waste and disposing of SW in an environmentally responsible manner. Following this came the establishment of the 4th E.A., which focused on the use of non-polluting technology throughout production and introduced a hierarchy as a continuous method of carrying out community waste management in the European Union (E.U). Recently, as seen by the 5th and 6th Environmental Acts, sustainable development, environmental laws, and decision-making have been aligned with EU policies and initiatives (Williams, 2015).

#### - **The Hierarchy of Solid Waste Management**

Although there are differences in SWM procedures between nations, in the majority of cases, relevant services are provided by the (local) government or commercial service providers and can be done by using the hierarchy of waste management (UNEP, 2015). The hierarchy has been widely used to design waste management strategies at the regional and national levels, particularly in industrialized nations, and is recognized as one of the key tenets of modern SWM systems (UNEP, 2015). The hierarchy of waste management, described by the 3Rs (reduce, reuse, and recycle), stratifies waste management choices and emphasizes maximizing resource usage while minimizing waste formation as a result (UNEP, 2015). The 3Rs stand for reducing waste generation, reusing objects before they are commissioned as rubbish, and recycling items after they are commissioned as waste. This is further explained in the waste management hierarchy, which also includes energy recovery, landfilling, reuse, recycling, and composting.

The hierarchy's purpose is to support waste management while minimizing environmental damage; as a result, it is used in the creation of policies for resource management, addressing issues with landfill scarcity, controlling pollution (water and air), and protecting public health (UNEP, 2015). The hierarchy's components are prioritized similarly in most countries, with waste prevention receiving top priority followed by reuse, recycling (including composting and material recovery), energy recovery, waste reduction through incineration, and lastly landfilling (ibid).

#### - **Collection of Solid Waste in the Case of Lagos State**

The Ministry of Environment and Physical Planning, Local Government Councils, Lagos State Environmental Agency, and Lagos State Waste Management Authority-LAWMA are the agencies primarily responsible for SWM in Lagos State (Kofoworola, 2017). SWM in Lagos State began with the establishment of the state's Refuse Disposal Board in the late 1970s (Igbinomwanhia, 2017). In the early 1980s, the board's name changed to Lagos State Garbage Disposal Board to reflect the expanded range of services offered for the collection of solid waste. LAWMA, an organization that reports to the state government and has been in operation since 1991, is the primary organization currently in charge of SWM in the city of Lagos (ibid). It was established as a result of the government seeing the need for more effective waste management, which goes beyond collection and disposal to include waste management (Lawal, 2016).

Previous research has identified inefficiencies in the Lagos SWM system, including a dearth of cars for waste collection and transportation, inefficient dumpsite waste disposal techniques, issues with administration, such as a weak institutional structure, and a dearth of funds (Longe & Ukpebor, 2019). The management of solid waste in Lagos has also been plagued by issues like unhygienic waste disposal practices among residents, employees' willingness to work, ongoing population growth in the state, corrupt behavior, and an absence of clear role definitions among related agencies, according to Adewole (2019). Igbinomwanhia (2017) lists inadequate waste data, the use of improper techniques, and limited budget allocations as additional issues LAWMA faces in managing waste.

The outsourcing of waste collection to the private sector under the PSP scheme may therefore be considered a significant improvement that has been made. According to reports, cooperation between the LAWMA and private operators has led to more efficient collection of waste from places of residence (Idowu, Omirin, & Osagie, 2016). About 90% of inhabitants in the Agege local government area, for example, employ the services provided by private operators, as opposed to the more prevalent use (nearly 94%) of cart pushers and common waste sites in the

past. This could be a contributing cause to the improvement (ibid). According to a series of monthly records kept by LAWMA (2018), private operators have been most active in collecting solid waste and depositing it at the state's designated landfills and dumpsites, compared to other means of collection (garbage collected directly by LAWMA and Franchising). On a broader scale, Oresanya (2015) has ascribed the improvement in waste collection to the state's recent years of sound and stable governance.

### **Research Method**

Ikorodu is a city in Lagos state, Nigeria. It borders Ogun State and is situated to the northeast of Lagos State along the Lagos Lagoon. Ikorodu has a total enumerated population of 535,619 as per the 2006 Census. Ikorodu is located about 36 kilometers (km) north of Lagos. The Lagoon encircles the town on its southern side. Ikorodu and Ogun State have a common border in the north. While in the East, it shares a border with Agbowa-Ikosi, a town in Lagos State's Epe Division. Ikorodu was once confined to the inner circular route of Ojubode, Etunrenren, Epadi, (Ayangbunren Road), Oju Ogbe, Ireshe, Eluku Street, Ojubode Street, Ojubode Orere Garage (Oriwu Hotel), Lagos Road, and Ikorodu Township has since transformed into a Metropolis with a population of more than a million people.

