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Demographic Drivers of Environmental Pollution Perception in Nigeria: A Quantitative Analysis

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Abstract. This study investigates the relationship between demographic factors such as age, education level, gender and geographical factors-location in terms of rural and urban, and people's perceptions of pollution in Nigeria, using data from Afro barometer Round 9. Employing descriptive and inferential statistical analyses (independent t-test, analysis of variance, and the Pearson product-moment correlation coefficient), the study reveals significant regional disparities in pollution perception ($F(5,1599) = 26.676$; $p < .01$) with no notable age-based differences. Key findings include positive correlations between pollution concern and male gender ($r = .058$, $p < .001$), higher education levels ($r = .051$, $p < .001$), urban residence, and regions such as the Northeast and Southeast. Sanitation (26.1% and plastic waste (26.6%) emerged as the most pressing environmental issues. The study underscores the need for tailored policies and community-specific awareness campaigns to address pollution effectively in the country. The implications of the findings for better pollution management were highlighted, and necessary recommendations were made based on these findings

Keywords: Environmental Pollution, Demographic Factors, Public Perception, Regional Disparities and Nigeria

1. Introduction

Environmental pollution is a global crisis, with developing nations like Nigeria bearing a disproportionate burden due to rapid urbanization, industrialization, and population growth.

Nigeria's contribution to global plastic waste (2.7%) (UNIDO, 2021), highlights the urgency of addressing pollution at both local and national levels. This percentage of contribution of Nigeria makes it critical phenomenon that demands attention.

Chukwuone, Amaechina, and Ifelunini's (2022) study found that more than two-thirds (67.4%) of households in the coastal city of Lagos engage in illegal waste disposal. It also found that most (75.5%) households were willing to clean up road gutters/drainage channels. While Nigeria contributes significantly to global plastic pollution, accounting for 2.7% of ocean plastic waste, a critical gap exists in understanding how demographic factors influence pollution perception across its diverse population segments, regions and socioeconomic groups. The research highlights notable differences in how Nigerians perceive pollution, shaped by factors like gender and age. Findings indicate that men are more inclined than women to view pollution as a critical challenge, pointing to potential gender-based disparities in environmental awareness.

These findings are in tandem with Soares, et. al., (2021), remarks that public perception of pollution is shaped by demographic factors such as age, gender, education, and geographical location, which influence awareness, attitudes, and behaviours towards environmental issues. Understanding these dynamics is therefore, critical for designing equitable and effective pollution management strategies.

Again, Del-Pino-Casado, et.al. (2014) opined that Nigeria's large size and diverse demographics provide a unique case study for

analysing how individuals perceive and respond to environmental challenges, influenced by these factors. In order to create policies, raise public awareness, and manage the environment sustainably, it is crucial to comprehend how demographic factors affect people's views of pollution.

Previous research has explored the relationship between demographic factors and environmental attitudes (Steg et.al. 2014, Hadler et.al. 2022). However, a comprehensive examination of how these factors influence pollution perception within the Nigerian context is lacking. This study therefore examines how demographic and geographical factors shape pollution perception in Nigeria, a country characterised by diverse socio-economic and ecological contexts. By subjecting the data collected from Afrobarometer Round 9 (2022), the study provides insights into regional and demographic variations in pollution perception, offering a foundation for targeted interventions.

2. Conceptual Clarification

The United Environment Programme UNDRR (UNEP) (nd.) defines **pollution** as indirect or direct alteration of the biological, thermal, physical, or radioactive properties of any medium in such a way as to create a hazard or potential hazard to human health or the health, safety or welfare of any living species (Cialone, et.al., 2012)) Pollution involves the introduction of substances harmful to humans and other living organisms into the environment. Hazardous solids, liquids, or gases created at more than normal levels and degraded the quality of our surroundings are known as pollutants. Human activity damages the ecosystem by contaminating the soil where plants grow, the water we drink, and the air we breathe.

