

# Solid Waste Management in Owerri Municipal: A Review

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**ABSTRACT:** The current waste management practices in Owerri municipality was reviewed in this research as well as the present solid waste collection services being rendered to the residents. Eleven sample locations were selected for this research, namely, Obinze, Nekede, Ihiagwa, Avu, Douglas road, Wetheral, Mbaise road, Okigwe road, Orji, World Bank and Naze junction. The investigation drew on previous studies carried out and on questionnaire survey, personal observation and one-on-one interaction with relevant waste management authorities and field workers in the municipality. Results showed that Owerri municipality is still struggling with managing solid waste and that the collection services at present is 61.27% and way below global expectations of not less than 75%. Recommendations were proposed to achieve a more robust collection efficiency in the municipality.

**KEYWORDS:** Solid waste, Management, Owerri, Review, Efficiency, Collection.

## I. INTRODUCTION

Waste can be said to be any undesirable material or substance discarded or abandoned. Solid waste refers to unwanted solid or semi-solid material arising from human activities [1]. Municipal solid waste is the general heterogeneous mass of rejected items or substances from households in the rural or urban community and the homogenous deposits of agricultural and industrial related rubbish [1]. In spite of the improved development of science and technology, solid waste management is still a serious environmental problem for most communities all over the world [2].

[3] reported that “the current solid waste management system in Nigeria is very rudimentary, insufficient and unsustainable, characterized by inadequate waste management facilities, poor access to waste collection and management services, and

very low quantum of generated waste collection”. They listed some major areas of challenges which include the absence of adequate laws and enabling legislations, inadequate solid waste infrastructure in the country, uncoordinated institutional functions/overlapping functions of existing institutions, inadequate funding and inappropriate technologies for sustainable and effective municipal solid waste management (MSWM). Others are weak enforcement of available laws, regulations, and applicable sanctions, lack of awareness among the general populace on the deleterious impacts of poor solid waste management practices, lack of comprehensive and reliable data for adequate solid waste management in the country, very limited private sector investment, lack of political will, lack of incentives for private sector participation in service delivery of solid waste management - in terms of loans, and availability of jobs to be undertaken by private sector participants, absence of voluntary compliance, lack of clear roles and responsibility for the various tiers of government and lack of cost recovery mechanisms for waste management services. It was opined that the country needed an integrated solid waste management system that will provide a holistic framework for the scale-up of these activities to create country-wide impact. And that to achieve this, Nigerians need to tackle the solid waste management challenges and issues with all seriousness and align with international best practices, adopting solid waste management trends. It was agreed that these efforts will indeed result in substantial reduction in volume of waste generated, increase re-use, recovery and recycling activities while targeting the elimination/upgrade of unsanitary dumpsites and landfills. Invariably, this will encourage private sector participation in solid waste management, create enabling environment for improved investments in the sector, promote job creation and improved economic activities by establishing waste

to wealth schemes. It was intended to comply with international best practices in environmental health and safety standards for solid waste management (SWM) sector, embed modern technologies in all SWM activities (recovery, collection, transport, disposal and treatment) in-country, and comply with international treaties and protocols adopted and ratified by the country on solid waste management. [4] informed that municipal solid waste (MSW) collection service provided by either the private or public sector, includes many activities and requires numerous collectors and equipment. Major aspects of MSW include the per capita generation, the type of equipment employed for collection, treatment and final disposal, the labour involved, and the distances the MSW transported through. They also iterated that inefficient MSW collection can rapidly deplete resources and energy. However, when the critical steps of prevention, reuse, recycling and proper disposal of solid waste are properly adhered to, solid waste menace is reduced to a considerable low level as to achieving a green environment

## II. MATERIALS AND METHODS

This paper is a review of the present waste management practices in Owerri municipality and its current collection efficiency. Sources of information include personal observation, journal articles, questionnaire survey and one-on-one interaction with waste management professionals and residents.

