

INTER-AMERICAN DEVELOPMENT BANK

# UPDATE OF THE CARIBBEAN WASTE MANAGEMENT ACTION PLAN (CWMAP)

## CARIBBEAN WASTE MANAGEMENT ACTION PLAN: PRIORITIES AND PLANS



**INTER-AMERICAN DEVELOPMENT BANK**

# **Caribbean Waste Management Action Plan (CWMAP)**

**FINAL REPORT  
Priorities and Plans**

*Submitted by*

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## List of Acronyms

<b>ACP</b>	Africa, Caribbean, Pacific
<b>ADF</b>	Advanced Disposal Fees
<b>BCRC</b>	Basel Convention Regional Center
<b>BMU</b>	Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety
<b>BSWaMA</b>	Belize Solid Waste Management Authority
<b>CARICOM</b>	Caribbean Community
<b>CARPHA</b>	Caribbean Public Health Agency
<b>CAWASA</b>	Caribbean Wastewater and Sewage Association
<b>CBOs</b>	Community Based Organisations
<b>CCCCC</b>	Caribbean Community Climate Change Center
<b>CEP</b>	Caribbean Environment Programme
<b>COTED</b>	Council on Trade and Development
<b>CSME</b>	Caribbean Single Market and Economy
<b>CWM</b>	Caribbean Waste Managers
<b>CWMAP</b>	Caribbean Waste Management Action Plan
<b>CWWA</b>	Caribbean Water and Wastewater Association
<b>CYEN</b>	Caribbean Youth Environment Network
<b>DCNA</b>	Dutch Caribbean Nature Alliance
<b>DRS</b>	Deposit Return System
<b>ECROP</b>	Eastern Caribbean Regional Ocean Policy
<b>EDF-SEI</b>	Electricité de France (EDF) in the Island Energy Systems (SEI)
<b>EPA</b>	European Partnership Agreement
<b>EPR</b>	Extended Producer Responsibility
<b>EPR</b>	Extended Producer Responsibility
<b>FAO</b>	Food and Agriculture Organisation
<b>GCFI</b>	Gulf and Caribbean Fisheries Institute
<b>GEF</b>	Global Environment Facility
<b>GPML</b>	Global Programme for Marine Litter
<b>HDPE</b>	High Density Polyethylene
<b>HLF</b>	High-Level Forum
<b>IADB</b>	Inter-American Development Bank
<b>IAST</b>	Institute of Applied Science and Technology
<b>IMO</b>	International Maritime Organization
<b>ISDND</b>	
<b>ISWA</b>	International Solid Waste Association
<b>JICA</b>	Japan International Cooperation Agency
<b>LBS</b>	Land-Based Sources
<b>MARPOL</b>	International Convention for the Prevention of Pollution from Ships
<b>MEAs</b>	Multilateral Environmental Agreements
<b>MIS</b>	Management Information System
<b>NCVQ</b>	National Certified Vocational Quality
<b>NGOS</b>	Non-Governmental Organisations
<b>NORAD</b>	Norwegian Agency for Development Cooperation
<b>OACPS</b>	Organization of African, Caribbean and Pacific States
<b>OECD</b>	The Organisation for Economic Cooperation and Development

<b>OECS</b>	Organisation of Eastern Caribbean States
<b>OSPAR</b>	Oslo-Paris Commission. Secretariat for the Convention for the Protection of the Marine Environment of the North-East Atlantic
<b>PAHO</b>	Pan American Health Organisation
<b>PAYT</b>	pay-as-you-throw
<b>PCB</b>	Polychlorinated biphenyl
<b>PET</b>	Polyethylene Terephthalate
<b>POP</b>	Persistent Organic Pollutants
<b>POPs</b>	Persistent Organic Pollutants
<b>PPG</b>	Project Preparation Grant
<b>PPPs</b>	Public Private Partnerships
<b>PSA</b>	Public Service Announcement
<b>PWFI</b>	Plastic Waste Free Islands
<b>RAPMaLi</b>	Regional Action Plan for Marine Litter
<b>RBT</b>	Revised Treaty of Basseterre
<b>RSAP</b>	Regional Strategic Action Plan
<b>SBRC</b>	Sustainable Barbados Recycling Centre
<b>SDG</b>	Sustainable Development Goals
<b>SIDS</b>	Small Island Developing States
<b>SLSWMA</b>	Saint Lucia Solid Waste Management Authority
<b>SPAW</b>	Specially Protected Areas and Wildlife in the Wider Caribbean Region
<b>SWM</b>	Solid Waste Management
<b>SWMC</b>	Solid Waste Management Cooperation
<b>UBEEC</b>	Unleashing the Blue Economy of the Eastern Caribbean Project
<b>UN</b>	United Nations
<b>UNCLOS</b>	United Nations Convention on the Law of the Sea
<b>UNEP</b>	United Nations Environment Programme
<b>UPOP</b>	Unintentional Persistent Organic Pollutants
<b>WCR</b>	Wider Caribbean Region
<b>WTE</b>	Waste to Energy
<b>WWF-NL</b>	World Wildlife Fund- Netherlands







# EXECUTIVE SUMMARY

## ES1. Background

The Wider Caribbean Region (WCR) consists of the insular and coastal states and overseas territories with coastlines on the Caribbean Sea and Gulf of Mexico as well as the adjacent waters of the Atlantic Ocean (UNEP CEP 2020). The WCR is experiencing an increase in the amount and complexity of waste generated, like most other countries of the world, due not only to common factors such as increasing population, urbanisation, and change of consumption patterns. There are also large quantities of imported material and packaging, and the excess amount of waste produced by tourism, including cruise-ship generated wastes which exacerbate the issue. It is estimated that in Latin America and the WCR, approximately 145,000 tons of waste are disposed of in open dumpsites daily, which includes around 17,000 tons of plastic waste (UNEP, 2018c).