Plastic pollution, on the other hand, refers to t he adverse effects and emissions caused by the production and use of plastic materials and products over the course of their life cycle. In addition to poorly managed plastic waste (s uch as open burning and dumping in unregulat ed dumpsites), this term encompasses the build up and leaking of plastic particles and things th at can harm people and the living andnon-living environment. Every year, more than 8 million tonnes of plastic trash find their way into the world's oceans. Approximately, 8.9% of the plastic waste in the world comes fr om countries in Sub- Saharan Africa. Egypt, and Nigeria are the top contributors, with the East Asia and the Pacific areas, accounting for 3% and 2.7% of the total, respectively (Jambeck et al., 2015; Li et al., 2016; Wang et al., 2018).

Perception of pollution is how individuals or groups understand and interpret the pollution issue. Various factors, including personal experiences, knowledge, and values, can influence such perception. In this study, it is important to highlight the importance of correlation. C A positive correlation will indicate that the two variables tend to move in the same direction. In contrast, a negative correlation indicates that the two variables move in opposite directions.

In Portugal, Soares et al. (2021) studied the perceptions of plastic pollution and sociodemographic and psychological factors as predictors of individuals' pro-environmental behaviours. The knowledge that plastics degrade in the environment. The study participants perceived the bio-ecological impacts of plastics as a more significant threat than socioeconomic ones. The study's analysis showed that factors like a person's background (e.g., age, income, or education), combined with their awareness of plastic pollution's harms and how seriously they viewed its consequences, could help explain why individuals adopt eco-friendly habits. In other words, what people know about plastic waste—and how it affects their lives—shapes their willingness to recycle, reduce plastic use, or support environmental policies. Awareness about the impacts of plastic pollution (socioeconomic, health impacts and bio-ecological impacts) was highly associated with pro-environmental behaviour (Soares, et. al. 2021).

Demographic factors are population characteristics that can be used to describe its composition. Some common demographic factors include age, gender, education level (Hidalgo-Ruz et al., 2018), income level (Karak et al., 2012; Kolekar, 2016), urban or rural residence (Heidbreder & Lea., 2019; Zhiyong & Han, 2018), region of residence (Milfont & Markowitz, 2016), occupation, marital status, and household size. Demographic factors are an important tool for understanding and describing populations.

Bukasa et al . (2020) studied factors influencing plastic waste pollution reduction in Kinshasa. They reported that all factors (environmental factors, Government policy, and economic factors) significantly positively impact plastic

waste pollution reduction. Kombiok et al. 's (2021) study revealed that two-thirds (63.3%) agreed to dispose of their plastic waste poorly. Education level and household wealth were significant determinants of poor plastic disposal.

Another factor is age: younger people consiste ntly rated pollution as a top issue, whereas old er participants seemed less concerned, indicati ng that priorities or experiences vary between generations.
These trends highlight the ways in which indiv idual backgrounds— ranging from gender to stage of life affect public perceptions of environmental issues and provide useful guidance for developing inc lusive policies that appeal to Nigeria's various populations.

The findings are intended to guide resource all ocation and community involvement efforts where they are most urgently needed by identifying which groups perceive environmental dangers more a cutely (or underestimate them).

3. Theoretical Framework

In order to investigate how demographic factors influence environmental pollution perceptions in Nigeria, the study combines the Theory of Planned Behaviour (TPB) (Ajzen, 1991) with the Value-Belief-Norm (VBN) theory (Stern et al., 1999). These theories provide complementary understandings of the normative, valuative, and cognitive processes by which people develop attitudes and intentions toward environmental challenges.

According to TPB, intentions and behaviours are influenced by three fundamental elements: - Attitudes (individual assessments of environmental activities), subjective norms (social pressures to act in a pro-environmental manner), and perceived behavioural control (self-efficacy in carrying out acts). Demographic factors like age, income, and education may influence these elements in Nigeria:
Age: Younger people may have greater pro-environmental sentiments since they have been exposed to climate education and internet activism more frequently (Lee et al., 2020).
Higher literacy levels are associated with a better understanding of the effects of pollution, which improves perceived behavioural control (e.g., adopting waste management methods).
Income: Even among people with good attitudes, perceived control (such as the affordability of renewable energy) may be limited by financial restrictions.
Ajzen (1991) however observed that in contrast to metropolitan settings where collective environmental action is more normative, rural people may prioritize immediate subsistence requirements over pollution concerns due to subjective norms affected by traditional traditions.

