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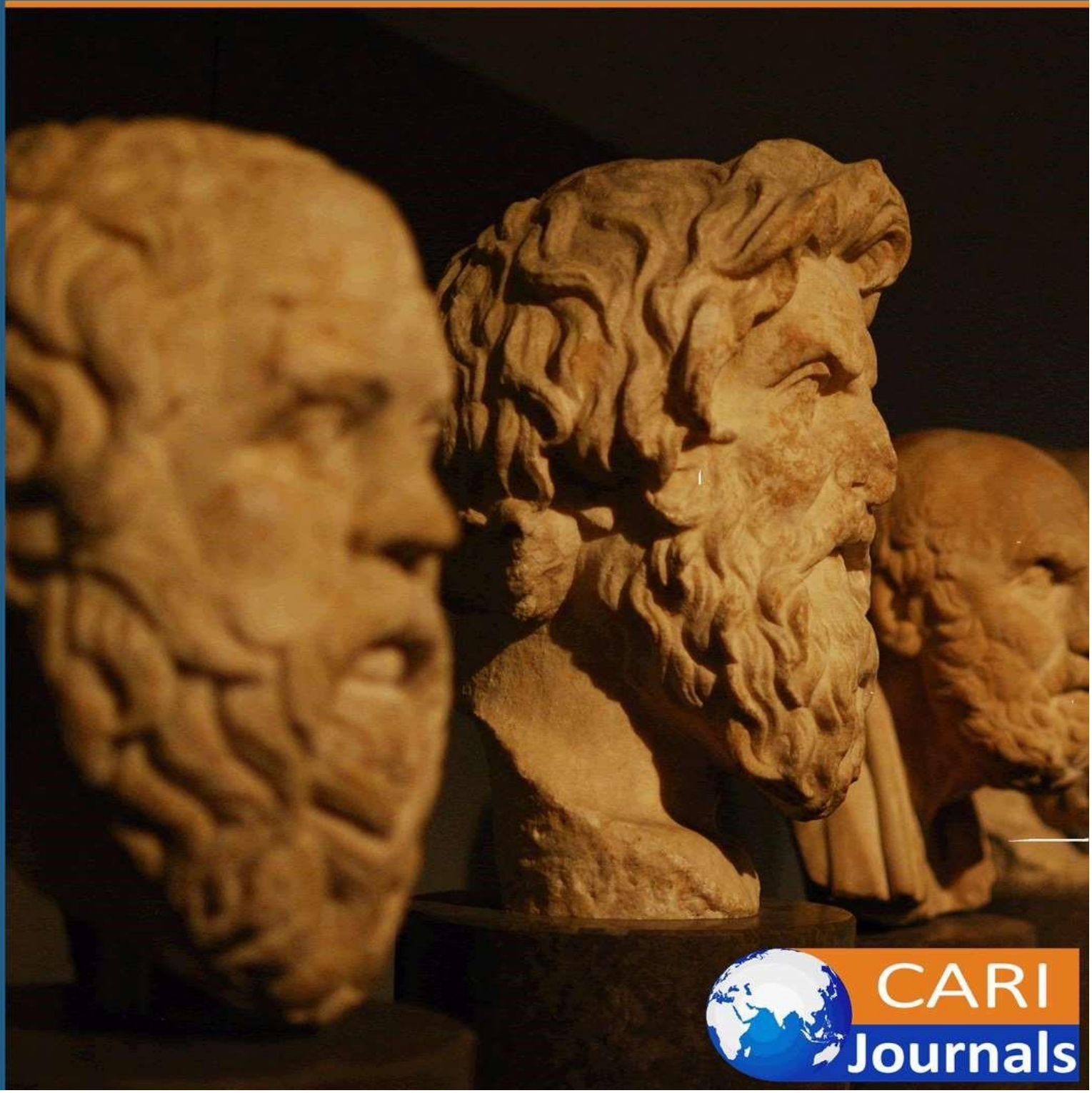

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The Ethics of Waste Management in the Metropolis of Yaoundé and Douala on Climate Change

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Abstract

This study explores the relationship between urban waste management practices and community public health outcomes. The efforts made by governments, civil society organizations (CSOs), and educational institutions to educate citizens seem inadequate. It is essential to observe as one plies the streets and roads in Yaoundé and Douala, garbage heaps, dust bins full to the brims, flies and a disgusting smell emanating from the dustbins and temporary waste disposal sites. When the municipal councils take more than a week to evacuate the garbage and empty the dustbins, some city dwellers burn the refuse. This may increase the quantity of nitrous gases emitted into the atmosphere, leading to global warming that triggers climate change. Consequentialists, Utilitarians have contended that human actions should always lead to a greater good for the greater number in society, thereby reducing pain and suffering. As such, the government, CSOs and citizens must change their mindsets concerning waste management to mitigate the obvious hazard it brings to humanity and the universe. In theory, much talk has been ongoing in the Conference of the Parties from Copenhagen in 2009 to Azerbaijan in 2024, but emissions of toxic gases, floods, landslides, hurricanes, storms, desertification and erosion are still rising. In this paper, I argue that the government needs to anticipate plausible measures of pre-collection, collection, treatment, and transformation of waste. The empirical and qualitative methods were used in this study. I found that, Douala and Yaoundé face escalating waste generation, fragmented management systems, and weak community engagement. Public health risks and environmental degradation are significant due to inadequate disposal practices. Enhanced awareness, community initiatives, and coordinated institutional efforts are essential for sustainable waste management and improved urban living conditions. This study contributes to theory by highlighting the interconnectedness of urban waste management and public health. Practically, it emphasizes the need for community-driven initiatives. Policymakers are urged to develop integrated strategies that enhance stakeholder collaboration, promoting sustainable waste management practices that mitigate health risks and foster resilient urban environments.

Keywords: *Climate Change, Civil Society Organizations, Environmental Conservation, Sustainable Development*

Introduction

The urbanization of African cities presents multifaceted challenges, particularly concerning waste management. Douala and Yaoundé, the economic and political capitals of Cameroon, exemplify the pressing issues associated with inadequate waste management systems in urban environments. Rapid population growth, coupled with increasing economic activities, generates significant amounts of municipal waste, overwhelming existing waste management infrastructure and leading to both environmental degradation and public health crises (Awasom & Biyong, 2020). The systematic mismanagement of waste in these cities reflects broader socio-economic and political issues, including a lack of governance, inadequate public services, and insufficient community engagement (Mogbo & Otchong, 2021). The visible consequences of ineffective waste management are stark in Douala and Yaoundé. Garbage accumulates on streets, informal dumping sites proliferate, and the lack of consistent waste collection exacerbates these problems. Urban areas become characterized by unsightly pollution that not only diminishes aesthetic value but also creates hazardous conditions for local residents (Tchounwou et al., 2019). The citizens, faced with growing mountains of waste, often resort to burning refuse, releasing toxic emissions that contribute to air pollution and climate change (Akanbi et al., 2021). Thus, the crisis of waste management is not merely an issue of urban aesthetics but one of environmental ethics and public health, warranting urgent attention and reform. A critical examination of the ethical dimensions of waste management reveals a gap between public obligation and civic engagement. Ethical theories, particularly utilitarianism, underscore the importance of actions that promote the greatest good for the greatest number (Singer, 2011).

