



# Urban Planning Perspectives - Evolving Solution To Plastic Pollution in Nigeria

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**Abstract:** *In Nigeria, plastic pollution is a serious environmental issue that negatively impacts the environment, the economy, and human health. This study attempts to investigate how urban planning views might be used to combat plastic pollution in Nigeria by investigating, the current level of plastic pollution in the nation, identifying successful urban planning initiatives and strategies from other countries, as well as analyzing the role of urban planning in mitigating plastic waste pollution in Nigeria. The study adopted a qualitative methodology, through case studies and systematic sampling technique was used to review past literatures who had successfully combatted the menace of plastic pollution in other countries. Collection of data were sourced from secondary data such as journals, articles etc. The findings revealed that an estimated 2.5 million tonnes of plastic garbage are produced in the nation each year, the government has put in place a variety of initiatives to support trash reduction and recycling which has not yielded positive results. The conclusion emphasizes the significance of urban planning viewpoints in combating plastic pollution in Nigeria and urges action to support environmentally friendly urban design and the proper disposal of plastic garbage in Nigeria.*

**Keywords:** *Waste Management, Sustainable Development, Nigeria, Plastic Pollution*

## Introduction

In Nigeria, plastic pollution has emerged as a critical concern for both the environment and public health (Akindele 2022). The nation confronts major difficulties in controlling and reducing the negative effects of plastic trash (Owukio et al. 2022) due to its fast-expanding population and rate of urbanization (BBC. 2020; Davisha 2016). Like many other developing countries, Nigeria has seen a rise in plastic usage and insufficient waste management infrastructure (Kehinde et al. 2020), which has resulted in significant plastic pollution in both urban and rural regions (Olanrewaju & Ilemobade 2009). Plastic garbage has significantly polluted rivers, landfills, and streets seriously harming the environment, jeopardizing water supplies, and endangering public health (Dumbili & Henderson 2020; Ajibade et al. 2021). This context emphasizes the necessity and significance of dealing with plastic pollution in Nigeria.

## Importance of Urban Planning in Addressing Plastic Pollution

In order to combat plastic pollution in Nigeria successfully, urban planning is essential (Samson & Oluwatoyin 2012). Urban planning tactics are becoming increasingly important as cities grow (Bibri et al. 2020) in order to create urban environments that are resilient, sustainable, and ecologically friendly (Sturiale & Scuderi 2019). Cities may adopt comprehensive programs to

reduce, reuse, recycle, and appropriately dispose of plastic trash (Kurniawan et al. 2021; Earth Reminder. 2020) by incorporating plastic waste management into urban planning procedures. Urban planning offers the chance to develop and put into place waste management infrastructure, encourage sustainable consumption habits, and develop an atmosphere that is conducive to behavioral change (Susan 2021; Locke 2021) Urban planning may also encourage resource efficiency (Elmqvist et al. 2019) and lessen dependency on single-use plastics by facilitating the incorporation of circular economy ideas (Bolger & Doyon 2019). Therefore, for Nigeria to build efficient and long-lasting solutions, it is essential to comprehend the importance of urban planning in managing plastic pollution (Chand Malav et al. 2020).

## Research Objective and Significance

The goal of this study is to investigate how urban planning views might be used to combat plastic pollution in Nigeria. This study aims to offer insights and suggestions for incorporating plastic waste management into urban planning practices in Nigeria by investigating the current level of plastic pollution in the nation, analyzing the role of urban planning in mitigating plastic waste, and identifying successful initiatives and strategies from other countries. This study's significance rests in its ability to educate politicians, urban planners, and other stakeholders on the value of taking plastic pollution into account in urban development plans and promoting



sustainable behaviors. The results of this study can help create strategies and regulations that reduce plastic pollution and support environmental sustainability and improve the overall quality of life in Nigerian cities.

## Materials and Methods

### Overview of Plastic Pollution in Nigeria

In Nigeria, plastic pollution is a serious environmental issue (Akindele 2022). An estimated 2.5 million tonnes of plastic garbage are produced in the nation each year, yet only a small percentage of that material gets recycled (Sogbanmu 2022). The residual garbage eventually finds its way into landfills, rivers, and the ocean, where it may severely harm the environment and people's health (National Geographic Society. 2012).