The Theory of Value-Belief-Norm (VBN) highlights how values (biospheric, altruistic, and egoistic) and moral norms influence environmental behaviour, VBN theory enhances TPB. It asserts that people who appreciate nature and have biospheric values are more likely to perceive human-caused environmental concerns and to activate personal standards to lessen harm.

This pathway is mediated by demographic fact ors:
Education: By promoting environmental litera cy, higher education increases perceptions of p ollution danger and cultivates biospheric value s.
Religion/Culture: In Nigeria, religious doctrin es or cultural beliefs (such as indigenous societies' peace with environment) may reinforce altruistic values and thereby infl uence how people perceive pollution.
Gender: Because they are frequently the prima ry caretakers, women may place a higher priori ty on the health effects of pollution (altruistic v alues), which heightens their sensitivity to envi ronmental cues (Xiao & McCright, 2015).

A combination of these two theories offers a multifaceted perspective.
According to TPB, the ability (control) and inc entive (attitudes/norms) to manage pollution ar e influenced by demographic characteristics.
VBN on the other hand, clarifies how moral and ethical drivers (values/beliefs) that underli e perceptions are shaped by demographics. For example, despite comparable subjective norms, educated urban youth may view pollution as crucial (biospheric values +strong perceived co ntrol), while rural elders may place a higher priority on economic survival (egoistic values + low control).
Diverse perceptions of pollution are produced by demographic factors moderating the TPB and VBN pathways.
Quantitative testing of these relationships will provide information about specific policy approaches, including adj usting climate messaging to age-specific sentiments or using religious norms to promote environmental causes.

4. Methodology

The research design which is similar to the one used by Gilmour et.al. (2014) was a cross-sectional survey using the Afrobarometer Round 9 data collected in 2022. Afro barometer is a Pan-African research network that collects data on various social, political, economic, and environmental issues which affect the people on the continent (www.afrobarometer.org). The Afrobarometer data is a representative cross-national survey conducted since 1999, using a multi-stage, stratified, random probability sampling technique to sample the respective populations.

4.1 Data source and sampling

The study utilised data from the Afrobarometer Round 9 collected in 2022. A multi-stage stratified random probability sampling technique was used to draw a sample of 1,600 respondents aged 15 and above, stratified by subnational units (State, and Region) and geographical location (urban and rural). The stratification was first on subnational units of government (state, province, region), then by location (urban or rural).

4.2 Variables and measures

The dependent variable of the study was respondents' perception of pollution as an overnment and location (urban/rural).

environmental issue. This was measured by determining respondents' views on whether pollution is a problem in the community and if plastic bags is a significant source of pollution. They were also asked if they considered the reduction of pollution as their own responsibility or that of government, as well as the role of the government in the control of pollution.

4.3 Validation of Instrument

The research instrument's construct validity was assessed with confirmatory factor analysis. Pilot testing was conducted, a reliability analysis and confirmatory factor analysis assessed the construct validity using Cronbach's alpha which revealed a 0.76 value. Descriptive and inferential statistics including independent t-test, Analysis of Variance, and Pearson Product Moment Correlation Coefficient Analysis were employed to analyse the collected data.

5. Results

The study utilises data from the Afrobarometer Round 9 survey, conducted in Nigeria in 2022. The survey employed a multi-stage, stratified random probability sampling techniques to ensure representativeness. The sample comprised 1,600 respondents aged 15 and above, stratified by subnational units of g

Demographic Correlations and Regional Variations

The demographic characteristics of the subjects used in the study are presented in Table 5.1.

Table 5.1: Distribution of study participants by sex and academic level.

