Policy Brief

(Input Paper)

Guyana

Prevention of Marine Litter in the Caribbean Sea

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adelphi RESEARCH

UN environment programme

UNIVERSITY of GUYANA

Supported by:

Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection

based on a decision of the German Bundestag

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2025

www.promar.org

This document was developed as part of the PROMAR project, funded by the German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV).

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Table of Contents

Abbreviations

CARICOM	Caribbean Community
CEO	Chief Executive Officer
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
EPR	Extended Producer Responsibility
GY$	Guyanese Dollar
IDB	Inter-American Development Bank
IMF	International Monetary Fund
IAST	Institute of Applied Science and Technology
MSW	Municipal Solid Waste
NDC	Neighbourhood Democratic Councils
PROMAR	Prevention of Marine Litter in the Caribbean Sea
PWSI	Professional Waste Solutions Incorporated
RDC	Regional Democratic Councils
RTC	Revised Treaty of Chaguaramas
SWMA	Solid Waste Management Authority
US$	United States Dollar
UNDP	United Nations Development Programme

1 Background

This policy brief on marine plastic pollution and waste management is part of the **Prevention of Marine Litter in the Caribbean Sea (PROMAR)** project, that contributes to the reduction of waste streams, namely plastic packaging and single-use plastics, into the Caribbean Sea while promoting circular economy solutions in the Dominican Republic, Costa Rica, Colombia, the British Virgin Islands, St. Kitts & Nevis, Trinidad & Tobago, Guyana and Suriname. The primary purpose of this Policy Brief is to review existing and relevant literature on marine litter prevention in Guyana and to serve as an input paper for the National Dialogue on Marine Litter Prevention and Plastic Waste Management in Guyana.

Background to the country

The Cooperative Republic of Guyana, located on the northern mainland of South America, is characterized by its rich biodiversity and extensive waterways. The country has a size of about 214,969km² (83,000 square miles), a coastline of 459km and just over 800,000 inhabitants, whereas the population is heavily concentrated in the northeast and around the capital Georgetown, with around 120,000 inhabitants. About 90% of Guyana's population occupies the nation´s coastal strip (Oyedotun and Bhola 2019). Large parts of the interior of the country are sparsely populated and covered with tropical rainforests with an incredible diversity of flora and fauna.

The country faces significant environmental challenges, including marine litter, which threatens its coastal and marine ecosystems. The current waste management systems are underdeveloped, leading to improper waste disposal practices that impact marine environments. (Ministry of Local Government and Regional Development 2013; La Kanhai et al. 2022). Urban centres and coastal communities are particularly vulnerable to pollution, which affects marine life and human health.

Existing challenges related to marine litter in the country

1. Economic Consequences:

Marine litter can impact fisheries and tourism, which are relevant to Guyana's economy. Guyana is not yet a major destination for Caribbean tourism for sun, sand and sea tourism, however, the presence of litter, particularly on shorelines, poses a threat to the aesthetic value and usability of these areas for tourism and recreation. Generally, in the Caribbean, marine litter is composed of 80% waste that originates from land-based sources and 20% from ocean-based activities like fishery (United States Environmental Protection Agency 2024). Studies show that marine litter in Guyana is predominantly composed of plastic materials, which account for 48.2% of the litter found on beaches. Other significant types of litter include metals (20.8%), paper/card (11.5%), glass (6.8%) and other materials (Oyedotun and Bhola 2019).

As mentioned, the coastal zones serve as crucial areas for socio-economic activities, attracting infrastructural development and human populations. None of the sampled beaches in the aforementioned study of 2019 could be graded as very good (A) or good (B) due to the presence of harmful litter and waste accumulation. The best-graded beaches, Rosignol and Georgetown, only achieved a fair (C) grade, indicating the need for substantial clean-up efforts to improve their usability for tourism (ibid.)[1].

[1] The grading system used in the study for evaluating the beaches along coastline is based on the EA/NALG guide. This system classifies beaches into grades ranging from A to D, where: Grade A indicates very good conditions with minimal litter and pollution,

In addition, economically, the fishing industry will suffer the most from plastic and microplastic pollution in the medium term. Contaminated seafood—due to the presence of microplastics or toxins—poses a significant risk to Guyana's fish exports, as highlighted by a study conducted by Alfred et al. (2022), which examined the occurrence and characteristics of microdebris in commercial fish species across Guyana. The study revealed alarming levels of microplastic contamination in commonly exported fish species, raising concerns about food safety and consumer confidence. This contamination could reduce international demand for Guyana's fish exports, severely impacting local livelihoods that depend on fishing and diminishing export revenues critical to the nation's economy. As global markets increasingly prioritize sustainable and uncontaminated seafood, the economic repercussions of such findings are likely to escalate, further straining an already vulnerable industry

1. Environmental Impact:

Marine litter, particularly plastics, can have devastating effects on marine life. Animals may ingest or become entangled in debris, leading to injury or death. This disrupts marine ecosystems and can lead to the decline of certain species. Furthermore, plastic can leach harmful chemicals into the water, affecting marine organisms.