### Description of Study Area

Owerri Municipal is located in the heart of Igboland, at the intersection of roads from Port Harcourt, Onitsha, Aba, Orlu, Okigwe, and Umuahia. Owerri has a tropical climate with a brief dry season and significant monthly rainfall; and an area of 58 square kilometres. The typical yearly temperature is 25.9 °C (78.6 °F). Owerri is a trade center for palm products, corn, yams, and cassava. Before the advent of the British in 1901–1902, Owere town (anglicized Owerri) was and still is today made up of five villages namely – Umuororonjo, Amawom, Umuonyeche, Umuodu and Umuoyima (collectively known as Owerri Nchi Ise). Historically, the indigenes of Owerri trace their ancestry to a man called EkwemArugo. With British

influence and colonization in the early 1900s Owerri town was the headquarters for Owerri Division and later old Owerri Province. Also, when Imo State was created on 3 February 1976, Owerri city was chosen as its capital. On 15 December 1996 Owerri city attained municipal status. Owerri has a total landmass of 24.88 square kilometers and a projected population of 632,781 (2019 estimates) based on 2012 estimates. [5] forecasted that Owerri will be one of the biggest cities come the year 2025 due to its annual population growth rate of 3.2 percent. The weather and climatic conditions in Owerri encourages economic activities such as agriculture (palm products, corn [maize], yams, cassava, etc.), tourism, and small-scale industries [6]. Owerri has an average temperature of about 27°C (80°F). Its vegetation is typically rain forest (although some parts consist of Guinea Savanna due to poor environmental management and pollution). Its inhabitants are mainly civil servants, traders and farmers who are predominantly native [7]. Owerri West is a Local Government Area of Imo State, Nigeria. Its headquarters are in the town of Umuguma. A very large portion of the local government constitute the capital city of Imo State, Nigeria. It has an area of 295 km<sup>2</sup> and a population of 99,265 at the 2006 census.

### Solid Waste Management in Owerri

Owerri has experienced a hike in solid waste growth over the years. There is indiscriminate dumping of waste along roads, drainages, illegal dump sites and in surface waters which has been a challenge to the government for many years (Figure 2). These problems are even more challenging due to economic, political and social factors [8], hence damage is done to the environment and human health as a result of the poor management of solid waste in the municipality. The authors reiterated that SWM has not been adequately invested upon due to political, social and economic factors. Areas of recommendation proposed included the inclusion of private sectors, individuals and organizations to the decision and mitigation of the challenges posed by this poor management in order to achieve a sustainable management system for solid waste.

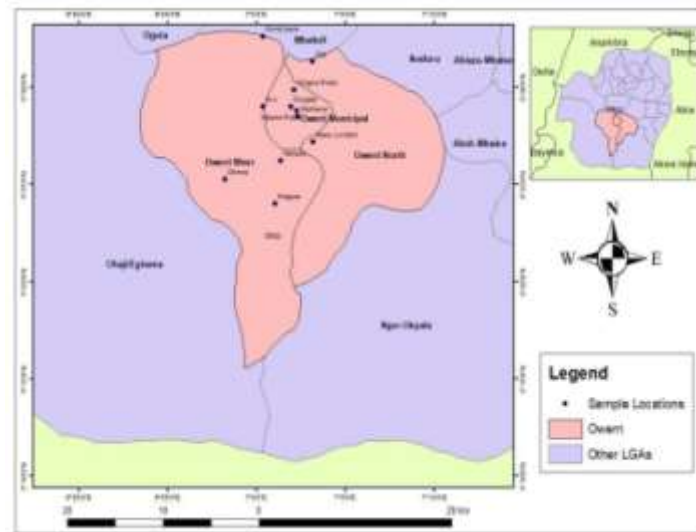


Figure 1. Map of Owerri [5]



Figure 2. An Official Dumpsite in Owerri

[6] described Owerri as the hub of tourism industry in the South-Eastern zone of Nigeria, where the sector is presently under threat as a result of poor waste management. They iterated that an absence of accurate data on solid waste production has been one of the major setbacks in implementing an integrated solid waste management system in the municipality. The proliferation of solid waste in the municipality was attributed to the upsurge of activities and the constant travel into the town from the surrounding rural areas by farmers who bring their produce to sell in its three large markets. Educational, household and health facilities too were not excused from this data; including poor storage facilities which gives rise to the rapid spoilage of perishable products.