Many Caribbean nations have underdeveloped waste management systems and often struggle with the proper management and disposal of waste. This lack of proper management of waste can be attributed to several factors such as limited availability of space for waste disposal facilities, lack of properly designed facilities for receiving waste, improper disposal behaviour by generators of waste, limited development of recycling, reuse or other waste as a resource/circular economy approaches and a lack of financing to improve existing waste management systems. Proper waste management is of critical importance to Caribbean countries since the improper disposal of waste has negative impacts on the environment. Environmental degradation resulting from pollution can have far-reaching impacts on the economies of Caribbean nations, which are often heavily dependent on sectors such as agriculture, fishing and tourism. To minimize these impacts and safeguard these vulnerable economies, there is an urgent need to address and improve the waste management situation at a national and regional level.

With the convening of the 1st High-Level Forum of the Caribbean Ministers Responsible for Waste Management in Georgetown, Guyana, in October 2017, the Caribbean Water and Wastewater Association (CWWA) has sought to draw attention to the challenges faced by the countries and present to these Ministers, options for addressing those challenges. Some of the main challenges, contained in the first Caribbean Waste Action Plan (CWMAP), were identified as follows:

-  lack of financing to put in place the needed institutions, policy, legislation, regulations and infrastructure to ensure compliance
-  long-term cost-effectiveness and need for effective cost recovery options
-  lack of skilled personnel to plan, implement and oversee the necessary actions
-  lack of political will to ensure the necessary actions are taken
-  lack of social acceptance of and awareness about improper behaviour (littering)
-  monitoring, data management and measures to reduce marine litter

Following that meeting the CWMAP has been revised, on two occasions, to include the comments and recommendations received during the First and subsequent HLF meetings and from other key stakeholders, including government representatives, community leaders, residents, recyclers, waste management companies, energy companies, consultants, NGOs, academia, and international organizations. However, the primary purpose of the Document is to serve as an essential reference






point when identifying priority actions for the region and designing and implementing them. This Action Plan now forms an important regional framework for identifying priority needs and developing and implementing programmes, projects, and activities to respond to these needs at national, sub-regional and regional levels.

Taking into consideration the comments received from subsequent meetings of the HLF Ministers meeting, as well as issues raised at other regional fora, particularly HLF-4, convened in 2020, the Inter-American Development Bank (IDB), together with the CWWA, has agreed to undertake an update of the CWMAP. The Implementation Monitoring Committee, comprising members from the CWWA, IDB, Caribbean Development Bank (CDB) and UN Environment Program, has determined that the CWMAP needs to be revised and updated, focusing on “Key Issues” and “Potential Action Items”. To aid in updating the CWMAP, the IDB engaged the services of a consultant to, inter-alia, liaise with the countries of the region to identify both regional and country-specific waste management strategies and systems that are environmentally and financially sustainable; and, most importantly, supported by civil society, which can be considered for funding. In addition, the update was also expected to provide a snapshot of ongoing, and pipeline regional projects and activities related to waste management, as well as provide examples of best practices and initiatives that can be replicated and/or upscaled.

The Consultancy is funded by the IDB through the Regional Technical Cooperation facility - RG-T3722 - Promotion of the Sustainable Financial and Operational Recovery post COVID-19 of Providers of Water and Sanitation and Solid Waste Management Services and the Creation of Employment in Latin America and Caribbean (LAC). The objective of the Technical Cooperation is to incentivize the sustainable recovery of providers of water and sanitation and solid waste management services through the design of interventions and the development of tools that will improve the operational and financial management of the provision of these services, optimization of infrastructure, strengthening of the governance of the sector and promotion of employment with a focus on innovation, equity and resilience in response to the crisis caused by the COVID-19 Pandemic.

## **ES2. Goals and Objectives of the CWMAP**

The goal of the updated CWMAP is to define both regional and country-specific waste management strategies and systems that are environmentally, socially and financially sustainable; and, most importantly, supported by civil society. The CWMAP is also intended to promote the development of programmes and projects that optimise the use of waste as a resource thus diverting waste from landfills and thereby extending the life of existing landfills. The specific objectives of the SWM Action Plan were to:

-  Comprehensively review, identify and map recently completed, existing and proposed regional waste management programmes, projects, and activities on waste management to identify gaps in implementing the current CWMAP.
-  Review and update proposed targets and indicators for the current CWMAP.
-  Prioritise areas where the Private Sector can be engaged.

## **ES3. Findings**

The updating of the CWMAP took note of the recently completed and ongoing project, identified new targets and also identified projects which countries can initiate, either individually or in partnership with other countries. The review also took note of the successes, or the challenges faced by countries in moving forward with plans outlined in the 2018 CWMAP. These are detailed in Table 8 and Annex



I & II. Several reasons have been advanced on previous occasions for the chronic implementation deficit there is little doubt, however, that the following account for much of the limited success. These are as follows:

 ***Lack of appropriate financing mechanisms for activities:***

Whilst the document presented specific activities to be undertaken to achieve the objectives identified, it did not specify any financing mechanisms to be able to undertake these activities. As such, the onus was left to individual waste management authorities to pursue their own financing mechanisms, and to donor organizations to individually arrange with these authorities for the undertaking of specific projects.

