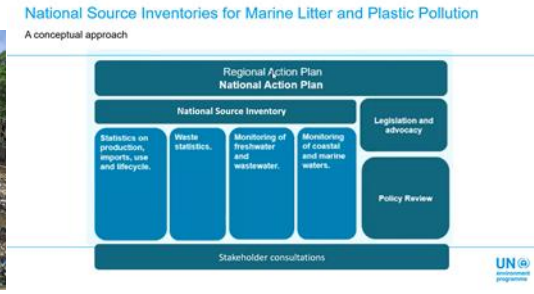
SAINT LUCIA NATIONAL SOURCE INVENTORY ON PLASTIC POLLUTION

Plastic Polymer leak rate (T/y)	Household	Commercial	Tourism	Fisheries	Total
PET (1)	120.24	30.67	35.47	0.61	186.99
HDPE (2)	44.98	18.094	7.11	0.19	70.374
PVC (3)	28.4	13.709	10.29	0	52.399
LDPE (4)	56.99	40.778	7.55	0.4	105.718
PP (5)	33.42	0.537	2.43	0.15	36.537
PS (6)	31.64	8.572	2.97	0	43.182
Other (7)	253.41	42.846	44.31	0.51	341.076
Total	569.08	155.21	110.1	1.86	836.28



Saint Lucia National Source Inventory on Plastic Pollution

Prepared under the guidance of: Department of Sustainable Development

With the support of: the Saint Lucia Solid Waste Management Authority (SLSWMA), the United Nations Environment Programme (UNEP), the International Union for Conservation of Nature (IUCN), with funding support from the European Union

Suggested citation: Government of Saint Lucia. (2022). Saint Lucia National Source Inventory on Plastic Pollution. Department of Sustainable Development, Ministry of Education, Sustainable Development, Innovation, Science, Technology and Vocational Training.

Table of Contents

List of Tables

List of Figures

ACRONYMS

ASYCUDA	:	Automated System for Customs Data
CED	:	Customs and Excise Department
CYEN	:	Caribbean Youth Environment Network
ECROP	:	Eastern Caribbean Regional Oceans Policy
EIA	:	Environmental Impact Assessment
GoSL	:	Government of Saint Lucia
GPA	:	Global Programme of Action on the Protection of the Marine Environment from Land-based Activities
GPML	:	Global Partnership on Marine Litter
GtC	:	Greening the Caribbean
IUCN	:	International Union for Conservation of Nature
km	:	Kilometre
ML-MAP	:	Marine Litter Management Action Plan
NCA	:	National Conservation Authority
Norad	:	Norwegian Agency for Development Cooperation
NSI	:	National Source Inventory
NSI-PP	:	National Source Inventory on Plastic Pollution
POP	:	Persistent Organic Pollutant
PWFI	:	Plastic Waste-Free Islands
SGD	:	St. Georges Declaration of Principles for Environmental Sustainability.
SLASPA	:	Saint Lucia Air and Sea Ports Authority
SLSWMA	:	Saint Lucia Solid Waste Management Authority
t	:	Metric tone
UNEA	:	United Nations Environment Assembly
UNEP	:	United Nations Environment Programme
WCR	:	Wider Caribbean Region

Acknowledgements

This National Source Inventory on Plastic Pollution (NSI-PP), was produced under the guidance of the Department of Sustainable Development (DSD), in collaboration with the Saint Lucia Solid Waste Management Authority (SLSWMA), with the support and cooperation of the public sector, private sector and civil society, drawing from prior related initiatives.

Generous financial support for this NSI-PP, was provided by the European Union, through a project implemented by the United Nations Environment Programme (UNEP), in collaboration with the International Union for the Conservation of Nature (IUCN).

The Department of Sustainable Development takes this opportunity to recognize the efficiency and assiduity of the consultant, Mr. Bishnu Tulsie, in the process of developing and compiling this report.

This NSI-PP significantly contributed to the design of Saint Lucia's Marine Litter Management Action Plan (ML-MAP), which was approved by the Saint Lucia Cabinet of Ministers on 16th January, 2023.

SAINT LUCIA NATIONAL SOURCE INVENTORY ON PLASTIC POLLUTION

1. Context and Rationale

1.1 International Context

Plastics have applications in most sectors of the economy and inappropriate post-use disposal practices are causing plastic pollution and marine litter to become major environmental challenges globally. In addition to degrading the aesthetics of the environment, they encourage the growth of disease vectors, threaten marine biodiversity and related livelihoods, exacerbate flooding during extreme weather events, smother coral reefs, and over time, break down into micro and nano plastics that enter the food chain, reducing fish stocks and contributing to negative human health impacts.

Marine litter, and in particular, plastic pollution, is a transboundary problem requiring a global response. To this end, it is now the subject of attention of international and inter-governmental processes working towards a more sustainable future for the planet, its inhabitants and ecosystems.

Since its first meeting in 2014, the United Nation Environment Assembly (UNEA-1) acknowledged the impacts of plastic pollution and marine litter on the marine environment and addressed the matter in all its subsequent meetings, calling for coordinated global action to address the problem, prioritizing a whole-life-cycle approach and resource efficiency, building on existing initiatives and instruments, and supported by, and grounded in science, international cooperation and multi-stakeholder engagement. The UNEA also charged the United Nations Environment Programme (UNEP) to lead the global effort in this regard. UNEP has developed a network of partner organisations and is mobilizing Member States at the regional and international levels to take action to address these problems. In 2017 UNEP launched the #CleanSeas Campaign, which is a global movement targeting governments, industry and consumers to urgently reduce the production and excessive use of plastics. This is to be achieved by, *inter alia*, transforming all spheres of change – habits, standards and policies - around the globe to dramatically reduce marine litter and the harm it causes.

At the practical level, UNEP's Global Partnership on Marine Litter has supported the development of sixteen (16) regional action plans and there is an ongoing programme to develop marine litter management action plans (ML-MAPs) in eight countries, including Saint Lucia. Other organisations are also active in this field by supporting the development of national marine litter action plans in about fifty countries.

Developing an ML-MAP starts with an understanding of the problem. This, in turn, requires quantification and characterization of marine litter, identification of the sources and understanding the leakages and pathways of waste entering the marine environment. To this end, UNEP and its partners are developing a methodology for producing national source inventories (NSI) to allow for a better understanding of the national level scale and nature of the problem, and to help inform the development of ML-MAPs to address it. This national source inventory is being developed to serve this purpose.

1.1.1 National Context

Solid waste management has been a challenge in Saint Lucia for decades, and led to the enactment of the Saint Lucia Solid Waste Management Act in 1996, to provide coordinated and integrated systems for the collection, treatment, recycling and disposal of solid waste, including hazardous waste; and to undertake the management of sanitary landfills. The Act also created the Saint Lucia Solid Waste Management Authority (SLSWMA) and charged it to take actions to achieve its purpose, thereby ushering in a period of improved management of solid waste in Saint Lucia. Notwithstanding, challenges remain, due mainly to improper waste disposal practices (See Figure 1) and inadequate resources allocated for waste management. Whereas there is a well-established island-wide domestic waste collection service, and regulations in place to require commercial and industrial operators to dispose the waste they generate at the designated landfills operated by the SLSWMA, much of the waste generated is not collected and enters the environment. A baseline assessment conducted in 2019 under the auspices of the Organisation of Eastern Caribbean States (OECS)[1] found that waste management regulations are not fully implemented or enforced, there are periodic interruptions to collection services, the SLSWMA faces funding challenges, and there is no current national solid waste management policy and strategy. While there are some ongoing initiatives to improve waste management, such as education and awareness programmes, clean-up campaigns and some recycling, problems still persist.

Figure 1: Waste disposal practices

1.2 Rationale for the National Source Inventory

Whereas local waste management investments are focused at the national level, the Government of Saint Lucia (GoSL) recognizes the global and trans-boundary nature of the problem caused by leakages from the waste management system and their flows into the marine environment, and the related negative consequences. In response, the GoSL has signed on to regional and international policies and agreements (see section 3.2 below), thereby joining with the international community to address pollution and, in particular, plastic pollution and marine litter. Saint Lucia is actively engaged in the UNEP programmes referenced in section 1.1 above and is also participating in the International Union for the Conservation of Nature (IUCN) Plastic Waste-Free Islands (PWFI) project funded by the Norwegian Agency for Development Cooperation (Norad) under which NSIs, regional waste management action plans, and ML-MAPs are being developed.

[1] Organisation of Eastern Caribbean States and the Norwegian Ministry of Foreign Affairs. 2019. Building Resilience in the Eastern Caribbean through Reduction in Marine Litter (ReMLit) project report: Saint Lucia Baseline Assessment Report.

In addition to compiling data on quantities of waste generated, the NSI also captures data on sources, leakages and flows, particularly into the marine environment. These science-based assessments will help inform the development of policies and waste management action plans, including for managing plastic pollution and marine litter, both of which are proven cross-border problems requiring coordinated global action for effective solutions.

2. Methodology:

The consultancy commenced with an inception meeting between the consultant and the project management team to review the terms of reference and ensure common understanding of the assignment, the nature and structure of the deliverables, to identify stakeholders and resource material to be consulted, and the timelines for key project outputs and activities. The meeting participants also discussed the role and support to be provided by the project management team throughout the consultancy.

This was followed by a period of research of the current literature and stakeholder consultations to allow for an understanding of the state of waste management, including plastic pollution and marine litter, the completed and ongoing initiatives that can inform the project deliverables, and the national and international landscape within which the project is being executed. This period also included initial planning for the technical consultation and the high-level meeting to be convened under the consultancy.

