Assessment of the Environmental Impacts of Plastic Waste in Ikeja, Lagos State.

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Abstract
There is a preponderance of plastic in the environment, so much that it has now become an integral part of society. Its usage and applications in the various sectors of the economy are enormous, leading to multiple impacts on the environment. This study attempts to assess the environmental impact of plastic waste on the environment. The study focused on Ikeja core areas comprise Obafemi Awolowo Way, Balogun, Orishe Street, Anifowoshe area, Ikeja under bridge, Ipodo, and Olowu. These areas are primarily for residential and commercial use, with a considerable number of mixed uses. In the process, the study examined the various types and sources of plastic generated in the environment, the volume of plastic waste generated, and the method of plastic waste disposal in the study area. Primary data were used, and questionnaire administration and an interview guide were employed for data acquisition. One hundred and sixty-three (163) respondents were randomly sampled from the total population of 837. Descriptive statistics were used in the analysis with the use of charts, frequency, and percentages. The Relative Impact Index was also used to measure the weight of impacts on the environment. The results revealed that plastic waste has its highest impacts as traffic disturbance, littering, blocked drainage, unsightly scene, and flooding in that order. The study, therefore, recommends the promotion of reduce, reuse, and recycle (3Rs) in the use of plastic materials, creation of awareness on the impacts of plastic waste on the environment, and finding an alternative to the use of plastic.

Keywords: Environment; Plastic Waste; Impacts; Recycling; Lagos

1.0 Introduction

The rapid growth of urban areas, due to the migration of people from one location to another searching for better opportunities, has added to the burden of these urban areas. Globally, the population of citizens in urban areas keeps increasing day by day, and this has caused diverse urban problems ranging from loss of biodiversity, pollution, and land degradation, to the release of toxic gases, high population, and waste problems. (Kumar, 2009).

Changes in lifestyles and the increasing efforts toward a better working condition and improved life are unending goals for the ever-increasing population. To a greater extent, these have contributed to more consumption of varieties of goods, which in turn results in waste generation of different forms. Plastics have become a part and parcel of our lives, with their expanding applications and wide use in various sectors as a form of packaging material. This presents enormous benefits to society, though not without its side effects.

The amount of plastic consumed annually has been growing steadily. (Kumar, 2017; Kaza *et al.*, 2018). For instance, on a global scale, more than one trillion plastic bags are manufactured and consumed annually, whereas less than 5% are recycled. As handy, lightweight, strong, and potentially transparent materials, plastics drive their own growth and are susceptible to a variety

of applications. Again, their low cost, excellent oxygen/moisture barrier properties, bio-inertness, and light weight make them excellent packaging materials. (Verma *et al.*, 2016; Okon, 2018). Plastic waste has been reported as becoming a widely recognised problem. In addition to serving as an important material for the economy and providing numerous benefits in recent times, it could take several years to biodegrade. It takes up valuable space in landfill sites and it is polluting the natural environment (EMS, 2018). According to Proshad *et al.* (2018),

Plastics are made up of synthetic organic polymers which are widely used in different applications ranging from water bottles, clothing, food packaging, medical supplies, electronic goods, construction materials, etc. Initially, plastic was assumed to be harmless and inert, however, many years of plastic disposal into the environment has led to diverse associated problems. (Rochman, *et al.* 2013a). Environmental pollution by plastic waste is now widely recognised as a major environmental burden. (Okunola *et al*, 2019). Plastic waste is said to be currently one of the biggest environmental concerns (UNEP, 2011a). It has become one of the most pressing environmental concerns globally, having become the root of recent global policy debates on environmental concerns. According to a report of the Organisation for Economic Cooperation and Development, the world is producing twice as much plastic waste as two decades ago, with the bulk of it ending up in landfill, incinerated, or leaking into the environment, and only 9% successfully recycled. The volume of plastics in the world grows as the population grows. As it takes hundreds to thousands of years to break down, the effect it has on the environment is long-lasting. Not only does plastic affect the oceans, but also affects the groundwater. In 2019, 6.1 million tonnes (Mt) of plastic waste leaked into aquatic environments, and 1.7 Mt flowed into oceans.

There is now an estimated 30 Mt of plastic waste in seas and oceans, and a further 109 Mt has accumulated in rivers (OECD, 2022). The build-up of plastics in rivers implies that leakage into the ocean will continue for decades to come, even if mismanaged plastic waste could be significantly reduced. (OECD, 2022). Plastic toxins in landfill and from litter can percolate into the groundwater that is available for people to drink. Plastic wastes are dumped illegally and this causes blockage of drainages which later leads to flooding and this has an effect on the environment. When plastic is burned, it releases a large amount of toxins, which pollute the air. (WECF 2004; Hopewell *et al.*, 2009)

In Nigeria, an estimated 50 billion plastic bags are used annually (GGRC, 2014) and plastics have become infinitely popular. They are found in different locations and various forms used for

different purposes. However, the highest form in which plastics are found is plastic bags and bottles. In some local and peri-urban communities in Nigeria, they are even used for feces disposal – a practice that has earned colloquial names like "shot put, flying toilet, and bullet". (Ogwo *et al.* 2013). When improperly disposed of too, plastic waste causes pollution.