 ***No clearly defined implementation mechanism:***

For the successful implementation of regional and sub-regional projects, an appropriate implementation mechanism is required that will seek funding, engage waste management authorities, develop contract documents, hire consultants and/or contractors, and measure and monitor progress. Such a mechanism was not specified in the original document.

 ***Challenges of Covid-19:***

The Covid-19 pandemic has impacted all waste management authorities shifting attention away from other developmental activities. The restrictions created due to this pandemic slowed down many project implementation activities, resulting in delays in the completion of infrastructural upgrades in many countries. Additionally, in some countries that depended on tourism as a means of waste management financing, the reduction in tourist numbers due to the pandemic resulted in reduced revenues and cancellation of intended projects.

 ***Political will:***

Though government support has been tremendous in several instances, there is also recognition that much more could be done. It is not uncommon to find adequate policies, laws, and regulations in some countries that are not adopted or in draft form for several years. In the Caribbean, with small populations, economies of scale and effort is best achieved if there is a harmonised or cooperative effort. Among the issues best addressed at a regional level are harmonised data collection and management, standard fees regarding taxes and visitor levy, and initiatives at ensuring that manufacturers and others involved in the retail sector do much more to reduce the amount of packaging material that comes into the islands and take greater responsibility for their final disposal.

 ***Absence of ownership or lack of a Champions***

The donor community, along with several regional agencies have provided tremendous financial and technical support for addressing waste management and marine litter. However, sustaining those initiatives, particularly at the national level, requires Champions. For example, in 2019, Antigua and Barbuda led the effort in placing bans on the use of plastic shopping bags, single-use plastics and Styrofoam. Later that year, they led the charge in getting the CARICOM Member States to adopt the St. John's Declaration that commits the Member States that have not yet done so to introduce measures to reduce and/or eliminate the use of single-use plastics. Thus, champions are needed to move the respective priority activities in the CWMAP forward.

## 1.0 Introduction

To address the increase in the generation of waste and the concerns regarding the region's inability to adequately address marine pollution and challenges to the existing waste management infrastructure, the Caribbean Waste Management Action Plan (CWMAP) was developed by the UN Environment Programme (UNEP) with funding from the Government of the Kingdom of the Netherlands in 2018. The document was prepared after extensive stakeholder consultations and has sought to provide a roadmap which the Countries of the Caribbean can use to develop strategies for management of waste at the national levels. The development process of the 2018 CWMAP also involved an assessment of both international and regional conventions, policies and protocols that govern waste in the Caribbean. Of particular relevance was the work of the UNEP Cartagena Convention Secretariat and its Land-Based Sources of Marine Pollution Protocol, where Solid Waste, Plastics and Marine Litter have been identified as high priority pollutants for attention.





The SWM Action Plan also reflected extensive dialogue with critical stakeholders at conferences and workshops over the last several years, which provided a forum to:

- Ascertain their perspective on the strengths and weaknesses of existing waste management systems;
- Identify best practices for managing waste within the region; and,
- Formulate the goals and objectives of a SWM Action Plan.

These dialogues took place over several regional and national conferences and sought to document the international and regional conventions, policies and protocols that govern waste in the Caribbean, and the programmes and projects that have been initiated, both at the regional and national levels to address associated environmental pollution which results from poorly managed waste. However, it was determined by the RSAP/CWMAP Implementation Monitoring Committee comprising members from the CWMA, IDB, CDB and UNEP that the CWMAP needs to be revised and updated with particular focus on “Key Issues” and “Potential Action Items”.

### 1.1 Objectives

The specific objectives of the SWM Action Plan were to:

-  Comprehensively review, identify and map recently completed, existing and proposed regional waste management programmes, projects, and activities on waste management to identify gaps in implementing the current CWMAP.
-  Review and update proposed targets and indicators for the current CWMAP (assess whether they are still relevant, realistic, and appropriate and support relevant regional and global commitments relating to solid waste, marine litter, and plastics management).
-  Estimate the costs and identify potential donors/financing mechanisms for implementation of the plan, including potential for public/private sector partnerships.
-  Prioritise areas where the Private Sector can be engaged.

### 1.2 Methodology

The methodological approach envisaged was primarily a desk-based literature review of regional waste management programmes, projects, and activities. It was also envisaged that this review, together with a qualitative assessment, based on a detailed questionnaire to a select number of Waste

Management Authorities in the region, would have provided sufficient insight into the key issues of concern, and the priority targets would inform the updated CWMAP. Unfortunately, due to the poor response to the questionnaires, an alternative data gathering method was necessary. Nevertheless, in the last three years, four major solid waste management initiatives and studies<sup>1</sup> involving several countries of the region and covering a range of topics including policies, legislation, operations and infrastructural challenges provided a wealth of information on the current state of waste management. More significantly, these studies covered traditional municipal waste topics and delved into new issues associated with plastic pollution, including challenges of waste recycling and sustainable financing. Thus, notwithstanding the need to pivot from the original plans, the richness of the information obtained from those studies reviewed enabled the consultant to obtain reasonably accurate information on the issues that continue to plague the countries and the projects or initiatives that should be given priority.