### Statistics and Data on Plastic Waste Generation and Disposal

Nigeria is the ninth-largest producer of plastic garbage in the world, according to 2018 World Bank research (Onwudinjo 2021). In Nigeria, just 9% of plastic garbage is recycled, and the rest 91% ends up in landfills, rivers, and the ocean, according to the research (Ugoeze et al. 2021). Lagos State, the most populated state in Nigeria (Osikomaiya et al. 2021), is anticipated to produce 9,000 tonnes of rubbish every day, according to a 2020 assessment by the Lagos State rubbish Management Authority (Ayadi & Alo 2020). Plastic makes about 86% of this garbage. Only 20% of the garbage produced in Lagos State gets collected, and only 10% of that rubbish is recycled, according to the report (Dumbili & Henderson 2020). The remaining 80% of rubbish either finds its way into streams and the ocean or is deposited in landfills (Kosior & Crescenzi 2020).

### Environmental and Health Impacts of Plastic Pollution

Environmental damage from plastic contamination is possible (Soares et al. 2021). Plastic may break down into tiny particles called microplastics and take hundreds of years to disintegrate (Kasmuri et al. 2022). When marine life consumes microplastics, it may have health issues or perhaps pass away (Lim 2021). Ecosystems and wildlife habitats can be harmed by plastic waste in the following ways:

- Blocking streams and causing environmental disruption
- Putting animals at risk
- Water and soil contamination
- Hazardous chemical emissions into the environment

(Awuchi & Awuchi 2019; Umaru et al.; Siddiqua et al. 2022).

Plastic pollution can have harmful effects on human health in addition to the environment, such as:

- Endocrine function disruption
- Compromising the immune system

- Inflicting cancer
- The likelihood of birth abnormalities rising

(Darbre, P. D. 2020; Allouzi, M. M. A. et al. 2021; Alabi, O. A. et al. 2019).

### Current Policies and Initiatives Addressing Plastic Pollution

In order to combat the issue of plastic pollution, the Nigerian government has taken some action. The usage of single-use plastic bags was outlawed by the government in 2018 (Nwafor & Walker 2020). Additionally, the government has put in place a variety of initiatives to support trash reduction and recycling (Amogunla 2021). However, it hasn't been enough to stop the increasing amount of trashed plastic that ends up in the oceans (Parker 2020). More stringent rules regarding the manufacture and usage of plastic must be put in place by the government (Nakamura 2021). Prioritizing our policies to implement individual behavioral changes as well as societal, institutional changes will enable us to reduce plastic pollution while simultaneously encouraging sustainable plastic waste management solutions (Vanapalli et al. 2021).

### Role of Urban Planning in Sustainable Development

Addressing plastic pollution is a crucial aspect of urban planning, which is crucial for reaching sustainable development goals (UNEP. 2017). Creating cities that are socially inclusive, economically successful, and ecologically sustainable is the goal of sustainable urban development (Kumar et al. 2021). Cities may successfully support sustainable development by including plastic waste management into urban planning procedures (Pinderhughes 2004). Urban planning is useful for locating waste management facilities (Matthews 2019), establishing effective trash collection (Kiruthiga et al. 2021), and disposal systems, and promoting sustainable consumption habits (National Geographic Society. 2011). Additionally, it makes it possible to incorporate green areas (Ambrey et al. 2016), recycling facilities, and sustainable infrastructure (Susan Meyer 2021) all of which can help to minimize plastic waste production and advance the circular economy.

### Integration of Plastic Waste Management in Urban Planning Strategies

Comprehensive plastic waste management solutions must be incorporated into urban planning initiatives (Kruljac 2012) in order to successfully combat plastic pollution. This entails including appropriate disposal techniques, trash segregation, recycling, and waste reduction strategies in urban development plans (US EPA. 2015; Wan et al. 2019). To develop and execute waste management infrastructure that especially addresses plastic trash, urban planners can work with waste management specialists, environmental organizations, and community stakeholders (Matthews 2019;



CareerExplorer. 2017). This may entail building recycling facilities, waste-to-energy plants (Covanta. 2022), and putting in place sufficient waste collection and segregation systems (Gonzalez 2022). Sustainable waste management techniques will be integrated into the city's infrastructure (Mwanza & Mbohwa 2021; Randhawa et al. 2020) and governance systems if plastic waste management is integrated into urban planning initiatives (Marshall & Farahbakhsh 2013).