In the context of Douala and Yaoundé, it calls into question whether current waste management practices serve the public interest or merely perpetuate inequality and suffering. There is a pressing need for responsible governance that ensures equitable access to waste management services and fosters public participation in sustainable practices (Kouadio et al., 2020). Moreover, the problem of waste management is situated within the broader narrative of climate change and environmental sustainability.

Global discussions around climate change stress the importance of local actions to mitigate environmental degradation (Intergovernmental Panel on Climate Change [IPCC], 2021). However, cities like Douala and Yaoundé often remain trapped in a cycle of reactive rather than proactive strategies, leading to dire consequences for both local and global ecosystems. The inadequate institutional frameworks and policies contribute to a lack of coordination among stakeholders, exacerbating the waste crisis and hindering sustainable development (Franco et al., 2020).

This study employs a qualitative methodology to investigate unethical waste management practices in Douala and Yaoundé, focusing on their environmental impacts and implications for climate change. By assessing the existing waste management systems, identifying critical shortcomings, and examining the ethical considerations of these issues, the research aims to forge

a pathway towards sustainable practices. Understanding the socio-political context of waste management is crucial for developing effective policy interventions and fostering a culture of sustainability among citizens (Nwankwo et al., 2021). The limitations of current waste management strategies in Douala and Yaoundé arise from a confluence of structural, institutional, and socio-cultural factors. Municipal councils often lack adequate funding and technical expertise, leading to inefficiencies in service delivery (Doh et al., 2020). Moreover, prevailing public attitudes towards waste disposal contribute to a culture of disengagement, wherein individuals perceive waste management as solely the responsibility of local authorities (Punja & Oguge, 2021). Overcoming these barriers necessitates a multi-faceted approach that includes enhancing community awareness, improving institutional capacity, and fostering partnerships between government bodies and civil society organizations (CSOs).

This research aims to position waste management as a collective challenge, advocating for innovative solutions that prioritize ethical practices and community involvement. By shifting the perception of waste from a liability to a resource, the study underscores the potential for transforming waste management into a pillar of urban sustainability (Pérez et al., 2022). The exploration of best practices from other contexts can inform the local practices in Douala and Yaoundé, offering insights into sustainable models that can effectively address the waste crisis while minimizing environmental impacts. Hence, this paper seeks to contribute to the discourse on environmental ethics and sustainable development, emphasizing that effective waste management is not merely an operational necessity but a moral imperative. By fostering an understanding of the ethical implications of waste management practices, the research aims to inspire action that enhances the quality of life for residents in Douala and Yaoundé while mitigating adverse environmental impacts. It is only by acknowledging the interconnectedness of waste management, public health, and climate change that we can find viable solutions that benefit both urban populations and the planet at large.

A review of urban waste management literature reveals significant gaps concerning the intersection of behavioral psychology and waste reduction practices. While studies emphasize technological solutions and policy frameworks (Huang et al., 2021; Rathi, 2021), less attention has been given to understanding community behavior and engagement in waste management initiatives. This gap suggests potential hypotheses such as: "Communities with higher levels of environmental education exhibit increased participation in waste reduction programs" and "Behavioral interventions significantly enhance the effectiveness of waste management policies." Addressing these hypotheses can deepen theoretical understanding and improve practical outcomes in urban waste management (Mälander et al., 2020).

Evolution of the Conference of Parties (COP) on Climate Change and its Impact on Douala and Yaounde.

The Conference of the Parties (COP) on climate change has evolved significantly since its inception. The COP is the supreme decision-making body of the United Nations Framework Convention on Climate Change (UNFCCC), which was established in 1992. The convention has been ratified by 197 countries, making it a nearly universal agreement (UNFCCC, 1992). According to Bodansky (2016), the COP has played a crucial role in shaping the global response to climate change. One of the key milestones in the evolution of the COP was the 2009 Copenhagen Climate Change Conference (COP 15). The Copenhagen Accord was adopted, recognizing the need to limit global warming to 2°C and providing a framework for climate finance and technology transfer (UNFCCC, 2009). As noted by Rajamani (2012), the Copenhagen Accord marked a significant shift towards a more pragmatic and flexible approach to international climate cooperation. The Cancun Agreements, adopted at COP 16 in 2010, built on the Copenhagen Accord, establishing a Green Climate Fund and a Technology Mechanism (UNFCCC, 2010). According to Doelle (2013), the Cancun Agreements demonstrated the ability of the COP process to deliver concrete outcomes and build trust among parties. The Paris Agreement, adopted at COP 21 in 2015, marked a major milestone in the evolution of the COP. The agreement aims to limit global warming to well below 2°C and pursue efforts to limit it to 1.5°C (UNFCCC, 2015). As noted by Bodansky (2016), the Paris Agreement represents a significant departure from the traditional top-down approach to international climate cooperation.

The Glasgow Climate Pact, adopted at COP 26 in 2021, emphasized the need for urgent action to address the climate crisis and achieve the goals of the Paris Agreement (UNFCCC, 2021). According to Rajamani (2022), the Glasgow Climate Pact highlights the growing recognition of the need for more ambitious and urgent climate action. The most recent COP meeting, COP 29 in Azerbaijan in 2024, focused on accelerating climate action and achieving the goals of the Paris Agreement (UNFCCC, 2024). As noted by Doelle (2024), COP 29 demonstrated the ongoing commitment of parties to the COP process and the need for continued international cooperation to address the climate crisis. The evolution of the COP has significant implications for cities like Douala and Yaoundé in Cameroon. As a party to the UNFCCC, Cameroon has committed to reducing its greenhouse gas emissions and adapting to the impacts of climate change (Kemajou et al., 2020). According to Njila et al. (2020), Cameroon is already experiencing the impacts of climate change, including rising temperatures, changing rainfall patterns, and increased frequency of extreme weather events. COP process provides opportunities for Cameroon to access climate finance, technology, and capacity-building support to enhance its climate resilience and reduce its carbon footprint (Kemajou et al., 2020). According to Rajamani (2022), the COP process has played a crucial role in supporting the development of climate policies and programs in developing countries like Cameroon.

