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Environmental and Socio-Economic Problems Associated Withhousehold Plastic Waste Disposal Practices in Peri-Uuran Areas Ofkano Metropolis, Nigeria

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Abstract : The environmental and socio-economic problems associated with plastic waste disposal practices in peri-urban areas of Kano metropolis was investigated using a survey involving a selected sample of respondents in the study area. It was observed that the environmental problems associated with such practices were contamination of air as a result of indiscriminate burning of plastic waste, water and soil, poisoning and killing of aquatic animals, blockage of drainages, littering of the surroundings and land degradation. Socio-economic problems included reduction in landed property, low agricultural yields and increase in government expenditure for clean ups. It was equally noted that the most significant environmental problem was air contamination during plastic waste burning while the most significant socio-economic problem was reduction in agricultural yield. Thus the recommendations for the study area included enactment and enforcement of strict laws against the indoctrinate disposal of plastic waste among residents, provision of awareness on the adverse effects of improper waste disposal practices provision of waste disposal facilities in designated locations

Keywords : Environmental; socio-economic; plastic waste; disposal; management

1.0 INTRODUCTION

One of the most significant challenges associated with unprecedented urban growth is the increase in indiscriminate generation of wastes particularly solid ones (Mapunda et al., 2023; Angmo& Shah, 2020; Alkaradaghi et al., 2021). As population continues to increase there in turn tends to be an increase in municipal waste majority of which are plastics (mostly non-biodegradable). Plastic wastes are disposed in unregulated dump sites, openly burnt or dumped in rivers leading to serious consequences on the environment (World Bank, 2022). A number of studies have addressed plastics waste management in the Nigerian context but only few have attended to plastic waste disposal practise in peri-urban areas. As opined in previous studies plastics represent one of the most toxic materials posing harmful impactto the environment and man due to improper management at their end-of-life. Poor plastic waste disposal causes serious pollution on land, water and air and exposing people to various poor health conditions (Stubenrauch&Ekardt, 2022; UNEP, 2022). Earlier studies by Koongolla et al. (2019), Diana et al. (2020), Kilic (2022), Lin et al. (2023), and Riaza et al. (2023) reported impact of plastic waste on the health of marine and terrestrial animals Researchers have also proven that the illicit deposition of plastics on the soil causes several health issues and decreases soil fertility (Ferdous, 2021). As reported by Alabi et al. (2019), chlorinated plastics lead to leaching of toxic chemicals into the soil, resulting in contaminating the groundwater and the soil thus posing negative impact on the ecosystem.Seay&Ternes, 2022). Moreover, the socio-economic implications of poor plastic waste management are

far-reaching, affecting key sectors such as agriculture, public health, and local government finances (Nyawira, 2023; Omokaro et al., 2024). However, proper disposal of plastic waste through the adoption of environmentally friendly practices will lead to ecological balance and preservation of biodiversity (Riaza et al., 2023).

Plastic waste disposal practices such as incineration of plastic wastes produce hazardous environmental pollutants which contaminate the atmosphere. Examples of such hazardous chemicals are heavy metals, furans, Dioxins, Carbon (ii) oxide, volatile organic compounds, and micro-plastics (Verma, 2016; Sarkingobir et al., 2021; Takada & Bell, 2021). These harmful substances cause harm to plants, animals, and humans. The inhaling of carbon (ii) oxide causes suffocation and chronic respiratory health problems in human, heavy metals are neurotoxin, and Volatile Organic Compounds (VOCs) are carcinogenic (Sarkingobir et al., 2021).Improper plastic disposal practicesin Nigerian cities Kano inclusive, lead to various forms of pollution, including soil, groundwater, and air pollution, along with the emission of greenhouse gases like methane, and the degradation of the aesthetic quality of the surroundings (Opoko et al, 2016; Rasaq,2024). The consequences of improper disposal of solid waste are more felt in low and middle-income countries, Nigeria inclusive (Massoud et al., 2022; SeethaRam, 2023; Angmo&Shah, 2021; Tamanna &Kabir, 2020; Maletz,et al., 2023;Rasaq,2024).