## Methodology

Research design and methodologies are either qualitative and quantitative according to Sauder et al. (2016). Although a qualitative method is used in this study. As defined by Bhandari, (2023) a qualitative method deals with the collection, review and analyzing data that are non-numerical or consists of verbal data such as texts, videos, visuals to understand an opinion on a particular topic or discuss in mind. The qualitative method further enables a focus to be replicated and view on a spectrum of perspectives from various authors and discussants. This research will be qualitative in nature rather than quantitative because the technique is focused on systematically reviewing case studies of past approaches on the subject topic in different scenario. According to Bhandari (2023), a qualitative data are occurrences in real world situations, that have been dealt with and naturalistic rather than assumptions and theoretical framework. The scenario used in this study are past approaches and cases from countries of the world in combatting plastic pollution which can be adopted and localised in Nigeria's perspective.

## Data Collection

The data collection relied heavily delved deeply on secondary data from several authors, online articles, web references and publications such as statistics on volume of plastic pollution, current level of the menace in the nation, priorities from case studies of cities of the world that have successfully combatted plastic pollution such as Curitiba in Brazil, San Fransischo, California, USA and Taipen in Taiwan.the reasons for this selection includes the practical step taken to curb the menace of plastic pollution. As soon this was done, a systematic review was done.

## Results

Case studies highlighting successful urban planning approaches to tackle plastic pollution in other countries Case studies from various nations offer insightful recommendations and best practices for tackling plastic pollution in cities. Urban planners in Nigeria can learn from these examples and be inspired by practical methods and tactics. Successful case studies include the following:

**1. Curitiba, Brazil:** Curitiba put into place a cutting-edge waste management system that prioritized garbage segregation, recycling, and education (Berzins 2020). The city established a network of recycling facilities (Lubow

2007) and put programs into place to promote public involvement in trash minimization and recycling projects (Adler 2016).

**2. San Francisco, California, USA:** San Francisco established a comprehensive zero-waste ordinance that required mandatory composting and a ban on plastic bags (US EPA. 2013; Abruzzo 2019). Significant reductions in plastic waste were achieved as a consequence of the city's urban planning activities, which were centered on building an infrastructure that enabled trash reduction, recycling, and composting.

**3. Taipei, Taiwan:** Through its "Pay As You Throw" initiative, Taipei was able to successfully minimize plastic trash (Wu et al. 2021). The city established a volume-based garbage tax system in which citizens are charged according to the volume of rubbish they produce (Sung et al. 2020). This strategy promoted recycling and trash reduction, which significantly reduced the amount of plastic garbage.

## Local Case Studies

Successful Urban Planning Initiatives addressing plastic pollution in Nigeria and analyzing their effectiveness

**1) The Lagos State Waste Management Authority (LAWMA)** is conducting several steps to lessen plastic pollution in Lagos, such as:

- More recycling containers were placed in public spaces (Dawodu et al. 2021).
- Educating community members on the value of recycling (Olatubosun et al. 2023).
- Provide financial inducements to encourage recycling (Kassah 2020).

Increasing the quantity of recycling bins in public spaces has been a success for (LAWMA) (Agbesola 2013). Residents now find it simpler to recycle their plastic garbage as a result. Additionally, LAWMA has been successful in informing locals of the value of recycling. The number of individuals recycling their plastic garbage has increased as a result of this (Allen-Taylor 2022). More individuals are now recycling their plastic garbage as a result of this.

**2) The Abuja Environmental Protection Agency (AEPB)** is conducting a variety of projects to lessen plastic pollution in Abuja, including:

- The prohibition of single-use plastic bags (Imam et al. 2008).
- Placing recycling containers in public areas (Abuja Metropolitan Management Council. 2016).
- Promoting recycling among the community's citizens.

The use of single-use plastic bags has been outlawed by the Abuja Environmental Protection Agency (AEPB) (Ondachi et al. 2023). The amount of plastic garbage produced in Abuja has decreased as a result. Recycling bins have been successfully installed in public spaces

thanks to the AEPB (Nwosu et al. 2016). Residents now find it simpler to recycle their plastic garbage as a result.

**3) The Eko Atlantic City** is a brand-new metropolis being built in Lagos, Nigeria on reclaimed ground (Murray 2016). The city is intended to be a cutting-edge, environmentally friendly community that prioritizes commerce, tourism, and entertainment (Bolarinwa 2023). A variety of initiatives to combat plastic pollution are included in the city's master plan, including:

- Single-use plastic bag prohibition
- A thorough recycling scheme
- Recycled materials being used in building (Eko Atlantic 2023).