A technical consultation was convened on April 29, 2022 to serve as the key activity to help identify data sources and methodological approaches for compiling the NSI and considerations to be factored into the ML-MAP. Through this activity, these were identified for follow up, either with individual organisations or in focus groups, to retrieve the available data and to explore ideas and options for consideration in developing the National Source Inventory on Plastic Pollution (NSI-PP) and the ML-MAP. Planning for this consultation was supported by UNEP and the IUCN, who also made presentations on the global, regional and national contexts under which the NSI and ML-MAP were being developed, at the event. The consultation also allowed participants to share their perspectives and recommendations on the structure and contents of the key project outputs as well as how these will support their work. Forty-seven persons representing stakeholder organisations attended the consultation, seven of whom participated virtually. Nineteen of the participants were males and twenty-eight were females.

The next major activity was the high-level meeting convened on July 21, 2022 to present the initial findings of the NSI-PP and recommendations of actions to be included in the ML-MAP, and to seek feedback from participants on their adequacy, utility and feasibility for implementation. There were fifty-nine participants, twenty of whom were males and thirty-nine females. Participants included six members of the Cabinet of Ministers, two Permanent Secretaries, one Deputy Permanent Secretary, six Directors, two Managers, three Chief Officers, technical staff of various ministries and statutory organisations, and representatives of non-governmental organisations. The meeting generated lively and interactive discussions and resulted in useful comments and recommendations to improve the reports.

Another consultation was convened on October 6, 2022 as a final opportunity to present the draft NSI and ML-MAP to a wider group of stakeholders for comments prior to finalizing the Reports. To this end, the Department of Sustainable Development (DSD) targeted some stakeholders involved in the previous

consultations, but the majority of invitees were either not involved in them or were invited but unable to participate. A total of sixty-three organisations and individuals were invited, of which forty persons representing stakeholder organisations, attended. Twenty- two of the participants were female.

During the consultancy, one hundred and twenty-eight persons and organisations representing various interest groups were consulted either in the context of the three consultations, individually or in focus groups sessions. Some were consulted on multiple occasions, initially to inform the structure and contents of the NSI-PP and the ML-MAP, for follow up and/or clarifications on matters previously raised and to review the draft NSI-PP and the draft ML-MAP. Drafts of the NSI and ML-MAP were shared with all participants at the third consultation for comments, which were received from several.

UNEP, through its Global Programme of Action on the Protection of the Marine Environment from Land-based Activities (GPA) and the Global Partnership on Marine Litter (GPML), and the International Union for the Conservation of Nature, acting through its Plastic Waste-Free (PWFI) project, provided support throughout the consultancy.

Compilation of this NSI-PP relied heavily on the 2021 report: *Plastic Waste National Level Quantification and Sectoral Material Flow Analysis: Saint Lucia National Report*[2], conducted by Asia Pacific Waste Consultants under contract with the IUCN, hereafter referred to as the PWFI Report. This Report, which was commissioned in January 2020 and completed in July 2021, included detailed analysis of the waste generated, the component of that waste comprising plastics and the amount of the plastic waste that was leaked into the environment from the domestic, commercial, tourism and fisheries sectors in 2019. The study was fashioned based on guidelines in the *Waste Audit Methodology: A Common Approach*[3] and included data collection and analysis, stakeholder interviews, observations, and examination and analysis of waste samples from various sources. In cases where data were unavailable or unreliable, default values from other studies and jurisdictions were used as proxy inputs into the analysis. The main statistical analysis was based on the Bayesian Statistical Model and estimates were based on a 95% confidence level.

3. Enabling Policy and Legal Framework

3.1 Policy Framework.

There are a number of national policies, plans and proposals that influence waste management generally, and plastic pollution in particular, the key ones of which are identified below.

a) The 2014 action plan to address climate change in the tourism sector in Saint Lucia[4] included improved sewage treatment and coastal water quality as a goal to be pursued.

[2] Asia Pacific Waste Consultants (2021). Plastic Waste National Level Quantification and Sectorial Material Flow: Saint Lucia National Report. Gland, Switzerland: IUCN.

[3] Waste Audit Methodology: A Common Approach. Pacific Region Infrastructure Facility and the Southern Pacific Regional Environment Programme. (https://www.sprep.org/publications/waste-audit-methodology-a-common-approach)

[4] Government of Saint Lucia and the Caribbean Community Climate Change Centre. (2015). Volumes I and II: Impact Assessment and National Adaptation Strategy and Action Plan to address Climate Change in the Tourism Sector of

b) The portfolio of projects for resilient ecosystems developed in 2020 under Saint Lucia's national adaptation planning process[5] includes ten project concepts under which issues such as improving ocean governance, managing marine litter, improving the attractiveness of the beach environment, valuation of goods and services associated with marine ecosystems and resources, water quality monitoring, addressing marine litter, and mangrove rehabilitation were included as areas for future investments.

c) Saint Lucia has approved a National Ocean Policy and Strategic Action Plan (2020 – 2035)[6] which includes clear statements of intent with regard to marine pollution, as contained in the following goals of the policy:

   Goal 2.3: Maintain effective marine pollution contingency planning, monitoring and response capabilities, in line with relevant international and regional conventions and national obligations.

   Goal 3.4: Support the effective monitoring and control of land and marine based sources of pollution.

   Goal 5.2: Develop and implement national systems of coastal and marine spatial planning to allow for the improved planning and control of marine and coastal activities.

d) In January 2019, the Government of Saint Lucia formally approved a plan to phase-out the use of Polystyrene (PS), Expanded Polystyrene (EPS) and Polystyrene terephthalate (PET) and high-density Polyethylene (HDPS) containers in the local food service industry. The government also approved a zero percent (0%) import duty on all biodegradable and compostable food service containers, and new Harmonized System (HS) Codes for these products to improve the monitoring of imports. The government also launched a public campaign to phase out the use of all Styrofoam and selected single-use plastic items such as straws, beverage cups and lids, snack, desert and sampling trays, packaging trays and containers, and plastic cutlery. These policy positions are supported through the enactment of the Styrofoam and Plastic Food Service Containers (Prohibition) Act (No. 22 of 2019) under which the importation, manufacture, sale, use and distribution of Styrofoam or plastic food service containers was prohibited as of August 1, 2019, but their use was allowed for such items held in stock on August 1, 2019 until the stock was exhausted.

e) The GoSL also developed a National Health Sector Policy (draft) whose goal is to produce a nation of empowered and healthy people, to be achieved through twenty-one (21) policy measures, one of which is to provide increasing managerial autonomy to public health institutions within the strengthened framework for public accountability with a view to achieving overall efficiency in service delivery, reducing waste and improving responsiveness to local needs.

Saint Lucia. Department of Sustainable Development, Ministry of Education, Innovation, Gender Relations and Sustainable Development.

[5] Government of Saint Lucia. (2020). Saint Lucia's Portfolio of Project Concept Notes for Resilient Ecosystems 2020–2028, under the National Adaptation Planning Process. Department of Sustainable Development, Ministry of Education, Innovation, Gender Relations and Sustainable Development.

[6] Government of Saint Lucia. (2020). Saint Lucia's National Oceans Policy and Strategic Action Plan ((NOP SAP) 2020 – 2035. Department of Sustainable Development, Ministry of Education, Innovation, Gender Relations and Sustainable Development.

f) In addition, a Medical Waste and other Bio-Hazardous Waste Management Plan setting minimum requirements for the safe handling, transportation and disposal of bio-hazardous waste was developed and implemented in 2006. Adherence to the provisions of this Plan will avoid the leakage of these waste streams into the environment.

g) In its Medium Term Development Strategy (2020 – 2023)[7], the GoSL committed to the strategic goal to foster and promote sustainable development at the national level through research and networking, resource mobilization and reporting by focusing on, *inter alia*, chemicals management, climate change and sustainable use of terrestrial and coastal resources. A number of interventions are proposed to help achieve these goals, including developing and implementing a marine pollution strategy and action plan, including for solid waste, point sources from industry, marine pollution from ports, sewage effluent and non-point pollutants; development and implementation of an integrated chemicals and waste management strategy with interventions to address pollution management/ mitigation; strengthening the policy, legislative and institutional frameworks for solid waste management and an improved solid waste collection methodology; identification and implementation of alternative uses for solid waste (re-use, recycling, composting); and improving national capacity to deal with new waste (e.g. e-waste)

3.2 International Agreements, Conventions and Protocols

Saint Lucia's domestic policy framework is further strengthened through the country's ratification of a number of international agreements, conventions and protocols related to waste and chemical management and/or pollution control. While these impose commitments on the State, they have not been promulgated into national law. However, ratification of these agreements is, *inter alia*, a clear statement of policy of the GoSL to join the international community in pursuing the purposes of these instruments. In this regard, the following are of relevance:

a) United Nations Convention on the Law of the Sea (UNCLOS): The law of the sea is a body of public international law governing the geographic jurisdictions of coastal States and their rights and duties in the use and conservation of the ocean environment and its natural resources. Part XII of the convention is concerned with the protection and preservation of the marine environment, and includes related provisions in seven (7) areas: underlying principles; jurisdictions; fishery resources; mineral resources; marine science and technology; environmental protection; and dispute settlement. UNCLOS also includes provisions for States to take measures to prevent, reduce and control pollution of the marine environment, including from land-based sources of pollution.

Saint Lucia ratified this Convention on March 27, 1985

b) International Convention for the Prevention of Pollution from Ships (MARPOL): Adopted in 1973, the MARPOL Convention is the main instrument for the prevention of pollution of the marine environment by ships from operational or accidental causes. Regulations under the Convention are

[7] Government of Saint Lucia: Medium Term Development Strategy 2020 – 2023. Department of Economic Development, Transport and Civil Aviation.

contained in its six (6) Annexes, of which Annex V: Prevention of Pollution by Garbage from Ships, prohibits the disposal into the sea of all forms of plastics.

Saint Lucia ratified the MARPOL Convention on March 24, 1998.

c) **Cartagena Convention:** The Cartagena Convention for the Protection and Development of the Marine Environment in the Wider Caribbean Region (WCR) is a regional legal agreement for the protection of the Caribbean Sea from pollution from ships, dumping of waste into the sea, from land-based sources, sea-bed exploration and exploitation, and from atmospheric discharges.