The evolution of the COP has been instrumental in shaping the global response to climate change. As Cameroon continues to navigate the challenges and opportunities of climate action, the COP process will remain a critical platform for international cooperation and support. The Copenhagen Accord recognized the need to limit global warming to 2°C and provided a framework for climate finance and technology transfer (UNFCCC, 2009). However, the accord was criticized for lacking binding emissions targets. The Paris Agreement aimed to limit global warming to well below 2°C and pursue efforts to limit it to 1.5°C (UNFCCC, 2015). The agreement also established a global goal to reduce greenhouse gas emissions. The Glasgow Climate Pact emphasized the need for urgent action to address the climate crisis and achieve the goals of the Paris Agreement (UNFCCC, 2021). The pact also encouraged countries to accelerate their efforts to phase out coal and reduce methane emissions.

The US has implemented various climate policies, including the Clean Power Plan, which aimed to reduce greenhouse gas emissions from power plants (EPA, 2015). However, the plan was repealed by the Trump administration in 2019. France has implemented a carbon pricing mechanism, which aims to reduce greenhouse gas emissions by 40% by 2030 compared to 1990 levels (French Ministry of Environment, 2020). The UK has set a target to reduce greenhouse gas emissions to net-zero by 2050 (UK Government, 2019). The country has also implemented policies to promote renewable energy and improve energy efficiency. Japan has implemented a carbon pricing mechanism and set a target to reduce greenhouse gas emissions by 26% by 2030 compared to 2013 levels (Japanese Ministry of Environment, 2020). Russia has set a target to reduce greenhouse gas emissions by 25% by 2030 compared to 1990 levels (Russian Ministry of Natural Resources, 2020). However, the country's climate policies have been criticized for being inadequate. China has implemented various climate policies, including a national carbon market, which aims to reduce greenhouse gas emissions (Chinese Ministry of Ecology and Environment, 2020). The country has also set a target to peak its carbon dioxide emissions by 2030. Cameroon has implemented policies to promote sustainable forest management and reduce deforestation (Cameroonian Ministry of Forestry, 2020). The country has also set a target to reduce greenhouse gas emissions by 32% by 2030 compared to business-as-usual levels. Chad has implemented policies to promote renewable energy and improve energy efficiency (Chadian Ministry of Energy, 2020).

The country has also set a target to reduce greenhouse gas emissions by 22% by 2030 compared to business-as-usual levels. Gabon has implemented policies to promote sustainable forest management and reduce deforestation (Gabonese Ministry of Forestry, 2020). The country has also set a target to reduce greenhouse gas emissions by 45% by 2030 compared to business-as-usual levels. The Central African Republic has implemented policies to promote renewable energy and improve energy efficiency (Central African Republic Ministry of Energy, 2020). The country has also set a target to reduce greenhouse gas emissions by 15% by 2030 compared to

business-as-usual levels. Equatorial Guinea has implemented policies to promote sustainable forest management and reduce deforestation (Equatorial Guinean Ministry of Forestry, 2020). The country has also set a target to reduce greenhouse gas emissions by 20% by 2030 compared to business-as-usual levels. Congo Brazzaville has implemented policies to promote renewable energy and improve energy efficiency (Congolese Ministry of Energy, 2020). The country has also set a target to reduce greenhouse gas emissions by 30% by 2030 compared to business-as-usual levels.

In conclusion, the COP process has played a crucial role in shaping the global response to climate change. While industrialized nations have implemented various climate policies, developing nations have also taken steps to reduce their greenhouse gas emissions. However, more needs to be done to address the climate crisis and achieve the goals of the Paris Agreement. The issue of climate change has become a contentious debate between industrialized and developing countries. Industrialized countries, which are responsible for the majority of greenhouse gas emissions, have been reluctant to take responsibility for their actions and provide compensation to developing countries that bear the brunt of the consequences. The concept of climate debt, also known as carbon debt, refers to the historical responsibility of industrialized countries for their greenhouse gas emissions (Warlenius, 2018). These countries have been emitting large amounts of carbon dioxide and other greenhouse gases since the Industrial Revolution, leading to the current climate crisis. Developing countries, on the other hand, have contributed relatively little to greenhouse gas emissions but are disproportionately affected by the consequences of climate change. Despite their historical responsibility, industrialized countries have been unwilling to provide adequate compensation and support to developing countries. The Green Climate Fund, established in 2010, aims to support developing countries in their efforts to reduce greenhouse gas emissions and adapt to the impacts of climate change. However, the fund has been criticized for being underfunded and inadequate to meet the needs of developing countries (Stadelmann et al., 2014).

The issue of climate change is not only an environmental issue but also a matter of climate justice and equity. Developing countries are not only bearing the brunt of the consequences of climate change, but they are also being asked to take on the responsibility of reducing greenhouse gas emissions. This is despite the fact that they have contributed relatively little to the problem (Shue, 2014). Industrialized countries have employed various tactics to avoid taking responsibility for their greenhouse gas emissions and providing compensation to developing countries. Some of these tactics include:

- **Shifting the burden**: Industrialized countries have shifted the burden of reducing greenhouse gas emissions to developing countries, despite their historical responsibility for the problem.

- **Green washing**: Industrialized countries have engaged in greenwashing, presenting themselves as leaders in climate action while continuing to emit large amounts of greenhouse gases.
- **Lobbying**: Industrialized countries have used their economic and political power to lobby against climate policies and regulations that would require them to take action to reduce their greenhouse gas emissions.
- **Climate finance**: Industrialized countries have failed to provide adequate climate finance to support developing countries in their efforts to reduce greenhouse gas emissions and adapt to the impacts of climate change.

In this way, industrialized countries have employed various tactics to avoid taking responsibility for their greenhouse gas emissions and providing compensation to developing countries. This lack of accountability and support has exacerbated the climate crisis and undermined efforts to address it. Industrialized countries must take responsibility for their actions and provide adequate compensation and support to developing countries to address the climate crisis. Climate justice and climate finance are two interconnected concepts that have gained significant attention in recent years. Climate justice refers to the fair distribution of the benefits and burdens of climate change mitigation and adaptation efforts. It acknowledges that climate change disproportionately affects vulnerable populations, including low-income communities, indigenous peoples, and small-island developing states. Climate justice seeks to address the historical and ongoing injustices perpetuated by climate change. The concept of climate justice is built on several key principles, including equity, human rights, participation, and sustainable development. Equity recognizes the different contributions to greenhouse gas emissions and the varying capacities of countries to respond to climate change. Human rights prioritize the protection of human rights, particularly for vulnerable populations. Participation ensures the active participation of all stakeholders, including local communities and indigenous peoples, in climate decision-making processes. Sustainable development promotes sustainable development and poverty reduction while addressing climate change. Climate finance, on the other hand, refers to the financial resources mobilized to support climate change mitigation and adaptation efforts in developing countries.