In Lagos, pollution by plastic items is a major environmental, and public health problem. (GGRC, 2014). Experts have opined that Lagos generates the highest volume of plastic waste in Nigeria and this is due to the overpopulation and commercial status of the area. (Punch Newspaper, 2018). Despite the government's efforts at recycling these plastics, the environment in Lagos is said to be increasingly choked with plastic waste thereby resulting in serious pollution. Millions of plastic waste accumulate and continue to pile up in the environment. According to Adebiyi-Abiola *et al*. (2019), volume of plastic generated in Lagos state might triple in 2025, if a consistent effort is not geared towards plastic waste control. All the dumped plastic in drainages ends up blocking drainages and has been confirmed to be a major cause of flooding, as they are impermeable materials.

Observations from many streets in Lagos particularly any time it rains, present undisputable evidence as wastes predominantly made of plastic materials accumulate in drainages, leading to water overflow in buildings and on the major and access roads. Asides the traffic disruptions that result, there is also damage to public and private property (Babayemi *et al.*, 2018). This study, therefore examined the various types and sources of plastic generated in the environment, the volume of plastic waste generated, and the method of plastic waste disposal in the study area

2.0 Study Area

Ikeja is the capital of Lagos state and is located at approximately between latitude 6°36'21'N and longitude 3°20'56''E (Geodatos, 2020). It lies in the upland area of Lagos State. It is at the south-facing scarp slope, which is part of the coastal plains. Ikeja consists of seventy-eight communities and the earlier settlers are the Awori, who migrated from Isheri in Ogun State. Some of the traditional settlements include Ipodo, Alausa, Olusosun, Oregun, Ojodu, Onigbongbo, Aguda-Titun, Agidingbi, Coker, Wasimi, Abule-Egun, Oke-Ira, and Keke, etc. However, the population of the Aworis is now a minority, given the enormity of migration and urbanization of the area. The name "Ikeja" was derived from Akeja-Onigorun, one of the ancestral gods of the Aworis in their Ota homeland (Oduwaye and Enisan, 2011). Ikeja became the Capital city of Lagos State in 1976 after the creation of 19 States in the country and since then, there has been a tremendous

development of Ikeja being the industrial and commercial hub of the State (Oduwaye and Enisan, 2011)

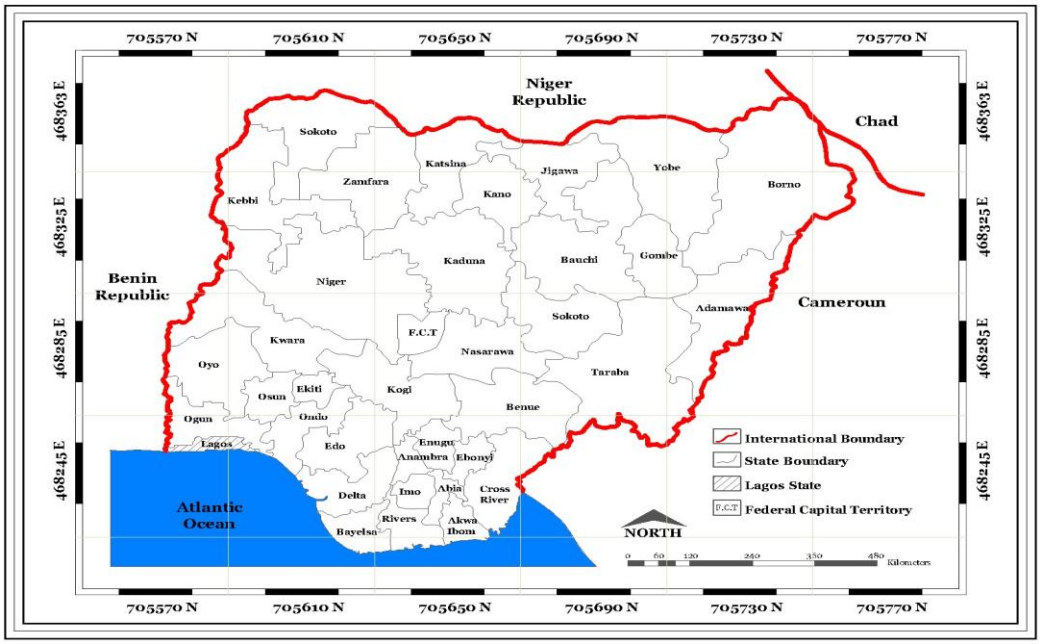


Figure 2.1 Map of Nigeria showing Lagos State
Source: Lagos State Ministry of Physical Planning and Urban Development, 2020

2.1 Economic Activities

The early settlers generally engaged themselves in farming, buying, and selling goods like clothes, agricultural produce, craftwork, and others. These economic engagements were upgraded with time, to the extent that they grew bigger and waxed stronger with more interaction with the people far and near and practically became dominant occupations.