Saint Lucia ratified the Cartagena Convention on August 27, 2013.

d) **The Basel Convention on the Control of Transboundary Movement of Hazardous Waste and their Disposal (The Basel Convention):** This Convention regulates the transboundary movements of hazardous wastes and their disposal and obliges its Parties to ensure that such wastes are managed and disposed of in an environmentally sound manner. The Convention covers toxic, poisonous, explosive, corrosive, flammable, eco-toxic and infectious wastes.

Saint Lucia ratified the Basel Convention on December 9, 1983.

e) **Convention on the Prevention of Marine pollution by Dumping of Wastes and other Matter (The London Convention):** The objective of this Convention is to promote the effective control of all sources of marine pollution and to take all practicable steps to prevent pollution of the sea by dumping of wastes and other matter. Under the Convention a so-called "black- and grey-list" approach is applied for wastes, which can be considered for disposal at sea according to the hazard they present to the environment. Dumping is prohibited for the blacklisted materials while disposal of the grey-listed materials requires a special permit from a designated national authority and must be done under strict control, and provided certain conditions are met.

Saint Lucia ratified the London Convention in 1980.

f) **The Rotterdam Convention:** This Convention promotes shared responsibility and cooperative efforts among Parties in international trade of certain pesticides and hazardous chemicals to protect human health and environment from harm. It also contributes to the environmentally sound use of those hazardous chemicals by facilitating information exchange about their characteristics, and by providing for a national decision-making process on their import and export.

Saint Lucia signed the Convention in January, 1999 but has not ratified it

g) **The Stockholm Convention on Persistent Organic Pollutants (POPs)**: This Convention focuses on eliminating or reducing releases of POPs. It sets up a system for tackling additional chemicals identified as unacceptably hazardous. Ultimately, the Convention points the way to a future free of dangerous POPs and promises to reshape our economy's reliance on toxic chemicals.

Saint Lucia ratified the Convention on October 4, 2002.

h) **The Minamata Convention on Mercury:** This Convention controls anthropogenic releases of mercury throughout its lifecycle. It includes a ban on new mercury mines, the phase-out of existing ones, the phase-out and phase-down of mercury use in a number of products and processes, control measures on emissions into the air, releases to land and water, and the regulation of the informal sector of

artisanal and small-scale gold mining. The Convention also addresses interim storage of mercury and its disposal once it becomes waste, sites contaminated by mercury, as well as health issues. Whereas Saint Lucia does not engage in activities that release mercury into the environment, it is subject to the related negative impacts, particularly through mercury contamination of marine resources that enter the human food chain.

Saint Lucia acceded to the Convention on January 23, 2019.

i) **St. George's Declaration of Principles for Environmental Sustainability (SGD) (2040):** The goal of the Declaration is to promote and support effective management and sustainable use of the natural capital of the Eastern Caribbean by enhancing its integrity and strengthening resilience and adaptive capacity. One of the strategic priorities of the SGD is an integrated approach to waste management through sustainable consumption, production and management practices that reduce waste and pollution in the environment.

j) **Eastern Caribbean Regional Oceans Policy (ECROP):** This policy is based on a vision that the coastal and marine resources of the Eastern Caribbean are sustainably managed to optimize the potential of the natural capital to support a blue economy, ensure resilience and adaptation to climate change, protect and restore the marine ecosystems of the region, and nurture our natural and cultural heritage for the benefit of current and future generations. The policy lays out a number of goals to help achieve the vision, among which are:

Goal 2.2: OECS Member States address the requirements of relevant international, regional and national obligations addressing marine pollution contingency planning, monitoring and response, and safety at sea.

Goal 3.3: OECS Member States ensure that land and marine based sources of pollution impacting the marine environment are effectively monitored and controlled.

Goal 8.3: The state of the marine environment is understood, both nationally and regionally, through coordinated monitoring and research activities.

In addition, there are a few important initiatives under development or consideration, which will improve the policy and regulatory framework for waste management. These include:

- A draft Management of Beverage Containers Bill (2019) that would incentivise the return of plastic beverage containers in exchange for the payment of a cash refund. This Bill is under review by a number of stakeholders.
- An initial National Waste Management Strategy was developed in 2003 but not submitted for approval by the Cabinet of Ministers. The development of such a strategy is included as an output in the recently approved, World Bank-funded project: Unleashing the Blue Economy in the Caribbean (UBEC).
- A Marine Pollution Management Bill that would, *inter alia*, establish administrative and operational requirements for the management of ship-generated waste and place a ban on the disposal of waste into the territorial waters of Saint Lucia is drafted, but has not gained traction.

3.3 Legal Framework:

There are a number of laws and regulations that address issues of waste management and pollution. These are discussed briefly below.

a) **Saint Lucia Solid Waste Management Authority Act (Cap. 6.10**): As stated above, this Act created the SLSWMA to provide coordinated and integrated systems for the collection, treatment, recycling and disposal of solid waste, including hazardous waste, and to establish and manage sanitary landfills throughout the country. The Act imposes an environment levy on all visitors, grants the SLSWMA the authority to charge a haulage fee for services provided on request, and a tipping fee if requested to unload any container containing solid waste. The Authority provides a twice-weekly domestic waste collection service island wide, except the City of Castries, which receives this service three times weekly.

b) **National Conservation Authority Act (Cap. 6.01):** This Act established the National Conservation Authority (NCA) as a corporate body to, *inter alia*, conserve the natural beauty and topographic features of Saint Lucia; remove derelict objects from a beach or a protected area; and secure sanitary conditions on a beach or protected area. The Act also authorises the NCA to prohibit a person from littering a beach or protected area.

c) **The Saint Lucia Air and Sea Ports Authority Act (Chap. 8.13):** This Act created the Saint Lucia Air and Sea Ports Authority (SLASPA) to, *inter alia,* provide for co-ordinated and integrated systems of airports, seaports and port services. The Act prohibits, restricts and controls the depositing of any substance, solid matter, article, or thing polluting or likely to pollute the waters of any seaport, and the disposal of garbage, papers, refuse or other material at an airport, except in the receptacles provided for that purpose. SLASPA is also responsible for ensuring compliance of vessels in Saint Lucian waters with the provisions of international conventions to protect the marine environment.

d) **Physical Planning and Development Act (Cap. 5.12):** This Act makes provisions for the development of land, the assessment of the environmental impacts of development, the grant of permission to develop land and for related matters, and has as one of its objects, to maintain and improve the quality of the physical environment in Saint Lucia. Section 22 of the Act requires developers of certain developments to submit an environmental impact assessment (EIA) which must accompany the application for approval of the development, and Schedule 4, which lists the types of development requiring an EIA, includes any industrial plant or development projects generating or potentially generating emissions, aqueous effluent, solid waste, noise, vibration or radioactive discharges, or will store and/or use hazardous materials.

e) **Public Health Act (Cap. 11.01):** The Public Health Act provides for the promotion and preservation of public health and authorises the Minister to make regulations to promote the objects of the Act. It establishes the Public Health Board with responsibility to advise the Minister on matters under the jurisdiction of the Act and allows for the appointment of public health officers to, *inter alia*, promote adherence to the provisions of the Act and its regulations as well as to monitor compliance thereof. Regulations under the Act that are relevant to plastic pollution and marine litter include Statutory Instrument 21/1978: Disposal of Offensive Matter; Statutory Instrument 70/1980: Food; and Statutory Instrument 3/1953: Mosquito Control.

f) Styrofoam and Plastic Food Service Containers (Prohibition) Act (No. 22 of 2019): This Act prohibits the importation of Styrofoam and single-use plastic food service containers and service items as of August 1, 2019. It also prohibits the manufacture, sale, use and distribution of Styrofoam food services containers as of August 1, 2020 and single-use plastic food service containers and service items as of 1 August, 2021. These prohibitions are supported through the application of a zero percent (0%) import duty on all bio-degradable and compostable alternatives and an education and awareness campaign to promote the transition away from single-use Styrofoam and plastic items in the food service sector.

g) Castries Constituency Council Act No. 1 of 2012: This Act created the Castries Constituency Council and charged it with responsibility for, *inter alia*, ensuring the cleanliness of streets and other public places within the city of Castries and its environs. Under this provision, the Council undertakes waste collection and the cleaning of drains within the City limits.

h) Fisheries Act: Cap. 7.15: This Act authorises the Minister to declare areas of the sea as marine reserves and to take measures, as necessary, to afford special protection of the flora and fauna of these areas. Such measures include managing marine litter, which impacts negatively on these resources.

i) **Works and Roads Act: Cap 8.05:** While this Act does not include waste management provisions, it grants the Minister the powers and responsibility to clear verges and drains and desilt waterways. These activities have impacts on waste flows, including into the marine environment.

3.4 Institutional Framework:

Responsibility for waste management lies with all sectors of society, including with individuals, the private sector, non-governmental organisations, and central government and its organs, as they all generate waste, or have responsibility for its proper management, or both. In addressing this dispersed challenge, the GoSL created a framework that focuses the energies of these groups towards the common goal of improving solid waste management to ensure a clean and healthy environment. The key actors in this framework are discussed below.

3.4.1 The Public Sector: Responsibility for solid waste management lies with the Ministry of Education, Sustainable Development, Innovation, Science, Technology and Vocational Training, whose portfolio includes serving as the focal point for a number of Multilateral Environmental Agreements concerned with waste management, including marine pollution, such as the Basel, Cartagena and Stockholm Conventions (see section 3.2 above), and Coastal Zone Management. The Ministry's responsibilities include managing the national waste management budget, the approval of fiscal instruments, the formulation of waste management policies, developing supporting legislation and education and awareness programmes.

The SLSWMA, which is the primary agency responsible for solid waste management, falls under the Ministry's portfolio and reports to the Minister through its Board of Directors. Its responsibilities include island-wide household waste collection services, landfill management, the disposal of biomedical and other hazardous waste, approval of waste management plans for mass crowd events and major construction projects, data collection and research. It also oversees waste disposal from the commercial,

industrial and institutional sectors which are responsible for disposing the waste they generate. The Authority also conducts extensive public education and awareness programmes to encourage more responsible waste management practices. The SLSWMA is governed by an eleven (11) member Board of Directors whose membership includes key government departments, the main private sector umbrella organisations and three persons appointed by the Minister who, in his or her opinion, represent any interests connected with or related to, the collection, disposal or re-cycling of solid waste.