### **1.3 Historical Context**

Since 2016 when it was first decided to include waste management as a topic of discussions at CWWA Annual General Meetings, they have continuously sought to provide a forum where the relevant issues could be discussed and shared via informed sessions and papers presented by waste experts from the region and the wider world. These engagements served as the foundation to structuring a pathway to improve waste management that could realistically be implemented in the region. Recent conferences and workshops are summarized below:

#### **Jamaica 2014**

In 2014, the Planning Institute of Jamaica and the National Solid Waste Management Authority, with support from the Inter-American Development Bank (IADB), organized a conference that allowed nine Caribbean countries to share their experiences on SWM and the SWM issues faced by the Caribbean region. This conference focused on:

- Examining approaches to SWM relevant to the changing dynamics of economic, social and environmental issues in the region.
- Providing guidance to stakeholders on the best practices in SWM suited for developing countries in the Caribbean, including management of special waste streams such as hazardous waste, medical waste, and e-waste.
- Establishing networks to facilitate dialogue among countries in the region and for sharing information and experiences.
- Examining the business potential of the sector, including waste-to-energy (WTE), recycling and other waste treatment options.

#### **Curacao 2016**

In September 2016, a workshop entitled “From Waste to Resource: Policy and Business Dialogue” was conducted in Willemstad, Curaçao and focused on the islands of Curaçao, Aruba, Bonaire, Saint Eustatius, Saba and Saint Maarten. The UN Environment Programme and Government of Curaçao organized the workshop, with the support of the Dutch Ministry of Infrastructure and the Environment. In addition to government representatives, participants included recyclers, waste management companies, energy companies, consultants, NGOs, academia, and international organizations. The workshop identified options for concrete steps in policy design and implementation

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<sup>1</sup> OECS RePlast Project, IUCN’s Plastic Waste Free Islands, World Bank Deep Dive and OECS ReMLit

to prevent and reduce waste flows and landfilling, as well as technical solutions to increase resource recovery and recycling amongst these specific islands.

### **Trinidad and Tobago 2016**

The CWWA, in collaboration with the IADB and the CDB jointly-hosted a workshop on the status of SWM in the Caribbean in October 2016. Participation ranged from Caribbean country entities responsible for SWM, practitioners, institutions, ministry representatives, international and 7 regional development partners and other participants who contributed their expertise, experiences and ideas. Participants identified the need for the following actions:

- Training for SWM personnel as well as a Master of Science programme for SWM;
- Increased political will, high-level advocacy, public awareness and education;
- Formation of SWM Authorities on every island to centralize jurisdictional and other issues related to SWM;
- Regional cooperation in the approach to SWM given commonality in the issues faced;
- Possibly convening parallel High-Level Forum (HLF) of Ministers for SWM within the CWWA;
- Evaluation of the status of SWM in the Caribbean as a whole;
- Raising awareness of SWM in the region by also highlighting its linkages to and with:
  - The marine sector
  - Tourism
  - Health
  - Climate Change
  - Sustainable Development Goals
  - Water and Wastewater
- The urgent need to foster better understanding of and guidelines on the viability of Waste-to-Energy (WtE) in the midst of regional clamour for WtE as an alternative to final disposal and waste as a renewable energy source.

### **Jamaica 2017**

In July 2017, UN Environment and the Dutch Ministry of Infrastructure and the Environment conducted a Caribbean Waste Management Conference “SIDS Approaches to Waste Management and the Circular Economy” (CWM Conference). A primary objective of the CWM Conference was to inventory the existing solid waste management systems throughout the Caribbean to assess strengths and weaknesses and begin establishing a platform for a regional solid waste action plan that fosters an environmentally and financially sustainable solid waste management system.

### **Guyana 2017**

One of the key issues that emerged at the CWM Conference was that there was a need to bring the urgency of addressing solid waste management issues to the highest levels of discourse among Ministers responsible for Waste Management in CARICOM. This approach would help facilitate the establishment of regional solutions to complex waste management issues. Therefore, the Caribbean Water & Wastewater Association, UN Environment, the Pan American Health Organization and the Inter-American Development Bank organized a Ministerial Forum in October 2017, comprising the development partners, Caribbean Ministers responsible for waste management and technical experts to discuss a regional strategic plan for waste management.

The first version of CWMAP was presented at the 1st High-Level Forum of the Caribbean Ministers Responsible for Waste Management in Georgetown, Guyana, in October 2017. Since that time, the

document has been revised to include the comments and recommendations received during subsequent meetings of the HLF and other regional conferences. It now forms an essential regional framework for identifying priority needs, developing and implementing programmes, projects and activities to respond to these needs at national, sub-regional and regional levels.

Notwithstanding the embrace of the CWMAP by the HLF, it has been determined by the RSAP/CWMAP Implementation Monitoring Committee, comprising members from the CWWA, CAWASA, IDB, CDB, CCCCC and UNEP, that the CWMAP needs to be revised and updated with a particular focus on “gaps”, “key issues” and “potential action items”.

While the CWWA Conferences have provided a platform for solid waste management challenges to be ventilated, the continued growth in the generation of waste and problems associated with final disposal have drawn attention to the need for more concrete initiatives. The convening of the HLF Ministers with the responsibility of solid waste management has demonstrated that, notwithstanding the national importance of these issues, regional coordination and a coordinated approach will provide greater opportunities to address challenges associated with the production, generation and disposal of plastic waste. Regional coordination will also mean developing harmonised standards for measuring the generation of waste and monitoring the performance of countries. In this context, the CWWA must continually provide a platform for discussion, but more importantly, use that platform to draw countries closer together by facilitating regional initiatives or assisting countries in implementing activities that will allow them to overcome their individual and collective challenges.

