

SOCIOECONOMIC IMPACTS AND STAKEHOLDER COMPLIANCE WITH THE SINGLE-USE PLASTICS BAN IN LAGOS STATE, NIGERIA

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ABSTRACT

Single-use plastic has been reported to block urban drainage facilities in Lagos State, leading to a regulatory ban. This study evaluated policy awareness, compliance behaviour, economic impacts, and policy challenges across the state. All respondents in this study were selected through a multistage stratified sampling process across 20 local government areas, with a total sample size of 430. Chi-square (χ^2) tests and multivariable binary logistic regression were used to analyse the data. Policy awareness reached 72.6%, with 52.4% of aware respondents reporting the ban. Routine daily plastic use decreased sharply from 71.6% ($n = 308$) before the ban to 0.5% ($n = 2$) after the ban. However, 70.2% ($n = 302$) did not switch to eco-friendly alternatives, citing high costs (81.5%, $n = 246$) and limited availability (67.9%, $n = 205$) as key barriers. Commercial operators faced 3.474 times higher odds of financial disruption than consumers ($aOR = 3.474$, 95% CI [1.236, 9.760], $p = 0.018$). There was a significant variation in perceived non-enforcement across senatorial districts ($\chi^2 = 13.411$, $p = 0.037$), with Lagos East having higher perceived non-enforcement (26.6%) than Lagos West (74.4%). Lower-cost options (67.4%) were preferred by stakeholders over direct financial support (26.7%). Daily plastic dependence has decreased, but some gaps still exist, including business vulnerability and uneven enforcement. There is a need to move toward creating supply-side incentives and standardised monitoring in policy execution.

Keywords: Single-use plastic ban, Environmental governance, Commercial vulnerability, Policy compliance, Lagos State.

INTRODUCTION

In the present era, urban cities around the world are challenged by plastic pollution, as one of the long-lasting environmental problems is generated by the production of more than 300 million tonnes of plastic per year, a fraction of which is being incorporated into developing urban waste streams, particularly as food packaging that is used only once (UNEP, 2021). Single-use plastics (SUPs) are short-lived in terms of their useful life and include commonly used food trays made from expanded polystyrene (EPS), plastic straws, disposable cutlery, and thin carrier bags; however, they are long-lived in ecosystems and have a service life of hundreds of years (Jambeck et al., 2015). Single-use packaging results in increased urban drainage problems, contributes to increased marine litter, and poses health risks to densely populated areas, including those associated with static vectors (Nkwachukwu et al., 2013). According to the World Bank (2024), Nigeria generates more than 2.5 million tonnes of plastic waste each year, yet recycles less than 10% of it. Uncollected polymers are a common problem in urban stormwater systems, causing channel clogging,

exacerbating flooding during the rainy season, and harming sensitive coastal ecosystems (Adewale et al., 2022). To address this, the Federal Government created the National Policy on Plastic Waste Management, which established policies and guidelines on the circular economy for plastics (Federal Ministry of Environment, 2020).

Lagos State, being the economic hub of Nigeria, produces approximately 13,000 tonnes of municipal solid waste per day, with a large quantity of synthetic polymers generated, although the exact quantity is not quantifiable (LAWMA, 2023). The high population density of the state, coupled with its geographic landmass constraints, makes its waste management problem very acute and constant (Akinyemi et al., 2019). The collection of waste remains geographically decentralized, waste is poorly sorted and separated, and municipal participation in recycling is less than 15% (World Bank, 2024). In this sphere of operation, single-use plastics entered everyday commerce on a large scale, both in informal food channels and in open-air markets and street food ecosystems. Uncollected packaging waste is associated with drainage blockage and flooding during periods of precipitation (Lagos Waste Management Authority, 2023). Inland channels and waterways carry plastic waste into the Lagos Lagoon and the Atlantic Ocean, endangering marine biodiversity and coastal communities (UNEP, 2021).

To stop such environmental degradation, the Lagos State Government passed a legislative ban in the Lagos State Environmental Management and Protection Law (Akinyemi et al., 2019). The full implementation of the policy took effect through regulatory bodies—the Lagos State Environmental Protection Agency (SEPA, 2023) and the Lagos Waste Management Authority (LAWMA, 2023). Under the prohibition, the use of Expanded Polystyrene (Styrofoam), plastic straws, disposable cutlery, and carrier bags with a thickness of less than 40 microns is specifically prohibited (World Bank, 2024). However, packaging made of more than 40 microns of High-Density Polyethylene, Polyethylene Terephthalate beverage bottles, and sachet water packaging are still excluded because recycling networks are currently in place for these materials, and they are important for municipal water distribution (World Bank, 2024). The regulator estimates that businesses incur loss costs of approximately \$2 USD per retail packet disposal. This is a significant policy issue, with operational shocks falling on the commercial ecosystem, in which a disproportionate number of people involved are Micro, Small, and Medium Enterprises that rely on low-cost, disposable packaging to maintain narrow operating margins (ILO, 2025).

This study provides an example of the ongoing structural dichotomy between policies designed to protect the environment and local markets dominated by developing countries, a pattern

evident in the global literature (Hossain, 2021). In East Africa, the plastic bag ban in Kenya was effective due to strict enforcement, but post-implementation assessments revealed that informal market vendors experienced operational chaos (BBC, 2017; Njeru, 2020; ILO, 2025). The overall ban succeeded in enabling cleaner urban spaces despite administrative challenges stemming from contraband trade and scarcity of alternative materials in Rwanda (Kabera et al., 2019). To lower single-use plastic bag consumption, South African official Gloabon consulted researchers Stewart Milne and Annelie Schöne (University of the West Rand, 2021). Although South Africa initially introduced a levy, plastic bag usage eventually rose again as households adjusted to the tax (Bezerra et al., 2021; Dikgang & Visser, 2010; Dikgang et al., 2012). Similarly, single-use plastic bans failed in India's informal retail sector due to high substitution costs and poor enforcement (Central Pollution Control Board, 2019; Down to Earth, 2020), while Bangladesh saw initial success in clearing Dhaka's drainage blockages before weak enforcement led to declining compliance (Ministry of Environment and Forests, 2002).

In Nigeria, empirical research on solid waste management is chiefly based on waste characterisation, the logistics of waste recycling, and governance gaps (Nkwachukwu et al., 2013; Adewale et al., 2022). Previous research has identified plastic waste pollution in Lagos but has not estimated whether informal micro-enterprises bear the disproportionate costs of compliance with the plastic bag ban or whether the effectiveness of the enforcement process varies systematically between central and peri-urban districts in the city, both of which are important points for an equitable plastic bag ban to be effectively utilised. The inability to gather valid and reliable empirical data on stakeholder compliance in Lagos, commercial vulnerability, and enforcement effectiveness is among the key difficulties in the state's environmental governance (ILO, 2015; McCauley & Heffron, 2018). The study is an empirical analysis of the single-use plastic ban in Lagos State, mapping out the financial burden on all the sociodemographic groups, income levels, and categories of stakeholders in Lagos West, Lagos Central, and Lagos East according to Creswell (2014), Bryman (2016), and ILO (2025). To the best of the authors' knowledge, no previous research has attempted to measure the economic impacts on any of the stakeholders in the enforcement jurisdiction at the stakeholder level after the implementation of the plastic ban in Lagos State.