As posited by (Oduwaye and Enisan, 2011), Ikeja can be classified as a high-class area. The heavy industrial establishment in the local government area makes it one of the most important areas for manufacturing activities in the entire federation. It also forms the hub for the emergence of the proposed Megacity in Lagos. With the classification of the city as a model city and the development of the Model City Plan for Ikeja, it will soon find its place among the major economic cities of the world (Oduwaye and Enisan, 2011). The authors claimed further that, along Oregun, Oba Akran, Agidingbi, and Opebi are heavy industrial and commercial activities. Some of the establishments include 7-up, and Eleganza at Oregun, Guinness Brewery, Michelin, Vita foam, Tower Aluminium, and several others. Notable among the commercial hubs is the computer village.

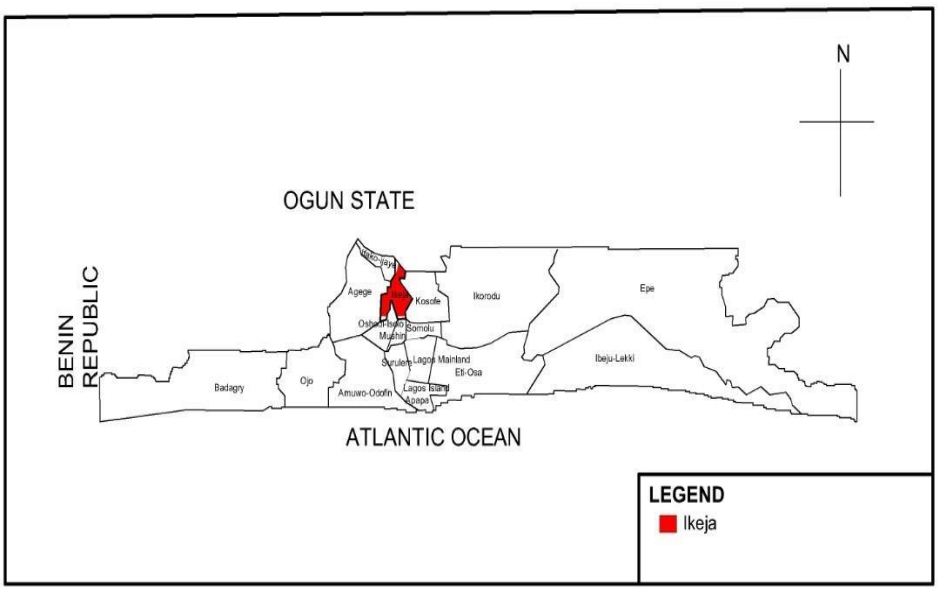


Figure 2.2 Map of Lagos showing Ikeja
Source: Lagos State Ministry of Physical Planning and Urban Development, 2020



Plate 2.1 Satellite Image of Ikeja Core Area, Lagos State
Source: Adapted from Google Earth Imagery, 2020

2.2. Population

According to the 2006 National Population Commission Census, the population of Ikeja is put at 317,614 while in 2016, the Lagos State projected its population to be 437,400 (National Bureau of Statistics, 2017) The later de-facto population of Ikeja was supported by relevant data including existing housing stocks, school enrolments, vehicle and motor bicycle registration and a host of other facts that cannot

be disputed. The population of Ikeja has been projected to be 1,772,787 for the year 2020 with a growth rate of 8.04. (United Nations, 2015)

2.3 Locational Characteristics

According to Oduwaye and Enisan, (2011), Ikeja is divided into four sectors using their geographical location and their homogeneity characteristics. The sectors are; Sector A, comprising Alawusa, the Central Business District, Lagos State Secretariat, and Agidingbi. Sector B, comprises Opebi, Toyin Street, Allen Avenue, Adeniyi Jones, and Aromire Avenue, while Sector C comprises Awolowo Way, Ajao Road, Olowu Street, Orise Street, Anifowoshe area, and Ipodo which are also classified as Ikeja core. Sector D is a private estate owned by Wemabod Estates Limited, which comprises Oba Akran, Ikeja Industrial Estate, Ladipo Oluwole area, etc. The area comprises both residential and industrial estates (Enisan, 2017)

Table 2.1 shows the activity Centres of Ikeja

Sector	***Activity centers***	***Remarks***
A	Alahusa Central Business District, Lagos State Secretariat, and Agidingbi	These are the major institutional land uses in the area
B	Ojodu/Berger Commercial Center	These are commercial areas
C	Ikeja Core: Obafemi Awolowo Way, Balogun, Orishe Street, Anifowoshe area, Ikeja unthe der bridge, Ipodo and Olowu	These form the bulk of residential and commercial use with a lot of mixed uses
D	Oba Akran, Ikeja Industrial estate	These are the major industrial land uses in the area