## 2.0 International and Regional Context

Conventions and protocols that influence the management of waste were assessed throughout the planning process to determine the commitments made by countries, identify aspects of waste management which these conventions and protocols seek to address and to facilitate harmonization between these existing initiatives and the SWM Action Plan. The most relevant initiatives that may influence the SWM Action Plan are summarized below.

**Table 1: International Conventions**

Convention/Agreement	Description
<b>Law of the Sea Convention</b>	United Nations Convention on the Law of the Sea (UNCLOS), 1982: UNCLOS came into force in 1994 and 167 States are party to it. The Convention provides a broad legal framework for ocean-related issues, placing a general obligation on States to protect and preserve the marine environment. It calls on States to address land-based sources of pollution as well as pollution from ships, cooperate with other states on marine issues, and work to address marine issues beyond national jurisdiction
<b>International Convention for the Prevention of Pollution from Ships (MARPOL)</b>	1973/1978: Ratified by 153 States, the International Convention for the Prevention of Pollution from Ships (MARPOL) was developed under the auspices of the International Maritime Organization (IMO). It was adopted in 1973 and amended in 1978. MARPOL includes regulations aimed at preventing and minimizing pollution from ships, both accidental pollution and that occurring during routine operations. Annex V of MARPOL, which came into force in 2013, addresses ocean-based litter pollution and prohibits the discharge of all plastics from ships. Under MARPOL Convention the Caribbean Sea is designated as a special area with specific regard to Annex V on Garbage. MARPOL requires coastal states to provide of adequate reception facilities at ports for ship wastes. These wastes include: <ul style="list-style-type: none"> <li>▪ Garbage</li> <li>▪ Oily waste</li> <li>▪ Ash fouling</li> <li>▪ Gray water</li> <li>▪ Ballast water</li> <li>▪ Sewage</li> </ul>
<b>Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention)</b>	1972: The London Convention aims to prevent marine pollution by regulating the dumping of wastes and other matter at sea. The convention has been in force since 1975, with 87 States Party to it. The 1996 London Protocol revised the London Convention, which allowed some dumping, prohibiting all dumping from ships except for materials listed on the so-called “reverse list”. The 1996 Protocol does not include plastic on the reverse list; thus, dumping of plastics is prohibited. It entered into force in 2006, and 45 States are party to the Protocol.
<b>Basel Convention</b>	The Basel Convention on the control of Transboundary Movement of Hazardous Waste and their Disposal (1989) is an international treaty that was designed to reduce the movement of hazardous waste between nations; and specifically, to prevent transfer of hazardous waste from developed to less developed

Convention/Agreement	Description
	<p>countries. The Basel Convention permits SIDS to export hazardous waste for the purpose of environmentally sound disposal considering SIDS will never be able to afford environmentally sound disposal of hazardous waste on-island.</p> <p>Obligations under the Convention include inter alia:</p> <ul style="list-style-type: none"> <li>▪ The development of a National Policy to address the issues of hazardous waste and other waste and their disposal, including national objectives to minimize the generation of hazardous waste considering social, technical and economic considerations.</li> <li>▪ Formulation of legislation to address the formal definition of relevant terms including “hazardous waste”, transboundary movement”, and “proper disposal”.</li> <li>▪ Formulation of guidelines to address the storage, transportation and disposal of hazardous and other waste.</li> <li>▪ Submission to the Convention Secretariat on the status of actions taken.</li> </ul> <p>In 2019, during the Basel Convention Conference of Parties, Governments made amendments to the Convention to include plastic waste and create a legally binding framework to make global trade in plastic waste more transparent and better regulated, whilst also ensuring that its management is safer for human health and the environment. A Partnership on Plastic Waste was also established. The Partnership seeks to mobilise business, government, academic and civil society resources, interests and expertise to assist Parties in implementing the new measures and to provide a set of practical supports – including tools, best practices, technical and financial assistance.</p> <p>The Basel Convention Regional Centre (BCRC) supports implementation of the Convention in the region through various projects and initiatives at the national and regional levels. These include projects that address Persistent Organic Pollutants, E-waste, waste oil and mercury. The details of some of these projects can be found in Table 3.</p>
<b>Stockholm Convention</b>	<p>The Stockholm Convention requires that Parties prohibit and/or take legal administrative measures to eliminate the production, use, import of chemicals listed in Annex A of the Convention and to limit the importation of chemicals listed in Annexes A and B to purposes environmentally sound disposal for a use-specific exemption as permitted by the Convention. It also seeks the continuing minimisation and ultimate elimination of releases of unintentionally produced persistent organic pollutants (UPOPs).</p>
<b>Rotterdam Convention</b>	<p>The Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade was adopted in 1998. The Convention emerged out of concern for the harmful impact on human health and the environment from the trade of certain hazardous chemicals and pesticides, as reflected in the Rio Declaration on Environment and Development and Chapter 19 of Agenda 21 on</p>