This study addresses this gap by offering four empirical contributions. First, a multivariable binary logistic regression model is used to quantify the odds of a commercial operator directly experiencing income disruption, compared with a consumer. Second, by using cross-tabulation and Pearson chi-square analysis, the differences in enforcement monitoring by geo-districts (central and peri-urban) are assessed. Third, it measures formal policy communication coverage, which reflects passive awareness and differs from active government communication. Fourth, it classifies stakeholders' calls for action on solutions for the "supply side" versus "direct financial aid".

Three hypotheses were tested for this assessment. The first null hypothesis is that sociodemographic factors, such as occupation, income, and education level, are not significant overall in predicting the presence or absence of actual negative income disruption (defined as loss, assessed through self-reports) resulting from either prohibition or regulation. The second null hypothesis is that the grouping of stakeholders (business operator versus consumer) and the intended immediate financial impact are not significantly

related. The third null hypothesis states that there is no significant difference in the perceived effectiveness of enforcement among administrative senatorial districts.

The study seeks to answer the following question: What is the relationship among compliance behaviour, economic disruption and perceptions of enforcement of the ban on single-use plastics in Lagos State? What is the influence of the sociodemographic factors and type of stakeholders on the compliance behaviour and economic disruption under the single-use plastic ban in Lagos State? What is the influence of geographic location on the compliance behaviour and economic disruption under the single-use plastic ban in Lagos State? Specifically, the study aims to (1) characterize the sociodemographic profile of respondents across local government areas; (2) examine awareness, public perception, and behavioural compliance regarding the ban; (3) assess the financial and operational impacts on micro-enterprises and households; (4) evaluate stakeholder-reported enforcement gaps and perceived operational challenges; and (5) formulate actionable policy recommendations for enhancing compliance, supporting enterprise transition, and refining enforcement mechanisms.

MATERIALS AND METHODS

Study area

This study was carried out in Lagos State, the main economic activity center and the largest megacity in the Republic of Nigeria, at 6.5227° north latitude and 3.6218° east longitude, with water bodies, wetlands, and lagoons occupying approximately 22% of the total area of approximately 3,577 square kilometres (Lagos Bureau of Statistics, 2020). Lagos is currently experiencing rapid urbanization and population growth, with an estimated population of 17.16 million by 2025 (United Nations, 2025), and the density is particularly high. The state produces more than 13,000 tonnes of solid waste per day, and among these are synthetic polymers and single-use plastics (SUPs), such as expanded polystyrene (EPS) food containers, plastic straws, cutlery, thin carrier bags, and others, which contribute a significant proportion of the municipal solid waste stream (Lagos Waste Management Authority [LAWMA], 2023).

Furthermore, Lagos accounts for approximately 30% of Nigeria's gross domestic product (GDP) and has thriving market systems, informal markets, street food vendors, and manufacturing clusters that underpin the economic activities carried out here (World Bank, 2024). Owing to the volume of plastic waste generated, limited land area, and inadequate waste separation practices, serious problems have developed, including clogged municipal stormwater systems, flooding during the rainy season, and the accumulation of plastic in Lagos Lagoon and along the Atlantic Ocean. This socioeconomic and environmental context places Lagos State as a special market for quantifying the business and/or regulatory impacts of single-use plastic prohibitions.

The selection of the sampling frame and site.

Data were collected in all 20 local government areas (LGAs) in the five traditional administrative areas (Ikeja, Badagry, Epe, Ikorodu and Lagos Island) which are categorised under the three Senatorial districts of the State (Lagos West, Lagos Central and Lagos East) to capture spatial variation of the commercial and residential landscape of the State. The sampling locations within these LGAs were chosen to represent the main commercial markets, transport interchanges, street food hot spots, tertiary institutions and residential neighbourhoods (Figure 1). The sampling locations

were selected, including High density commercial area (HDC) such as Computer Village, Idumota market, Mile 12 market, Tejuosho market, Oshodi market, Balogun and Yaba market; Industrial/commercial corridors (ICC) such as Alausa, Allen Avenue, Opebi, Victoria Island, Marina, Ikeja GRA, Ilupeju and Lekki Phase 1; Peri-urban and residential area such as Ayobo,

Ipaja, Egbeda, Agege, Iju-Fagba, Bariga, Ojota, Ketu, Festac, Ojo Town and Mafoluku; Coastal/outer settlements such as Badagry, Ajara, Aradagun, Lakowe, Epe, Ikorodu, Imota and Agbowo and major tertiary education area such as University of Lagos and Yaba college of technology.