2. Human Health Risks:

After the micro and nano plastics are ingested by marine organisms, they enter the human food chain, where they can have adverse effects on human health. By acting as vectors for hormone-mimicking chemicals, substances contained in plastics can interfere with hormonal balance, leading to adverse health effects such as reproductive issues and developmental problems in humans. (Sharma and Chatterjee 2017; Alfred et al. (2022) showed that in Guyana, plastic micro debris ingestion by marine organisms is a significant concern, particularly affecting commercially important fish species such as *Bagre bagre*, *Nebris microps*, and *Macrodon ancylodon*. The study revealed that 40% of the fishes examined contained microdebris, with a total of 112 microdebris particles collected from 90 specimens. These particles included pellets, microbeads, fragments, fibers, films, and foams, with white-colored materials being the most frequently ingested. The Meadowbank landing site had the highest number of microdebris particles, highlighting the prevalence of pollution in local waters. The waste problem in general can lead to the spread of pests such as rats and the transmission of diseases. Open waste incineration leads to toxic gases that can spread throughout the city. Unsecured landfills can cause leachate that can contaminate groundwater. These effects are not abstract but can be observed in many developing countries.

3. Aesthetic and Recreational Impact:

Littered beaches and coastal areas in Guyana not only deter recreational activities and reduce the appeal to visitors but also lead to an aesthetic degradation of the country's rich and preservable natural and coastal regions, impacting residents' quality of life (Mæland and Staupe-Delgado 2020).

Underlining the challenges mentioned above in a recent study, Guyana ranked at place 6 worldwide for mismanaged plastic waste to ocean per capita, with 1.59 kg per year. (Meijer et al. 2021) The marine pollution problem is evident, also in comparison with similar Caribbean countries, as shown in Table 1.

suitable for recreational use without additional cleanup. Grade B represents good conditions, requiring only minor cleanup efforts. Grade C indicates fair conditions, where significant cleanup is needed to make the beach suitable for recreation. Grade D denotes poor conditions, with substantial litter and pollution, necessitating major cleanup efforts before the beach can be used for tourism or recreation. (Oyedotun and Bhola 2019

General Waste management situation

Table 1: Comparison of beach pollution in some Caribbean countries (Diez et al. 2019)

Country	Km of Coast Surveyed	Litter Concentration (items/km)	Plastic Beverage Bottles	Plastic Bottle Caps	Plastic Grocery Bags
Jamaica	151	4684	1497	509	115
Dominican Republic	117	3966	394	30	116
Guyana	**4**	**3904**	**1086**	**448**	**50**
St Vincent and the Grenadines	4	2435	623	76	102
Average (Caribbean)		2014	431	148	54
Belize	48	1914	157	101	85
Trinidad and Tobago	13	1636	351	151	25
Barbados	44	1260	97	126	22
St Kitts and Nevis	6	1050	394	135	5
Cuba	2	601	4	38	30
Average (Global)		573	65	34	22
Grenada	1	543	110	9	23
Suriname	1	160	31	11	25

The Cooperative Republic of Guyana faces significant waste management challenges, including nuances that discourage the enforcement of environmental laws, allowing improper disposal practices to persist mostly unchecked, limited technological capabilities the encourage the use of outdated methods making waste collection and processing inefficient and inadequate for growing urban populations, and still currently utilizing dumpsites and only one landfill, despite technological advancements in the sector used in other countries (Margallo et al. 2019). According to the Department of Public Information, the country aims to improve waste collection, enhance landfill quality, reduce single-use plastics, and increase public awareness (Department of Public Information, 2017).

Currently, waste management relies heavily on dumpsites and only one functional landfill, Haags Bosch Landfill, that meets international standards, there is limited focus on zero-waste initiatives or recycling. Guyana generates approximately 422,248 tons of municipal solid waste (MSW) annually, with a per capita generation of 558.5 kg (University of Leeds 2020). Rapid economic growth projected at 86% annually over the next 10 to 20 years could exacerbate waste generation and consequently pollution issues (IMF, 2019; Meredith, 2019).