	Frequency	**Percent**
Gender		
Male	830	51.9
Female	770	48.1
Total	1600	100.0
Age		
18-30yrs	744	46.5
31-40yrs	413	25.8
41-50yrs	221	13.8
51-60yrs	152	9.5
61-100yrs	70	4.4
Total	1600	100.0
Education		
No formal Education	314	19.6
Primary Education	222	13.9
Secondary	693	43.3
Post-secondary	266	16.6
University degree	105	6.5
Don't know	1	.1
Total	1600	100.0
Location		
Urban	685	42.8
Rural	915	57.2
Total	1600	100.0

Geo-Political Zone		
South-South	247	15.5
North-East	203	12.7
North-West	389	24.3
North-Central	229	14.3
South-East	188	11.7
South -West	345	21.5
Total	1600	100.0

Eight hundred and thirty (830) (51.9%) of the respondents were male, and seven hundred and seventy (770) (48.1%) were female. Forty-six per cent were within the age group of 18-30 years, 25.8% were in the 31-40yrs. The age distribution shows a relatively young/youthful sample. On educational background, 43.3% have secondary education, approximately 14% have primary education, and only 6.5% have a university education. Most respondents (57.2%) were rural, and 42.8% were urban. A positive correlation was found between gender and education regarding environmental pollution perception

The analysis in Table 5.2 shows that sanitation/human waste management (26.1%) and trash disposal, including plastic (26.6%), are the two most important environmental issues in the community; others are air pollution (10.4%) and pollution of water sources (14.9%)—approximately 53% perceived pollution as a serious problem. About one-third (33.1%) of the population said it is not a serious problem, while 11.6% said it is not serious.

Table 5.2

Most important environmental issue in community	**Frequency**	**Percent**
None of these / there are no problems	189	11.8
Air pollution	166	10.4
Pollution of water sources	239	14.9
Sanitation or human waste management	417	26.1
Trash disposal, including plastics	425	26.6
Deforestation	97	6.1
Some other issue	47	2.9
Don’t know	20	1.3
Total	1600	100.0
Pollution a problem in community		
Very serious	353	22.1
Somewhat serious	495	30.9
Not very serious	529	33.1
Not at all serious	185	11.6
Refused	0	.0
Don’t know	37	2.3
Total	1600	100.0
Plastic bags major source of pollution		
Strongly disagree	79	4.9
Disagree	283	17.7
Neither agree nor disagree	102	6.4
Agree	669	41.8
Strongly agree	342	21.4
Refused	1	.1
Don’t know	125	7.8
Total	1600	100.0

Table 5.3

Primary responsibility for reducing pollution	Frequency	Percent
None of these / No one	3	.2
Ordinary citizens	514	32.1
Business and industry	60	3.8
The national government	500	31.2
Local government	411	25.7
Traditional leaders	87	5.5
Someone else	7	.4
Don’t know	18	1.1
Total	1600	100.0
Government do more or less to limit pollution		
Much less	92	5.8
Somewhat less	80	5.0
About the same	390	24.4
Somewhat more	234	14.6

Much more	763	47.7
Refused	2	.1
Don't know	39	2.4
Total	1600	100.0

From Table 5.3, the ordinary citizens and the national government were seen as having the primary responsibility of playing key role in reducing pollution, but the national government needs to do more in limiting the problem.

Table 5.4: Independent t-test by sex, and location

Gender	**N**	**Mean**	**Std. D**	**t**	**Sig.**
Male	830	16.017	3.5962	-2.327	.020
Female	770	16.462	4.0456		
Location	N				
Urban	685	16.2548	3.6790	.208	.835
Rural	915	16.2145	3.9317		

Table 5.4 presents the findings of the difference tests on pollution between males and females, on the one hand, and urban and rural, on the other.

Results in Table 4 showed that participants do not differ in their perception of pollution by sex and location. The result implies that male and female participants have the same perception of pollution, and residents of urban areas have similar perceptions.