Therefore, extended to Aga Titun, Agbele, Erunwen, Solomade, Eyita, Agbala, Lowa, Gbasemo, Oke Ota Ona Owutu as the headquarters which includes Ipakodo, Majidun, Otowolo, Oriokuta, Ajaguro, Ogolonto, AraromiSolebo, etc. and Ikorodu North Local Council Development Area.

The purpose of this study was to investigate how the collection and handling of solid waste affected some estates in Ikorodu. Jakande Estate, Ayonusi Estate, Jubilee Estate, and Old Winners Estate of Ikorodu community are purposely selected for this study. To satisfy the study's goals, structured interviews, first-hand observation, and a review of secondary data were all used. Interviews were used to gather primary data in the estates of the case study area from residents in households, businesses, hospitals, schools, and markets. 200 respondents in total were sampled. The research methods included in-person interviews, questionnaires, and observations. Additionally, descriptive statistics like bar and pie charts were employed to examine additional data in line with the goals while chi-square analysis was employed to test the hypothesis.



## Results and Discussions

### - Waste Collectors:

The state now has a sizable number of operators, thanks to the privatization of solid waste collection. They all operate in various sizes. In terms of available people and equipment, each is working at a distinct scale or capacity. An indication of a company's ability to collect waste is frequently the strength and quality of workers in conjunction with its facilities. All of the businesses have offices in their respective areas, making it simpler for clients and oversight organizations to find them in the event of service delivery issues. The Lagos State government has made available compaction vehicles with a capacity of roughly five tonnes to all service providers. The companies either own the trucks outright or, in a few circumstances, lease them.

The various waste collectors operating in Jakande Estate, Ayonusi Estate, Jubilee Estate, and Old Winners Estate of Ikorodu were examined, these collectors are Ola Jendor Int'l company, Samelu company, Juvenco company, and Zero waste company, 57% of residents in the estate said they utilize two compact closed trucks to park their waste frequently, 26% said they use three trucks, 13% said they use four vehicles, and only 3% said they use five trucks.

According to the waste collector, these trucks typically last between three and seven years. The worker sizes of businesses range from 7 to 19. Vehicles for logistics, shovels, and protective clothing like gloves, boots, and pullovers to protect the crew from injuries and direct contact with harmful organisms are additional facilities owned and provided by businesses for efficient service delivery. The door-to-door collection is the major method used for waste collection. When the collection vehicle enters a low-income region or a portion of a medium-income area to serve households, it honks to inform the residents. Crews gather the waste from the bin located in front of the house in high-income neighborhoods. The frequency of waste pickup varies from place to place. In that estate, the collection is reportedly done twice a week, as said by about 73% of contractors' surveys. The majority of the collection frequency they acknowledged, is dependent on the mechanical state of the collection trucks and the agreement between the contractors and the locals. With the exception of a few reasonably worn trucks, the majority of collection trucks purchased from LAWMA are new.

The majority of collecting teams for contractors are untrained, casual laborers who earn between 7,000 and 20,000 naira (or from #7,000 to #20,000) per month, depending on the region. In every region of the estate, there are between 3 and 4 crews per truck. The supervisors or managers, who are typically educated, make between #18,000 and #40,000 while the drivers make a greater salary between #20,000 and #30,000.

Additionally, employees may receive daily meals, stipends, free housing, and holidays in the study area. From Monday through Saturday, all home solid garbage is collected between the hours of 8 a.m. and 6 p.m. In low-income areas, the PSP operators' monthly operating costs range from #500,000 to #900,000, in middle-income areas they range from #600,000 to #800,000, and in higher-income areas they range from #640,000 to #1,000,000. The running cost includes the cost of fueling trucks and other vehicles, the cost of maintaining and repairing trucks, vehicles, and generators, the cost of renting additional inputs, like trucks, in some circumstances, as well as the expense of paying workers' salaries and wages. Inward coverage zones, each contractor serves a different amount of residences.

Contractors are in charge of homes between 180 and 231 in low-income areas like the study area. In all regions, payment for services is mostly made via issuing bills and paying through banks. 40% of the contractors requested payment in cash and 60% used this method.