Climate finance is essential for achieving the goals of the Paris Agreement and promoting climate justice. The sources of climate finance include public funding, private sector funding, and carbon markets. Public funding is provided by governments through bilateral and multilateral channels, such as the Green Climate Fund. Private sector funding is provided by companies and investors through various mechanisms, including green bonds and impact investing. Carbon markets generate revenue for climate projects through carbon pricing mechanisms. Despite the importance of climate finance, several challenges remain. One of the key challenges is the insufficient funding. The current level of climate finance falls short of the estimated needs. Another

challenge is the access and allocation of climate finance. Developing countries face challenges in accessing and allocating climate finance. Additionally, climate finance must be additional to existing development aid and not divert funding from other essential sectors. The linkages between climate justice and climate finance are critical. Climate finance must be distributed equitably, prioritizing the needs of vulnerable populations and countries. Climate finance decision-making processes must involve the active participation of local communities and indigenous peoples. Climate finance must also support climate resilience and adaptation efforts, particularly in developing countries. By addressing these linkages, climate finance can promote climate justice and support the achievement of the Paris Agreement goals.

Conclusively, climate justice and climate finance are interconnected concepts that require urgent attention. Ensuring equitable access to climate finance, promoting participatory decision-making, and supporting climate resilience are essential for achieving climate justice and addressing the climate crisis. By addressing these challenges, we can promote a more just and equitable response to climate change. Developing countries have long been vocal about the disproportionate impact of climate change on their economies, infrastructure, and populations. While it is true that industrialized countries bear historical responsibility for greenhouse gas emissions, developing countries must also take proactive steps to address the challenges posed by climate change. The "blame game" approach, where developing countries focus primarily on criticizing industrialized nations for their emissions, has yielded limited results. Instead, developing countries should prioritize precautionary and pre-emptive measures to cope with the effects of climate change, such as floods, erosion, storms, and high temperatures. One key strategy is to invest in climate-resilient infrastructure, including sea walls, levees, and green roofs. This can help protect communities from extreme weather events and reduce the economic costs of climate-related disasters (IPCC, 2014). Developing countries can also promote sustainable land use practices, such as agroforestry and permaculture, to enhance soil fertility, reduce erosion, and promote biodiversity (UNEP, 2019). In addition, developing countries can implement climate-smart agriculture practices, such as conservation agriculture and climate-resilient crop and animal varieties, to enhance agricultural productivity and resilience (FAO, 2017).

Developing countries can invest in climate information and early warning systems to enhance their preparedness and response to climate-related disasters (WMO, 2019). Finally, developing countries can promote climate education, training, and awareness-raising programs to enhance public understanding of climate change and its impacts, and to promote individual and collective action to address the challenge (UNESCO, 2019). In conclusion, while developing countries have legitimate concerns about the impact of climate change, they must also take proactive steps to address the challenge. By investing in climate-resilient infrastructure, promoting sustainable land use practices, implementing climate-smart agriculture practices, investing in climate information and early warning systems, and promoting climate education and awareness,

developing countries can reduce their vulnerability to climate change and promote sustainable development.

Adaptation and Resilience by the Cameroon Government to Cope with Climate Change.

Yaoundé and Douala, the two largest cities in Cameroon, are facing significant climate-related challenges, including flooding, landslides, and heat stress. To enhance their resilience and adapt to the impacts of climate change, urban planning and infrastructure development can be improved to reduce the risk of flooding and landslides (Douglas et al., 2019). This can include the construction of drainage systems, flood-resistant buildings, and roads that can withstand heavy rainfall. According to Kamga (2019), Cameroon's urban areas are particularly vulnerable to climate-related disasters, highlighting the need for proactive adaptation measures. Green spaces and urban forestry can also help mitigate the urban heat island effect, reduce air pollution, and provide habitats for biodiversity (Jim, 2013). Yaoundé and Douala can increase their green spaces and promote urban forestry through tree-planting programs and community-led initiatives. As noted by Buyadi et al. (2017), urban forestry can play a critical role in enhancing urban resilience to climate change. Climate-resilient agriculture is another important adaptation strategy for Yaoundé and Douala (Morton, 2017). This can include the adoption of climate-resilient crop and animal varieties, agroforestry practices, and conservation agriculture.

According to Nkamankeng et al. (2018), climate-resilient agriculture can enhance food security and reduce the vulnerability of farmers to climate-related shocks. Flood protection measures, such as sea walls, levees, and flood-resistant buildings, can be implemented in Douala to reduce the risk of flooding and protect communities (IPCC, 2014). Additionally, waste management and drainage systems can be improved to reduce the risk of flooding and waterborne diseases. As noted by Douglas et al. (2019), effective waste management and drainage systems are critical for reducing the vulnerability of urban areas to climate-related disasters. Early warning systems and emergency preparedness plans can be established in both Yaoundé and Douala to respond to climate-related disasters (Kamga, 2019). Community-led adaptation initiatives can also be promoted to enhance community resilience and adaptation to climate change. According to Buyadi et al. (2017), community-led adaptation initiatives can play a critical role in enhancing urban resilience to climate change. Climate change education and awareness programs can be implemented in both cities to enhance public understanding of climate change and its impacts, and to promote individual and collective action to address the challenge (Morton, 2017). As noted by Nkamankeng et al. (2018), climate change education and awareness are critical for promoting behavior change and enhancing community resilience to climate change. Rural areas and the outskirts of cities are often more vulnerable to the impacts of climate change due to their limited resources, infrastructure, and capacity to adapt. However, these areas also play a critical role in supporting the resilience of metropolitan areas. Here are some possible measures of adaptation and

resilience that can be implemented in rural areas and outskirts to benefit both rural communities and metropolitan areas:

Rural areas can adopt climate-resilient agriculture practices, such as agroforestry, conservation agriculture, and climate-smart agriculture, to enhance food security and reduce the vulnerability of farmers to climate-related shocks (Morton, 2017). These practices can also help to maintain ecosystem services, such as pollination, pest control, and soil health, which are essential for agricultural productivity. In addition, rural areas can implement sustainable water management practices, such as rainwater harvesting, drip irrigation, and watershed management, to reduce the risk of water scarcity and flooding (Kamga, 2019). These practices can also help to maintain water quality, reduce soil erosion, and support biodiversity. Rural areas can also promote ecosystem-based adaptation, which involves the restoration and conservation of natural ecosystems, such as forests, wetlands, and mangroves, to provide natural barriers against climate-related hazards (IPCC, 2014). For example, restoring forests can help to reduce soil erosion, improve water quality, and provide habitat for biodiversity. Furthermore, rural areas can implement early warning systems and emergency preparedness plans to respond to climate-related disasters, such as floods, landslides, and droughts (Douglas et al., 2019). These systems can help to reduce the risk of loss of life, property damage, and displacement of communities. In terms of energy, rural areas can promote the use of renewable energy sources, such as solar, wind, and hydro power, to reduce dependence on fossil fuels and enhance energy security (IEA, 2020). This can also help to reduce greenhouse gas emissions and mitigate climate change.