While these are the two key public sector agencies with responsibility for waste management, there are others, such as the Environmental Health Department of the Ministry of Health, which is responsible for medical waste management and disposal and oversight of the SLSWMA, and the National Conservation Authority which has responsibility for managing beaches and parks, including waste management in these areas. In addition, the Ministry of Housing and Local Government has responsibility for cleaning of storm drains and the streets within the geographic boundaries of the constituency councils.

3.4.2 Private Sector: The private sector is responsible for disposing of the waste it generates at the designated landfills. This sector also includes licensed waste haulers who provide collection and disposal services to the SLSWMA, the private sector, SLASPA, as well as for mass crowd events, and waste recyclers who collect, process and export specific waste streams. There are also eight companies that produce plastic items from imported plastic pellets or preforms (see Table 1 below) which also should be considered part of the institutional arrangement for waste management because of the nature of their business.

3.4.3: Non-governmental organisations: There are a number of non-governmental organisations such as the Caribbean Youth Environment Network (CYEN), the Saint Lucia Dive Association, service and environmental clubs, school groups and community based groups that are driven by their concern over the state of the environment to conduct education and awareness programmes and cleanup activities in communities, coastal areas and rivers island-wide. Other, more formal groups such as the United States Peace Corps, the Japan Agency for International Cooperation and the Saint Lucia National Trust are also part of this group of stakeholders.

3.5 Data Management

The SLSWMA keeps reliable records of waste landfilled, beginning from 2004 which it lists under twenty waste categories. While some of the categories allow for the identification of specific waste streams (e.g. cardboard, green waste, tyres), other categories such as beach cleaning, residential, commercial and hotel waste do not allow for this level of categorization. The SLSWMA also conducts periodic waste categorization studies which provide some information to generate estimates of various waste categories. There is also some data on plastic waste collected under the RePlast demonstration project but this is rather limited in the context of a time series of data needed to generate information to inform policy and actions to improve waste management. Beyond these two sources, there is a paucity of data sources to draw upon to estimate waste generated and leaked.

Import data maintained by the Customs Department is a reliable source of data on items imported into the country which will eventually enter the waste stream. While the timing of their entry into the waste stream is unknown, this could be estimated for specific waste streams with reasonable reliability to make

this data useful to estimate waste generated. While this will not inform the amount leaked into the environment, estimates can be generated through the analysis of waste collected through cleanup campaigns and waste characterisation studies.

4. Sources of Plastic Waste and Pollution:

Saint Lucia does not produce plastics. All plastics entering the national jurisdiction are either imported directly as ready-for-use products, plastic pellets or preforms that are converted into plastic items, plastic containers that contain products, products that comprise plastic parts or wrappings, waste streams from aircrafts and vessels, or transboundary plastic marine litter. Each of these sources is explored further in the sections below and the analysis relies heavily on the already referenced Plastic Waste National Quantification and Sectorial Material Flow Analysis conducted by the IUCN, with support from the Norad. The PWFI Report includes a robust quantification of plastic waste generated, waste management systems, leakage and flow rates based on extensive field research, the use of assessment models and statistical analyses. The study includes assessments of plastic leakages and flows for 2019, and is sufficiently recent to inform this NSI-PP.

4.1 Plastic Imports:

Plastics are imported into Saint Lucia either as complete items, embodied as components in some products or as pellets or preforms used to manufacture plastic products. The main imported plastic items include single-use and reusable beverage bottles, plastic containers, PVC pipes, plastic films, outdoor furniture, single-use food containers, straws and cutlery. The latter group of single-use items are being phased out under recently approved policies and regulations (see section 3.3 (f) above). There are eight (8) companies that import preforms or pellets to manufacture a range of plastic products either for their own use or for sale to users of the products. These companies and the products they manufacture are listed in Table 1 below.

Table 1: Companies and the Plastic Products they Manufacture

Companies	Products Manufactured	Company Activity
Paradise Bottling: Goddard Catering Group (Saint Lucia) Ltd.	Water and beverage bottles	Catering for aircrafts and production of bottled water
Forest Spring Bottling	Water bottles	Production of bottled water
Windward and Leeward Brewery Ltd.	Water, soft drinks and other non-alcoholic beverages	Manufacturing of beer and soft drinks
SMJ Beverages	Water and other beverages	Production and sale of soft drinks
Blue Waters Bottling (Saint Lucia) Ltd.	Water and other alcoholic and non-alcoholic beverages	Production of bottled water
Ramco Plastics Ltd.	Plastic bags, containers, bottles etc.	Production of plastic bags used for shopping, packaging items for sale and in agricultural applications
Chemical Manufacturing and Investments Co. Ltd.	Cleaning product bottles	Production of chemical cleaning products
Plastic Solutions Ltd.	Plastic bags	Production of plastic bags used for shopping, packaging items for sale and in agricultural applications

The most reliable data source to quantify plastic imports is the Customs as Excise Department (CED) import data maintained on the Automated System for Customs Data (ASYCUDA) platform, which was developed to harmonize Customs tariffs worldwide, and which classifies all products using HS Codes. Whereas plastics and articles thereof are captured in Chapter 39 of the Harmonised Commodity Description and Coding System, products made wholly or partly of plastics, or contained in plastic containers are in several chapters of the HS Codes (see Table 2 below for the relevant chapters and product descriptions).

4.2 Products that comprise plastic components or wrappings

There is a large number of items of trade comprising goods made solely of plastics, plastic containers filled with consumer products, or those that incorporate plastic components in their design. An examination of the HS Codes and comparison with the products researched under the PWFI Report yielded the following chapters (See Table 2 below) as being of interest in estimating the amount of plastics imported into Saint Lucia.

Table 2: Products Made of, or Incorporating Plastics in Their Design

ASYCUDA Chapter	Product Description	HS Codes Recommended for further consideration for Import Data Collection
Chapter 04	Buttermilk, Butter, Curdled Milk and Milk Products, Cream; Yogurt, Kephir and other fermented or acidified milk and cream	1401; 0402; 0403.10; 0403.90; 0404; 0405;
Chapter 10	Cereals, Rice, Packaged grains	10.06
Chapter 15	Animal or vegetable fats and oils and their cleavage products; Crude oils, Prepared edible fats; Animal or vegetable waxes, margarine (except liquid margarine)	15.01; 15.03; 15.04; 15.05; 15.06; 15.07; 15.08; 15.09; 15.10; 15.11; 15.12; 15.13;

ASYCUDA Chapter	Product Description	HS Codes Recommended for further consideration for Import Data Collection
		15.14; 15.15; 15.16; 15.17; 15.18;
Chapter 20	Preparations of vegetables, fruits, fruit juices, nuts and other parts of plants, Peas, Beans	2008.10; 20.09;
Chapter 21	Ice cream, Sorbets, Preparations for infant use, and Other miscellaneous edible products	12-3.10; 2103.20; 2103.90; 2105;
Chapter 22	Beverages, Spirits, Mineral and aerated water, Sodas, Vinegar and vinegar substitutes,	22.01; 22.02; 2209;
Chapter 24	Tobacco and manufactured tobacco substitutes	2402.02
Chapter 27	Mineral fuels, Mineral oils and products of their distillation, Lubricating oils, Petroleum jelly	2710.19.71; 2710.19.72; 2710.20.30; 2712.12.00;
Chapter 29	Vitamins, Supplements, Health and beauty products, Hydrocarbons and their halogenated, sulphonated, nitrated or nitrosated derivatives	29.36
Chapter 30	Pharmaceutical products	30.03; 30.04
Chapter 32	Tanning or dying extracts; Tannins and their derivatives, Dyes, pigments and other colouring matter, Paints and varnishes, Putty and other mastics, Inks, Emulsion and other water-based paints and pigments.	3204; 3206; 3210.00.10;
Chapter 33	Essential oils and resinoids; Perfumery, cosmetic or toilet preparations, Sunscreens and tan products, Shampoos and Conditioners.	3304.99; 3305; 3306.20; 3307.20;
Chapter 34	Soap, Liquid soaps, Dish washing and other liquid detergents, Liquid bleaches, Organic surface-active agents, Washing preparations, Lubricating preparations, Artificial waxes, Prepared waxes, Polishing or scouring preparations, Candles and similar articles, Modelling pastes, Dental waxes and dental preparations	3402.20; 3402.90;
Chapter 38	Miscellaneous Chemical Products	3820.00; 3825.10;
Chapter 39	Plastics and articles there-of such as polyethylene and high density polyethylene and products made of PET, HDPE, PVC, LDPE, PP, PS and other plastics, including boxes, films, crates and containers, floppy discs, egg boxes, plastic bags, cups, lids, food containers, storage containers, trays, spoons, knives, forks, kitchenware and other household items, buckets, coat hangers, dustbins, straws, sacks, flower pots, shopping bags, *etc*.	39.01; 39.02; 39.03; 39.04; 39.05. 39.06, 39.07; 39.15; 39.16; 39.17; 39.18; 39.19; 39.20; 39.21; 39.23; 39.24; 39.25; 39.26;
Chapter 42	Articles of leather, saddlery and harnesses; Travel goods, handbags and similar containers;	4202.11; 4202.22; 4202.31;
Chapter 54	Synthetic filaments, strip and the like of man-made textile material,	54.01; 54.02; 54.03; 54.04; 54.05, 54.06; 54.07; 54.08;