The proliferation of plastic waste has become a pressing global challenge, significantly exacerbated by the increasing reliance on single-use plastics in households. Inadequate waste management systems, combined with low public awareness and insufficient recycling infrastructure have led to environmental degradation, public health risks, and economic losses (Shelemo, 2023). Thus proper understandingof waste handling issues is thus essential in order to formulate policies and interventions that are effective (Ibikunle, 2022; Belhiah, 2023). The study of plastic waste disposal practices in peri-urban areas of Kano is important as they are experiencing rapid urbanization, have unique socio-economic dynamics, and are dealing with urgent environmental challenges (Riaza et al., 2023). Existing studies on peri-urban waste disposal revealed that most of the plastic related waste generated is either disposed in unregulated dump sites or openly incinerated, thus posing adverse health effects and consequences on the environment (Shittu et al., 2024). This uncontrolled dumping could pose significant threats, contaminating groundwater, and negatively affecting ecosystems. The indiscriminate disposal of plastics not only affects the environment but also exposes individuals working in waste disposal areas to significant occupational health hazards. Proper disposal of generated plastic waste is thus essential for environmental and individual protection. Its effective disposal practices arecrucial to mitigate the risks associated with ineffective disposal systems (Abegaz et al., 2021).

2.0 LITERATURE REVIEW

2.1 Conceptual Review

Household Plastic Waste Management

Household plastic waste management refers to the processes and practices involved in handling plastic waste generated by households, including collection, segregation, recycling, reuse, and disposal (Yintii et al., 2014). Effective management aims to minimize environmental harm while maximizing the potential for resource recovery. Key dimensions in household plastic wastemanagement include waste generation, waste segregation, up-cycling, recycling, reuse and disposal (Chen et al., 2021; Chow et al., 2017; Yintii et al., 2014)

Waste generation is the understanding of the types and quantities of plastic waste produced by households. Waste Segregation is sorting waste at the source to facilitate

recycling and reduce contamination. Recycling and reuse entails converting waste plastics into new products or reusing them to extend their lifecycle. Up-cycling entails the reuse of discarded objects or materials in such a way as to create a product of higher quality or value than the original. Disposal which is the concern in this study includes methods such as landfilling, incineration, or improper dumping, emphasizing on reducing environmentally harmful practices.

2.2 Empirical Studies on Environmental Problems Associated with Household Plastic Waste Disposal Practices

The world is confronted with challenges resulting from the management of huge amount of solid waste disposal, which constitute about 60% plastic wastes. This in turn has made its management very difficult making the situation an issue of concern in research. A number of empirical studies have examined plastic waste disposal practices both in developed and developing countries (Akoudjin et al., 2023; Fhumulan, 2020; Debrah et al., 2021; Roche Cerasi et al., 2021; Shershneva, 2021; Seay& Ternes, 2022; Kariukiet al., 2025).However, there are only few studies that focused on theenvironmental and socio-economic problems associated with plastic waste disposal practices in peri-urban areas in the North western part of Nigeria particularly in a highly urbanised area like Kano metropolis. In many cases, these areas face substantial increases in population and development, which poses intense pressure on infrastructure and waste management systems (Bichi&Amatobi, 2013; Chow et al., 2017). Most studies on plastic waste in Nigeria were restricted in scope to cities rather than peri-urban areas. For instance,studies by Deborah et al. (2021) and Seay and Ternes (2022)which examined disposal of plastic waste in developing countries emphasized that improperplastic waste disposal majorly in urban centres contributes to land, water, and air pollution, disrupting ecosystems and threatening biodiversity. However, the socio-economic challenges associated with plastic waste disposal were not examined and this could lead to unsustainability in the long term.

Rasaq (2024) did extensive review of existing waste management frameworks particularly plastics in Nigeria and their applicability towards the achievement of circular economy. Elimination of waste and pollution, circulation of products and materials, and restoration of nature were used in the assessment. It was discovered that apart from poor implementation of existing solid waste management policies market acceptability of recycled plastic products is still low in Nigeria, hence the need for holistic approaches towards coordination of formal and informal plastic waste recyclers, and establishment of strong linkage between end-user industries and enabling environment to support the recycling process. They observed that despite ban in the single use of plastics across the globe it has not been effective in Nigeria. Nigeria enacted the Plastic prohibition bill banning the manufacturing, use, and importation of all plastic bags in May 2019. However, this ban does not affect the behavioural and plastic management system in Nigeria as plastic bags are still used in cities across the country, littered in waterways and landfills. He therefore, suggested that there is a need to review the bill to include waste generation and management. Although their study was comprehensive in approach they didnor attend to peri-urban areas.