Studies found that illegal dumping is prevalent, caused by limited waste collection coverage, lack of waste treatment plants, and absence of waste separation from the source. These issues contribute to the aforementioned environmental degradation and public health risks (Oyedotun et al. 2021). While there is a positive attitude towards recycling, the absence of formal recycling infrastructure and support from municipal authorities hampers its effectiveness of it. Waste is disposed of in open dumpsites, and the country is struggling to transform that into proper and controlled landfills (Margallo et al. 2019) and has not yet developed waste reduction mechanisms and policies at the household level. Although there is a comprehensive strategy for 2013-2024 (Ministry of Local Government and Regional Development 2013), little of it seems to have been implemented. The strategies outlined in Guyana's National Solid Waste Management Plan (2013–2024) were never implemented due to a critical institutional gap. The plan designated the Solid Waste Management Authority (SWMA) as the lead agency responsible for executing most of the proposed actions. However, the SWMA was contingent on the passage of the Solid Waste Management Bill through Parliament, which would have established it as a statutory body under the Solid Waste Management Act. Since the bill was never enacted, the legal framework needed to create the SWMA did not exist. Consequently, without the necessary legislative instrument, the authority—which was intended to oversee national solid waste management—was never formed, leading to the failure of the plan's implementation.

2 Policies, Important Actors and Initiatives

Guyana is a party to the Cartagena Convention for protecting the marine environment in the Caribbean region. Being part of this convention implies having protocols on land-based sources of marine pollution. (United Nations Environment Programme 2012). Guyana does not have a specific policy for dealing with marine litter, but there are various laws and regulations regarding waste management, some of which deal with the regulation of solid waste, such as plastic, that eventually finds its way into the ocean.

The Cooperative Republic´s current general waste management policy is based on a national strategy that was developed for the period 2013-2024. This strategy, known as '**Putting Waste in Its Place'**, forms the foundation for dealing with waste in the country. It aims to guide policy for a cleaner environment, to improve health protection and to contribute to economic prosperity (Ministry of Local Government and Regional Development 2013). The strategy has six key goals and forty-four strategic actions: reducing waste and illegal dumping, reducing waste generation, improving resource recovery, implementing efficient and cost-effective waste collection, improving waste infrastructure and strengthening human and institutional capacity. These constitute the core of the government's expectations of waste management at the end of the strategic period and into the future. Leading agendas are defined for each strategic point, which are responsible for steering the implementation. A key aspect of the strategy is the involvement of municipalities in an integrated and financially sustainable approach. Institutionally, the **Ministry of Local Government and Regional Development** plays a central role. It is responsible for formulating the national waste management policy and oversees the activities of the regional and municipal councils.

However, despite the strategy, local authorities struggle to manage the increasing volume of waste due to resource constraints. Several factors contribute to the ineffective municipal solid waste management:

- Inadequate collection coverage, both geographically and temporally
- Insufficient waste treatment facilities, lack of suitable plants
- Inadequate transport services

These issues hinder the full realization of the national waste management strategy. Also, in Guyana, there is still a lack of waste separation at source and prevalence of uncontrolled open dumping. The current system typically involves weekly waste collection by trucks in most communities. However, this process lacks comprehensive monitoring and consistency. The collection and transportation procedures are often irregular and not standardized across different areas (Oyedotun et al. 2021) as there are no record of facilities in place for the comprehensive monitoring.

Apart from the above-mentioned waste management strategy Guyana's **Environmental Protection Act**, established in 1996 and amended in 2005, is the primary legislation for environmental protection and sustainable resource management (National Assembly of the Parliament of Guyana 2005). It introduced subsidiary regulations on water quality, hazardous waste management,

noise, air quality, and more. The Act created the **Environmental Protection Agency (EPA)** to effectively manage the natural environment so as to ensure the conservation, protection, and sustainable use of Guyana's natural resources It also provides for the prevention and control of pollution and utilises principles of environmental management such as the polluter pays principle, precautionary principle and the strict liability principle. A review to amend the Act began in 2020 (Kum 2022).

Under the **Environmental Protection Act**, the import, manufacture, and sale of polystyrene (also known by the trade name Styrofoam) have been prohibited since 2015. This was implemented and enforced under the Environmental Protection (Expanded Polystyrene Ban) Regulations 2015, which took effect in January 2016. Guyana engaged in consultations before the Styrofoam ban was implemented, with discussions occurring years prior to it becoming law.