Source: Oduwaye and Enisan, 2011

3. 0 Methodology

The research adopted a survey design. Primary and secondary data were used in the study, and the instrument of data collection employed was a set of questionnaires. The data that was collected through the use of questionnaires includes the socio-economic characteristics of the respondents, such as occupation, sex, educational qualification, and the methods of plastic waste disposal. Also, the volume and type of waste generated in the study area were collected from plastic waste collectors/agencies. The part where the sample was collected from is Sector C of Ikeja, which comprises Awolowo Way, Ajao Road, Olowu Street, Orise Street, Anifowoshe area, and Ipodo. The total number of buildings in Sector C of Ikeja is 837 buildings (Google Earth Imagery, 2020). Given at least one household per building as a representative, 7% of 837 population was therefore sampled, totaling 163 sample size (Bartlett, *et al.* 2001). Systematic random sampling was used to administer 163 questionnaires by selecting respondent from a building at a random for a start at Awolowo Way as the starting point and selecting other buildings with a fixed interval of 5. The necessary information such as the volume of plastic waste generated was obtained from the Lagos State Waste Management Agency in charge of Ikeja and its environs, as well as private plastic waste collectors. Analysis of data was done with the aid of descriptive statistics and results were presented using tables, percentages, frequencies, and charts of different types. The Likert scale and Relative Impact Index were also used to determine the rank and impact index of plastic waste in Ikeja.

In determining the level of the environmental impact of plastic waste in the area, the Likert scale of 1-5 was used to rate the impact. In this study, the respondents were requested to rate their opinion regarding the identified impacts on a 5-point Likert scale. In ascending order, the impact are No Impact, Less Impact, Moderate Impact, High Impact and Very high impact).

The IWV (Impact Weight Value) was obtained by summing up the product of the total number of responses to each variable and the weight attached to each rating i.e. (a x 5) + (b x 4) + (c x 3) + (d x 2) + (e x 1). The mean used in the computation is obtained by summing up the IWV and dividing it by the total number of variables. The mean deviation is derived by subtracting the mean from the Relative Impact Index of each impact. The mean was derived by dividing the sum of the total Relative Impact Index (RII) by the total number of variables.

This is expressed mathematically as:
NR (f) = Number of Respondents
IWV = Impact Weight Value
X = Mean = $\sum$IWV/NR(f) divided by the number of variables
D = Deviation (Impact Index) = IWV/NR(f) - X
d^2 = Standard Deviation

The nearer the value is to 5, the higher the impact of such environmental issue in the study area.

4.0 Results and Discussion

4.1 Socio-Economic Characteristics

4.1.1 Age of the Respondents

Figure 4.1 presents a pie chart showing the ages of the respondents. The chart shows that the majority of the respondents fall between the age range of 26-40 and 41-60 years with 49.1% and 39.3% respectively. While 19.6% are between the age groups 18-25. It can be concluded from this that people of the age group 26-40 and 41-60 were more than other age groups. This is because most of the respondents were independent traders with stores and stalls.

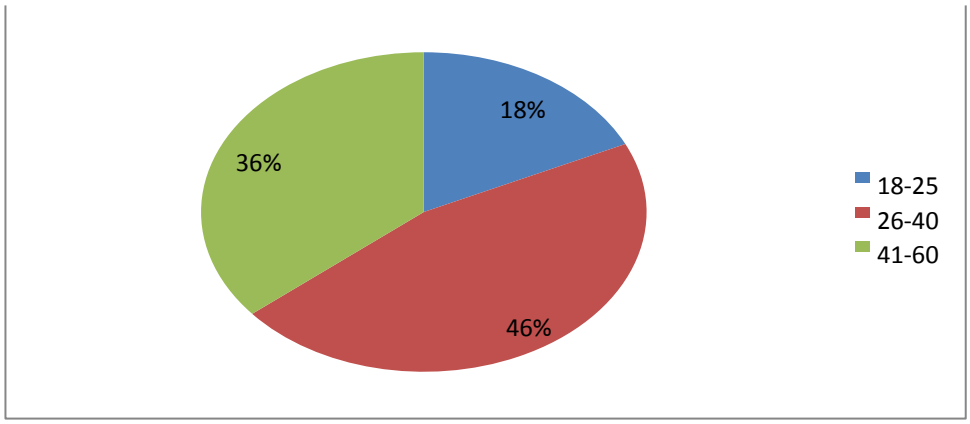


Figure 4.1 Age of the Respondents
Source: Authors' Fieldwork, 2020.

4.1.2: Gender of the Respondents

Figure, 4.2 shows the gender distribution of respondents in the study area, with 50.3% of the respondents being male while 49.7% of the population is female. The closeness in the percentage of both genders is a result of the fact that both genders actively engaged in different activities in the study area. This is very relevant to the study, as the use of plastic transcends gender. Both genders use plastics of different types for economic or personal uses.