Finally, rural areas can promote climate-resilient infrastructure, such as flood-resistant buildings, roads, and bridges, to reduce the risk of damage from climate-related hazards (UNDRR, 2019). This can also help to support economic development, improve livelihoods, and enhance human well-being. In conclusion, rural areas and the outskirts of cities play a critical role in supporting the resilience of metropolitan areas. By adopting climate-resilient agriculture practices, implementing sustainable water management practices, promoting ecosystem-based adaptation, implementing early warning systems and emergency preparedness plans, promoting renewable energy sources, and promoting climate-resilient infrastructure, rural areas can enhance their resilience to climate change and support the resilience of metropolitan areas. The mindset of citizens plays a crucial role in addressing the issue of waste disposal. Education on the ethics of waste disposal is essential to promote responsible behavior and encourage individuals to take action to mitigate the environmental impacts of waste.

In many communities, waste disposal is often viewed as someone else's problem, and individuals may not consider the consequences of their actions. This lack of awareness and understanding of the ethics of waste disposal can lead to irresponsible behavior, such as littering, improper disposal of hazardous waste, and failure to recycle. Education on the ethics of waste disposal can help to change this mindset by promoting a sense of personal responsibility and

stewardship for the environment. By learning about the impacts of waste on the environment, human health, and the economy, individuals can develop a deeper understanding of the importance of proper waste disposal. One key aspect of educating citizens on the ethics of waste disposal is to promote the concept of the "waste hierarchy." This hierarchy prioritizes waste reduction, reuse, and recycling over disposal, and encourages individuals to think critically about their waste generation and disposal practices. Another important aspect of education on the ethics of waste disposal is to highlight the social and environmental injustices associated with improper waste disposal. For example, the disposal of hazardous waste in landfills can contaminate soil and groundwater, posing serious health risks to nearby communities. By understanding these injustices, individuals can develop a sense of empathy and responsibility to act in ways that promote environmental justice.

In addition to formal education, community-based initiatives and social marketing campaigns can also be effective in promoting education on the ethics of waste disposal. For example, community clean-up events and waste reduction challenges can engage citizens and encourage them to take action to reduce their waste footprint. Furthermore, education on the ethics of waste disposal should also involve the private sector and government agencies. Companies can promote sustainable packaging and waste reduction practices, while governments can implement policies and regulations that support proper waste disposal and recycling. In conclusion, education on the ethics of waste disposal is essential to promote responsible behavior and encourage individuals to take action to mitigate the environmental impacts of waste. By promoting a sense of personal responsibility and stewardship for the environment, education can help to change the mindset of citizens and promote a culture of sustainability. In many urban areas, citizens often engage in a practice that contributes to environmental degradation and public health issues. At night, some citizens tend to allow dust bins or trash cans to overflow, and in some cases, they even drop their dirt on the floor. This behavior is often driven by a lack of awareness, inadequate waste management infrastructure, and a general disregard for community cleanliness.When dust bins or trash cans are not emptied regularly, they can overflow, causing litter to spill onto the streets. This not only creates an eyesore but also attracts pests, rodents, and other disease-carrying animals. Moreover, when citizens drop their dirt on the floor, it can lead to the spread of diseases, contamination of water sources, and other environmental hazards.

This behavior can also be attributed to a lack of civic responsibility and community pride. When citizens do not take ownership of their surroundings, they are more likely to engage in behaviors that harm the environment and public health. In addition, inadequate waste management infrastructure can also contribute to this problem. In some areas, waste collection services may be irregular or inadequate, leading citizens to dispose of their waste inappropriately. This can be due to a lack of resources, poor planning, or inadequate governance. To address this issue, it is essential to implement effective waste management strategies, educate citizens on proper waste disposal

practices, and promote community involvement in maintaining cleanliness. Governments, community leaders, and citizens must work together to create a clean and healthy environment for everyone.

In Douala and Yaoundé, the two largest cities in Cameroon, littering is a pervasive problem that affects the cleanliness and beauty of public spaces (Kamga, 2019; Manga, 2018). Despite efforts by local authorities to maintain cleanliness, many residents and visitors continue to litter the streets and public places with various types of waste, including banana peelings, plastic bottles, food wrappers, and other organic and inorganic materials. According to Kamga (2019), the lack of a strong culture of waste management and environmental responsibility is a major contributor to this problem. Similarly, Manga (2018) notes that the absence of effective waste collection and disposal systems in some areas can contribute to the problem, as people may feel that they have no alternative but to dispose of their waste in public spaces. One of the main reasons for this behavior is the lack of awareness about the impact of littering on the environment and public health (UNEP, 2019; WHO, 2018). Moreover, the rapid urbanization and population growth in Douala and Yaoundé have put pressure on the cities' infrastructure and services, including waste management (Kamga, 2019; Manga, 2018). The influx of people from rural areas has led to an increase in waste generation, which can be challenging for local authorities to manage. According to UNEP (2019), the global waste management situation is critical, with many cities struggling to manage their waste effectively. The practice of littering banana peelings and other organic materials is particularly common in Douala and Yaoundé (Manga, 2018; Nguegang, 2020). Banana peelings are a significant contributor to the waste stream in these cities, as bananas are a staple food in Cameroon. However, the peelings can create unsightly messes and attract pests, which can spread diseases. According to Nguegang (2020), the decomposition of organic waste, including banana peelings, can also contribute to the production of greenhouse gases.

To address the issue of littering in Douala and Yaoundé, local authorities, civil society organizations, and community leaders must work together to raise awareness about the importance of proper waste disposal and environmental responsibility (Kamga, 2019; UNEP, 2019). This can involve public education campaigns, community clean-up events, and the provision of waste collection and disposal services. Furthermore, the government can implement policies and regulations to promote waste reduction, reuse, and recycling, and to encourage individuals and businesses to adopt environmentally responsible practices. The pungent smell emanating from garbage heaps, dust bins, and waste disposal points is a potent mixture of decaying organic matter, rotting food, and other putrid substances. When these waste collection points become full to the brim or are not regularly evacuated by municipal councils, the resulting stench can be overwhelming.