Under the same Environmental Protection (Expanded Polystyrene Ban) Regulations 2015, Guyana also adopted the **"Environmental Protection Litter Enforcement Regulation",** which came first in 2013 (Environmental Protection Agency 2013) that prohibits littering, which naturally often is a leading source of marine litter, if done in coastal areas or close to rivers, which is the case for almost the entire population of the state. The policy came into force in 2013 and defines litter as "any solid or liquid material or product, including bottles, tins, logs, sawdust, derelict vehicles, packaging, paper, glass, food, animal remains, garbage, and any other refuse or waste material" (ibid.).

Under Guyana's Environmental Protection (Litter Enforcement) Regulations 2013, penalties for littering are structured as follows:

- First Offense: A fine ranging from GYD 50,000 to $100,000 (≈ 230 to 460 USD) or imprisonment for up to three months.
- Second or Subsequent Offense: A fine ranging from GYD 100,000 to $200,000 or imprisonment for up to six months.

These penalties apply to individuals who improperly dispose of waste in public or private spaces without consent.

Additionally, the Georgetown Mayor and City Council (M&CC) has proposed bylaws to impose fines for littering within city limits:

- First Offense: A fine of GYD 10,000.
- Second Offense: A fine of GYD 20,000.
- Third Offense: A fine of up to GYD 500,000 or six months' imprisonment.

These proposed bylaws aim to enhance enforcement and deter littering in Georgetown. It's important to note that while the Environmental Protection Agency (EPA) enforces national regulations, local municipalities like Georgetown may implement additional bylaws to address littering within their jurisdictions. Apart from municipalities, the Neighbourhood Democratic Councils (NDCs), also have the authority to enact bylaws tailored to their communities, but these must align with national legislation and receive approval from higher authorities. The Municipal and District Councils Act provides the legal framework for such local governance actions by the NDCs.

Similarly, this applies for the disposal of litter from motor vehicles or trailers. The enforcement is carried out by Litter Prevention Wardens appointed by public authorities or the Minister. Wardens have the power to enforce regulations, prevent littering, and arrest offenders without a warrant for certain offenses. Obstructing or interfering with a warden's duties is an offense (Environmental Protection Agency 2013).

There was a proposed **ban on single-use plastics**, a separate initiative pursued through research and stakeholder consultations between 2019 and 2020, with plans for a phased rollout in 2021. Instead, it has evolved into a broader Circular Economy Strategy, which is currently being prepared. Guyana continues to track developments under the Intergovernmental Negotiating Committee on Plastic Pollution, although it remains uncertain whether these efforts will lead to a ban on single use-plastics.

In addition, under this policy framework, there are also special rules for handling hazardous waste in the **Hazardous Wastes Management Regulation** (National Assembly of the Parliament of Guyana 2005).

There is a **Solid Waste Management Bill 2014** for Guyana, which is a comprehensive legislative proposal aimed at regulating various aspects of waste management in the country (Ministry of Local Government and Regional Development 2014). Key points of the bill include:

- Establishment of a Solid Waste Management Authority as the central agency for waste management.
- Regulations for authorizations, licenses, and operating certificates for waste disposal facilities.
- Guidelines for waste collection and disposal for municipalities and private providers.
- Definition of offenses and penalties related to improper waste disposal.
- Provisions for financing waste management activities.
- Empowerment of the Authority to issue detailed regulations.

The bill has not yet been approved in the national assembly to date.

Responsible Authorities

The Ministry of Local Government and Regional Development is responsible for formulating the national policy on solid waste management, whereas the regulation is mainly carried out by the Environmental Protection Agency (EPA) (IDB, 2006). According to the Municipal and District Councils Act, each Council has the responsibility for solid waste collection and disposal (Riquelme et al. 2016).

There are several different institutions, that oversee waste management in Guyana. The aforementioned:

- **Environmental Protection Agency (EPA)** which is tasked with ensuring that the environmental impact assessment process is followed for any activities that have to do with the generation of wastes.