Okpoko et al (2016) conducted a study to determine whether residents' socio-economic characteristics influence their choice of waste disposal method. Based on literature reviewed twenty socio-economic variables were selected and subjected to standard multiple regression using SPSS version 20. Results revealed that the model comprising of the socio-economic characteristics investigated explained only14% of the variance in choice of household waste disposal methods. The findings thus suggest that the socio-economic characteristics of residents in the study area, collectively and individually,

contributed very little in their choice of waste disposal method. Only six of the variables, namely number of households sharing same building with respondents (.001); number of children below eighteen years (.004); employment structure (.004); income (.014); number of wives of household heads (.016); and house type (.037), made statistically significant unique contributions to explaining the choice of waste disposal method by residents in the study area. The number of households sharing same building with respondents contributed the strongest with standardized beta coefficient of -.149 followed by number of children below eighteen years (-.125), employment structure (-.109) and income (- .107). However, their study was only focused on socio-economic factors influencing residents' choice of solid waste disposal methods in informal settlements in Lagos. It also was not specific on the environmental and socio-economic effects of plastic waste disposal in peri-urban areas.

The improper management of plastic waste in most Nigerian cities and its environs equally has significant socio-economic impacts. First of all, the plastic pollution leads to degradation which in turn has adverse effects on agricultural production, tourism, and trade which are the major hubs of the city (Bichi&Amatobi 2013). Similarly,Chow et al. (2017)found that plastic pollution negatively impacts agricultural productivity by contaminating soil and waterways, leading to reduced crop yields and economic losses for farmers. Additional plastic waste can cause complex hazardous derivatives and by-products. Furthermore, improper plastic waste management adversely affects the local government's budget for waste collection and disposal (Cheruiyot&Sitienei, 2020; Omollo, 2019). Thus, the cost of such initiatives can overwhelm local authorities, limiting the potential for sustainable development. In addition, poor waste management often contributes to the spread of diseases, leading to increased healthcare costs (Yang et al., 2018).This could be the same in the peri-urban areas in Kano metropolis. Addressing the issue of household plastic waste requires a holistic approach that integrates environmental conservation with socio-economic development.

3.0 STUDY AREA AND METHODOLOGY

Survey design and observation methods were adopted in the study. It involved obtaining data using questionnaires and physical observation. Variables in the study was developed based on reviewed literature Two peri-urban areas namely Sabon-gari and Danal-Bare in Kano metropolis were purposively selected for the study due to the high population concentration in them. At second stage, the number of streets in each location was identified through physical counts. A total of 195 and 160 streets were identified in Sabon-gari and Danal-Bare respectively. Thirdly, a random start was determined by selecting one out of the first five streets in the study area.Subsequently, every fifth street was systematically chosen after which one out of every ten buildings was selected for study. A household head in each selected building or any other respondent who has attained the age of 18 years or more was selected for questionnaire administration.

Table 1: Number of Buildings in the Study Area and Sample Selected

Area	Number of Streets	Number of Selected Streets	Number of Buildings across Selected Streets	Sample Picked
Sabon-gari	195	40	750	75
Danal-Bare	160	32	605	61
	355	72	1315	136

Source, Author, 2026

The questionnaire was used to probe into respondents' socio-economic characteristics, modes of plastic waste disposal, their awareness of environmentally friendly practices

and their opinions about environmental and socio-economic implications associated with plastic disposal practices in the study area. respondents' opinions of the level of severity of the environmental and socio-economic effects of plastic waste disposal was rated on a Five point Likert Scale ranging from 5-extremely severe, to 1-not severe at all. Physical observation was equally conducted to obtain information on condition of drainages, dump sites, river bodies and quality of air and water in study area. Both descriptive and inferential statistics were used to analyse collected data.

4.0 RESULTS AND DISCUSSIONS

Socio-demographic Profile of Respondents

It was revealed through cross-sectional study conducted in the study area that there was dominance of male residents (68.5%) over the female counterparts (31.5%). Respondents with secondary certificate as their highest education qualification represented the most significant percentage. (64.5), followed by post-secondary qualifications (29.5%) while as few as 15.9% had no formal education. Few respondents (14.0%) in the study area had a primary school education. Majority, representing 60.5% of the respondents in the study area were self-employed while only 11.0% were not employed at all. This indicates that most of the residents ownedone form of business or the other. There was a preponderance of those in the work force age bracket over other age brackets. For instance, about (59.5%) were between the ages of 21 to 45 years and 21.5% of the respondents were between 46 to 60 years. On the contrary, only 20.0% were above 60 years of age. More than half (61.5%) of the respondents earned less than ₦30,000. This implied that a greater proportion of the residents in the study area live below expected living standards. Close to half (48.6%) of the respondents claimed they had household comprising 6 to 10 members while about (30.6%) had between 1 and 5 members. Few (8.0%)of the respondents had over ten household members

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Table 2: Socio-demographic Profile of Respondents in the Study Area