In the course of their research on assessment of waste management practices among residents in Owerri municipal, [7] discovered that solid waste was poorly managed and open dumping was a popular means of waste disposal, which are

later gathered by waste collectors and sent to a general dumpsite. Incineration was identified as the least method desired by the residents for waste disposal. Food waste was found to be the most prevalent in the waste stream, and although a number of residents stored their household waste in bin bags and containers, very few persons saw the need for sorting waste before disposal. A very worrying area of interest was that some residents in Owerri disposed their waste in the water closet. This habit will inadvertently lead to blockage of their sewer system and an eventual breakdown if not curtailed. Other residents in Owerri were investigated to dispose their waste in flowing flood waters any time it rains. This habit results in strewn waste all over roads and open spaces, drainages, gutters and bushes, which most times will not be swept away or gathered, thereby leading to reduced aesthetics of the whole area affected. However, there was found a willingness by the affected residents, about 90% of those contacted, to

support the government in having a better waste management system in the municipality by even paying for the service, since they were tired of self-help. The authors concluded by blaming the government for paying less attention to the problem of solid waste in the area, and recommended a better waste management infrastructure, plan, awareness and education to achieve a positive turnaround in solid waste management.

Waste management practices in Owerri markets were looked into by [9]. From their study, it was understood that the markets aesthetics were hampered greatly by poor waste management practices. Markets were identified to be the source of major solid waste generation and because a high percentage of the Owerri populace spends considerable time in the markets daily, they become subject to the negative effects of poor sanitation. Their study was conducted among 400 traders who owned shops in the two largest markets in Owerri municipal, namely, Eke Ukwu and Relief markets. Questionnaires was used as the tool to collate relevant data from the marketers, and findings showed that biodegradable waste had the highest generation and each shop produced an average of 5kg waste per day. This amounted to about 720 tons of waste produced by these markets annually. The deplorable sanitation state of the markets was also attributed to transporting waste to dumpsites via dragging across the floor. This act leads to littering when the bags tear and waste is scattered around the already poorly managed environment.

Places like Eziobodo, Obinze and Ihiagwa in Owerri West were noted to be experiencing very poor sustainable solid waste management. Waste are strewn just about everywhere and plastic waste is on the increase too. This was made public by [10], who also drew attention to a challenge of dumpsite or landfill siting due to hazardous wastes intermingled with domestic waste in the area. They agree with other authors like [11], [12] and [7], that poor solid waste is a menace in the environment such as in Owerri which results to diseases like malaria, yellow fever, myiasis, diarrhea, typhoid and Lassa fever. Their study is also in line with what a number of researchers [13], [14] and [15] discovered concerning the relationship social demographics has with the increase and management of solid waste in Owerri.

[16] also decried the level of waste management in Owerri municipality and the poor attention it received from the residents. They were reported as often throwing waste from windows of moving vehicles, by the roadsides, business premises and markets. Sometimes residents were even known to defecate by the roadsides even in

broad daylight. Open drainages were utilized as dumpsite as well as many other unconventional areas. The author agrees with [17] and [18], that to curb this menace, there needs to be a synergy between the government, private sectors, residents, organizations and the media for state-of-the-art solid waste management system in the municipality.