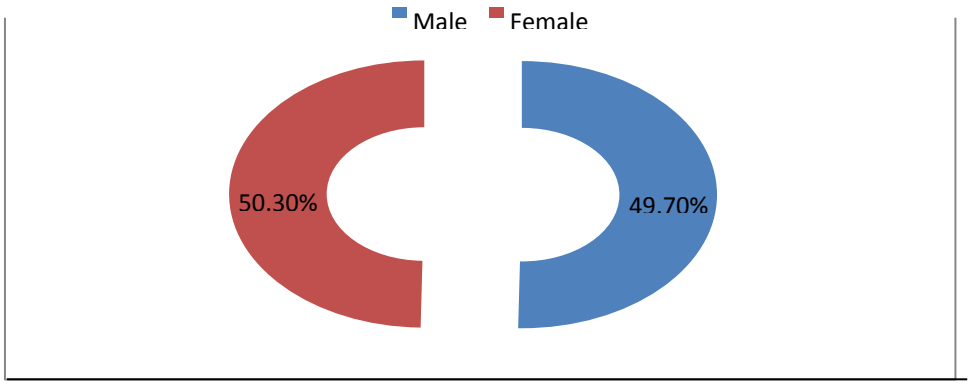


Figure 4.2: Gender of the Respondents
Source: Authors' Fieldwork, 2020

4.1.3 Educational Status of the Respondents

The study as indicated in Table 4.1 revealed the educational status of the respondents. Most of the respondents are tertiary and secondary school graduates with a percentage of 55.2% and 41.1% respectively while those with primary school certificates constitute 3.7%. Therefore, it can be deduced that most of the respondents are learned. This would afford them a better understanding and knowledge of the subject matter and enhance better contributions and output.

Table 4.1 Educational Status of the Respondents

Educational Status	Frequency	Percentage
Primary Education	6	3.7
Secondary Education	67	41.1
Tertiary Education	90	55.2
Total	**163**	**100**

Source: Authors' Fieldwork, 2020.

4.1.4 Occupational Status of the Respondents.

Figure 4.3 provides insight into the Occupational Status of the respondents in the study area. It shows that 47.24% of the respondents were traders, 32.52% were involved in the private sector, 8.59% were civil servants, and 7.36% were artisans while 4.29% of the respondents were students. This result shows the largest percentage of the respondents belong to trading. This is supported by the fact that Ikeja is majorly an economic centre and the heart of the state. It might therefore not be out of place that most of them deal in one way or the other with plastics to package products to and from the markets.

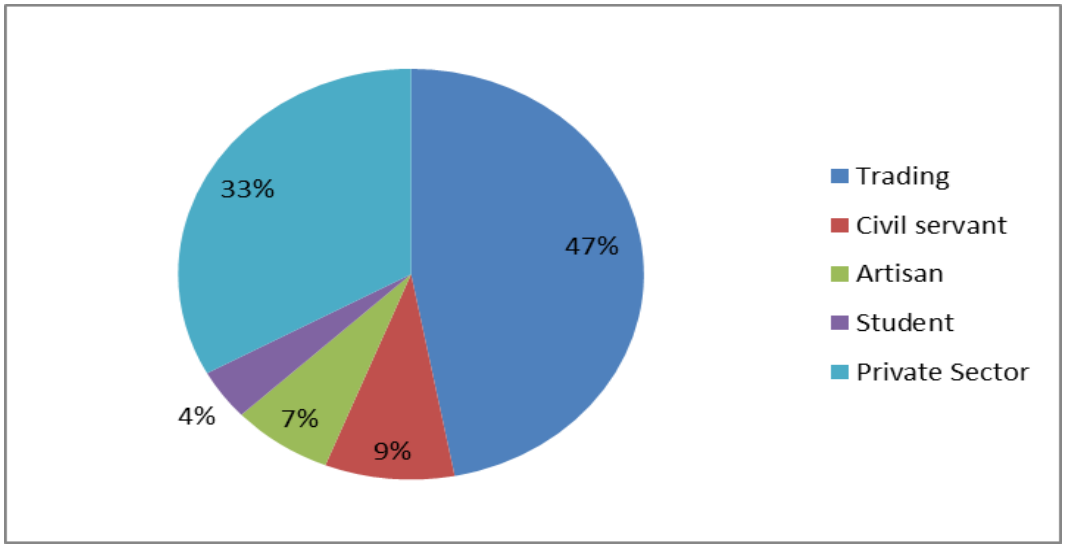


Figure 4.3 Occupational Status
Source: Authors' Fieldwork, 2020.

4.2.1 Types of plastic waste

The result of types of plastic waste as indicated in Table 4.2 revealed that Polyethylene Terephthalate (PET) type used for water bottle and food containers had 43%, High-Density Polyethylene (HDPE) was 24% while Low-Density Polyethylene (LDPE) and Polypropylene (PP) were 12% and 13% respectively. Polyvinyl Chloride (PVC) accounted for 3% and others 5%. Of all the types of plastic recorded, the categories used for bottle, takeaway containers and other packaging materials recorded the highest percentage and only Polyvinyl Chloride (PVC) used in higher grade equipment was the lowest with 3%. It is the type of plastic used for pipes and medical equipment and less common in terms of general waste. This finding is in agreement with Kumar, *et al*., (2016) and European Commission (2018) on the less general waste from PVC and more general waste from PET and HDPE.