Contractors struggle with issues including delayed or refused payments. Less than half of all operators can recoup their user fees. The user fee is determined by the state's area and property value. User fees in low-income areas range from #750 to #3500 per month/per house. The disposal site is where the collected wastes are dumped. Rakes and shovels are utilized to clear up rubbish at the site of the collection; no technology is used to minimize waste.

**Table 1: Lawma summary of current charges per type of building in Low-Income areas like Ikorodu.**

S/N	Type of building	Amount per month
1	Room	#750
2	Shops	#750
3	Self-contained	#750
4	Flat	#1,250
5	Duplex	#2,000
6	Bungalow	#2,000
7	Mansion	#3,500

Author's survey, 2022

**Table 2: Residents.**

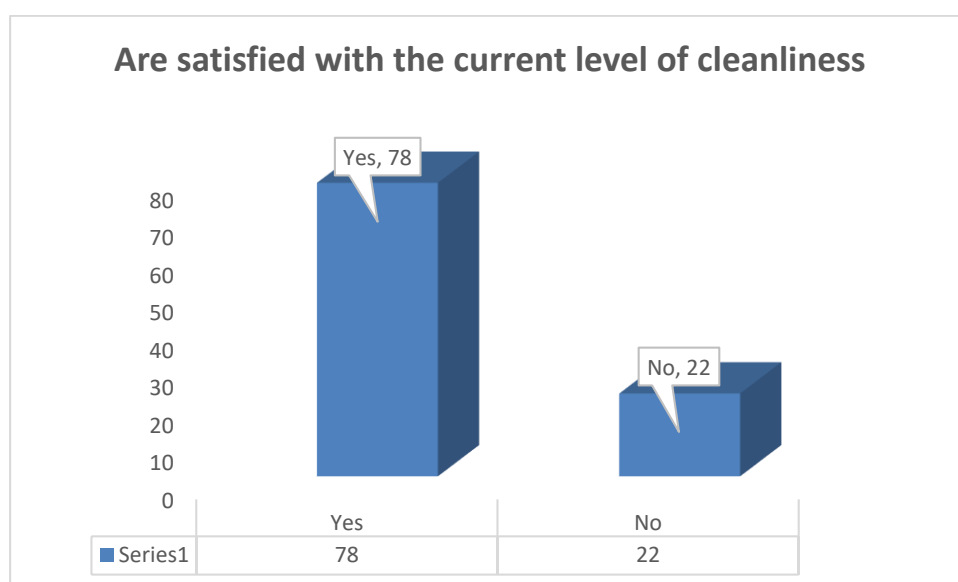
VARIABLES		FREQUENCY	PERCENTAGE (%)
Gender	Male	96	48
	Female	104	52

<b>Educational Background</b>	Below Secondary	48	24
	Secondary Education	60	30
	Beyond Secondary	92	46
<b>Are satisfied with the current level of cleanliness</b>	Yes	156	78
	No	44	22
<b>Frequency of waste collection in designated areas from user's</b>	Once per Week	176	88
	Twice per	24	12