Waste collection routes and high transportation costs to dumpsites was identified as one of the major setbacks of having a sustainable solid waste management (SSWM) in Owerri according to [19]. They saw the current solid waste management system (SWMS) in the region as informal and inefficient due to inadequate collection system, which leaves waste for long periods on the streets, thereby encouraging more illegal dumping due to these service delivery gaps. To mitigate these challenges, they proposed a framework for intelligent waste collection route optimization using decision tree algorithms for a cloud-based big data repository. The framework seeks to enhance SWM by installing IoT sensor nodes on waste bins to monitor their fill levels. They also proposed using global positioning system (GPS) to tell the present state of the waste in situ at the different storage areas, provide information for optimal collection routes and provide information to collection trucks about the location of waste in the municipality.

### III. RESULTS AND CONCLUSION

From the survey conducted at the eleven sample locations, solid waste collection coverage efficiency was found to be 61.27%. This is very unsatisfactory as a less than 75% of SW coverage signifies low coverage on a global scale. A user inclusiveness by the providers is paramount to mitigate this gap, where complaints from the residents can be initiated and prompt response carried out by the providers to ensure that all the waste is captured to the permanent dump site. Another reason for the low SW coverage is the presence of few haulage trucks and inefficient trucks serving the municipality. The physical condition and efficiency of the collection trucks was seen to have a need of proper general maintenance/refurbishment/replacement, as a greater percentage were observed to be in bad condition. Table 1 shows that waste was evacuated on a daily basis at the eleven locations and that over 50% of the temporary dumpsite utilized waste skips, which is commendable. Naze junction showed the highest percentage of evacuation (81%) while Ihiagwa had the least evacuation frequency (47%). This indicates that more coverage is required to ensure that solid waste is taken off the streets, drains and other unauthorized areas in the municipality.



Therefore, to improve on solid waste management in the area of collection efficiency, the following recommendations are proposed:

1. Implementation of proper and functional solid waste management user inclusivity program.
2. Increase of community involvement in SWM decision-making.
3. Provision and creation of more skips and more temporary disposal sites.
4. Creation of optimal routes for haulage trucks or collection vehicles.
5. Provision of more haulage trucks.
6. Adequate maintenance of haulage trucks.
7. Increase of collection and disposal staffing level and provision of better working conditions.
8. Provision of regular and adequate training for collection and disposal staff.
9. Implementation of strict worker health and safety regulations for collection and disposal staff.
10. Implementation of polluter pays policy.

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Table 1. Coverage of Collection Service

Coverage of Collection Service	OB	NE	IH	AV	DO	WE	MR	OR	OJ	WB	NJ	Average
Haulage truck capacity	5	20	10	10	>20	10	10	10	5	20	20	
Area of Evacuation	Dumps	SD	Dumps	Dumps	Skips	Skips	Skips	Skips	Skips	SD	Skips	
Final point of disposal	OD	OD	OD	OD	OD	OD	OD	OD	OD	OD	OD	
Evacuation frequency	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily	
Evacuation efficiency (%)	54	49	47	50	65	78	59	69	48	74	81	<b>61.27</b>

OB=Obinze, NE=Nekede, IH=Ihiagwa, AV=Avo, DO=Douglas, WE=Wetheral, MR=Mbaise road, OR=Okigwe road, OJ-Orji, WB=World bank, NJ=Naze junction, SD=Skips and Dumps, OD=Official dumpsite

Count		Knowledge of insufficient waste collection trucks										Total	
		40	41	43	47	49	50	54	56	60	62		
Where do you live	Obinze	1											1
	World Bank								1				1
	Nazi									1			1
	Nekede			1									1
	Ihiagwa					1							1
	Avu						1						1
	Douglas				1								1
	Wetheral		1										1
	Mbaise Road					1							1
	Okigwe Road										1		1
	Orji											1	1
<b>Total</b>		1	1	1	1	2	1	1	1	1	1	1	11

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	99.000 <sup>a</sup>	90	0.242
Likelihood Ratio	49.981	90	1.000
N of Valid Cases	11		