Convention/Agreement	Description
	“Environmentally sound management of toxic chemicals, including prevention of illegal international traffic in toxic and dangerous products”.
<b>Minamata Convention</b>	The Minamata Convention on Mercury was formally adopted on October 10 <sup>th</sup> , 2013, as a global response to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds. The Convention embodies both voluntary and compulsory measures that aim to reduce the impact of mercury on health and the environment, through various provisions related to extraction, usage, releases, trade, storage and waste management.
<b>Convention on Biological Diversity</b>	<p>The Convention’s objectives are to help conserve biological diversity, to promote sustainable use of its elements; and to ensure fair participation in the benefits that may derive from the utilization of genetic resources. The agreement sets out an international consensus on these issues and thereby creates a legal framework that will contribute to the preservation of biological diversity.</p> <p>Consistent with basic international law, the Convention reiterates that States have the sovereign right to exploit their natural resources pursuant to their own environmental policies, but with the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction. Article 4 states that the requirements of the Convention apply not just within a state’s borders, but also to all actions under the State’s control, inside or outside of the State’s physical jurisdiction and regardless of where their effects are felt.</p>
<b>Sustainable Development Goals (SDGs) 2030</b>	<p>On October 21, 2015, the UN General Assembly adopted resolution 70/1 and endorsed the 2030 Agenda for Sustainable Development and the Sustainable Development Goals (SDGs). Marine litter and microplastics are directly addressed by SDG 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development- SDG 14.1 requires a significant reduction of marine debris by 2025. Changing consumer and industry attitudes and behaviours towards plastics, including the elimination of single-use plastic, moving towards a more circular economy model as well as adopting proper waste management on land and at sea are all critical for achieving this target.</p> <p>SDG 14 can, however, be cross-linked with other SDGs. These include:</p> <ul style="list-style-type: none"> <li>▪ SDG 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture.</li> <li>▪ SDG 3: Ensure healthy lives and promote well-being for all at all ages.</li> <li>▪ SDG 6: Ensure availability and sustainable management of water and sanitation for all.</li> <li>▪ SDG 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.</li> </ul>

Convention/Agreement	Description
	<ul style="list-style-type: none"> <li>▪ SDG 9: Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation.</li> <li>▪ SDG 11: Make cities and human settlements inclusive, safe, resilient and sustainable.</li> <li>▪ SDG 12: Ensure sustainable consumption and production patterns- SDG target 12.4 requires that the release of chemicals to air, water and soil must be significantly reduced. SDG target 12.5 is clear in stating that by 2030 overall waste generation must be significantly reduced through prevention, reduction, recycling and reuse.</li> </ul>

There are also several agreements and conventions on a regional level which address the issues of waste management, marine pollution and the transboundary movement of waste. Some of these are discussed below.

**Table 2: Regional Agreements and Conventions**

Convention/Agreement	Description
<b>The Cartagena Convention</b>	<p>The Cartagena Convention requires Parties to adopt measures aimed at preventing and controlling marine pollution, as well as to take appropriate measures to protect and preserve fragile ecosystems. To this end, the convention is supplemented by three protocols which are critical to address land-based and oil-spill pollution, as well as to conserve and manage critical habitats and species that constitute the basis for the region’s natural capital:</p> <ul style="list-style-type: none"> <li>▪ The Protocol Concerning Co-operation in Combating Oil Spills in the Wider Caribbean Region (Oil Spill Protocol);</li> <li>▪ The Protocol Concerning Specially Protected Areas and Wildlife in the Wider Caribbean Region (SPAW Protocol);</li> <li>▪ The Protocol Concerning Pollution from Land-Based Sources and Activities (LBS Protocol). The LBS Protocol provides standards for wastewater discharges and industrial effluent. It identifies two water categories: Class 1 waters and Class 2 waters. Class 1 waters represent waters that are particularly sensitive to the impacts of domestic wastewater (waters containing coral reefs, mangroves, protected areas listed in the SPAW Protocol, recreational waters, etc.). Class 2 waters mean waters other than Class 1 waters which are less sensitive to the impacts of domestic wastewater.</li> </ul> <p>The Cartagena Convention provides support for the implementation of sub-regional, regional, and global initiatives involving the countries of the Wider Caribbean. These include the Saint Georges Declaration for the OECS, the Caribbean Sea Commission, the Sustainable Development Goals, and several multilateral environmental agreements.</p>
<b>Revised Treaty of Chaguaramas</b>	<p>The 1973 Treaty of Chaguaramas, which gave birth to the Caribbean Community (CARICOM), was amended in 1989 to create the Caribbean Single Market and Economy (CSME). There are a wide range of provisions in the Revised Treaty that seek to ensure that Member States developments are tied to environmental consideration.</p>