The smell is often described as a noxious blend of ammonia, hydrogen sulfide, and other volatile organic compounds (VOCs) that are released as waste decomposes (WHO, 2018). These

gases can cause eye irritation, respiratory problems, and other health issues for people living or working nearby (EPA, 2020). As the waste decomposes, the smell can become increasingly intense, especially during hot weather or when rain causes the waste to become waterlogged (Kamga, 2019). The stench can permeate entire neighborhoods, causing discomfort and distress for residents, and even affecting local businesses and economic activity. In addition to the health risks and nuisance, the pungent smell from garbage heaps and waste disposal points can also have environmental implications. For example, the release of methane and other greenhouse gases from decomposing waste can contribute to climate change (IPCC, 2014). Furthermore, the inadequate management of waste disposal points can attract pests and rodents, which can spread diseases and create additional health risks for nearby communities (Manga, 2018). In conclusion, the pungent smell emanating from garbage heaps, dust bins, and waste disposal points is a serious issue that requires attention from municipal councils, waste management authorities, and local communities. Regular waste collection, proper waste disposal, and education on waste management practices can help mitigate this problem and reduce the associated health, environmental, and economic risks.

Government's Efforts to Cope with the Growing Demography (Population) of the Metropolis and Waste Management.

The demographic increase accompanied by urbanization is a significant driver of climate change. As the global population grows, so does the demand for resources, energy, and infrastructure, leading to increased greenhouse gas emissions and environmental degradation. Urbanization, in particular, plays a crucial role in climate change. As people move from rural areas to cities, they adopt more energy-intensive lifestyles, leading to increased energy consumption and greenhouse gas emissions (IPCC, 2014). Urban areas are characterized by high population densities, which can lead to increased waste generation, air pollution, and heat island effects (WHO, 2018). The demographic increase in urban areas leads to increased energy consumption, primarily due to the growing demand for electricity, heating, and cooling (EIA, 2020). Additionally, urban areas are often associated with high levels of transportation emissions, primarily from fossil fuel-based vehicles, which contribute to climate change (IPCC, 2014). The waste management challenges in urban areas also contribute to climate change. Urban areas generate significant amounts of waste, which, if not managed properly, can lead to methane emissions and contribute to climate change (WHO, 2018). Furthermore, urbanization often leads to the destruction of natural habitats, such as forests, wetlands, and wildlife reserves, which can contribute to climate change by releasing stored carbon and reducing the ability of ecosystems to sequester carbon dioxide (IPCC, 2014). The urban heat island effect is another climate change-related issue in urban areas. Urban areas tend to be warmer than surrounding rural areas due to the urban heat island effect, which can lead to increased energy consumption and greenhouse gas emissions (EPA, 2020).

To mitigate the effects of climate change, it is essential to adopt sustainable urban planning practices, invest in renewable energy, promote energy-efficient technologies, and implement effective waste management strategies. In a nutshell, the demographic increase accompanied by urbanization is a significant driver of climate change. Addressing the climate change challenges associated with urbanization requires a multi-faceted approach that involves governments, private sector entities, and individuals. By working together, we can reduce the environmental impacts of urbanization and create more sustainable, resilient, and livable cities.

The practice of dumping waste in water basins is a pervasive problem that has severe environmental consequences, ultimately contributing to climate change. Water basins, including rivers, lakes, and oceans, are essential components of the Earth's ecosystem, providing habitats for diverse aquatic life, regulating the water cycle, and supporting human activities such as fishing, transportation, and recreation. When waste is dumped into water basins, it can have devastating effects on the environment. The waste can include a wide range of materials, such as plastics, chemicals, agricultural runoff, and sewage. These pollutants can contaminate the water, harming aquatic life and disrupting the delicate balance of the ecosystem (UNEP, 2019). One of the primary environmental concerns associated with dumping waste in water basins is the impact on water quality. Pollutants can enter the water through various pathways, including runoff from land, industrial effluent, and sewage. These pollutants can lead to the degradation of water quality, making it unsuitable for human consumption, agriculture, or other uses (WHO, 2018).

The degradation of water quality can have far-reaching consequences, including the loss of biodiversity, disruption of aquatic ecosystems, and negative impacts on human health. For example, exposure to polluted water can lead to the spread of waterborne diseases, such as cholera, typhoid, and dysentery (WHO, 2018). Furthermore, the dumping of waste in water basins can contribute to climate change. When organic waste decomposes in water, it releases methane and other greenhouse gases, which contribute to global warming (IPCC, 2014). Additionally, the pollution of water basins can lead to the destruction of aquatic ecosystems, including mangroves, coral reefs, and seagrasses, which are essential carbon sinks (UNEP, 2019). In sum, the practice of dumping waste in water basins has severe environmental consequences, including the degradation of water quality, loss of biodiversity, and negative impacts on human health. Moreover, it contributes to climate change by releasing greenhouse gases and destroying aquatic ecosystems.

To mitigate these impacts, it is essential to adopt sustainable waste management practices, including reducing waste generation, increasing recycling and composting, and implementing effective waste disposal systems. The poor treatment of industrial waste in Cameroon is a significant environmental concern that can have severe impacts on human health and the environment (Kamga, 2019; Njomo, 2020). Industrial waste can include a wide range of hazardous materials, such as chemicals, heavy metals, and toxic substances, which can contaminate soil,

water, and air if not disposed of properly (WHO, 2018; UNEP, 2019). In Cameroon, the lack of effective regulations and inadequate infrastructure have contributed to the poor treatment of industrial waste, posing a risk to human health and the environment. The contamination of soil and water is a major concern in Cameroon, where industrial waste is often dumped in landfills or waterways without proper treatment (Njomo, 2020; Kamga, 2019). Exposure to hazardous materials can cause a range of health problems, including cancer, neurological damage, and reproductive issues (ATSDR, 2020; WHO, 2018).

In Cameroon, the lack of access to clean water and sanitation exacerbates the problem, making it essential to address the poor treatment of industrial waste (UNICEF, 2020; World Bank, 2020). The poor treatment of industrial waste in Cameroon also contributes to climate change, as the decomposition of organic waste in landfills produces methane, a potent greenhouse gas (IPCC, 2014; UNEP, 2019). Furthermore, the extraction, processing, and transportation of raw materials can lead to greenhouse gas emissions, which contribute to global warming (Kamga, 2019; Njomo, 2020). In Cameroon, the government has implemented policies to reduce greenhouse gas emissions, but more needs to be done to address the poor treatment of industrial waste (Government of Cameroon, 2020; World Bank, 2020). To address the poor treatment of industrial waste in Cameroon, it is essential to implement effective regulations, infrastructure, and practices (Kamga, 2019; Njomo, 2020). This can include the development of waste management plans, the implementation of recycling and composting programs, and the use of alternative technologies, such as bioremediation and phytoremediation (UNEP, 2019; WHO, 2018). In Cameroon, the government has established the National Environmental Management Plan, which aims to improve waste management practices, but more needs to be done to address the poor treatment of industrial waste (Government of Cameroon, 2020; World Bank, 2020).