Table 4.2: Type of Plastic Waste

Plastic types	**F**	**Percentage**
Polyethylene Terephthalate (PET)	70	43
High-Density Polyethylene (HDPE)	39	24
Low-Density Polyethylene (LDPE)	20	12
Polypropylene (PP)	21	13
Polyvinyl Chloride (PVC)	5	3
Others	8	5
Total	**163**	**100**

Source: Authors' Fieldwork, 2020

4.2.2 Sources of plastic waste

The sources of plastic waste according to the respondents varied, as shown in Figure 4.4, the result indicated that 60% of plastic waste was from household waste (such as single-use plastic bags, bottles, food packaging, and sachet water bags). 30% were sourced from market waste and 5% from industrial waste (manufacturing and construction-related materials). Plastic from medical waste accounted for 3%, and others 2%. This result aligns with that of Pivnenko, (2016) that household generate most of the plastic waste found in the environment due to improper management.

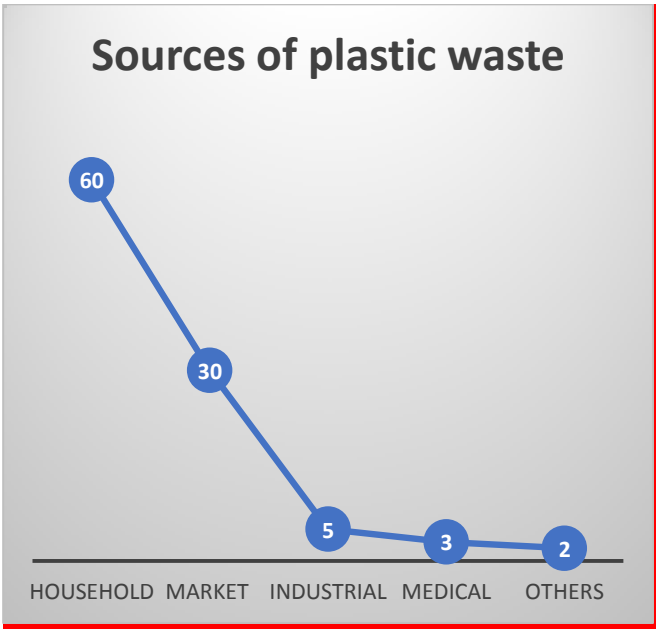


Figure 4.4: Sources of plastic waste
Source: **Authors' Fieldwork, 2020**

4.2.3. Volume of plastic waste

In terms of volume of plastic waste generated in the study area, it was revealed according to the result as shown in table 4.3 that 57% of the

respondents generate 0.10-0.50kg of waste daily, 23.4% of them generated between 0.60 and 1.0kg and the remaining 19.6% generated more than 1kg on daily basis. The implication of this result is that the volume of plastic waste generated by some individuals alone constitute their per capita waste generation with average per capita waste generation of 0.79 kg/person/day in Nigeria (Akindayo, 2019). This simply means that plastic wastes form the larger part of the total waste generated by some of the respondents. The result aligns with UNEP, (2018) particularly for urban centre residents.

Table 4.3: Volume of Plastic Waste

Volume in kg	F	Percentage
0.10-0.50kg	93	57
0.60-1.0kg	38	23.4
Above 1kg	32	19.6
Total	**163**	**100**

Source: Authors' Fieldwork, 2020

4.3 Method of Plastic Waste Disposal

4.3.1 Method of Disposal

Figure 4.5 indicates the result of the plastic waste disposal method. More than 50% of the respondents dump their plastic waste in their immediate environment while 31.97% of the respondents burn their plastic waste. The implication of open dump site filled with plastic waste ranges from buildup of plastic waste in the environment with some finding their way into the drainages. This may further lead to blockage of drainages and eventually to flooding. This is in line with the report of NBS (2019). Burning of plastic materials also contaminates the atmosphere, as the smoke generates carbon monoxide capable of polluting the environment and endangering human lives.

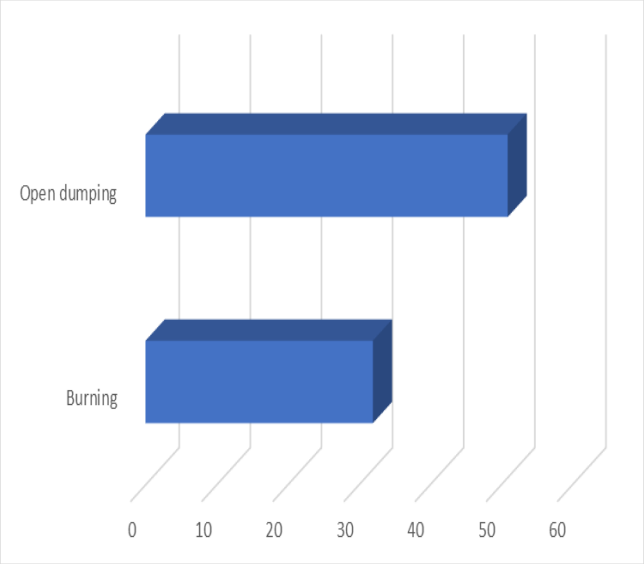


Figure 4.5 Plastic Waste Disposal Methods
Source: field work 2020

4.3.2 Frequency of Burning

After the disposal of waste, the study further probed into the frequency of burning of plastic waste. The result as shown in Figure 4.6 has 53.11% of the respondents burn their plastic waste once a week while 34% burn 2-3 times a week. The respondents agreed that they mostly resorted to burning of plastic when waste management agency didn't collect their waste on time. They only turned to burning when there's no other alternative to the evacuation of their plastic waste. Burning of waste particularly plastic waste is dangerous to the environment. It releases toxic substances such as Furan and Dioxin, Carbon monoxide,

chlorine, hydrochloric acid, amines, nitrides, styrene, benzene, 1,3-butadiene, CCl4 and acetaldehyde into the atmosphere which contributes to climate change and in turn affects the environment and human lives, as the carbon monoxide generated can endanger human lives.