	<p>Article 65 of the Revised Treaty speaks specifically to environmental protection, and both the Community as a whole and the Member States are required to cooperate with third States and competent environmental organisations in fulfilling that obligation. Likewise, in respect of the Development of Maritime Transport Services, the Councils of the Community, Council on Trade and Development (COTED) is required to promote cooperation among the Member States in the implementation of relevant international maritime instruments relating to maritime safety, marine environmental protection, and the implementation of relevant international maritime instruments related to the safety of shipping and the prevention of vessels source pollution (Article 56 (c)).</p> <p>CARICOM’s Draft Environment and Natural Resources Policy Framework also lays out a regional approach to the sustainable management of the environmental and natural resources of member states. It reflects an awareness that unsustainable use of resources could undermine regional sustainable development options within the context of the 2030 SDGs. It proposes a structure for balancing the need to exploit land, air, water, and oceans for economic development with the maintenance of healthy environments. As an umbrella policy framework, it provides the guiding principles for planning the protection, conservation, and sustainable use of the environmental and natural resources of the CARICOM member states.</p>
<p><b>Revised Treaty of Basseterre</b></p>	<p>The Organisation of Eastern Caribbean States (OECS) was established by the Treaty of Basseterre on June 18, 1981. The Treaty was signed by seven Eastern Caribbean Countries - Antigua and Barbuda, Dominica, Grenada, Montserrat, Saint Kitts and Nevis, Saint Lucia, and Saint Vincent and the Grenadines. The Revised Treaty of Basseterre, signed on June 18, 2010, established the OECS Economic Union.</p>
<p><b>St. George’s Declaration</b></p>	<p>Article 24 of the Protocol of Eastern Caribbean Economic Union to the Revised Treaty of Basseterre (RBT) speaks to each Protocol Member State implementing the St. George’s Declaration of Principles for Environmental Sustainability in the OECS to minimize environmental vulnerability, improve environmental management and protect the region’s natural (including historical and cultural) resource base for optimal social and economic benefits for Member States.</p> <p>Overall Aim: Foster Equitable and Sustainable Improvement in the Quality of Life in the OECS Region.</p> <ul style="list-style-type: none"> <li>▪ Goal 1: Build the Capacity of Member States and Regional Institutions to Guide and Support Processes of Sustainable Development</li> <li>▪ Goal 2: Incorporate the Objectives, Perspectives, Resources and Talents of All of Society in Environmental Management</li> <li>▪ Goal 3: Achieve the Long-term Protection and Sustained Productivity of the Region’s Natural Resource Base and the Ecosystem Services it provides</li> <li>▪ Goal 4: Ensure that Natural Resources Contribute Optimally and Equitably to Economic, Social and Cultural Development.</li> </ul> <p>In 2020, the OECS taking into consideration global and regional commitments to address growing challenges of waste management, updated the SGD (SDG 2040) and has, as one of six Priority Goal: Chemicals, Pollution and Waste, which has as its main Goal - Integrated</p>

	approaches to chemicals and waste management through sustainable consumption, production and management practices that reduce waste and pollution in the environment.
<b>St. John's Declaration</b>	In 2019, the CARICOM Heads of Government adopted a Declaration aimed at addressing the high levels of plastics and microplastics in the Caribbean Sea and their adverse impact. The St. John's Declaration seeks to advance the call to action for Governments against plastic pollution and single-use plastics at the regional level. Championed by Antigua and Barbuda, the St. John's Declaration encourages CARICOM Member States that have not yet done so to introduce measures to reduce and/or eliminate the use of single use plastics. It also commits to addressing the damage to our ecosystems caused by plastics by 2030 and to work with the private sector to "find affordable, sustainable and environmentally friendly alternatives".

**Table 3: Status of Ratification of the Cartagena Convention and its Protocols**

State	Date of Ratification		
	Cartagena Convention & Oil Spills Protocol	SPAW Protocol	LBS Protocol
Antigua & Barbuda	11-Sep-86		13-Jul-10
The Bahamas	24-Jun-10	24-Jun-10	24-Jun-10
Barbados	28 May-85	14-Oct-02	29-Jun-19
Belize	22-Sep-99	04-Jan08	04-Feb-08
Colombia	03-Mar-88	05-Jan-98	
Costa Rica	01-Aug-91		26-May-16
Cuba	15-Sep-88	04-Aug-98	
Dominica	05-Oct-90		
Dominican Republic	24-Nov-98	24-Nov-98	06-Sep-12
France	13-Nov-85	05-Apr-92	04-May-07
Grenada	17-Aug-87	05-Mar-12	05-Mar-12
Guatemala	18-Dec-89		
Guyana	14-Jul-10	14-Jul-10	14-Jul-10
Haiti			
Honduras	13-Oct18	13-Oct-18	13-Oct-18
Jamaica	01-April-87		05-Nov-15
Mexico	11-Apr-85		
Netherlands	16-Apr-84	02-Mar-92	
Nicaragua	25-Aug-85	04-May-21	
Panama	06-Nov-87	27-Sep-96	09-Jul-03
St. Kitts and Nevis	15-Jul99		
Saint Lucia	30-Nov-84	18-May-00	30-Jan-08
St. Vincent and the Grenadines	11-Jul-90	26-Jul-91	
Suriname			
Trinidad and Tobago	24-Jan-86	10-Aug-99	28-Mar-03
United Kingdom	28-Feb-86		
United States of America	31-Oct-84	16-Apr-03	13-Feb-09
Venezuela	18-Dec-86	28-Jan-97	
European Commission			

### 3.0 Regional Projects, Programmes and Initiatives

Since the last update of the CWMAP, the governments of the region, with the assistance of several regional and international donor partners, have embarked on various initiatives to address the growing problem of waste management, and in particular, the prevalence of plastic pollution. Among have been initiatives to reduce the proliferation of plastic bags and Styrofoam by either completing banning their use, or reducing their use through ...

Other recent initiatives include the updating of the St. Georges Declaration by the OECS Commission where waste management is identified as one of six pillars that the Commission and its Member States hope to pursue in the coming decade and beyond.

The most encouraging initiative was the adoption of the St. John's Declaration, championed by Antigua and Barbuda take aimed at addressing the high levels of plastics and microplastics in the Caribbean Sea and their adverse impact. The St. John's Declaration seeks to advance the call to action for Governments against plastic pollution and single-use plastics at the regional level. The St. Johns Declaration encourages CARICOM Member States that have not yet done so to introduce measures to reduce and/or eliminate the use of single use plastics. It also commits to addressing the damage to our ecosystems caused by plastics by 2030 and to work with the private sector to "find affordable, sustainable and environmentally friendly alternatives"

In that regard, it should be noted that Twelve CARICOM Member States have to varying extents passed legislation to implement full or partial bans on the use of single use plastics and styrofoam products. However, the region has fallen short of a region-wide plastics ban. CARICOM's adoption of the St. Johns Declaration is a good step towards showing our leadership's commitment towards addressing the serious threat marine litter poses to our sustainable development.