Furthermore,

- the **Regional Democratic Councils (RDCs),** who oversees the regional government and the waste management activities of the Neighbourhood Democratic Councils (NDCs).
- the **Neighborhood Democratic Councils (NDCs)** are expected to administer smaller divisions and communities within each region and are responsible for the waste management actions, street sweeping, and drain cleaning of neighborhoods.
- the **Ministry of Public Works and the Institute of Applied Science and Technology (IAST)** are other governmental organizations and agencies that have stakes in the nation's waste management systems.
- **The Ministry of Local Government and Regional Development (MoLGRD),** which oversees local government bodies, including municipalities and Neighbourhood Democratic Councils (NDCs), which are directly involved in waste management at the community level. They coordinate waste collection services and implement local waste management policies.

- **The Ministry of Health (MoH**) in Guyana plays a key role in solid waste management, particularly in addressing waste types that impact public health. While the MOH does not manage general solid waste collection or disposal, its involvement focuses on specific aspects such as oversight of medical and hazardous waste, public health campaigns, regulation of landfills and dumpsites and disaster and emergency waste management

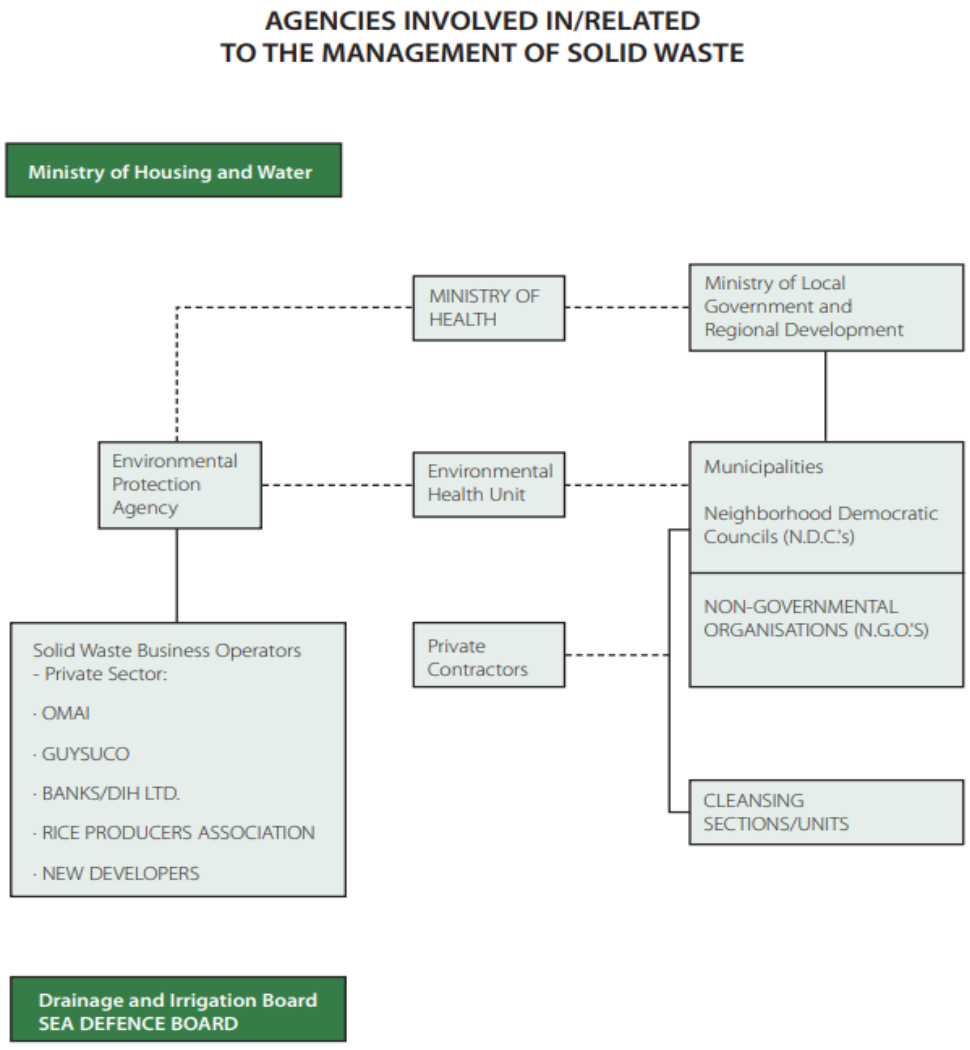

Figure 1. Agencies involved in/related to the management of solid waste in Guyana. Source: (Pan American Health Organization 2003)

Source of Image: (Pan American Health Organization 2003)