ASYCUDA Chapter	Product Description	HS Codes Recommended for further consideration for Import Data Collection
Chapter 55	Manmade staple fibres, woven fibres.	55.01; 55.02; 5503.20; 5503.30; 5503.40; 55.06; 55.07; 55.08; 55.09; 55.10; 55.11; 55.12; 55.13; 55.14; 55.15; 55.16
Chapter 56	Waddling of textile material, felt and non-wovens; Special yarns; Twine; Cordage, ropes and cables and articles thereof, Textile fibres, Twine, cordage and cables, coated, covered or sheathed with rubber or plastics, Fishing nets and other made-up nets	5601.21.20; 5601.22.20; 5601.29.20; 56.07; 56.08; 5609.00
Chapter 57	Carpets and other textile floor coverings	57.03.20
Chapter 58	Special woven fabrics; Gauzes and other net fabrics, Narrow woven fabrics, Tufted Textile fabrics; Lace; Tapestries, Trimmings, Embroidery, Narrow woven fabrics.	5804.21; 5810.92;
Chapter 59	Impregnated, coated, covered or laminated textile fabrics; Textile articles of a kind suitable for industrial use	59.02; 59.03;
Chapter 60	Knitted and crocheted fabrics	6001.22; 6001.92;
Chapter 61	Articles of apparel and clothing accessories, knitted or crocheted	6101.30; 6102.30; 6103.23; 6103.32.90; 6103.43.90; 6104.13; 3104.23; 6104.32.90; 6104.43; 6104.44; 6104.53; 6104.63; 6105.20; 6106.20; 6107.12; 6108.11; 6108.22; 6108.32; 6108.90; 6110.30; 6111.20.90; 6112.12; 6112.31; 6112.41; 6114.30; 6115.21; 6115.22; 6115.95; 6116.93;
Chapter 62	Articles of apparel and clothing accessories, not knitted or crocheted	6201.13; 6201.93; 6202.13; 6202.93; 6203.12; 6203.23; 6203.32.90; 6203.43.90; 6204.13; 6204.23; 6204.32.90; 6204.43; 6204.44; 6204.53; 6204.62.90; 6205.30; 6206.30.20; 6207.29; 6208.11; 6208.22; 6208.91.90; 6209.20.90; 6211.33; 6214.30; 6212.40; 6215.20;
Chapter 63	Other made up textile articles; Nets; Worn clothing and worn textile articles; Rags	6301.40; 6302.22; 6302.32; 6302.53; 6203.93; 6303; 6305.20; 6306.22; 6310;
Chapter 64	Footwear, Gaiters and the like; Parts of such articles	6404; 6406.20;

ASYCUDA Chapter	Product Description	HS Codes Recommended for further consideration for Import Data Collection
Chapter 65	Headgear and parts thereof	6506.91
Chapter 67	Prepared feathers and down and articles made of feathers or of down; Artificial flowers; Articles of human hair	67.02; 67.04.90;
Chapter 84	Nuclear reactors, boilers, machinery and mechanical appliances and parts thereof, Office machines, Audio, video and recording machines and parts there-of, Air-conditioning machines, Refrigerators, freezers and other refrigerating or freezing equipment.	84.15; 84.18; 3; 8421.21; 84.70; 84.71; 84.72;
Chapter 85	Electrical machinery and equipment and parts thereof, Sound recorders and reproducers, Television image and sound recorders and reproducers, and parts and accessories of such articles	85.08; 85.09; 85.12; 85.13; 85.17; 85.18; 85.19; 85.21; 85.23; 85.25; 85.26; 85.27; 85.28; 85.30; 85.31; 85.44; 8547.20;
Chapter 87	Vehicles other than railway or tramway rolling-stock, and parts and accessories thereof	87.02; 87.03; 87.04; 87.07; 8708.10; 8708.93; 87.11; 87.13; 87.14.95; 8715;
Chapter 89	Ships, boas and floating structures	8902.00; 89.03; 89.05; 8906.90; 89.07;
Chapter 90	Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical instruments and apparatus, and parts and accessories thereof	90.01; 9003.11; 90.04; 90.05; 90.06; 90.07; 90.058; 90.17; 90.18; 90.19; 90.20;
Chapter 94	Cushions and similar stuffed furnishings; Lamps and lighting fittings not elsewhere specified; Illuminated signs, illuminated name plates and the like; Prefabricated buildings.	94.01; 94.02; 9403.70; 9404.21; 9405.30; 9405.92;
Chapter 95	Toys, games and sports requisites; parts and accessories thereof, Dolls and other plastic toys, Water ski equipment, Christmas decorations, Board games and accessories	9503; 9504.90.10; 9505.10.10; 9506; 9507.10; 9501.90.10
Chapter 96	Miscellaneous manufactured articles	9603.10; 9603.21; 9603.90.30; 9608.10; 9608.20; 9608.30; 9608.40; 9608.50; 9608.60; 9608.99; +96.13; 96.15; 96.19;

Although long, the list above is not exhaustive, as there are other items of trade that could contain plastic components. The CED indicated that generating the list of imports for the products under these headings will yield thousands of pages of Excel data which may be counterproductive to analyse, as many of them may make small contributions to leaked plastics or may be wholly landfilled. In determining how deep to mine the CED database, a balance should be struck between the cost of such investigation and the utility of the additional data. For the purposes of this, and subsequent reviews and updates of the source inventory, decisions should be taken to add or remove items of trade for quantification depending on the amount of plastics involved, disposal methods and leakages, and the impact their inclusion or removal may have on waste management policies and practices. To this end, the rows highlighted in Table 2 are

flagged for inclusion in future estimates of plastics entering the economy, plastic waste generated, leaked add eventual flows into the marine environment.

The PWFI Report targeted seven polymer types that are imported into the country which together make the greatest contribution to plastic pollution in Saint Lucia. The findings, which are in Table 3 below, indicate that plastic type 7 – Other, which includes eyeglasses, baby and sports bottles, electronics, CD/DVDs, lighting fixtures and clear plastic cutlery is the plastic type most leaked, followed by Type 1 - Polyethylene Terephthalate (PET), which includes beverage bottles, food bottles/jars and polyester clothing or rope, and Type 4 – Low Density Polyethylene (LPDE), which includes plastic/cling wrap, sandwich and bread bags, bubble wrap, garbage bags, grocery bags and beverage cups.

Table 3: Plastic Waste Imports by Polymer Type and Leakage Rates

Plastic Polymer leak rate (t/y)	Household	Commercial	Tourism	Fisheries	Total
PET (1)	120.24	30.67	35.47	0.61	**186.99**
HDPE (2)	44.98	18.094	7.11	0.19	**70.374**
PVC (3)	28.4	13.709	10.29	0	**52.399**
LDPE (4)	56.99	40.778	7.55	0.4	**105.718**
PP (5)	33.42	0.537	2.43	0.15	**36.537**
PS (6)	31.64	8.572	2.97	0	**43.182**
Other (7)	253.41	42.846	44.31	0.51	**341.076**
Total	**569.08**	**155.21**	**110.1**	**1.86**	**836.28**

4.3 Waste from external sources

a) Waste streams from aircrafts

Waste generated by aircrafts is placed is bins provided by the SLASPA. This waste, which is not segregated, and primarily includes items of glass, plastics and paper products, is collected by licensed haulers and delivered to the landfill where it is buried. The SLSWMA, which keeps records of this waste stream, received 92 t of this co-mingled waste from aircrafts in 2019/20.

b) Cruise Sector

There were 372 cruise ship calls, which brought 1,286,004 cruise visitors to Saint Lucia in 2019. The vast majority of these ships dock at Port Castries, with few of the smaller, multi-mast vessels docking within the Soufriere and Rodney bays. Cruise ships practice some measure of waste segregation (plastics, aluminum and glass items are separated), some of which is collected by waste recyclers. The rest of the waste is transported by licensed waste haulers contracted by the ship's agent to the Deglos Landfill for final disposal.

The SLSWMA data indicates that it received 2655.7 t of ship-generated waste in 2019/20.

c) Yachts:

The ports for docking yachts are the IGY Rodney Bay Marina, Rodney Bay, Marigot Bay and Soufriere Bay. In 2019 there were 5,488 yacht calls that brought 66,596 visitors to Saint Lucia. This number was lower than the annual average of 10,709 calls, due to the impact of the Covid-19 pandemic.

The IGY Rodney Bay Marina receives the majority of yachts arriving in Saint Lucia (54% in 2019). The Marina provides waste bins, which are available at all times on the jetty, and into which co-mingled waste is deposited. The yachts that dock within Rodney Bay also use this facility. The bins are emptied daily and stored in a designated location into which the restaurants and other commercial enterprises operating within the marina dispose of their waste. The Marina has contracted a local waste management company - Greening the Caribbean (GtC)- to develop and implement a waste minimization system, which includes the labelling of the collection bins for segregated waste (paper/cardboard, e-waste; glass, metal, plastics and general waste). However, much of the waste is co-mingled, and GtC does some separation at its recycling facility before disposing of the remainder of the waste at the Deglos landfill.

Yachts at Marigot Bay dispose their co-mingled waste into commercial waste bins provided. The bins are emptied by licensed contractors and the waste taken to the Deglos landfill for final disposal. There is no segregation of this waste stream prior to disposal.

In Soufriere, the waste from yachts, which is co-mingled, is disposed of in bins provided and these are hauled away under the arrangements for municipal waste collection and disposal services for the town.

It is estimated that yachts generate between 40 kg and 160 kg of waste per vessel and when this is applied to the average number of calls, the estimated amount of waste from this sector in 2019 was 1,053 t.

d) Transboundary waste:

This category of waste includes plastic waste disposed at sea from anthropogenic activities such as shipping, operations of oil rigs, waste dumped at sea, lost fishing gear, waste discarded from pleasure crafts and waste that flows into the marine environment from leaked land-based sources that are transported by ocean currents and wind across jurisdictions and end up on the coasts of other countries. This waste source is difficult to estimate accurately and was not quantified by the PWFI Report.