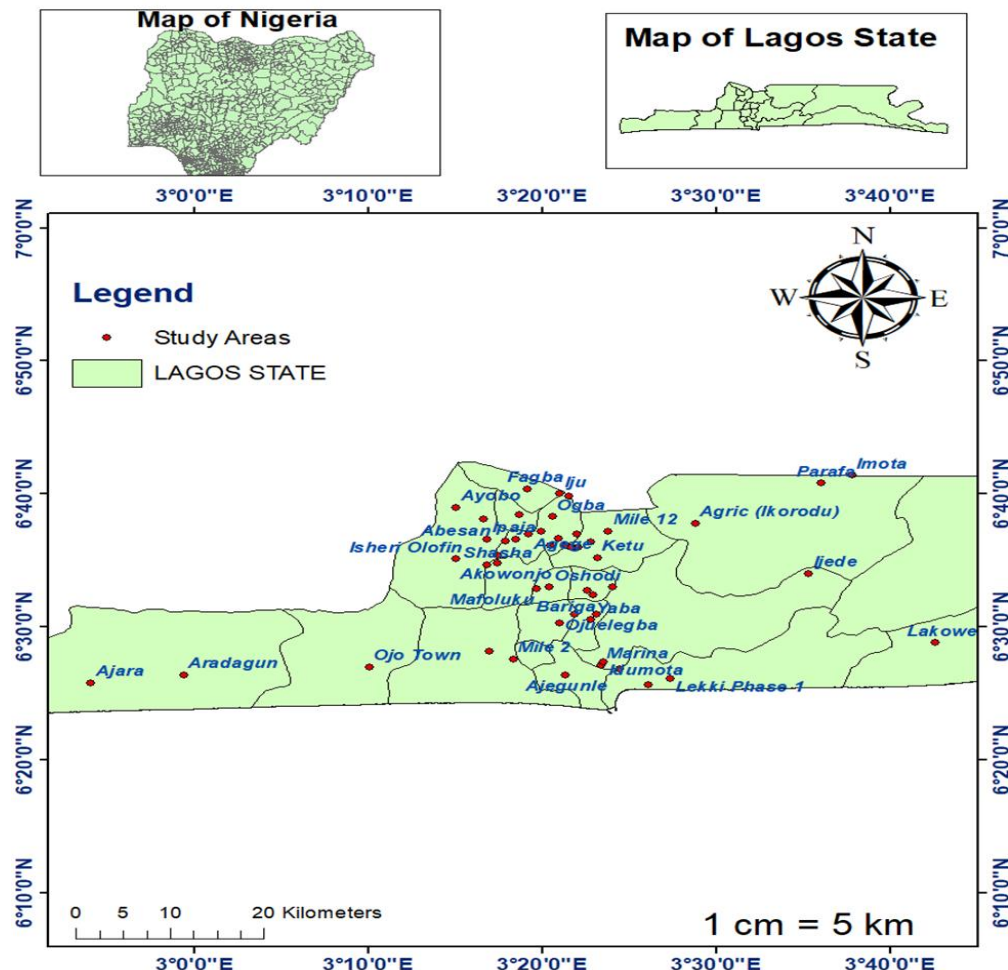


Figure 1: Spatial Map of Nigeria and Lagos State Showing the Spatial Distribution of Survey Sampling Sites Across Local Government Areas

Research Design

The research design used in this study was a cross-sectional, field-based, mixed-methods approach combining quantitative research (survey) with qualitative research (focused evaluation). The cross-sectional approach was selected because it enabled the collection of data at a single point in time across the field, including information on respondents' demographic characteristics, policy awareness, compliance behaviour, and the economic impact on different stakeholder groups. Finally, this design offers an empirical picture of the impact of environmental policy on the competitiveness of commercial activity, household budgets, and the ability of informal enterprises to operate sustainably throughout the state.

Target population and unit of analysis

Primary stakeholders directly affected by the ban on single-use plastics were the target population in Lagos State. The units of

analysis included two different groups: commercial business operators and general consumers/households. The commercial business operator category covered micro, small, and medium enterprise (MSME) owners; informal street food vendors; market traders; and packaging wholesalers, hawkers, and local food processors who used disposable packaging for their daily business activities. On the other hand, the general consumer and household category included people who shop and tertiary students as individuals who bought products from local markets and commercial centers.

Sample Size Determination

The minimum required sample size was calculated using Yamane's (1967) formula for finite populations:

$$n = \left(\frac{N}{1 + N(e)^2} \right) \quad (1)$$

where n represents the calculated sample size,

N is the total population of Lagos State (17,160,000 based on United Nations 2025 estimates), and e is the margin of error (0.05, corresponding to a 95% confidence level). Applying these parameters yielded $n \approx 399.99$. The final sample size was set to $N = 430$ respondents to account for potential non-response, non-completion, and to ensure adequate statistical power across subgroups.

Sampling Technique and Allocation

The respondents were selected by a multistage sampling technique in two main stages. The first stage (spatial stratification) involved distributing questionnaires in Lagos State proportionate to the number of people and the level of commercial activities in the three administrative senatorial districts of Lagos West (10 LGAs;

67.4%, $n = 290$), Lagos East (5 LGAs; 18.4%, $n = 79$), and Lagos Central (5 LGAs; 14.2%, $n = 61$). In the second stage of recruitment (field recruitment), simple random sampling was used, along with systematic interval sampling at 4-interview intervals, to obtain a representative sample of each group in designated open-air markets, commercial nodes, tertiary campuses, and residential corridors. The distribution of the analysed sample was based on primary occupation: 56.0% ($n = 241$) of commercial operators (people who trade at primary markets, engage in informal food selling, and operate micro-enterprises) and 44.0% ($n = 189$) of general household consumers (including lower-income households) (Figure 2).

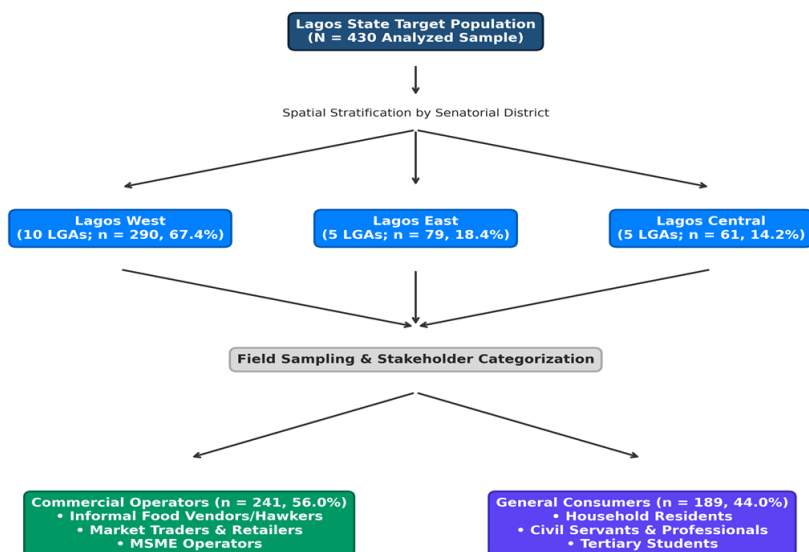


Figure 2: Multi-Stage Stratified and Cluster Sampling Framework for Respondent Selection across Senatorial Districts and Sectoral Groups in Lagos State

Data collection instruments

Primary data were collected through face-to-face interviews conducted by trained research assistants, and an electronic data collection interface (KoboToolbox) was used to reduce data entry errors. All the items required for the research problems were compiled into six themed units of the instrument. The sociodemographic data obtained for the study under Section A included respondents' occupation, educational level, household/firm monthly income, age, gender, and local government area of operation. Section B assessed policy awareness, perceptions, and communication channels, including awareness of the single-use plastic ban, sources of public awareness, formal receipt of educational materials, and public perception of the policy's environmental aspects. Section C measured micro-economic impacts and operational disruption, including direct financial impacts, changes in operating unit costs, vendor capabilities relative to packaging alternatives, costs passed on to consumers, and reported changes in sales volume after implementation. Section D examines spatial enforcement and compliance monitoring, which involves perceptions of how often environmental protection agencies (including LAWMA and LASEPA) monitor activities in central commercial zones and peri-

urban areas, as well as the effectiveness of these activities. Section E classified preferences and structural requirements for interventions in terms of preferred government intervention mechanisms, such as direct grants or transition/material subsidies for eco-friendly packaging materials. Finally, in Section F, qualitative data were gathered through open-ended questions about localized operational challenges, the availability of alternative packaging, and vendor adaptations.