Relevant Initiatives

1. One initiative to be named is the "Litta-Reporta" app, developed by software developer Maryam Bacchus, focuses on environmental sustainability. It was created in collaboration with Cassini Technologies to address issues like littering and clogged drains, which affect marine life and ecosystems, and contribute to climate change. The app provides data on areas in Guyana prone to dumping and is funded by the Inter-American Development Bank, making it free on Google Play and the Apple Store. It connects people affected by pollution with authorities. (News Room 2024)
2. In 2024, the Guyanese government signed an investment agreement to construct a $214 million (US$ 980.000) state-of-the-art waste treatment plant. The agreement was facilitated by Dr. Ashni Singh, Senior Minister for Finance and Public Service, and handed over by Dr. Peter Ramsaroop, Guyana's Chief Investment Officer, to Mahendra Jettoo, CEO of Professional Waste Solutions Incorporated (PWSI). The facility, to be built at Coverden, East Bank of Demerara, will employ over 40 people and aligns with the government's commitment to achieving the United Nations Sustainable Development Goals, particularly clean water and sanitation (Department of Public Information 2024)
3. Another relevant project in the past was carried out in collaboration with the United Nations Office for South-South Cooperation. The "Guyana Solid Waste Management Improvement Project" enhanced the government's capacity to manage solid waste, reduce environmental impacts, and improve urban sanitation. (United Nations 2018) The project provided local governments with waste-collection trucks and excavators, rehabilitated markets and tarmacs to discourage illegal vending, and distributed waste bins and educational materials in schools. A national communications strategy was also developed to raise public awareness about solid waste management. Key results included benefiting 350,000 residents with improved sanitary conditions and infrastructure, such as garbage trucks and excavators for fifteen councils and three municipalities. Over 100,000 residents saw improvements in market facilities, with eight markets and two tarmacs added to waste collection routes. Additionally, over 50 primary schools received educational materials and waste separation bins, promoting sustainable practices among students. The project, with a budget of $1,093,260, ran from April 2014 to September 2018, partnering with the Ministry of Communities and UNDP Guyana (United Nations 2018).

Finance Mechanisms (what are the financial implications & how are waste management systems financed)

According to the "**Putting Waste in its place**" strategy, Georgetown City residents pay for waste management and other basic municipal services through their council rates, which were last reviewed in 2012 (Ministry of Local Government and Regional Development 2013). Rate collection is low, as the council only collected about 40% of the amount owed in 2013. The council's revenue base is also supplemented by an annual subvention from the central government. Other town councils as well as the Neighborhood Democratic Councils (NDCs) also charge rates in addition to receiving an annual subvention from the central government; however, council rates have reportedly not been reviewed for more than two or three decades, and collection rates are generally low (Ministry of Local Government and Regional Development 2013).

The **Customs Act** passed in 1995 imposed an environmental tax of GY$10 (0,04 US$) on each imported non-returnable container of metal, glass or plastic holding any alcoholic or non-alcoholic drink. However, the act did not provide any guidelines for the use of the funds, which

were paid into general revenue. In 2014 a Suriname-based exporter of beverages to Guyana sued the Government of Guyana alleging that the environmental tax violated the Revised Treaty of Chaguaramas, in particular the free movement of goods and the prohibition on import duties on goods of CARICOM origin. The Caribbean Court of Justice agreed and ordered the Government of Guyana to cease collection of the tax and to reimburse the Suriname company over US$6 million. The government has since announced plans to revise the Customs Act to levy GY$5 tax on all bottled beverages imported and locally produced (Eleazar 2014).

The **Solid Waste Management Bill (Ministry of Local Government and Regional Development 2014)**, which is not yet in force, foresees a Haulage fee, which shall be paid to the authority by any person at whose expense the authority hauls or transports. The haulage fee shall be charged and paid at a rate to be prescribed. There is also a tipping fee planned, which shall be paid to the authority by any person at whose expense the authority unloads any container of solid waste on to a sanitary landfill. Furthermore, it declares that the ministry of finance may make regulations creating financial instruments for the financing of waste management activities implementing the waste management strategy and the aforementioned act (Oyedotun et al. 2021).

3 Problem Analysis

Waste management in Guyana, like in many developing countries, presents significant challenges since the poor handling of hazardous, liquid and solid wastes leads to adverse socio-economic, health, and environmental costs for the Guyanese people and their natural environment. In the year of 2021, Guyana generated approximately 422,248 tons of MSW annually, with an environmental stress level of 2.1 tons of MSW per square kilometre. The country's per capita waste generation stands at 558.5 kg per year, with 0.22 kg generated per $1 of waste-intensive consumption. With Guyana's economy projected to grow rapidly in the coming years, potentially by 86% annually for the next 10-20 years, there are concerns about a corresponding increase in urban population growth and municipal solid waste generation (Oyedotun et al. 2021).