On reclaimed territory in Lagos, Nigeria, a new metropolis called The Eko Atlantic metropolis is being built. The master plan for the city outlines a variety of initiatives to combat plastic pollution. These actions include a complete recycling program, a prohibition on single-use plastic bags, and the use of recycled materials in building. These actions are anticipated to be successful in lowering

These initiatives are helping to lessen plastic pollution and enhance the environment. There are several more elements that contribute to good urban planning in Nigeria in addition to these particular projects. These consist of:

- Effective governmental leadership
- Public-private collaborations
- Community involvement
- Sustainability
- Innovation

(Chisa et al. 2015; City Insight 2020; Un- Habitat 2023; Echendu & Georgeou 2021).

## Discussion

### Challenges and Barriers to Addressing Plastic Pollution in Nigeria

#### A. Inadequate Waste Management Facilities

The absence of efficient waste management infrastructure in Nigeria is one of the main obstacles to tackling the plastic pollution problem (Dumbili & Henderson 2020). The incorrect disposal of plastic garbage is a result of insufficient waste collection methods (Rajmohan et al. 2019), poor recycling facilities, and restricted landfill capacity. Plastic garbage cannot be efficiently separated, recycled, or disposed of properly without a well-designed waste management system (Hossain et al. 2022), which causes it to accumulate in landfills, waterways, and streets. Urban planning initiatives that emphasize the creation of comprehensive waste management infrastructure (Aakriti. 2020), including the building of recycling facilities, trash collection systems, and suitable treatment facilities (Fainstein 2016) are necessary to

address this problem.

#### B. Lack of Knowledge and Instruction on Plastic Pollution

The general public's lack of knowledge and education about plastic pollution is a big obstacle to resolving it in Nigeria (Solaja et al. 2020; Soares et al. 2021). The harmful effects of plastic trash on the environment and human health are not widely known (Kutralam-Muniasamy et al. 2022). Due to this ignorance, there is little concern for and participation in ethical waste management techniques (Miner et al. 2020). This study enables knowledge and understanding of plastic pollution, urban planning initiatives must include educational programs and awareness campaigns that target neighborhoods, schools, and workplaces. Urban planning may play a significant influence in modifying attitudes and behaviors toward plastic trash by promoting responsible consumption and waste management practices (Lehmann 2011) as well as raising knowledge of the environmental effects of plastic waste.

#### C. Economic and Cultural Aspects That Affect How People Use and Dispose of Plastic

Addressing plastic pollution in Nigeria is also significantly hampered by economic and cultural considerations (Uba 2021). For many customers, plastic packaging is the material of choice since it is frequently regarded as handy and economical (Rujnić-Sokele & Pilipović 2017). Additionally, cultural habits that encourage the production of plastic trash include using single-use plastics for food and beverage packaging (Hardesty et al. 2021). It takes a multifaceted strategy that takes into account cultural sensitivities, various packaging alternatives, and financial incentives to get beyond these obstacles (Rhein & Schmid 2020; Iacovidou et al. 2020). Promoting sustainable economic models, such as the growth of regional eco-friendly packaging firms, and incorporating cultural perspectives into waste management methods are two ways that urban planning may be helpful (Appannan et al. 2022; Clark et al. 2009). Designing successful urban planning interventions that address the economic and cultural aspects driving plastic use (Moore et al. 2003) and disposal habits necessitates engaging with local communities and stakeholders to understand their needs, beliefs, and preferences (Knickmeyer 2019).

#### D. Infrastructure Development for Waste Collection, Segregation, and Recycling

Building a strong waste management system is one of the most important urban planning techniques for reducing plastic pollution in Nigeria (Duru et al. 2019). This entails the development of effective garbage collection systems that reach both urban regions and rural areas (Uma et al. 2013). The best sites for garbage transfer stations, recycling facilities, and material recovery facilities may be found by urban planners (CareerExplorer. 2017). This study guides in promoting efficient disposal and





recycling, adequate waste segregation infrastructure, such as specialized bins for various types of plastics, may be incorporated into urban planning plans. Furthermore, by building recycling facilities and fostering public-private partnerships, it is possible to increase the capacity for recycling plastic trash and lessen the need for landfilling (Olukanni, & Nwafor 2019; Peterson & Hughes 2017).

#### **E. Incorporating Plastic Waste Reduction Policies In Urban Development Plans**

Urban planning strategies should include plastic waste reduction measures into urban development plans in order to successfully reduce plastic pollution (Afrin et al. 2021). These restrictions and incentives may be used to discourage the use of single-use plastics, stimulate the use of eco-friendly packaging materials, and promote the adoption of sustainable corporate practices (George & George 2023). Urban planners can work with appropriate parties, such environmental organizations and business representatives (Fainstein 2016), to create and implement regulations that have an impact on the manufacture, use, and disposal of plastics (Schuyler & Ramezani 2022). Cities may encourage sustainable activities and promote the shift to a circular economy by including these policies into their urban planning frameworks (Bolger & Doyon 2019).