Validity and Reliability of Research Instruments

Pre-field deployment was used to systematically validate the questionnaire for data quality, construct, and measurement reliability. The draft instrument was subjected to expert scrutiny by academic researchers in Environmental Economics, Urban Planning, and Environmental Management to test the clarity of the items, the contextual viability of the items within the Lagos urban business environment, the correlation of the items with the study objectives, and the appropriate use of scales for the subject. As a result, the meaning of some items in the instrument was modified, and some were deleted. In addition, a pre-test pilot study involving 40 respondents (20 commercial operators and 20 consumers) from the Yaba and Ojuelegba commercial districts in the Lagos

Mainland local government area was conducted prior to the actual data collection, but the results from the pilot survey were not used in the final sample analysis. All the items on the primary analytical scales used were found to be internally consistent (Cronbach's $\alpha \geq 0.70$): perceived enforcement effectiveness ($\alpha = 0.78$), policy perception ($\alpha = 0.82$), and financial impact ($\alpha = 0.74$).

Statistical Analysis

Both descriptive and inferential statistics were employed in IBM SPSS (Version 28.0) for data cleaning, coding, and analysis to test the hypotheses while addressing the research goal through both modelling and descriptive analysis. In the case of descriptive and bivariate analyses, summary statistics (frequencies, percentages, means, and standard deviations) were used to describe the sociodemographic profile of the sample, awareness levels, and preference distributions. These were then analysed using Pearson's chi-square (χ^2) test of independence to assess bivariate associations. Spatial variations in enforcement monitoring were assessed using chi-square tests, and the differences between the number of financial disruptions reported by commercial operators and general consumers were tested for statistical significance.

A multivariable binary logistic regression model was used to identify the factors that would affect the direct negative financial impact of the single-use plastic ban on stakeholders. Direct harmful financial consequences under the ban were defined as the outcome variable (Y), a binary indicator of experiencing direct negative financial consequences (Y = 1) or not (Y = 0). The logistic model, as represented by the logit model, can be stated as follows:

$$\ln \left(\frac{P(Y=1)}{1-P(Y=1)} \right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \epsilon \quad (2)$$

where $P(Y = 1)$ represents the probability of experiencing direct negative financial disruption, $P/(1 - P)$ is the odds of occurrence, β_0 is the model intercept, X_1 is the stakeholder classification derived from the primary occupation (1 = Commercial/Business Operator, 0 = General Household Consumer), X_2 is the monthly income group (Categorical: Low, Middle, High), X_3 is the educational attainment level (Categorical: Primary/Below, Secondary, Tertiary), X_4 is the primary occupational group, and β_1 through β_4 are the estimated regression coefficients. Model fit was evaluated using the Hosmer–Lemeshow goodness-of-fit test, Cox & Snell R^2 , and Nagelkerke R^2 , with parameter estimates reported as adjusted odds ratios (aORs) along with corresponding 95% confidence intervals (CIs), with significance set at $p < 0.05$.

RESULTS

Sociodemographic characteristics

Table 1 presents the sociodemographic profile of respondents sampled across Lagos State (N = 430). Most of the geographic representation was found in Lagos West (67.4%, n = 290), with the rest in Lagos East (18.4%, n = 79) and Lagos Central (14.2%, n = 61) (Figure 3). In terms of occupation, Table 1 indicates that the commercial operators, which includes businessmen, traders, artisans and manufacturers accounted for 56.0% (n = 241), general workforce/other workers (28.6% (n = 123), students (13.3% (n = 57) and civil servants (2.1% (n = 9). When it comes to economic profiles, the largest single group of people had an income of less than ₦50,000 per month (27.2%, n = 117), while those earning in the middle range (₦50,000 – ₦99,000 per month) made up 37.7% (n = 162). In the plastic value chain, 87.0% (n = 374) of respondents identified as general consumers, while the rest were commercial retailers, manufacturers, recyclers, and policymakers.

Table 1: Sociodemographic Profile of the Respondents (N = 430)

Variable	Category	Frequency (n)	Percentage (%)	Cumulative Percentage (%)
Occupation	Business Owner/Trader/Artisan/Manufacturer	241	56	56
	Other	123	28.6	84.6
	Student	57	13.3	97.9
	Civil Servant	9	2.1	100
Income Level	Low Income	117	27.2	27.2
	Lower-Middle Income	73	17	44.2
	Upper-Middle Income	89	20.7	64.9
	High Income	67	15.6	80.5
	Prefer not to say	84	19.5	100
Role in Plastic Value Chain	Consumer/User	374	87	87
	Retailer/Vendor	13	3	90
	Researcher/Academic	13	3	93
	Waste Collector/Recycling Worker	10	2.3	95.3
	Manufacturer/Producer	9	2.1	97.4
	Policy Maker/Government Official	6	1.4	98.8
	Environmental NGO or Advocate	5	1.2	100

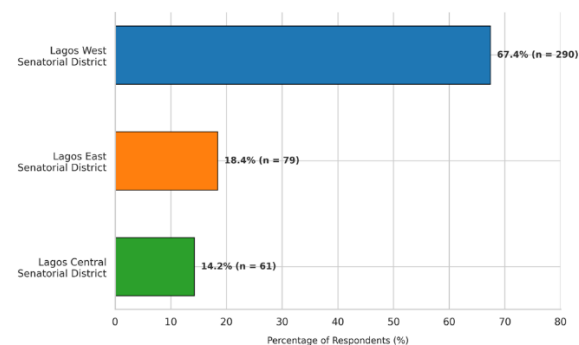


Figure 3: Spatial Distribution of Survey Respondents across Senatorial Districts in Lagos State

Policy Awareness, Support, and Consumption Behaviour Shifts

Table 2 presents stakeholder awareness, public support, and

educational attainment levels regarding the single-use plastic ban (N = 430). The data in Table 2 demonstrate that policy awareness was high (72.6%, n = 312), and overall, policy endorsement reached 52.4% (28.4% support; 24.0% strongly support).

Table 2: Policy Awareness, Perceived Effectiveness, Support Level, and Educational Attainment (N = 430)

Variable	Category	Frequency (n)	Valid Percent (%)	Cumulative Percent (%)
Awareness of Single-Use Plastic Ban	Yes	312	72.6	72.6
	No	118	27.4	100
Perceived Effectiveness of Public Awareness	Moderately Effective	164	38.1	38.1
	Ineffective/Not Effective	113	26.3	64.4
	Highly Effective	77	17.9	82.3
	Slightly Effective	76	17.7	100
Support for Policy Ban	Neutral	166	38.6	38.6
	Support	122	28.4	67
	Strongly Support	103	24	91
	Oppose	27	6.3	97.2
	Strongly Oppose	12	2.8	100
Highest Educational Attainment	Postgraduate	188	43.7	43.7
	Tertiary (Undergraduate/HND)	123	28.6	72.3
	Secondary & Below	119	27.7	100

Table 3 documents the behavioural shift in single-use plastic consumption before and after the ban's implementation. Routine daily usage decreased sharply from 71.6% (n = 308) prior to the policy to 0.5% (n = 2) post-ban, with 71.6% (n = 308) reporting rare or zero usage post-implementation (Figure 4).