The country grapples with the strengthening of implementation of waste management laws, limited technological capacities in waste treatment and management, and the prevalence of uncontrolled open dumpsites. While there have been some efforts, unfortunately, sustainable approaches such as zero-waste plans, waste reduction, reusing, recycling, or upcycling incentives are not yet widespread in Guyana. Guyana is still struggling to move from the disposal of waste in open, uncontrolled dumpsites to recycling, properly controlled landfills and waste incineration.

During storms or heavy rain, it is common that waste is blown into the canals and rivers and ultimately into the sea because of some citizens' attitude to disposing of waste into the environment, that eventually end up in the canal. Due to this, waste ends up in the environment with the risks for human health and the adverse economic effects e.g. harming tourism being evident. Despite these limitations, Guyana aims to improve waste delivery services, enhance quality and proliferation of landfills as opposed to dumpsites, reduce single-use plastics, and increase public awareness about proper disposal methods.

Another issue is drain clogging and waste runoff, particularly in the capital city of Georgetown. The city's drainage systems are often overwhelmed by improper waste disposal practices, leading to frequent blockages. This is worsened by a lack of adequate waste management infrastructure and limited public awareness about the impacts of littering. Waste runoff, particularly during heavy rains, carries litter and pollutants into waterways, affecting both human health and marine ecosystems, because especially in coastal areas, this is where the waste will eventually end up. A newspaper article from Stabroek News from January 2025 describes the problem and underscores the need for improved accountability, public awareness, and strategic waste management to address these persistent problems. (Anthony 2025). Further newspaper reports also stress the problem, that the drains are clogged with garbage and therefore flooding occurs again and again. There are not enough garbage bins or they are not emptied properly, and heavy rain causes waste to enter the drains and ultimately the sea. (Chabrol 2023)

The following gaps in policies and in the current political framework can be identified:

1. **Implementation Gap:** Despite having a National Solid Waste Management Strategy for 2013-2024, the strategy has not yet been molded into firm policy. Also, there's a significant gap between the strategy and the implementation. The strategy's goals are not being effectively realised on the ground yet.
2. **Resource Allocation:** There is an evident gap in resource allocation. Municipal authorities and town councils' resources are not enough to deal effectively with the

continuously growing amounts of wastes being generated. This indicates a need for better funding.

3. **Technological and Infrastructure Gap:** There is inefficient collection coverage and a lack of suitable waste treatment plans. Regarding technology, in many cases specialized equipment such as compactors, skimmers, etc which indicates a need for policies that promote technological advancement and infrastructure development in waste management.
4. **Policy Gap**: A comprehensive national policy promoting recycling and waste separation at the household level is non-existent (Pan American Health Organization 2003). At the local level, municipal administrations and community initiatives are constrained by the absence of relevant laws, or even a policy declaration at the national level.
5. **Harmonization Gap:** There is an obvious need for a single overarching regulatory body for solid waste management. Apart from the EPA's National Regulations, there is a variety of Laws and By-Laws administered by differing Municipal Agencies.
6. **Enforcement and Monitoring Gap:** There is a clear gap in enforcement and monitoring policies. While responsibilities are decentralized to local authorities, many lack the resources and autonomy to enforce regulations effectively. Inconsistent inspections, inadequate data collection, and minimal legal follow-through contribute to poor compliance. This gap is further exacerbated by the need for strong coordination among agencies, highlighting the need for stronger policy coherence, institutional support, and accountability mechanisms.
7. **Missing Integrated Waste Management Approach:** While the strategy aims for an integrated approach, the current system lacks an integrated approach, suggesting a need for policies that better coordinate different aspects of waste management and involve various stakeholders.
8. **Public Education and Participation Gap**: While the strategy aims to involve community participation, the current situation suggests a need for stronger policies on public education and engagement in waste management practices. Also, the lack of research and development (R&D) in Guyana hampers efforts to prevent marine litter in the Caribbean Sea. Without R&D initiatives, the country faces critical gaps in understanding the sources, composition, and impacts of marine litter, which are essential for designing effective mitigation strategies. For instance, limited local studies on plastic pollution pathways or the effectiveness of waste management interventions force Guyana to rely on regional or global data, which may not fully capture local realities. This knowledge gap undermines the development of targeted policies, innovative recycling technologies, or circular economy solutions tailored to Guyana's unique context.