#### **F. Public Awareness Campaigns and Educational Programs**

Campaigns to raise public awareness and educational initiatives are essential parts of urban planning plans to reduce plastic pollution (Charitou et al. 2021). Urban planners can work with governmental organizations, non-governmental organizations (NGOs) (Raimi et al. 2022), and educational institutions to encourage responsible consumption and waste management practices (Zorpas 2020) and raise awareness of the negative environmental effects of plastic trash. These initiatives may consist of multi-media campaigns, school programs, and community workshops that stress the value of reducing, reusing, and recycling plastics (Clayton et al. 2020; Riaz et al 2023). Urban planning can facilitate behavior change and promote sustainable practices at the individual level (Knickmeyer 2019).

#### **G. Collaborative Efforts Between Government, NGOs, and Businesses**

Effective plastic pollution prevention in Nigeria depends on cooperation between the government, NGOs, and industry (Akindele 2022; Rajabi et al. 2021). Partnerships between government organizations in charge of waste management, non-profit organizations dedicated to environmental protection (Charles 2019), and companies involved in the manufacture and distribution of plastics can be facilitated by urban planners (Bureau of Labor Statistics, U.S. 2019). By working together, we can create cutting-edge solutions like extended producer responsibility programs, sustainable packaging efforts, and neighborhood trash management initiatives (Gaur et

al. 2022; Farooq et al. 2022). In order to implement comprehensive and long-lasting solutions to plastic pollution, urban planning may develop these collaborations and take advantage of the resources and knowledge of several stakeholders (Bohman et al. 2020).

#### **Conclusion and Future Works**

This paper has argued that urban design in Nigeria faces challenges in combating plastic pollution due to inadequate waste management infrastructure, lack of knowledge, and cultural and economic factors. Integrating waste management into sustainable urban development can help reduce pollution.

The relevance of Urban Planning in Nigeria is clearly supported by the current findings. In order to combat plastic pollution in Nigeria, urban planning is essential. Cities may support the aims of sustainable development and build socially inclusive, economically successful, and ecologically sustainable urban settings by including plastic waste management into urban planning initiatives. This paper emphasizes the importance of urban planning in combating plastic pollution through improvements in waste management infrastructure, eco-friendly urban design, partnerships, and effective policies.

This study emphasizes the need for collective efforts, sustainable urban design, and efficient regulations to combat plastic pollution. It calls for partnerships, collaborations, and ongoing investment in waste management infrastructure, emphasizing the importance of a comprehensive strategy for Nigeria's metropolitan regions.

Nigeria can reduce plastic pollution and create sustainable cities by adopting sustainable urban design techniques and prioritizing plastic waste management. This will create resilient and habitable urban areas for present and future generations. Nigeria can demonstrate leadership in sustainable urban development and serve as a model for other countries facing global plastic pollution challenges.

#### **Recommendations for Urban Planning Solutions in Nigeria**

Strengthening waste management infrastructure is crucial to combat plastic pollution in Nigeria, encompassing the development of garbage collection, recycling, and treatment systems. Urban planners must prioritize constructing an efficient infrastructure capable of managing the escalating plastic waste. This involves expanding garbage collection coverage, employing waste segregation methods, and promoting recycling and proper disposal. Adequate funding, strategic planning, and collaboration with relevant stakeholders are imperative for enhancing Nigeria's waste management infrastructure. To mitigate plastic pollution, sustainable urban design and waste reduction techniques should be integrated into urban planning, emphasizing green spaces, pedestrian-friendly structures, and mixed-use developments. Encouraging reusable bags, bulk purchasing, and regional circular economies can significantly reduce plastic waste. By incorporating these strategies, Nigeria can forge



resilient, eco-conscious, and socially responsible cities. Effective urban planning solutions necessitate partnerships among diverse stakeholders, including local communities, businesses, NGOs, and governmental bodies. Collaborative initiatives, information exchange, and resource sharing are essential for lasting plastic pollution reduction. Policy-wise, robust regulations should underpin urban development endeavors, featuring extensive producer responsibility measures and restrictions on single-use plastics. Supporting eco-friendly packaging, incentivizing recycling, and waste reduction through legislation is paramount. Urban planners should collaborate with legislators and environmental experts, aligning regulations with local waste management strategies and global benchmarks.

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