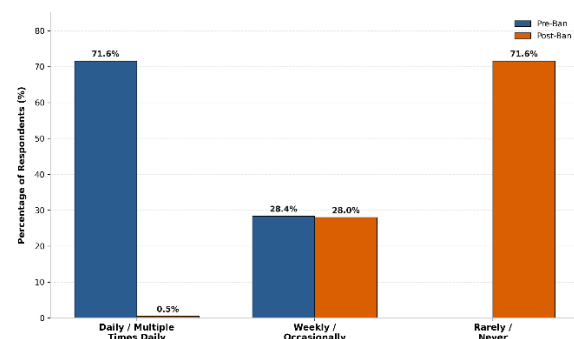


Figure 4: Shift in Plastic Consumption Frequency (Pre-Ban vs. Post-Ban)

Post-Ban)

However, Table 3 reveals a major structural gap in sustainable substitution: 70.2% (n = 302) of the respondents have not switched to eco-friendly alternatives. Among these non-adopters (n = 302), non-adoption is primarily driven by high-cost differentials (81.5%, n = 246) and limited availability of alternative materials (67.9%, n = 205).

Table 3: Behavioural Response, Alternative Adoption, and Plastic Consumption Trends Pre- and Post-Ban (N = 430)

Variable	Category	Frequency (n)	Valid Percent (%)	Cumulative Percent (%)
Switched to Eco-Friendly Alternatives	No	302	70.2	70.2
	Yes	128	29.8	100
Personal Plastic Reduction	Reduced a Little/Moderate Reduction	194	45.1	45.1
	No Reduction (0%)	153	35.6	80.7
	Reduced Significantly/Completely Stopped	83	19.3	100
Pre-Ban Single-Use Plastic Usage Frequency	Multiple times daily	176	40.9	40.9
	Daily	132	30.7	71.6
	Infrequent/Weekly (≤ A few times a week)	122	28.4	100
Post-Ban Single-Use Plastic Usage Frequency	Rarely/Never	308	71.6	71.6
	Occasionally	91	21.2	92.8
	Several times a week	17	4	96.8
	Once a week	12	2.8	99.5
	Daily	2	0.5	100

Predictors of Financial Disruption and Institutional Governance

Table 4 presents the cross-tabulation of perceived enforcement effectiveness across administrative districts, revealing statistically significant spatial heterogeneity ($\chi^2 = 13.411$, $df = 6$, $p = 0.037$). Within-district evaluations revealed that perceived non-enforcement/ineffectiveness was highest in Lagos East (36.7%, n = 29 out of 79), whereas only 10.0% (n = 29 out of 290) of the respondents in Lagos West rated enforcement as highly effective. The respondent feedback in Table 4 corroborated these

governance gaps, identifying selective/corruption-prone enforcement (42.8%, $n = 184$) and market supply inflation (50.0%, $n = 215$) as primary structural barriers.

Table 4: Cross-tabulation of perceived enforcement effectiveness across Senatorial Districts (N = 430)

Perceived Enforcement Level	Lagos (n=290)	West Lagos Central (n=61)	Lagos East (n=79)	Total (N=430)	Pearson Chi-Square (χ^2)	df	p value
Not Enforced/Ineffective	63 (57.8%)	17 (15.6%)	29 (26.6%)	109 (100.0%)	13.411	6	0.037
Weakly Enforced/Low Effectiveness	94 (70.1%)	13 (9.7%)	27 (20.1%)	134 (100.0%)			
Moderately Enforced/Medium Effectiveness	104 (70.3%)	26 (17.6%)	18 (12.2%)	148 (100.0%)			
Strictly Enforced/High Effectiveness	29 (74.4%)	5 (12.8%)	5 (12.8%)	39 (100.0%)			
Total Sample Distribution	290 (67.4%)	61 (14.2%)	79 (18.4%)	430 (100.0%)			

Table 5 presents the multivariable binary logistic regression for predicting direct negative income disruption under the ban ($N = 430$). Controlling for monthly income bracket (X_2), educational attainment level (X_3), primary senatorial district (X_4), and formal policy communication received (X_5), Table 5 identifies stakeholder classification (X_1) as the sole statistically significant predictor of

financial vulnerability ($B = 1.245$, Wald = 5.580, $p = 0.018$). Commercial business operators faced 3.474 times greater odds of experiencing direct negative revenue impact than general consumers did ($aOR = 3.474$, 95% CI [1.236, 9.760]).

Table 5. Binary Logistic Regression Model Predicting Negative Income Disruption (N = 430)

Predictor Variable	B	S.E.	Wald	df	p value	Odds Ratio (Exp(B))	95% C.I. for Exp(B) (Lower – Upper)
Occupation			7.191	3	0.066		
Occupation (1)	1.146	1.022	1.259	1	0.262	3.147	0.425 – 23.315
Occupation (2)	-1.005	0.677	2.201	1	0.138	0.366	0.097 – 1.381
Occupation (3)	-0.060	0.679	0.008	1	0.93	0.942	0.249 – 3.564
Monthly Income Group			4.492	4	0.344		
Income Group (1)	-0.184	0.63	0.086	1	0.77	0.832	0.242 – 2.856
Income Group (2)	-0.919	0.706	1.693	1	0.193	0.399	0.100 – 1.592
Income Group (3)	-2.074	1.121	3.424	1	0.064	0.126	0.014 – 1.131
Income Group (4)	-0.461	0.648	0.506	1	0.477	0.631	0.177 – 2.247
Educational Attainment			1.373	2	0.503		
Education Level (1)	0.473	0.677	0.488	1	0.485	1.606	0.426 – 6.057
Education Level (2)	0.701	0.6	1.362	1	0.243	2.015	0.621 – 6.535
Stakeholder Classification							
Commercial/Business Stakeholder (1)	1.245	0.527	5.58	1	0.018	3.474	1.236 – 9.760
Constant	-2.634	0.854	9.507	1	0.002	0.072	—

Stakeholder Interventions and Strategic Recommendations

Table 6 presents the descriptive distribution of stakeholder-endorsed policy interventions (N = 430).