**Researchers survey, 2023**

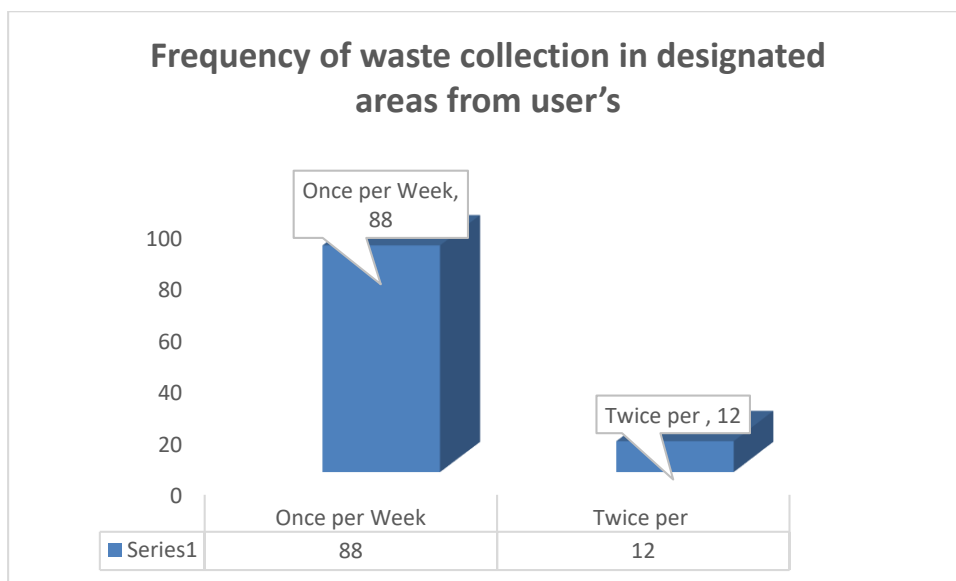
**- Residents Responses**

The average age of the residents/users sampled was 40 years, 48% of them were men and 52% of them were women. A family of five people on average made up 78% of the respondents. Roughly 45% of them had education beyond high school, and about 30% had a secondary school diploma. Depending on the region, educated people make between \$40,000 and \$1,000,000 or more annually. The door-to-door waste collection system is preferred and accepted by all sampled users.



A whopping 79% of consumers expressed satisfaction with the level of cleanliness that had been achieved thanks to local waste collectors' efforts. This is explained by the fact that they have observed waste spilling out of bins or containers, bad odors, and littered areas due to infrequent or delayed waste collection in the region in the past.

According to user experience, the most common frequency for waste collection in authorized locations was once per week (88%), followed by twice per week (12%).



However, the low frequency of waste pickup dissatisfied 44% of users in the study area. This makes it clear that the locals would like an increase in the area's designated frequency for waste collection services. In low-income areas, 10% or so of users are prepared to pay higher user fees. Only 48% of users anticipate that the public and contractors will decide on the fees. Around 78% of consumers rarely notice the regulating agency/presence of LAWMA's in the locations, which makes their monitoring and evaluation of the entire exercise inadequate.

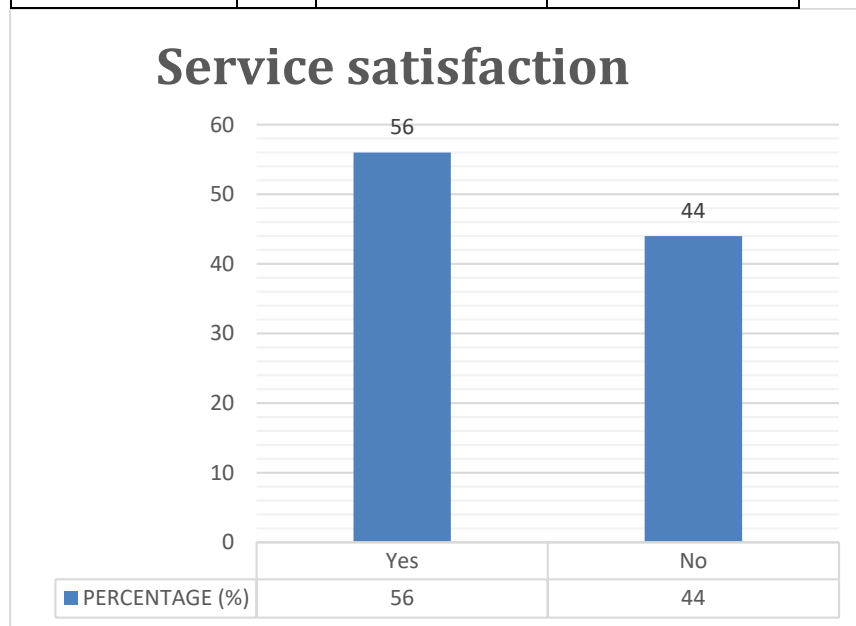
**- Service Quality**

Two methods were used to rate the effectiveness of the waste pickup service. First, by giving organizations ratings for service quality characteristics (reliability of collection, trash overflow, hygienic conditions at bin/container locations, reaction to client complaints, and crew attitude at waste collection) on a five-point scale ranging from very poor to very good. Second, the residents were asked to identify their level of satisfaction with the services received in the case study area by marking either "pleased" or "unsatisfied." In a customer satisfaction survey, service satisfaction is defined as the difference between the customers' perceptions of the service they received (perceived quality) and the ideal service quality they expected.

**Table 3: Service satisfaction**

VARIABLES	FREQUENCY	PERCENTAGE (%)

<b>Service Satisfaction</b>	Yes	112	56
	No	88	44



	Reliability of collection	Waste overflow	Sanitary conditions at bin/container locations	Response to customer complaints	Crew attitude at waste collection
<b>Severity index (%)</b>	50	48	59	53	51

**Research’s survey**

**Service Satisfaction:** According to the graph above, roughly 44% and 56% of the study area, residents respectively, were dissatisfied with the domestic solid waste contractors' present level of service quality.