Table 5.5: Analysis of variance of perception by age, educational background, and region

Age_	**Mean**	**N**	**Std. D**	
18-30yrs	16.1624	744	3.9498	$F_{(4,1599)} = 1.925$; $p > .104$
31-40yrs	16.1376	413	3.8610	
41-50yrs	16.0122	221	3.1530	
51-60yrs	16.7309	152	3.8220	
61-100yrs	17.1289	70	4.0759	
Total	16.2318	1600	3.8244	
Education				
No formal Education	15.6187	314	4.3224	$F_{(5,1599)} = 2.510$; $p > .028$
Primary Education	16.5070	222	4.0338	
Secondary	16.3423	693	3.8200	
Post-secondary	16.5270	266	3.2576	
University degree	15.9721	106	2.8867	
Total	16.2318	1600	3.8248	
Region				
South South	15.3962	247	3.8140	$F_{(5,1599)} = 26.676$; $p < .01$
North East	17.4466	203	4.7361	
North west	14.8527	389	2.9566	
North Central	17.2674	229	3.6775	
South East	17.5957	188	4.3204	
South west	16.2403	345	3.1979	
Total	16.2318	1600	3.8244	

The one-way analysis of variance results showed that the mean scores of the six geo-political regions of Nigeria differed significantly from one another F (5,1599) = 26.676; p <.01. On age, F (4,1599) = 1.925; p >.104, among education groups, F (5,1599) = 2.510; *p* >.028) no significant difference existed.

The bivariate analysis to determine the relationship between selected demographic variables and public perception of pollution is as shown in Table 5. 6,

Table 5.6: Bivariate matrix of relationships between demographic factors and perception of pollution

	1	**2**	**3**	**4**	**5**	**6**
1. Gender	1					
2. Age	-.152**	1				
3. Education	-.167**	-.007	1			
4. Urban or Rural	-.010	-.012	-.300**	1		
5. Region	.006	.053*	.159**	-.295**	1	
6. Pollution	.058*	.048	.051*	-.005	.088**	1

**. Correlation is significant at the 0.01 level, *. Correlation is significant at the 0.05 level (2-tailed)

6. Key Findings

Demographic correlations:

Gender: A positive correlation was found between gender and pollution perception ($r=0.058$, $p<0.001$), with men more likely to view pollution as a serious problem.
Age: Younger people were likelier to perceive pollution as a serious issue.
Education: Higher education levels correlated positively with viewing pollution as a serious problem ($r=0.051$, $p<0.001$).
Location: Urban residents were likelier than rural residents to perceive pollution as a serious issue.
Region: People in Nigeria's Northeast and Southeast regions were more likely to view pollution as a serious problem than other regions ($r=0.088$, $p<0.001$).

Major environmental concerns:
Sanitation/human waste management (26.1%) and trash disposal, including plastics (26.6%), were identified as the two most important environmental issues in communities.
Approximately 53% of respondents perceived pollution as a serious problem.
63.2% agreed or strongly agreed that plastic bags are a significant source of pollution.
Responsibility and government actions:
32.1% of respondents believed ordinary citizens are primarily responsible for reducing pollution, followed by the national government (31.2%) and local government (25.7%).
62.3% of respondents thought the government should do somewhat more or much more to limit pollution.

7. Discussion of Findings

The research highlighted how Nigerians' views on pollution vary depending on age and gender. Men tended to rate pollution as a more urgent threat than women, indicating that gender influences how people perceive environmental risks. Younger generations, meanwhile, were far more vocal about prioritising pollution as a critical challenge compared to older adults—a gap that may reflect evolving attitudes toward environmental issues over time. These findings underscore how personal background, from gender to life experiences tied to age, could shape what communities focus on as Nigeria grapples with pollution.

Pollution and education were found to be significantly positively correlated. According to this correlation, those who have more education are more likely to believe that pollution is a significant issue than those who have less education. The survey found a strong correlation between people's opinions on pollution and where they live. There is a pronounced geographic divide as urban dwellers are much more likely than their rural counterparts to view pollution as a serious problem. Within Nigeria, this trend also differed by region, with people in the Northeast and Southeast showing significantly higher levels of concern about pollution than people in other areas. These findings underscore how local settings significantly influence public understanding of ecological concerns.

These views are further influenced by personal traits. A number of variables are involved, including gender, age, and educational attainment. For instance, compared to older adults with less formal education, younger, better-educated respondents expressed greater concerns about environmental degradation. These differences show how personal histories and experiences shape perceptions of ecological hazards.