The Work done by Civil Society Organizations to Mitigate the Fffects of Climate Change on the Environment and on Humans

Civil Society Organizations (CSOs) play a vital role in mitigating the effects of climate change on the environment and humans. These organizations, which include non-governmental organizations (NGOs), community-based organizations, and advocacy groups, work tirelessly to raise awareness, promote sustainable practices, and support climate change adaptation and mitigation efforts.

Raising Awareness and Education

CSOs are instrumental in raising awareness about climate change and its impacts on the environment and human societies. They organize workshops, seminars, and campaigns to educate the public, policymakers, and other stakeholders about the causes and consequences of climate change. For example, the Cameroon-based NGO, Environment and Development Action in the Third World (ENDA-TM), has implemented a climate change awareness program that targets local

communities, schools, and policymakers (ENDA-TM, 2020). This program aims to educate people about the impacts of climate change on agriculture, water resources, and human health, and to promote sustainable practices that reduce greenhouse gas emissions. In addition to raising awareness, CSOs also provide education and training on climate change adaptation and mitigation strategies. For instance, the World Wildlife Fund (WWF) Cameroon has launched a climate change education program that targets local communities and schools (WWF, 2020). This program aims to educate people about the importance of conservation and sustainable use of natural resources, and to promote climate-resilient agriculture and water management practices.

Promoting Sustainable Practices

CSOs promote sustainable practices and behaviors that reduce greenhouse gas emissions and mitigate the effects of climate change. For instance, the Cameroon-based CSO, Association pour la Protection de l'Environnement et du Développement (APED), has implemented a sustainable agriculture program that promotes agroforestry practices and reduces the use of chemical fertilizers and pesticides (APED, 2020). This program aims to improve agricultural productivity and resilience to climate change, while also reducing greenhouse gas emissions. Similarly, the International Union for Conservation of Nature (IUCN) has launched a sustainable forest management program in Cameroon that aims to reduce deforestation and promote sustainable land-use practices (IUCN, 2020). This program works with local communities and governments to develop sustainable forest management plans and to promote the use of sustainable forest products.

Supporting Climate Change Adaptation and Mitigation Efforts

CSOs support climate change adaptation and mitigation efforts by providing technical and financial assistance to local communities and governments. For example, the Cameroon-based CSO, Réseau des Organisations des Droits de l'Homme et de la Défense de l'Environnement (RODHE), has implemented a climate change mitigation program that aims to reduce greenhouse gas emissions from deforestation and forest degradation (RODHE, 2020). This program works with local communities to develop sustainable forest management plans and to promote the use of sustainable forest products. In addition to supporting climate change adaptation and mitigation efforts, CSOs also provide humanitarian assistance to communities affected by climate-related disasters. For instance, the International CSO, Oxfam International, has provided humanitarian assistance to communities affected by floods and droughts in Cameroon (Oxfam, 2020).

Advocacy and Policy Influence

CSOs play a crucial role in advocating for climate change policies and influencing decision-making processes at local, national, and international levels. For example, the Cameroon-based CSO, Centre pour l'Environnement et le Développement (CED), has been advocating for the adoption of climate change policies and laws in Cameroon (CED, 2020). This organization

works with policymakers and other stakeholders to develop and implement climate change policies that prioritize the needs of vulnerable communities. In the same line, the International CSO, Greenpeace International, has been advocating for climate justice and pushing for the adoption of climate change policies that prioritize the needs of vulnerable communities (Greenpeace, 2020).

Challenges and Opportunities

Despite the important work of CSOs in addressing climate change, there are several challenges that these organizations face. One of the main challenges is the lack of funding and resources, which can limit the scope and impact of their work (UNEP, 2019). Another challenge is the lack of coordination and collaboration between CSOs, governments, and other stakeholders, which can lead to duplication of efforts and inefficiencies (OECD, 2020). However, there are also opportunities for CSOs to make a greater impact in addressing climate change. One of the main opportunities is the growing recognition of the importance of climate change adaptation and mitigation, which has led to increased funding and support for CSOs working on these issues (UNFCCC, 2020). Another opportunity is the growing use of digital technologies, such as social media and online platforms, which can enable CSOs to reach wider audiences and mobilize greater support for their work (ITU, 2020). To conclude, CSOs play a vital role in addressing climate change, and their work is essential for promoting sustainable development and reducing the impacts of climate change on vulnerable communities. Through their efforts to raise awareness, promote sustainable practices, support climate change adaptation and mitigation efforts, and advocate for climate change policies, CSOs are helping to build a more sustainable and resilient future for all. However, to maximize their impact, CSOs must be supported with adequate funding, resources, and coordination. Governments, international organizations, and other stakeholders must work together with CSOs to address the challenges of climate change and promote sustainable development.

Relevance of Findings on Urban Waste Management and Community Public Health.

The findings of this study are highly relevant in addressing the pressing challenges of urban waste management and its direct correlation with public health in rapidly urbanizing cities like Yaoundé and Douala. These cities face escalating waste generation compounded by fragmented management systems, which significantly impacts both environmental integrity and community well-being. The relevance of these findings can be classified into several key areas: public health implications, environmental sustainability, community engagement, and policy development. Firstly, the study highlights the substantial public health risks associated with inadequate waste management practices. The presence of overflowing garbage, combined with delayed municipal waste collection, creates breeding grounds for vectors such as rats and flies, which can exacerbate diseases such as cholera and malaria (Karimi & Khosravi, 2021). The observed practices of burning waste further complicate the situation by releasing hazardous pollutants, contributing to respiratory diseases and other health issues (World Health Organization

[WHO], 2018). Understanding these links emphasizes the urgent need for community-led initiatives that address waste reduction and encourage responsible disposal practices.

Secondly, the findings shed light on the interrelationship between waste management and environmental sustainability. The accumulation of waste not only affects urban aesthetics but also contributes to problems such as soil and water contamination and exacerbates climate change through increased greenhouse gas emissions (Jabatan, 2020). As cities like Douala and Yaoundé grow, the management of urban waste becomes critical to reducing the carbon footprint and mitigating climate impacts. This aligns with the United Nations Sustainable Development Goal (SDG) 11, which emphasizes making cities inclusive, safe, resilient, and sustainable (United Nations, 2015). Moreover, community engagement emerges as a vital element in the study's findings. The lack of active participation from residents in waste management initiatives is a significant barrier to effective solutions. The research indicates that enhancing awareness and fostering community-driven efforts can lead to more sustainable practices. Empowering communities through education fosters a sense of ownership and responsibility, encouraging collective action toward improved waste management (Bennett et al., 2019). This community-centered approach is fundamental to changing entrenched behaviors and ensuring the long-term sustainability of waste management systems.