Table 6: Descriptive Distribution of Stakeholder-Endorsed Policy Support Interventions (N = 430)

Policy Support Variable	Category	Frequency (n)	Valid (%)	Percent Ranking
Support for Affordable Alternatives	Yes	290	67.4	1st
	No	140	32.6	
Support for Expanded Awareness Campaigns	Yes	197	45.8	2nd
	No	233	54.2	
Support for Business Training & Capacity Building	Yes	175	40.7	3rd
	No	255	59.3	
Support for Government Financial Grants/Subsidies	Yes	115	26.7	4th
	No	315	73.3	
Total Sample Base		430	100	

To resolve compliance bottlenecks, Figure 5 illustrates that respondents prioritized the provision of affordable eco-friendly alternatives (67.4%, n = 290, Ranked 1st), followed by expanded public awareness campaigns (45.8%, n = 197, Ranked 2nd),

targeted business adaptation training (40.7%, n = 175, Ranked 3rd), and direct financial subsidies or grants (26.7%, n = 115, Ranked 4th).

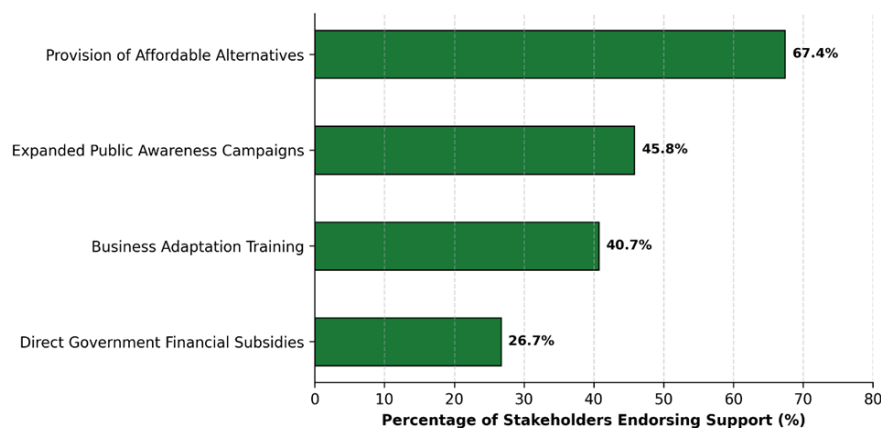


Figure 5: Percentage of Stakeholders Endorsing Key Policy Support Interventions

DISCUSSION

Socio-Demographic Vulnerability and Commercial Stakeholder Exposure

The concentration of study participants in Lagos West and the high proportion of commercial respondents—predominantly informal traders, micro-business owners, and artisans—reflect the spatial and economic layout of Lagos State as a commercial center (Adisa et al., 2019; Akiyode, 2017). Within the overall plastic value chain, most of these commercial operators functionally operate as end-user consumers of packaging materials rather than formal producers or primary distributors, utilizing disposable single-use plastics to bundle products within their daily workflows. Commercial hubs like Oshodi anchor dense retail networks that drive the daily urban economy (Eyewuoma & Olubukola, 2025). Consequently, capturing a high proportion of commercial stakeholders offers

insight into the frontline economic actors who directly navigate regulatory policy shifts (Adisa et al., 2019; Akiyode, 2017).

Commercial operators reported notable financial exposure under the single-use plastic ban, consistent with patterns observed among micro, small, and medium enterprises (MSMEs) in developing markets operating on low profit margins and relying on low-cost packaging to limit operational overhead (Adisa et al., 2019). The observed economic vulnerability appears linked to supply-chain cost absorption and material cost shifts during the transition (Bui et al., 2021; Hosseini Shekarabi et al., 2025). When compliant packaging alternatives carry a price premium, vendors face a trade-off: absorbing the difference reduces narrow margins, while passing costs to price-sensitive consumers risks customer loss (Al-Qasimi et al., 2024; Bui et al., 2021). Parallel operational disruptions, initial cost increases, and supply constraints were

documented during single-use plastic transitions in Kenya and Rwanda (Artavia-Mora et al., 2026; Behuria, 2021; Ogutu et al., 2023; Xie & Martin, 2022). Conversely, studies evaluating plastic bag charges in high-income contexts, such as the UK and Australia, indicate lower commercial disruption, as formal retail sectors benefit from established bulk packaging networks and consumers with higher purchasing capacity (Hopewell et al., 2009; Thomas et al., 2019; Tough, 2007).

Policy Awareness Gaps, Behavioral Shifts, and Substitution Bottlenecks

While high policy awareness coincided with a self-reported decline in daily single-use plastic use—aligning with evidence that regulatory notifications can alter routine behaviors (Borg et al., 2022; Oludoye et al., 2026)—the low rate of adoption of certified eco-friendly alternatives indicates an implementation gap (Heidbreder et al., 2020; Onyekuru et al., 2026). Crucially, the majority of respondents failed to transition to sustainable substitutes. Among this non-adopter sub-sample, non-adoption was overwhelmingly driven by severe cost barriers and acute market supply shortages. Rather than substituting plastic with formal alternatives, many respondents reduced overall packaging use, though the survey did not capture specific informal workarounds or covert plastic use (Rabiu & Jaeger-Erben, 2024). This disconnect between policy awareness and structural adoption appears influenced by market supply inflation, limited local production, and the functional constraints of alternative materials (Global Plastics Policy Centre, 2022; Kibria et al., 2023). Paper and fabric substitutes may lack the moisture resistance required for packaging wet goods in open-air markets (Kibria et al., 2023), though this study did not directly assess functional suitability—only cost and availability barriers. This pattern aligns with observations across urban centers in Nigeria, where environmental policy intent often precedes the domestic availability of affordable, functional alternatives (Oludoye et al., 2026; Onyekuru et al., 2026). Similar initial bottlenecks occurred during early plastic ban rollouts in Bangladesh and India due to under-developed alternative material industries (Global Plastics Policy Centre, 2022). In contrast, jurisdictions that paired bans with phased subsidies, tax relief, and manufacturing support reported smoother commercial transitions (Global Plastics Policy Centre, 2022).

Governance Heterogeneity, Spatial Enforcement Disparities, and Structural Challenges

Significant variations in perceived enforcement effectiveness across senatorial districts point to uneven regulatory oversight in Lagos State (Asiyanbi & Adewusi, 2026; Collord et al., 2021). Higher reported enforcement in Lagos West compared to Lagos East may reflect spatial imbalances in monitoring resources, though perception-based measures cannot distinguish between objective enforcement intensity and awareness-driven reporting bias across commercial corridors (Collord et al., 2021; Oluwakoya, 2024). Respondent feedback also highlighted selective enforcement, informal fee-seeking, and short compliance timelines as factors worsening these geographic gaps (Brown, 2021). These administrative constraints reflect broader challenges in urban environmental management in rapidly expanding cities, where regulatory agencies face resource limitations and personnel shortages, leading to concentrated enforcement in accessible commercial nodes while peripheral areas receive less coverage (Brown, 2021; Collord et al., 2021; Oluwakoya, 2024).