4 Recommendation

Based on the previous remarks, the existing studies and the specific national circumstances in Guyana, the following initial recommendations can be made:

1. A comprehensive national solid waste management strategy, “Putting waste in its place” that addresses all aspects of the waste stream, from generation to final disposal, has been developed over a decade ago. The strategy ends in the year 2024. Large parts of the strategy have still not been moulded into a comprehensive national policy, and the problems are still evident. The document was probably not able to find its way into parliament. Gaps should be identified here, what else could be included and how the strategy can be adopted and hence implemented.
2. It is necessary to strengthen the legal and regulatory framework for waste management by updating existing laws and regulations and developing new ones as needed. This should include clear definitions of roles and responsibilities for different agencies involved in waste management, as already demanded in the National-Solid-Waste-Management-Strategy.
3. The long-term goal of the path should be to move towards a mandatory EPR system to make manufacturers and importers responsible for the entire lifecycle of their products, including proper disposal or recycling at end-of-life. This can help reduce waste generation and increase recycling rates (Margallo et al. 2019).
4. It will be necessary to invest in waste management infrastructure, including sanitary landfills, resource recovery and recycling facilities, and composting plants. Phase out open dumpsites and uncontrolled burning of waste (Margallo et al. 2019). Implementing mandatory household waste sorting prior to disposal can significantly enhance the efficiency of modern waste management systems. By requiring residents to separate recyclables, organic waste, and non-recoverable materials at the source, municipalities can optimize the operation of sanitary landfills, resource recovery facilities, recycling centres, and composting plants. Sorted waste reduces contamination in recycling streams, allowing facilities to process materials more effectively and recover higher-quality resources.
5. Waste collection coverage and efficiency should be improved, especially in rural and underserved areas. Each municipality can have its own municipal solid waste management plan. Consider centralizing and optimizing waste collection nationwide (Ministry of Local Government and Regional Development 2013).
6. Public education and awareness programs on proper waste management practices, recycling, and the impacts of marine litter should be developed and implemented. Integrate waste management education into school curricula, as already demanded in the National-Solid-Waste-Management-Strategy.
7. In addition to EPR as a possibility, other policy options should be available:
    a. Establish a container deposit program for beverage containers to reduce littering and increase recycling rates (Ministry of Local Government and Regional Development 2013).
    b. Ban or restrict single-use plastics like plastic bags.
    c. Develop sustainable financing mechanisms for waste management, such as user fees, environmental taxes, or a dedicated waste management fund

8. It is important to consider the perspective of marine litter i.e. plastic pollution that ends up in the environment and ultimately in the sea, in possible policy frameworks. For example, these aspects can be included in municipal solid waste management plans
9. Beach and coastal cleanup programs can help address existing marine litter issues and raise awareness (Oyedotun and Bhola 2019)
10. Develop a marine litter monitoring and assessment program to track sources, quantities, and impacts of marine debris (United Nations Environment Programme 2012)
11. Strengthen regional cooperation on waste management and marine litter prevention through existing frameworks like the Cartagena Convention (United Nations Environment Programme 2012)
12. Informal sector integration is another important approach that can be used by providing training, protective gear, and access to cooperatives to improve income and safety for waste pickers. Small-scale recycling businesses can also be supported through grants and low-interest loans since they can fall under the category of green jobs or businesses.
13. Data management and monitoring has to be digitized and supported by participatory monitoring by using Geographic Information Systems (GIS) to monitor waste generation and landfill conditions. Mobile apps can also be introduced for reporting illegal dumping and accessing recycling schedules.
14. To improve enforcement, an amendment should be made in the Environmental Protection Act to clearly distinguish between littering and illegal dumping, as they differ in scale and impact. Separate fine structures should apply, with increased penalties for both offenses. Additionally, mandatory community service should be introduced for all violations—whether first-time or repeat offenses—to reinforce accountability and deter future misconduct. This approach ensures fair yet stricter consequences for these environmental violations.
15. To combat marine pollution, ghost gear should be regulated by mandating the proper disposal of abandoned fishing nets to avoid contributing to marine litter. Additionally, port waste reception facilities must be implemented or improved where necessary to ensure ships responsibly offload waste instead of dumping it at sea. These measures would significantly reduce ocean debris while supporting sustainable fishing and shipping practices.

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Supported by:

Federal Ministry
for the Environment, Nature Conservation,
Nuclear Safety and Consumer Protection

based on a decision of
the German Bundestag