Lastly, the relevance of the study's findings extends to policy development. Policymakers must formulate integrated waste management strategies that incorporate stakeholder collaboration and community input. The fragmented management systems identified underscore the need for coordinated efforts between government entities, civil society organizations, and the private sector. The call for integrated strategies reflects the necessity for holistic approaches that align with global environmental commitments and public health objectives. Such policies would not only enhance waste management efficiency but also bolster public health promotion efforts by reducing exposure to hazardous waste conditions (Rathi, 2021). In conclusion, the findings of this study provide valuable insights into the nexus between urban waste management and public health. They highlight the urgency for action across multiple dimensions—public health protection, environmental sustainability, community empowerment, and strategic policymaking. Addressing these interconnected challenges is essential for fostering healthier urban environments and ensuring the well-being of communities in Yaoundé, Douala, and other similar cities worldwide.

Recommendations for Enhancing Urban Waste Management: Contributions to Theory, Policy, and Practice

The challenges presented by urban waste management in cities like Yaoundé and Douala necessitate comprehensive recommendations that contribute meaningfully to theory, policy, and practice. These recommendations derive from recent research findings and aim to enhance waste management systems while safeguarding public health and promoting environmental sustainability are three-fold:

Contribution to Theory: To contribute theoretically, future research should expand the conceptual framework surrounding urban waste management to incorporate social, economic, and environmental dimensions in a more integrated manner. Scholars are encouraged to adopt interdisciplinary approaches that consider behavioral psychology, community engagement theories, and environmental justice (Mälander et al., 2020). For instance, developing models that illustrate how community behavior influences waste management outcomes can provide a theoretical basis for understanding the dynamics of participation and compliance in waste reduction initiatives. Enhancing theoretical models with these perspectives can facilitate a richer understanding of the systemic issues in urban waste management, thus driving further inquiry into best practices.

Contribution to Policy: On the policy front, recommendations call for the implementation of integrated waste management strategies that prioritize stakeholder collaboration. Policymakers should establish frameworks that involve local communities, Non-Governmental Organizations, and the private sector in decision-making processes. Such collaboration can ensure that policies are context-specific and more responsive to community needs (Davis & Hall, 2021). For example, creating public-private partnerships (PPPs) can mobilize resources and expertise, leading to more effective recycling and waste management programs. Additionally, local governments should consider adopting incentive-based policies that reward communities for practicing sustainable waste management, such as providing tax breaks for businesses that adopt eco-friendly waste disposal methods (Rathi, 2021). Moreover, policies must emphasize education and awareness initiatives, tailored to different community segments, to improve residents' understanding of waste management's importance. Research indicates that well-informed citizens are more likely to engage in responsible waste disposal practices, which can lead to significant improvements in urban waste management effectiveness (Scheinberg et al., 2016).

Contribution to Practice: In practice, local governments and municipal authorities should prioritize the establishment of efficient waste collection systems that are responsive to the rapid urbanization trends in cities like Yaoundé and Douala. This may involve employing technology, such as GPS tracking for waste trucks and mobile applications for reporting waste management issues, which can foster greater accountability and efficiency (Bezerra et al., 2020). Additionally, community engagement initiatives should be prioritized—programs that actively involve residents in waste management processes, such as educational campaigns and volunteer clean-up events, can foster a greater sense of responsibility among citizens. Encouraging communities to adopt practices like composting and recycling through hands-on workshops and incentives can also significantly enhance sustainability (Huang et al., 2021). Lastly, monitoring and evaluation systems should be instituted to assess the effectiveness of waste management strategies continuously. Implementing feedback mechanisms can help refine practices based on community input and observed outcomes, ensuring that waste management systems evolve to meet changing

needs. In conclusion, by addressing theoretical gaps, strengthening policy frameworks, and enhancing practical approaches, stakeholders can significantly improve urban waste management systems. These recommendations can help build healthier urban environments, ensuring public health and fostering environmental sustainability in rapidly urbanizing cities.

Conclusion

The study of waste management practices in Douala and Yaoundé has unveiled significant insights into the complex interplay between environmental ethics, community engagement, and sustainable urban development. The findings indicate that the current waste management systems in these cities are inadequate, resulting from a confluence of socio-economic challenges and structural weaknesses. Inefficient waste disposal, coupled with insufficient public services, not only exacerbates environmental issues but also heightens public health risks for urban residents (Doh et al., 2020; Nwankwo et al., 2021). The accumulation of waste in public spaces and informal dumping sites illustrates the urgent need for systemic reform, highlighting the ethical responsibility of local governments to prioritize sustainability and public health in their waste management strategies (Kouadio et al., 2020). Moreover, this research emphasizes the essential role of community engagement in effective waste management solutions. Citizens often perceive waste management as primarily the responsibility of local authorities, leading to a culture of disengagement and neglect about individual roles in environmental stewardship (Punja & Oguge, 2021). Engaging communities in dialogue about waste reduction, resource recovery, and sustainable practices can foster a sense of collective responsibility, ultimately transforming waste into a resource rather than a liability (Pérez et al., 2022).

Ethical engagement that incorporates the perspectives and needs of marginalized communities is vital to developing inclusive waste management policies that contribute to social equity and environmental justice (Mogbo & Otchong, 2021). The implications of this study extend beyond the immediate context of Douala and Yaoundé. As urbanization continues to accelerate globally, cities must confront similar waste management challenges. The lessons learned from this study underscore the need for collaboration among diverse stakeholders, including government bodies, civil society organizations, individuals, and the private sector, to establish integrated waste management systems that prioritize ethical considerations and sustainable practices (Franco et al., 2020). Best practices and innovative solutions from contexts around the world can inform policy frameworks and spark critical reforms in urban waste management in Cameroon and other comparable regions (Awasom & Biyong, 2020). As urban areas confront the dual crises of waste management and climate change, it is essential to align local actions with global sustainability goals. The Intergovernmental Panel on Climate Change (IPCC, 2021) emphasizes that addressing local environmental issues like waste management is integral to achieving broader climate resilience and sustainability objectives. To this end, a paradigm shift is required—one that reframes waste as a valuable resource and integrates waste management within the urban

sustainability agenda. In conclusion, effective waste management in Douala and Yaoundé necessitates an ethical approach that embraces both individual responsibilities and collective action. By addressing structural weaknesses and engaging communities, this research advocates for a holistic and sustainable framework for waste management. Recognizing the intertwined nature of waste management, public health, and environmental sustainability is crucial for forging practical and ethical solutions that enhance the quality of urban life and safeguard the planet for future generations. It is a call to action for policymakers, citizens, and researchers alike to champion sustainable waste management practices that reflect our collective commitment to a healthier and more equitable world.

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