Furthermore, directing enforcement primarily at informal retailers rather than upstream packaging producers can generate perceptions of inequity and informal resistance (Edo et al., 2023; Oluwakoya, 2024). Similar variations in spatial enforcement have been observed in developing urban centers across Southeast Asia and Latin America (Yin et al., 2026). Conversely, international contexts with high compliance rates indicate that uniform outcomes are associated with centralized compliance tracking paired with regulation of primary production facilities (Global Plastics Policy Centre, 2022; Yin et al., 2026).

Conclusion and Policy Recommendations

This study is an empirical assessment of the single-use plastic ban in Lagos State across sociodemographic, behavioural, governance, and economic dimensions. The results revealed that policy awareness is high and that the use of single-use plastics has decreased in terms of day-to-day use; however, there is still a gap between Level 2 and Level 3 party usage, that is, between compliance with the policy and the adoption of certified alternatives. Most stakeholders have cut back on plastic use or found informal alternatives; in the absence of lower-cost materials for non-adopters, material supply shortages, and limited functionality of certified alternatives, there has simply been no easy way to shift to sustainable alternatives. These changes in the food supply chain are particularly challenging for commercial operators, with spatial monitoring varying and institutional oversight practices inconsistently enforced between and within municipal areas. This is a manifestation of a preference for supply-side rather than demand-side interventions, such as material subsidies, thereby highlighting the importance of interventions to improve the affordability of alternative materials.

Regulatory frameworks need to shift from overly reactive, downstream punitive measures to more proactive, supply-side measures to overcome these market and governance hurdles and facilitate a sustainable transition toward a circular economy. State authorities (LAWMA, LASEPA and others) should focus on offering upstream economic incentives (tax rebates, waivers on import duties, local production incentives) to reduce wholesale costs and increase the supply available to small vendor businesses and low-income consumers, particularly given their preference for lower-cost and cheaper alternatives, rather than relying on direct financial payments. Additionally, defining uniform statewide enforcement parameters, anti-corruption monitoring, and digital compliance monitoring systems can strengthen the enforcement process, focus it more on primary manufacturers and bulk distributors, and reduce geographic disparities. Finally, introducing transition windows, grace periods, and technical orientation programmes on sustainable packaging logistics will enhance operational capacity and ensure sustainable compliance in a manner that is equitable and sustainable in Lagos State and across Sub-Saharan Africa.

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REFERENCES

- Adewale, A., Okunola, A., & Salami, A. (2022). Plastic waste management in Nigeria: Challenges and policy responses. *Journal of Environmental Studies*, 15(2), 45–58.
- Adisa, R. A., & Ogunsuji, O. J. (2019). Taxation of the informal sector and economic development of Lagos State. *Accounting and Taxation Review*, 3(4), 110–118.
- Akinyemi, O. M., Nnorom, I. C., & Osibanjo, O. (2019). Waste management practices in Nigeria: Impacts and challenges. *Environmental Management and Sustainable Development*, 8(1), 14–30. <https://doi.org/10.5296/emsd.v8i1.14150>
- Akinyemi, O. M., Nnorom, I. C., & Osibanjo, O. (2019). Waste management practices in Nigeria: Impacts and challenges. *Environmental Management and Sustainable Development*, 8(1), 14–30. <https://doi.org/10.5296/emsd.v8i1.14150>
- Akiyode, A. H. (2017). Spaces of the informal economy: Reimagining street trading through accessibility distribution analyses in Lagos [Doctoral dissertation, Cardiff University]. Cardiff University Research Portal. <https://orca.cardiff.ac.uk/id/eprint/110323/>
- Al-Qasimi, M., Khudari, M., & Al Balushi, Z. (2024). A review on mitigating disruptions and improving resilience in supply chain logistics. *WSEAS Transactions on Business and Economics*, 21, 2101–2112. <https://doi.org/10.37394/23207.2024.21.210>
- Behuria, P. (2021). Ban the (plastic) bag? Explaining variation in the implementation of plastic bag bans in Rwanda, Kenya and Uganda. *Environment and Planning C: Politics and Space*, 39(8), 1791–1808. <https://doi.org/10.1177/2399654421994893>
- Borg, K., Lennox, A., Kaufman, S., Tull, F., Prime, R., Rogers, L., & Dunstan, E. (2022). Curbing plastic consumption: A review of single-use plastic behaviour change interventions. *Journal of Cleaner Production*, 344, Article 131077. <https://doi.org/10.1016/j.jclepro.2022.131077>
- Bezerra, J. C., Walker, T. R., Clayton, C. A., & Adam, I. (2021). Single-use plastic bag policies in the Southern African development community. *Environmental Challenges*, 3, Article 100029. <https://doi.org/10.1016/j.envc.2021.100029>
- Brown, C. T. (2021). Effective environmental compliance and enforcement in Nigeria: Motivation, challenges and prospects. *African Journal of Law & Criminology*, 11(1), 91–107.
- Bryman, A. (2016). *Social research methods* (5th ed.). Oxford University Press.
- Bui, T. D., Tsai, F. M., Tseng, M. L., Tan, R. R., Yu, K. D. S., & Lim, M. K. (2021). Sustainable supply chain management amid disruption and organizational ambidexterity: A data-driven analysis. *Sustainable Production and Consumption*, 26, 373–410. <https://doi.org/10.1016/j.spc.2020.09.017>
- Central Pollution Control Board. (2019). *Annual report on plastic waste management*—Ministry of Environment, Forest and Climate Change, Government of India.
- Collord, M., Goodfellow, T., & Asante, L. A. (2021). Uneven development, politics and governance in urban Africa: An analytical literature review (ACRC Working Paper No. 2021-02).
- Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). SAGE Publications.
- Dikgang, J., & Visser, M. (2010). Behavioural response to plastic bag legislation in South Africa. *South African Journal of Economics*, 78(1), 20–40. <https://doi.org/10.1111/j.1813-6982.2010.01295.x>
- Dikgang, J., Leiman, A., & Visser, M. (2012). Analysis of the plastic-bag levy in South Africa. *Resources, Conservation and Recycling*, 66, 59–65. <https://doi.org/10.1016/j.resconrec.2012.06.009>
- Down to Earth. (2020). *Why India's plastic ban is failing*. Centre for Science and Environment. <https://www.downtoearth.org.in>
- Eyewuoma, L. G., & Olubukola, A. F. (2025). Effect of street trading on commercial property values: A case study of Oshodi, Lagos State. *International Journal of Environmental Design & Construction Management*, 7(4), 1–15.
- Federal Ministry of Environment. (2020). *National policy on plastic waste management in Nigeria*. Government of Nigeria.
- Global Plastics Policy Centre. (2022). A global review of plastics policies to support improved decision-making and public accountability (March, A., Salam, S., Evans, T., Hilton, J., & Fletcher, S.). Revolution Plastics, University of Portsmouth.
- Heidbreder, L. M., Steinhorst, J., & Schmitt, M. (2020). Plastic-Free July: An experimental study of limiting and promoting factors in encouraging a reduction of single-use plastic consumption. *Sustainability*, 12(11), Article 4698. <https://doi.org/10.3390/su12114698>
- Hopewell, J., Dvorak, R., & Kosior, E. (2009). Plastics recycling: Challenges and opportunities. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 364(1526), 2115–2126. <https://doi.org/10.1098/rstb.2008.0311>
- Hossain, M. (2021). Plastic ban implementation challenges in developing countries. *Journal of Environmental Management*, 293, Article 112118. <https://doi.org/10.1016/j.jenvman.2021.112118>
- Hosseini Shekarabi, S., Kiani Mavi, R., & Romero Macau, F. (2025). Supply chain resilience: A critical review of risk mitigation, robust optimisation, and technological solutions and future research directions. *Global Journal of Flexible Systems Management*, 26(4), 681–735. <https://doi.org/10.1007/s40171-025-00458-8>
- International Labour Organization. (2015). *Guidelines for a just transition toward environmentally sustainable economies and societies for all*. ILO Publications.
- International Labour Organization. (2025). *Lessons from Kenya's bag ban for a just transition of MSMEs*. ILO Publications. https://www.ilo.org/sites/default/files/2025-05/Navigating_environmental_policy_change%20%28003%29.pdf
- Jambeck, J. R., Geyer, R., Wilcox, C., Siegler, T. R., Perryman, M., Andrady, A., Narayan, R., & Law, K. L. (2015). Plastic waste inputs from land into the ocean. *Science*, 347(6223), 768–771. <https://doi.org/10.1126/science.1260352>