4.4 Fisheries Sector:

Waste generated by the fisheries sector was based on samples collected, interviews with fishers, and estimates of gear lost or discarded. The PWFI Report estimates for waste generated by the fisheries sector was based on interviews with fishers and analysis of waste samples taken from the fish landing sites. This analysis did not include fishing gear lost during fishing operations and the PWFI Report relied on estimates generated by the Food and Agricultural Organisation. On the basis of these analyses, it is estimated that the fisheries sector generated 96 t of waste, of which 10.8 t was plastics.

The data from the analysis above is consolidated in Table 4 below for ease of reference.

4.5 Summary of Findings:

The data on total waste generated by sector is presented in Table 4 below

Table 4: Waste Generated by Sector (t)

Waste Generation (2019) (metric tonnes)								
	Domestic	Commercial	Tourism				Fisheries	Total
			Land based	Water based		Airlines		
				Criuse & Cargo	Yachts			
Waste Generated	29301	39411	5515	2191	1052	92	96	77658
Tourism Total			8850					

As can be seen from Table 4 above, the commercial and domestic sectors generated the majority (88%) of all waste in 2019, and the combined tourism subsectors generated 8,850 t or 11.4%. Waste from the fisheries sector is relatively small (0.12%).

5. State of Knowledge: Data Sources and Quantification of Plastic Waste and Marine Litter Generated, and Related Gaps, Constraints and Opportunities.

5.1 Landfill Quantification

The SLSWMA database of waste delivered to the landfill contains data on waste received under twenty sources and/or categories, making it a useful reference for waste generated and landfilled. In addition, the SLSWMA conducted two waste characterisation studies (2008 and 2018) which provide two reference points for the quantities of waste collected by category. Both studies segregated the waste into nine main categories, *viz*, Paper and paperboard, Glass, Metal, Plastic, Textiles, Organics, Construction and demolition, Special care waste, and Other wastes, and the resulting ratios can be applied to the total waste stream to estimate the quantity of each of these waste types generated. While this will yield useful estimates, more frequent studies will provide additional reference points, thereby increasing the accuracy of the estimates. However, the SLSWMA data does not capture waste that is burned, leaked into the environment, or otherwise disposed of, introducing a limitation to the level of confidence that may be attributed to those estimates in the context of assessments of waste, including plastic waste, that is leaked and may eventually make its way into the marine environment. This is the central challenge the country faces in determining the amount of plastic waste generated, landfilled or leaked, and the flows of the latter into waterways and the marine space.

5.2 Sectorial Analysis: Quantification, Leakage and Flows:

The quantification of waste generated, the plastic component of that waste and the leakages into the environment below are drawn from the PWFI Report referenced earlier. That analysis employed the Pacific Regional Infrastructure Facility Waste Audit Methodology[8], which is a robust methodology and

[8] Asia Pacific Waste Consultants (2021). Plastic Waste National Level Quantification and Sectoral Material Flow: Saint Lucia national Report. Gland, Switzerland. IUCN

assessment tool, developed to estimate national level waste generation, leakages and flows, and resulting marine pollution, making it a reliable resource to inform this assessment.

5.2.1 Domestic Sector:

Ninety-nine percent (99%) of households surveyed reported that they dispose of their waste through the municipal waste collection service, and 98% reported that they dispose of plastic waste co-mingled with other household waste. Whereas this will signal a low possibility for leakage from the domestic sector, the manner in which the waste is placed for collection could impact this conclusion, as some persons may not secure the waste in a manner to prevent leakage (see Figure 2). There are also cases where domestic waste is dumped into remote locations, resulting in direct leakage and eventual flow into the marine space (see Figure 3).

Figure 2: Waste placed for collection

The PWFI Report's estimation of waste generated from the domestic sector was based on the analysis of 209 waste samples and 243 interviews, the analysis of 1,075 samples of landfill waste and 17 waste samples from waste stockpiles. The subsequent analysis estimated that the average waste generated at the household level was 0.44 kg/person/day, and with an estimated population of 182,795 in 2019, total household waste is estimated to be 29,350 t/year (29,301 t according to the PWFI Report), of which 3,412 t, or 11.6%, is plastic and this is leaked at a rate of 3.1kg/person/year, or 569 t of waste per year

Figure 3: Waste illegally dumped at a remote location

5.2.2 Commercial Sector:

The estimation of waste generated and flows for this sector was based on the analysis of 39 waste samples and 37 interviews. As explained above, commercial operations are responsible for the disposal of their waste, which they do either through their own waste management arrangements or through the use of licensed waste haulers. The PWFI Study reported that 92% of commercial operators dispose of their plastic waste co-mingled with their general waste, indicating a potentially low rate of leakage from this sector. A small number of commercial operators reported burning their plastic and organic waste. Based on the samples examined and extrapolation of the results, it was estimated that the commercial sector generated 39,411 t of waste in 2019, of which 946 t is plastics, 155 t of which was leaked into the environment.

5.2.3 Tourism Sector:

For the purposes of this analysis, the tourism sector was divided into three sub-sectors: accommodation sector, water-based tourism and air-based tourism. Estimation of the waste generated by each subsector was based on audits of waste generated, and mainly through interviews with stakeholders. On the basis of the analysis conducted, it is calculated that during 2019 to 2020 the tourism sector as a whole

generated 8,849 t of waste, of which 704 t were plastics. It was also estimated that, overall, the tourism sector leaked 110 t of plastics into the environment in 2019.

5.2.3.1 Accommodation Subsector: Hotels and guest houses are responsible for disposing the waste they generate, which they do by employing the services of private waste haulers. Research concluded that all waste from the hotel and restaurant sectors are landfilled with no segregation or recycling[9]. Given that all waste from these subsectors is landfilled, there is little opportunity for leakage, assuming that all waste is placed in bins for disposal.

Travel restrictions imposed by the Covid-19 pandemic impacted on the operations of the accommodation sector and by extension, on waste generated. As such, samples were not collected for analysis and the estimate of waste generated relied on data from the SLSWMA and interviews with nine properties. The estimation also relied on similar research conducted in Spain and Vietnam, and on audits conducted in India, Antigua and Vietnam, and the results extrapolated to Saint Lucia based on parameters such as number of stay over visitors, length of stay, room nights and hotel occupancy rates. On the basis of these reviews and assessments, the PWFI Report estimated that the accommodation sector generated 5,515 t of waste, of which 276 t was plastics, and an estimated 14%, or 38.6 t was leaked into the environment. The SLSWMA reported an average of 5,441 t of waste from the accommodation sector over 2015 – 2019, which compares well with the PWFI Report. For the purposes of this analysis, the PWFI Report estimate of 5,515 t will be used.

5.2.3.2 Airlines: As noted above, waste generated by airlines are placed in bins provided by the SLASPA and is collected and disposed of at the landfill by licensed waste haulers. There is no segregation or recycling of this waste stream. The estimation of waste generated and flows for this subsector was based on audits of the records from SLASPA and the SLSWMA. No physical audits were conducted because this waste stream was considered potentially hazardous due to the Covid-19 pandemic. According to the PWFI Report, the airline sector generated 92 t of waste in 2019, of which 10.7 t was plastic. Given that airline waste is handled the same way as general waste, the default leak rate of 14% is applied to this stream, yielding a net leakage of 1.5 t of plastics. However, as noted above, all airline waste is taken from the airports directly to the landfill by licensed waste haulers, leaving little, if any opportunities for leakage. The estimate in the PWFI Report is therefore an overstatement and there is probably no leakage from this source.

5.2.3.3 Cruise and Cargo Ships: Cruise ships practice some waste segregation. Plastics, aluminium and glass items are separated and collected by recyclers, and all other waste, which is co-mingled, is hauled away to the landfill for final disposal. All waste generated is placed in bins provided by SLASPA, from which it is taken to the landfill by licensed waste haulers. Both cruise and cargo ships dispose of some waste at sea, and the PWFI Report estimated that of all plastic waste generated by the cruise sector, 95% is collected and 5% dumped at sea. Data to inform the PWFI Report was collected through interviews, and analysis of the records of SLASPA and the SLSWMA.

[9] The Travel Foundation. 2015. Overview and Hotspots Analysis of the Tourism Value Chain in Saint Lucia. UNEP, wrap, Saint Lucia Tourism Authority.

SLASPA's records indicate that cruise ships offloaded 2,191 t of waste in 2019/20 which is 221 t more than was received at the Landfill. The difference is very likely due to segregated waste given to recyclers and reusable material collected by ship chandlers and later sold for reuse. For the purposes of this assessment, the PWFI values are used to estimate waste flows. On this basis, total plastic waste generated, which is estimated at 12.5% of the total waste, was 126.2 t in 2019, of which 14%, or 38.3 t was leaked into the environment. However, given that some of the waste is retrieved for resale, and that the ships' agents arrange for the waste to be transported to the landfill, it is likely that the waste leak rate used in the PWFI analysis is overstated and the actual amount is lower.

5.2.3.4 Yachts: All yacht visitors reported placing their waste in bins provided by the marinas from which they are collected by waste haulers for disposal at the landfill. This waste is not segregated and is delivered for landfilling as co-mingled waste. The estimation of waste generated and flows were based on interviews with yacht visitors, marina operators and physical analysis of samples collected. The analysis concluded that the yachting subsector generated 1052 t of waste in 2019, of which, 12%, or 126.2 t was plastics. Of this amount, it is further estimated that 14%, or 17.7 t was leaked into the environment.

5.2.4 Fisheries Sector:

There are 927 fishing vessels and 3,364 fishers registered in Saint Lucia. Data on fishing gear and methods were collected for analysis to estimate the amount of waste generated by the fisheries sector, which comes from abandoned, lost or otherwise discarded fishing gear, as well as waste generated by the crew. The analysis was also informed by an examination of 9 waste samples collected and 15 interviews. Based on the data gathered and the analysis, the PWFI Report estimated that, in 2019, the fisheries sector generated 96 t of waste, of which 10.8 t was plastic. Leakage of plastics is estimated at 1.86 kg/boat/year, which translates to 1.7 t per year. The PWFI Report also estimated that the fisheries sector sheds 0.9 t of microplastics per year.