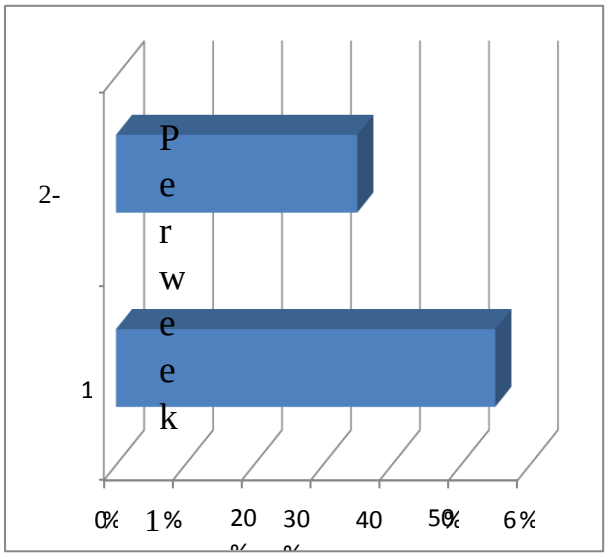


Figure 4.6 Duration of Burning
Source: **Authors' Fieldwork, 2020.**

4.3.3 Waste Collection Services

The study examined the respondents' engagement of waste collection agencies and found, in the Table 4.4, 79.8% engaged in the use of waste collection agencies while 20.2% of them did not make use of waste collection agencies to dispose of their waste. It can be deduced from this that the waste from those who did not engage the service of waste collection agencies is likely to be disposed of indiscriminately thereby finding its way into drainages and other inappropriate places constituting an environmental nuisance.

Table 4.4: Waste Collection Services Engagement

Response	Frequency	Percentage
Engaged	130	79.8
Not engaged	33	20.2
Total	**163**	**100**

Source: Authors' Fieldwork, 2020

4.3.4 Disposal Site

Table 4.5 indicates the result of awareness on the availability of dumpsite in the area. About 66.3% of the respondents claimed that they were aware of dumpsite availability in the study area while 33.7% claimed that they were not aware of any dumpsite. Further investigation from the area however confirmed the existence of a landfill at Olusoshun, though with skeletal services. The presence or absence of a dumpsite around the study area has an important role to play in the proper disposal of waste. There is a tendency to get waste properly disposed of through cart pushers and other collecting agencies who are also sure of where to transport the waste after collection.

Table 4.5: Disposal Site

Presence of disposal site	Frequency	Percentage
Yes	108	66.3
No	55	33.7
Total	**163**	**100**

Source: Authors' Fieldwork, 2020

4.4 The Relative Impact Index (RII) of the Perceived Environmental Impact of Plastic Waste

The overall RII result as indicated in table 4.6 and visually represented in figure 4.7, shows that traffic disturbance caused by plastic waste has the highest perceived environmental impact on the study area as ranked by the respondents with a 0.6 index, followed by littering with a 0.53 index, the third impact caused by plastic waste is blocked drainage, which has 0.33 index, while the unsightly scene was rated fourth with -0.05 index and flooding, according to the RII was rated fifth environmental impact with -0.19 index. It can therefore be deduced from the result that causing traffic disturbance was the highest environmental impact agreed on by the respondents. This is understandable, as the study was carried out in Lagos where traffic gridlock is a daily occurrence.

Table 4.6: Relative Impact Index

Environmental Impact	5	4	3	2	1	NR(f)	IWV	(RII)	Mean	Rank	D
Blocked drainages	41	85	37	0	0	163	656	4.02	**3.69**	3rd	0.33
Flooding	22	45	89	7	0	163	571	3.50		5th	-0.19
Traffic disturbance	7	26	105	25	0	163	504	3.09		1st	0.6
Unsightly Scene	17	74	68	4	0	163	593	3.64		4th	-0.05
Littering	48	106	6	3	0	163	688	4.22		2nd	0.53
Total								18.47			