Additionally, the severity index result, which was used to evaluate the quality of service in various locations, shows that the study area's house-to-house solid waste collection is in a moderately sanitary condition (SI = 59%). The subsequent sections are moderate to highly clean and experience fewer waste spillovers. A low rate of service providers responding quickly to customer complaints (53%), a low rate of dependability in terms of frequency of waste collection (50%), and an average rate of positive attitude of the waste collectors' crew toward services may all be contributing factors to the study areas' medium rates of sanitary conditions.

**- Testing Of Hypotheses**

**H<sub>0</sub>:** Waste collection around some estates has no effect in the study area.

**H<sub>1</sub>:** Waste collection around some estates has an effect in the study area.

**Test statistics**

	Observed N	Expected N	Residual
Effect	38	32.5	5.5
No Effect	27	32.5	-5.5
Total	65		

**Test Statistics**

	Does waste collection around some estate affect this area?
Chi-Square	6.3912
Df	1
Asymp. Sig.	.001

**Decision Criterion**

Reject H<sub>0</sub> if p-value ≤ α(0.05), otherwise accept H<sub>1</sub>

**Conclusion**

Since p-value=0.001 which is an asymptotic value in the table < α(0.05), we reject H<sub>0</sub>, thereby accepting H<sub>1</sub> and concluding that waste collection around some estates has an effect in the study area.

## **Conclusion and Recommendation**

This study examined how well private sector businesses performed in terms of the caliber of the services they offered and their level of productivity. Additionally, performance-related constraints on businesses were looked at. A whopping 79% of residents expressed satisfaction with the level of cleanliness that had been achieved, thanks to local waste collectors' efforts.

This is explained by the fact that they have observed waste spilling out of bins or containers, bad odors, and littered areas due to infrequent or delayed waste collection in the region in the past. According to user experience, the most common frequency for waste collection in authorized locations was once per week (88%), followed by twice per week (12%). However, the low frequency of waste pickup dissatisfied 44% of users in the study area. This makes it clear that the locals would like an increase in the area's designated frequency for waste collection services.

From this study, it is believed that no single waste collection option can be employed in isolation for Solid Waste in Lagos state. Disposal on waste sites is the dominant means of managing waste in the state but this is not sustainable. Considering the nature and components of waste generated by Lagos state households, a blend of certain management options in the waste management hierarchy (reduction, reuse, recycling, and composting) would be more suitable in tackling the challenge of Solid waste collection and the state should look to landfilling only after other management options higher in the hierarchy have been fully explored. These management options should be integrated into a sustainable framework with adequate consideration given to their hierarchical importance. So that the desired result is accomplished, these options should also be considered and employed based on local conditions rather than foreign methods.

The backbone of most options in the waste collection hierarchy is waste segregation at the source. Other key aspects are proper storage, more efficient waste collection systems, and sustainable recovery and disposal. Public education and properly planned waste management programs need to be introduced into the current waste management system. These are relevant because households should know and understand the importance of waste segregation and proper storage, as well as those of recycling and compost production. Integration of scavengers into the SWM sector is also necessary for recycling to become more efficient in the state. Friendly climates for waste reduction, recycling, and compost production have to be created by the authorities through the introduction of complementary programs and policy development. The idea of incentivized waste segregation is popular among all households -whether low-income, middle-income, or high-income. Therefore, to encourage and enhance the cooperation

of households; the inclusion of incentives should not be overlooked when designing programs for waste management.

Better efficiency on the part of the private operators could be achieved if the use of less expensive collection trucks that are more suited to the type of waste and conditions in Lagos state are introduced by LAWMA. Further, the private operators can be relieved of the burden of cost recovery if LAWMA could develop strict payment regulations for households, and these should be enforced following the improvement of collection services. Further recommends, that properly designed and well-operated solid waste disposal sites are needed in the state. Key considerations should include proper siting and design. Operations should target odor elimination, leachate and landfill gas control, and energy generation.

Finally, this study gives significant insight into the Solid Waste Collection in Ikorodu, Lagos state, and how improvements can be made. Nevertheless, there is a need for further studies of a similar nature with a significantly higher number of interviewees in each actor group across all the LGAs in Lagos state. Data from such studies would give more in-depth knowledge of Solid Waste Management challenges faced in the state and would provide valuable details needed for the development and implementation of sustainable Solid Waste Management programs and policies that are most suitable for the state.

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