According to the data, the majority of communities' top environmental concerns were trash disposal, especially plastics, and sanitation or human waste management (26.1% and 26.6%, respectively), with plastic bags ranking as the main pollutant (62.2%). According to the findings, the government and its pertinent agencies need to take significant action to solve these problems, starting with the development of policies and ending with the implementation of intervention plans.

Lastly, the results indicate that practitioners ne ed to create culturally aware methods for envir onmental management and pollution reduction.

Practitioners must, for instance, understand the varying environmental values and beliefs held by members of various demographic groups a nd create strategies that take these values and b eliefs into consideration.

8. Conclusion and Recommendations

This study is significant because it can provide light on the perceptions and experiences of various populations regarding pollution. The pollution problem in Nigeria can then be addressed with more effective policies and programs created using this knowledge. Based on the results, it was determined that people's perceptions of pollution in Nigeria are correlated with demographic and regional characteristics. The article also discussed the

implications of the findings for better pollution management.

Based on the findings of this study, the following recommendations are made:

Effective policies that address the specific needs and concerns of different demographic groups regarding pollution control and environmental management are needed. Such policies will help reduce disparities and inequalities in the impacts of pollution on different communities and enhance their participation and cooperation in environmental protection.
Governments at the national, subnational, and local levels will need to develop pollution control measures that consider the demographic characteristics of different communities to promote more environmentally enlightened citizens.

A uniform approach could alienate groups facing unique challenges, such as tech-based solutions (e.g., air quality apps), which might overlook rural populations struggling with unsafe drinking water. Instead, interventions should prioritize context-specific strategies, such as addressing water contamination in villages or promoting waste management literacy in cities. The success of pollution control measures depends on matching policies with the lived experiences of each community, ensuring that solutions are both practical and culturally relevant.

Integration of environmental literacy components as curriculum inserts into the school curricula and community programmes can assist greatly in bridging generational gaps noticed in the perceptions of the different age groups and ultimately foster long term behavioural change.

Creation and dissemination of targeted public awareness campaigns that educate and inform different demographic groups about the causes, consequences, and solutions to pollution in Nigeria. The campaigns will help raise people's awareness and knowledge of environmental issues and motivate them to prevent and reduce pollution. These measures need to be complemented by creating tailored campaigns for specific demographic groups to raise awareness of pollution issues and their dangers.

Significant sources of pollution, such as sanitation, human waste management, trash disposal, and plastic bags, should be seen as top environmental concerns that affect most communities in Nigeria and need to be addressed consciously through participatory management. This will help to improve the environmental quality and health of the people and reduce the costs and risks associated with pollution.

Culturally sensitive pollution control and environmental management strategies that respect and incorporate different demographic groups' local values and beliefs about the environment must be adopted. This would help build trust and rapport with the communities and foster a sense of environmental stewardship and responsibility.
Messages regarding the dangers of pollution would need to be tailored to the experiences of various groups, because public education initiatives require accuracy. Urban campaigns may use social media and community workshops to address issues like garbage management or industrial pollutants. In contrast, rural initiatives could address agricultural runoff or unsafe drinking water through radio broadcasts or partnerships with local leaders. By meeting people where they are—both geographically and culturally—governments may inspire increased engagement and action

9. Limitations of the Study and Future Research

However, there are certain limitations on this study. The survey's cross-sectional design, which illustrates the research's inability to demonstrate causal links between the variables under investigation, is one of these drawbacks. While cross-sectional design can restrict causal inferences, the inclusion of self-reported data may suggest some bias. In order to have a better knowledge of the dynamics of pollution perception, it is advised that more research be done to examine longitudinal patterns and behavioural treatments Such research should also explore the underlying mechanisms that drive environmental attitudes and behaviours.

The suggested further research will aid in determining the direction and causative mechanisms of the impacts of demographic factors on Nigerian public perceptions of pollution. Understanding why various groups of individuals hold varying opinions on pollution and how to persuade them to alter their beliefs and actions will be much easier with the help of the follow-up.

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