5.3 Summary:

The data from the sector analyses above are consolidated in Table 5 below for ease of reference:

Table 5: Waste Generation, Plastic Waste and Leakages by Sector

	Domestic	Commercial	Tourism				Fisheries	Totals
			Land-based	Water based		Airlines		
				Cruise	Yachts			
Waste Generated (t)	**29301**	**39411**	**5515**	**2191**	**1052**	**92**	**96**	**77658**
Percentage plastic	11.6%	2.4%	5%	12.5%	12%	11.6%	12%	
Plastic Waste (t)	**3412.0**	**945.9**	**275.8**	**273.9**	**126.2**	**10.7**	**11**	**5055.5**
Plastic Leak Rate	3.1kg/ person/ year	16.4%	14%	14%	14%	14%	0.2 kg/ boat/ day	
Plastic Leaked (t)	**569**	**155**	**38.6**	**38.3**	**17.7**	**1.5**	**12.6**	**832.7**

An examination of the data from the domestic and commercial sectors, which together account for 88% of the waste generated, reveals that while the commercial sector generated 50.7% of total waste, it contributed 18.7% of the total plastic waste and 18% of total plastics leaked into the environment. ON the other hand, the domestic sector generated 37.7% of total waste, but contributed 67.5% of total plastic waste and 68.3% of all plastics leaked into the environment. This suggests that special attention needs to be paid to the domestic sector in any waste management strategy.

The PWFI Report also estimated the waste generated by waste type for the domestic and commercial sectors, and this data are presented in Table 6 below.

Table 6: Percentage of Waste Generated by Waste Type

Waste Type	Household Sector	Commercial Sector
Plastics	11.60	2.40
Rubber	0.00	3.00
E-waste	0.02	0.00
Hygiene	3.10	0.03
Textiles	3.50	0.03
Paper and Cardboard	11.40	16.10
Organics	51.50	38.50
Wood	1.10	8.40
Glass	4.60	1.00
Metals	9.90	9.90
White Goods	0.00	0.00
Construction	3.00	18.70
End-of-life Vehicles		0.60
Hazardous	0.20	0.50
Ash		
Other		
Total	**99.92**	**99.15**

5.4 Plastic Imports

The PWFI Report also estimated the plastics imported, disposed and recycled. This estimate was informed by CED data for imported plastics, food and drink items and manufactured items. Total waste disposal was estimated based on the SLSWMA weighbridge data and the composition of waste streams based on audits of household, commercial and tourism-based wastes. The analysis acknowledged estimation errors resulting from sampling errors, conversion errors, year-to-year variations in total quantities imported and disposed of, and different categorization of plastics in the import and waste streams. Within the context of the errors, the model used estimated the overall plastic leakage rate to be 14% at a 95% confidence interval, and yielded the estimates for plastics imported, disposed of, recycled and leaked by polymer type in Table 7 below.

Table 7: Plastic Imports, Disposal, Recycled and Leaked by Polymer Type

Polymer	Annual imports (2018/19 (t/y)	Total Waste disposal rate 2019 (t/y)	Total recycled rate 2019 (t/y)	Total Leaked
PET (1)	1505.92	1437.39	14.07	54.46
HDPE (2)	584.85	540.66	3.93	40.26
PVC (3)	514.52	426.86	0	87.66
LDPE (4)	86.58	50.59	0	35.99
PP (5)	372.55	367.73	0	4.82
PS (6)	397.31	356.17	0	41.14
Other (7)	2157.43	1891.18	0	266.25
Total	**5619.17**	**5070.58**	**18**	**530.59**

The amount of each polymer type in Table 7 is based on default values for the percentage of plastics contained in each of the products imported. These values are best estimates which may need refinement to be more reflective of national imports.

5.5 Marine Litter:

The Regional Action Plan on Marine Litter Management (RAPMaLi)[10] defines marine litter as a global problem due to the multiple access and egress points, including direct dumping on the coast, litter dumped at sea which can eventually be deposited on the coast, land-based mismanagement caused by the indiscriminate disposal of waste upriver, and wind and storm-driven litter which ends up in the ocean. That report goes on to state that once in the ocean, this litter can be transported thousands of miles by ocean currents, travelling along waterways, through gyres and eddies, and eventually either sink to the ocean floor or be deposited onto a near or distant shore. According to a 2019 article by UNEP[11], seventy five percent of marine litter in the Caribbean Sea comes from land-based sources, and most of it consists of plastics. Further, in the Ocean Conservancy's 2007 International Coastal Cleanup (ICC)[12], 378,000 volunteers cleaned 33,000 miles of shoreline worldwide and removed 2.7 million kg of debris in one day. The collected debris was tabulated as follows:

- 57 percent of the debris was related to shoreline recreational activities;
- 33 percent from smoking-related activities;
- 6.3 percent from fishing or waterway activities;
- 2 percent from dumping; and
- less than 1 percent from medical and personal hygiene activities

[10] Chris Corbin et al. 2014. Regional Action Plan for Marine Litter Management for the Wider Caribbean. UNEP, Caribbean Environment Programme.
[11] UNEP. 2019. The Caribbean addresses the scourge of plastic pollution
[12] The Ocean Conservancy Clean up Reports (2007) (https://oceanconservancy.org/trash-free-seas/international-coastal-cleanup/annual-data-release/)

Whereas it may be reasonable to apply these percentages to characterize marine litter in Saint Lucia, some refinement should be pursued based on the analysis of marine litter collected from well-structured national coastal clean-up campaigns.

No reliable database of marine litter could be accessed to quantify the amount of plastic litter in Saint Lucia's coastal region, but a 2019 World Bank Report [13] found that the concentration of plastic litter in marine and coastal environments in the Caribbean region (including Saint Lucia) is disproportionally high, with an average of 2,014 items of litter per kilometre (km) when compared to a global average of 573 items per km of beach. The most common waste was single-use plastic bottles, comprising 21% of the items recorded. Another study conducted under the Prevention of Marine Litter in the Caribbean Sea (POMAR)[14] project reported that as many as 20,000 pieces of micro-plastic have been detected per square km of the ocean in the north-eastern Caribbean. While these data points do not define the scale of the marine litter problem along Saint Lucia's coastline and marine environment, they signal the gravity of the problem in the region as a whole.

Various organisations, including the SLSWMA, the Divers Association and civil society groups, have conducted coastal and marine clean-up campaigns, but these are intermittent and the waste collected is not analysed to yield data that can be used to estimate quantities generated at the national level.

5.6 Gaps, Constraints and Opportunities:

As noted in the sectorial analysis above, the amount of waste generated, the amount that comprises plastics and the leak rates were based on estimates derived from actual segregation and quantification of some waste samples, interviews with stakeholders, and default values derived from other studies. As such, the reported quantities, as presented in Table 5 above, are best estimates which will serve the purpose of this NSI. However, in developing future NSIs, resources should be invested in improving the quality of the input data, which would result in improved estimates of waste generated, plastic waste, and leak rates. To this end, the following constraints and opportunities should be explored in designing the research to develop future inventories.

5.6.1 Total Waste Generated:

Gaps: The reports reviewed to inform this inventory do not have consistent quantification of total waste generated or the components of the waste streams. This implies that the data sources used to inform the analyses are not consistent, leading to the variations mentioned. Data on goods imported that will eventually be discarded are available from the ASYCUDA database, but except for single-use items, the timing and manner of their entry into the waste stream is difficult to determine. Then, there are the

[13] Diez et al. 2019. World Bank Group, UN Environment, Organisation of Eastern Caribbean States, Centre for Environment, Fisheries and Aquaculture Science (Cefas): Marine Pollution in the Caribbean: Not a minute to Waste.

[14] https://promar.org/en/home#:~:text=Prevention%20of%20Marine%20Litter%20in%20the%20Caribbean%20Sea%20(PROMAR)&text=PROMAR%20is%20contributing%20to%20the,Republic%2C%20Costa%20Rica%20%26%20Colombia

waste streams from construction, agriculture, manufacturing, institutional entities and other economic activities that are not quantified at source, some of which are landfilled, but an unknown quantity is either burned or leaked into the environment. There are also a few recovery and recycling operations targeting some waste streams such as plastics, metals and paper products, but recyclers are reluctant to provide data on the quantities they process. The SLSWMA keeps accurate records of waste received at the landfill but this does not capture the amount that is burned or buried at source or leaked into the environment. Further, waste is discharged into Saint Lucia by vessels and aircrafts for final disposal. This waste is treated in the same manner as municipal waste and as such, the rates of landfilling and leakage determined for other waste streams could reasonably be applied to these streams.

Constraints: The above analysis suggests that accurate quantification of waste generated in Saint Lucia is difficult, perhaps impossible. Further, the cost of pursuing accurate quantification would be prohibitive and not reflective of the value of such quantification in informing waste management policies and programmes. As such, accurate quantification of total waste generated may not be necessary from both the cost and utility perspectives. Rather, best estimates that cover the main sources and employ consistent methodologies over time can yield trends in waste generation, leakages and flows to help policy makers and waste management practitioners to improve waste management policies and practices.

Another constraint is the absence of a central database of data and/or information on waste management. This should be corrected to enable research on the subject and to ensure consistency in the data used to inform waste management policies and programmes.

Opportunities: The SLSWMA keeps reliable records of waste landfilled by source. It also conducts periodic waste categorization assessments which can help produce data on waste categories delivered to the landfill. These data sources will help with the quantification of waste generated and inform efforts to quantify waste stream categories. However, as noted earlier, a wider set of quantification ratios of the different waste streams will be needed to improve on the reliability these estimates.

The reluctance of recyclers to provide data could be addressed by policy or regulations requiring that the data be reported. In addition, the CED data for any recovered waste that is exported is an additional source of information on the amount of waste removed from the waste stream.

By its very nature, leaked waste is difficult to measure accurately and must be estimated by proxy based on international trends, models and local research. Whereas quantification of leakage may never be precise, systematic data collection and analysis over time will produce estimates and trends that reduce the errors, thereby providing improved waste generation, leakage and flow rates. To this end carefully-designed and managed clean-up campaigns should be executed and the waste collected should be segregated and analysed to provide estimates of the amounts leaked by waste category. This data can be analysed to generate trends which can inform targeted policies and programs to reduce leakages and flows.