Source: Authors' Fieldwork, 2020

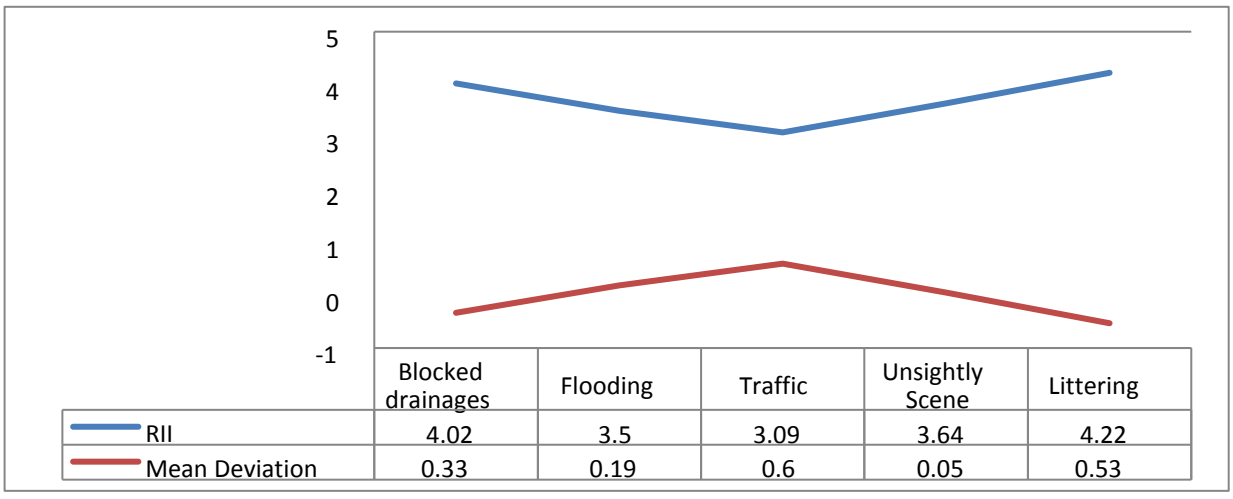


Figure 4.7: Relative Impact Index
Source: **Authors' Fieldwork, 2020**

4.5 Public Perception of Government's effort on plastic waste management

4.5.1 Effort of Government

Figure 4.8 revealed the respondent's perception of the effort of government towards plastic waste management. About 65% of the respondents argue that the government is not doing enough in its efforts to manage plastic waste, while the remaining 35% believe that the government is doing its best in managing plastic waste. This perception must have emanated from the situations around the Ikeja environs where particularly plastic waste was preponderance and an eyesore.

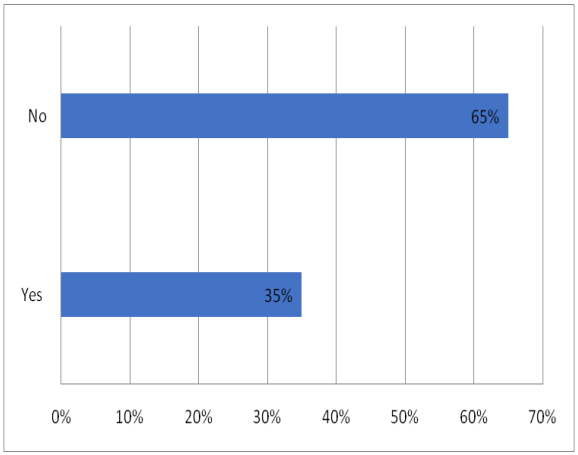


Figure 4.8 Effort of government
Source: Authors' Fieldwork, 2020

The result in table 4.7 shows that 56.4% of the respondents agreed that the use of plastic should be continued while 43.6% agree that the use of plastic should be discontinued. Though, some of the respondents agreed that if plastic was to be discontinued, there should be an alternative such as glass or refill container to it as most of the goods being sold are packaged

Table 4.7 Utilization of plastic

Utilization of Plastics	Frequency	Percentage
Continued	92	56.4
Discontinued	71	43.6
Total	**163**	**100**

Source: Authors' Fieldwork, 2020.

5.0 Conclusion

It is practically impossible nor realistic to rid today's environment of all the available plastic materials, however, given the enormity of plastic and its environmental impacts, alternative materials should be sought, to prune down the effect of plastic waste in Ikeja area. Strict measures are required to address the negative impacts of plastic in our environment and Ikeja in particular, sensitization on the severity of the problems of plastic waste, and the adoption of alternative packaging materials. Recycling technologies can also be considered as reliable solutions to problems attached to plastic waste. Lastly, the development of recycling technologies should be encouraged by the state government to tackle the problem in the environment.

5.1 Recommendations

As a result of the above findings made on the environmental impacts of plastic waste, and the

insight gained from the study, these recommendations, therefore, are suggested to curb or at least reduce the associated environmental impacts of plastics in the study area:

i There is a need for specialized treatment for plastic waste management in Ikeja and Lagos state generally.

ii Given the danger posed by plastic waste, particularly in flooding, strict rules and regulations must be properly enforced by the Lagos state government. The government must chart new environmental protocols and policies that will check the production, entry into the markets and use of plastics.

iii It was discovered during the study that most of the respondents were not aware of the environmental impacts that plastic waste causes in their environment. It is recommended that public sensitization about the impacts of plastic waste in our environment be instituted and run on all media platforms.

iv Alternative use of plastic can curb the problems that emanate from plastic waste. This will reduce the number of plastics being used and in turn, reduce the number of plastic waste dumped within the environment.

v The promotion of reduce, reuse and recycle (3Rs) approach can help in reducing the quantity of plastic waste generation. Reducing production, reusing the already produced ones for other uses, and recycling used plastics for the production of other items will go a long way in solving the environmental impacts plastic waste has on the environment.

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