- Kabera, T., Wilson, D. C., & Nishimwe, H. (2019). Solid waste management in Rwanda: Current practices and challenges. *Waste Management & Research*, 37(2), 153–165. <https://doi.org/10.1177/0734242X18817998>
- Kibria, M. G., Masuk, N. I., Safayet, R., Nguyen, H. Q., & Mourshed, M. (2023). Plastic waste: Challenges and opportunities to mitigate pollution and effective management. *International Journal of Environmental Research*, 17(1), Article 20. <https://doi.org/10.1007/s41742-023-00507-z>
- Lagos Bureau of Statistics. (2020). *Lagos State Digest of Statistics 2020*. Ministry of Economic Planning and Budget, Lagos State Government.
- Lagos Waste Management Authority. (2023). *Annual solid waste management and recycling report*. LAWMA.
- Lagos Waste Management Authority. (2023). *Annual solid waste report for Lagos State*. LAWMA.
- Lohr, S. L. (2010). *Sampling: Design and analysis* (2nd ed.). Cengage Learning.
- McCauley, D., & Heffron, R. (2018). Just transition: Integrating climate, energy and environmental justice. *Energy Policy*, 119, 1–7. <https://doi.org/10.1016/j.enpol.2018.04.014>
- Ministry of Environment and Forests. (2002). *Notification on the ban of polythene bags in Bangladesh*. Government of Bangladesh.
- Njeru, J. (2020). Urban governance and plastic waste management in Kenya. *Environmental Policy and Governance*, 30(3), 158–172. <https://doi.org/10.1002/eet.1889>
- Nkwachukwu, O. I., Chidi, N., Taiwo, O., & Brigid, N. (2013). Focus on plastic waste: Origin, effects and management. *Environmental Management and Sustainable Development*, 2(1), 173–188. <https://doi.org/10.5296/emsd.v2i1.3101>
- Ogutu, M. O., Akor, J., Mulindwa, M. S., Heshima, O., & Nsengimana, C. (2023). Implementing circular economy and sustainability policies in Rwanda: Experiences of Rwandan manufacturers with the plastic ban policy. *Frontiers in Sustainability*, 4, Article 1092107. <https://doi.org/10.3389/frsus.2023.1092107>
- Oludoye, O., Cudjoe, D., Adu-Gyamfi, G., Obuobi, B., & Nketiah, E. (2026). Breaking free from single-use plastics: The power of policy, social support, and culture. *Environmental Development*, 59, Article 101474. <https://doi.org/10.1016/j.envdev.2026.101474>
- Oluwakoya, A. O. (2024). Regulatory frameworks and enforcement mechanisms in urban transport governance: A case study of Lagos State. *RUN Contemporary Journal of Politics and Administration*, 3(1), 18–31.
- Onyekuru, N. A., Chukwuone, N., & Oranu, C. O. (2026). Readiness and the political economy of plastic ban in Nigeria: Lessons from Tanzania. *Journal of Material Cycles and Waste Management*, 28(6), 3066–3076. <https://doi.org/10.1007/s10163-026-02590-8>
- Rabiu, M. K., & Jaeger-Erben, M. (2024). Reducing single-use plastic in everyday social practices: Insights from a living lab experiment. *Resources, Conservation and Recycling*, 200, Article 107303. <https://doi.org/10.1016/j.resconrec.2023.107303>
- Thomas, G. O., Sautkina, E., Poortinga, W., Wolstenholme, E., & Whitmarsh, L. (2019). The English plastic bag charge changed behavior and increased support for other charges aimed at reducing plastic waste. *Frontiers in Psychology*, 10, Article 266. <https://doi.org/10.3389/fpsyg.2019.00266>
- Tough, R. (2007). *Plastic shopping bags: Environmental impacts and policy options*. Department of the Environment and Water Resources, Australian Government.
- United Nations Environment Programme. (2021). *From pollution to solution: A global assessment of marine litter and plastic pollution*. UNEP. <https://www.unep.org/resources/pollution-solution-global-assessment-marine-litter-and-plastic-pollution>
- United Nations. (2025). *World urbanization prospects: The 2025 revision—Department of Economic and Social Affairs, Population Division*.
- World Bank. (2024). *Improving solid waste and plastics management in Lagos State*. World Bank Group. <https://doi.org/10.1596/41838>
- World Bank. (2024). *Improving solid waste and plastics management in Lagos State*. World Bank Group. <https://doi.org/10.1596/41838>
- Xie, J., & Martin, J. (2022). Plastic waste management in Rwanda: An ex-post policy analysis. World Bank Group. <http://hdl.handle.net/10986/38156>
- Yamane, T. (1967). *Statistics: An introductory analysis* (2nd ed.). Harper & Row.
- Yin, F., Ibrahim, R. L., & Alomair, A. (2026). Governing the green transition: How institutional quality conditions renewable energy's sustainability impacts in BRICS and MENA. *Environmental Policy and Governance*, 36(3), 568–593. <https://doi.org/10.1002/eet.70063>