Access to quality time series data is key to informing the design of programmes to reduce waste generation, increase the rate of waste recovery, recycling and reuse, and reduce leakages. One

mechanism to achieve this is to create a central database of waste data and information which should be maintained by a single "gate keeper" entity, which could be either the SLSWMA or the National Environmental Information System maintained by the Department of Sustainable Development. The mechanisms for data generation, capture, entry, storage and analysis are to be worked out, but should be pursued, beginning with retrieval of existing data and the systematic generation, capture and storage of future data and information.

5.6.2 Plastic Pollution:

Gaps: There is a cluster of data gaps related to plastic pollution. Firstly, accurate data on the amount of plastics imported into the country which will eventually enter the waste stream, whether landfilled, recycled or leaked, is difficult to establish. In preparing the PWFI Report, the consultants retrieved and assessed the CED records for 586 items made of, or incorporating plastics that were imported into the country to determine the amount imported by polymer type. The relevant chapters of the related HS Codes for the items researched are included in Table 2 above, and the analysis includes a breakdown of the products by application, type and percentage plastics. The analysis employed default values for polymer types that are not universally accepted and to this extent, the results are best estimates only. However, the resulting quantities are sufficiently robust to be used as the starting point for total plastics imported into the country.

Constraints: Quantification of the plastic waste generated is not known with sufficient accuracy. The two waste characterization studies conducted by the SLSWMA provide two point assessments of the percentage plastics in the total waste landfilled. The SLSWMA's 2008 Waste Characterisation Study[15] estimated the percentage of plastics in waste landfilled to be 26% and the 2018 Study[16], which focused on the Gros Islet and Anse-la-Raye/Canaries Waste Collection Zones only, reported that 20% of all waste generated was plastics. These percentages may be applied to estimate total plastic waste generated and as such, the errors inherent in those assessments will be transferred to the estimation of plastics landfilled. On the other hand, the PWFI Report estimated annual imports of plastics, disaggregated by polymer type to be 5,619.2 t, of which 90.2%, or 5,070.6 t, was landfilled, 18 t was recovered and recycled and 530.6 t leaked into the environment. These variations highlight the challenges faced in determining the amount of plastic waste generated, landfilled and leaked.

Opportunities: While precision may not be achievable, research should be conducted to develop and continuously refine estimates of plastic waste generated, landfilled, recycled or leaked into the environment. Approaches could include more frequent waste characterization studies by the SLSWMA, structured cleanup campaigns that generate waste characterization reports, and promoting the application of citizen science across the country to generate quality data that can be used to develop and refine the estimates. This approach can be supplemented through literature research of similar studies conducted in comparable economies and countries to establish comparisons in determining the estimates. These activities should be conducted with pre-determined frequency to establish a time series of values and trends that will, in turn, provide refinement of the estimates, establish trends in the

[15] Saint Lucia Solid Waste Management Authority. Waste Characterisation Study. 2008

[16] Saint Lucia Solid Waste Management Authority. Waste Characterisation Study, Gros-Islet & Anse la Raye/Canaries Waste Collection Zones. 2018

generation and management of plastic waste and inform the development of further policy measures, as may be necessary, to effectively managing plastic pollution.

5.6.3 Recovery and Recycling:

Gaps: While the Saint Lucia Solid Waste Management Act charges the SLSWMA to, *inter alia*, recycle waste, this activity has not entered the mainstream of the Authority's activities except for advocating for incentives to encourage waste recycling. According to the SLSWMA, there are eighteen companies that recycle a range of waste streams, including metals, plastics, paper/cardboard, glass, E-waste, used lead-acid batteries, tyres, wood and used oil. Of these, nine are listed as recycling plastics. However, interviews with recyclers indicated that there are only two who export recovered plastics, which they receive from collection activities conducted under the RePlast project and from Jua Kali, a local company that collaborates with the local private sector to recover and recycle plastics. Both activities offer incentives to persons who turn in their plastic waste for recycling. The recycling operations are not well regulated and there is a reluctance to provide data on the amount of plastics recovered and exported.

Constraints: Except for the plastics collected under the RePlast project and by Jua Kali, plastics are co-mingled with other waste and recyclers reported that the cost of separation and the low resale value of this waste stream make the activity uneconomical. This is a serious limiting factor to any effort to remove plastics from the waste stream through recovery and recycling operations. This also reduces opportunities to generate data that can improve estimates of plastic waste generated and leaked into the environment.

Opportunities: Recycling plastic waste will reduce pressure on the landfill and remove the recycled material from the waste stream, thereby eliminating the possibility of leakage of the recycled material. This activity should be encouraged and regulated to ensure adherence to best practices, including the health and safety of workers, the use of appropriate technology to improve efficiency, facilitation of export activities and the collection of data on the amounts recycled/exported. The economic viability of recycling plastics requires segregation prior to collection by the recyclers. This will also require both official interventions to encourage waste segregation at source and continuation and expansion of initiatives such as the RePlast project or the introduction of a deposit refund system. In considering the design of such programmes, the opportunity to cover other waste streams should be embraced and cost recovery factored into the design. This could result in a national recycling programme that will monetise waste streams, support the circular economy, create additional employment opportunities and reduce waste landfilled or leaked. It will also serve as a data source to inform policies and programmes to improve waste management at the national level.

6. Next Steps

National Source Inventories on Plastic Pollution provide data on the sources of plastic pollution and serve as the basis on which policies, programmes and action plans can be developed to manage these waste streams and reduce their impacts. Developing this NSI-PP relied heavily on the PWFI Report, independent research, and consultations. It is, however, subject to a number of constraints discussed earlier in this inventory, which must be addressed if future inventories are to help improve waste management services. In this regard, the following, which have been discussed earlier in this Inventory, are listed for future consideration:

a) The data and analysis in this inventory cover the domestic, commercial, tourism and fisheries sectors. Other sectors and areas of activities such as construction, agriculture, manufacturing, mass crowd events, sports, education and institutional operations also generate waste, including plastics. These should be assessed to determine which ones should be included in future inventories based on the volumes of waste generated.

b) Table 2 contains the majority of the goods that are either made of, or incorporate plastics in their construction, that are imported into the country. This NSI did not consider all these goods and it may not be necessary to do so. However, future inventories should explore the feasibility of including other goods that contribute significant amounts of plastics that eventually leak into the environment.

c) One way to improve quantification of the different waste streams is to undertake waste segregation at source and to collect, store and analyse the data generated. While this may not be feasible, at least in the short to medium term, it should be practiced when it becomes possible. In the meantime, waste segregation studies and analysis of the waste collected during cleanup activities should be undertaken to generate data on leak and flow rates. This will, in turn, help to improve the accuracy of estimates in future inventories;

d) Quantification of marine litter is rather difficult because it originates from domestic and external land-based sources, as well as from activities at sea. The best option available to quantify marine litter is to conduct periodic coastal and seabed cleanups and to analyse the waste collected to generate data on waste types and quantities. This data can then be used to generate estimates of flow rates into the local marine environment.

e) Accurate quantification of total waste generated, the amount of each waste type in the waste stream, the amount leaked into the environment and the amount that flows into the marine environment, may not be possible, and would be an expensive undertaking. Whereas steps could, and indeed should be undertaken to improve the accuracy of these estimates, precise quantification is not necessary to inform evidence-based waste management policies and programmes. Instead, it would be more cost effective to conduct periodic inventories to generate best quantification estimates, and this data be used to develop related trends. Over time, these time series data will generate science-based information to inform the development of waste management policies and programmes.

f) The recommendations above and the ML-MAP that accompanies this NSI include recommendations for data collection. These should be pursued as over time they will improve both the range and accuracy of the data available to inform policy and actions to improve waste management.

g) A central database of data and other information on all aspects of waste generation and management should be established to provide a single, comprehensive source of data and information that can be used to inform future inventories as well as to guide the development of science-based policies and programmes, and support national reporting obligations under regional and international conventions and agreements.

h) In pursuing options to improve data collection and estimates of waste generated, its leakage and flows into the marine environment, due consideration should be given to the resources developed by the United Nations System and its partners, as well as by Governments and other stakeholders that provide methodologies, guidance and best practices that may be adopted. The list below is certainly not exhaustive, however it is a starting point for accessing such resources:

- UNEP, 2021 – Understanding the State of the Ocean: A Global Manual on Measuring SDG 14.1.1, SDG 14.2.1 and SDG 14.5.1: (https://wedocs.unep.org/handle/20.500.11822/35086).
- GESAMP, 2019. Guidelines for the monitoring and assessment of plastic litter and microplastics in the ocean. (https://wedocs.unep.org/bitstream/handle/20.500.11822/30009/plasLit.pdf?sequence=1&isAllowed=y)
- GPML- Global Model for Monitoring Marine Litter. (https://internationalwasteplatform.org/gpml-a-global-platform-for-monitoring-marine-litter-and-informing-action/)
- UNECE, 2021. Draft Waste Statistics Framework. (https://unece.org/sites/default/files/2021-03/04_WasteStatistics_forConsultation.pdf)
- Florida State University, Global Model for Monitoring Marine Litter. (https://www.coaps.fsu.edu/our-expertise/global-model-for-marine-litter)
- Australian Plastics Flows and Fates Study 2019-20 National Report. (https://www.agriculture.gov.au/sites/default/files/documents/apff-national-report_0.pdf).
- IUCN, 2020. The Marine Plastic Footprint. (https://www.iucn.org/resources/publication/marine-plastic-footprint)

For more information, contact

The Department of Sustainable Development

Tel: 486-5863 / 486-5833

Email: sdestlucia@gmail.com

The Saint Lucia Solid Waste Management Authority

Tel: 453-2208

Email: admin@sluswma.org

Working towards a Debris-Free Ocean