Socio-demographic Profile	Percentage
Gender	
Male	68.5
Female	31.5
Total	100.0
Education	
Not-educated	15.9
Primary	14.1
Secondary	64.5
Post-secondary	29.5
Total	100.0
Occupation	
Self-employed	60.5
Civil servant	28.5
Unemployed	11.0
Total	100.0
Marital status	
Single	37.5
Married	50.5
Divorced	7.8
Windowed	4.2
Total	100.0
Age (in years)	
18-35	33.3

36-45	55.1
46-60	13.5
Over 60	8.1
Total	100.0
Income	
<N30,000	61.5
Between N30,000-N45,000	30.5
Above N45,000	8.0
Total	100.0
Households Sizes	
1-5	30.6
6-10	48.8
Above 10	21.6
Total	100.0

Source: Author, 2026

As regards dwelling attributes, Table 3 shows that majority of respondents lived in the multiple house type (38.5%) while about one-third lived in self-contained flats (28.7%) and single family houses (29.3%). A significant percentage of respondents rented their apartment (62.6%) while 29.7% owed their residence. Very few (6.0%) respondents live in family houses while 3.5% live in other types of dwellings.Over one-half of the respondents 66.8% had either one or two bedrooms in multi-family houses.

Table 3: Dwelling Attributes in the Study Area

Dwelling Attribute	Percentage
Type of Housing	
Self-contained	28.7
Single-family house	29.3
Multiple-family house	38.5
Others	3.5
Total	100.0
Current Tenure Status	
Rental	62.6
Owner-occupied	29.7
Family house	6.0
Others	2.7
Total	100.0
Number of households sharing dwelling with respondent	60.5
More than three	28.5
Three	11.0
Two or less	100.0
Total	

Source: Author, 2026

Respondents' Choices of and Reasons for Plastic Waste Disposal Practices in the Study Area

It was shown in findings that about less than one-third (28.6%) of the respondents indicated thatthey disposed of their household wastes by patronising the government mandated waste management operators. Others dispose of wastes in ways that are prohibited by government.

Respondents' Choices of Waste disposal practices

Dwelling Attribute	Percentage
Government Mandated Operators	28.6
Burning	49.5
Reuse/recycling	45.5
Burying	12.1
Open dumping on vacant land	15.9
Dumping into moving water/drainage	27.0
Others	10.0
Reasons for Choices of Disposal	Percentage
No available Facilities for Disposal	60.4
Not aware of the right practices	45.3
I feel that is the best option	10.4

****Respondents gave multiple responses**
Source: Author, 2026

Fit was shown in findings that over half (60.4%) of residents attributed their choice of disposal to the fact that there were no available facilities for proper disposal of waste. About 45.3% argued that they were not aware of the right practices for proper disposal while and few as 10.45 felt they were disposing plastic watse the proper way.

Environmental and socio-economic problems associated with plastic waste disposal practices in the Study Area

Most (4.29) residents rated contamination of air through burning of plastics having the most severe environmental problems while reuse of plastics was the least (1.90). Reuse of plastics was reported to be the most environmentally friendly metho of disposal. The second most severe environmental problem was contamination of water bodies while the third, fourth, fifth, sixth and seventh were killing of aquatic lives (3.89), littering the surroundings, soil contamination (3.81), blockage of drainages (3.75), land degradation (3.57). respectively. From the results of the findings, it could be said that plastic waste disposal in the study area could be associated with several environmental externalities.In the other hand, socio-economic problems associated with plastic waste disposal practices were reduction in land property value (3.95), reduction in agricultural crop yield (3.85) and increase in government expenditure on clean-ups (3.01). the finding confirms earlier submissions by Bichi and Amotabo (2013) and Fhumulani (2020) that plastic waste disposal practices poses both environmental and socio-economic impacts in an urban setting.

5. CONCLUSIONS AND RECOMMENDATIONS

The study investigated the environmental and socio-economic problems associated with plastic waste disposal practices in peri-urban areas of Kano metropolis. It was observed that the environmental problems associated with such practices were contamination of air as a result of indiscriminate burning of plastic waste, water and soil, poisoning and killing of aquatic animals, blockage of drainages, littering of the surroundings and land degradation. Socio-economic problems included reduction in landed property, low agricultural yields and increase in government expenditure for clean ups. It was equally noted that the most significant environmental problem was air contamination during plastic waste burning while the most significant socio-economic problem was reduction in agricultural yield. Thus the recommendations for the study area were

a) Enactment and enforcement of strict laws against the indoctrinate disposal of plastic waste among residents
b) Provision of awareness on the adverse effects of improper waste disposal practices
c) Provision of waste disposal facilities in designated locations

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