Notwithstanding those initiatives, achieving the goals set out in the previous CWMAP or identified at HLF-4 have not been a stellar success. There is a further need to review proposed Targets and Indicators in the current Plan to assess whether they are still relevant, realistic, and appropriate and support relevant regional and global commitments relating to solid waste, marine litter, and plastics management.

The identification of funding has still not been undertaken and issue relating to overflowing or poorly managed landfills are still issues of major concerns.

As part of the assessment of gaps, and areas where future financial support is required, the consultant is expected to conduct an analysis of potential funding opportunities including identification of specific donors who could support implementation of the Plan. Prioritize areas where the Private Sector can be engaged should also be identified for potential bilateral collaboration as well as opportunities for creating employment, carbon emission reductions from waste management activities, resilient infrastructure and circular economy.

The various national, regional and international mandates and commitments have given rise to several programmes and projects both at the national and regional levels to address solid waste in general and specifically, the growing proliferation of plastics in the marine environment. The details of some of these projects are listed below:

**Table 4: Ongoing or Planned Waste Management Programmes, Projects and Initiatives in the WCR**

#	Project/Activity Name	Partners/ Institutions	Countries Involved	Brief Description
1	<b>Action Plan for Regional Cooperation on Chemicals and Waste Management 2021-2024</b>	UNEP, Intergovernmental Network on Chemicals and Waste for Latin America and the Caribbean		<p>The vision of the Intergovernmental Network on Chemicals and Waste for the Latin America and Caribbean region is to enhance capacities for the minimization of the adverse effects of chemicals and waste on the health of the populations and the environment within the region. The mandate and main objective are to support coordination and cooperation among countries in the region to achieve the 2030 Agenda Sustainable Development Goals on the sound management of chemicals and waste.</p> <p>The Action Plan 2021-2024 intends to define the cooperation priorities for the period, including a Work Programme which includes specific activities to be implemented during the period 2021-2022. It was prepared in consultation with countries of the region through a survey to: (i) identify priority issues, (ii) ascertain their importance at a national level (ranking), and (iii) identify the cooperation actions that the Intergovernmental Network could pursue to support countries on addressing the priority issues.</p>
2	<b>The Development and Implementation of a Sustainable Management Mechanism for Persistent Organic Pollutants (POPs) in the Caribbean (GEF 5558) (2014)</b>	GEF, BCRC Caribbean, UNIDO	Antigua and Barbuda, Barbados, Belize, St Kitts and Nevis, St. Lucia, St Vincent and the Grenadines, Suriname, Trinidad and Tobago	<p>The overall project has the following four (4) main objectives:</p> <ol style="list-style-type: none"> <li>1. Strengthen the requisite human, institutional and infrastructural capacities for the compliance and implementation of the Stockholm Convention</li> <li>2. Strengthen the capacity of 5 Caribbean countries to improve waste management practices at their landfills to reduce site contamination by POPs and UPOPs; Establish demonstration projects for the reduction of POPs and UPOPs in Belize (medical waste) and Suriname (design and construction of an engineered landfill)</li> <li>3. Assess and rank potentially POPs contaminated sites in all 8 countries; determine contamination levels at the Guanapo landfill, Trinidad and develop appropriate remediation strategies for future implementation at this site</li> <li>4. Manage the consolidation and off-island disposal of Polychlorinated Biphenyls (PCBs) in four (4) countries.</li> </ol> <p>Any status?</p>

#	Project/Activity Name	Partners/ Institutions	Countries Involved	Brief Description
3	<a href="#">PROBLUE</a>	World Bank	Multiple countries	<p>PROBLUE<sup>2</sup> is a Multi-Donor Trust Fund housed at the World Bank that supports the development of integrated, sustainable and healthy marine and coastal resources. With the Blue Economy Action Plan as its foundation, PROBLUE contributes to the implementation of Sustainable Development Goal 14 (SDG 14) and is fully aligned with the World Bank’s twin goals of ending extreme poverty and increasing the income and welfare of the poor in a sustainable way.</p> <p>PROBLUE, which is worth around \$5.6 billion in active projects focuses on Four Key Areas:</p> <ul style="list-style-type: none"> <li>▪ The management of sustainable fisheries and aquaculture</li> <li>▪ Addressing threats posed to ocean health by marine pollution, including litter and plastics, from marine or land-based sources</li> <li>▪ The sustainable development of key oceanic sectors such as tourism, maritime transport and offshore renewable energy</li> <li>▪ Building government capacity to manage marine resources, including nature-based infrastructure such as mangroves, in an integrated way to deliver more and long-lasting benefits to countries and communities</li> </ul> <p>In respect of Pillar 2, the objective is “To reduce marine pollution and contribute to the restoration of coastal and marine ecosystems”. To achieve that objective of turning the tide on plastic waste and marine pollution, the Bank has identified three strategic activities. These priority areas are:</p> <ul style="list-style-type: none"> <li>▪ Preventing land-based and sea-based sources of plastic pollution by improving waste management and developing circular economy and upstream reduction of plastics.</li> <li>▪ Preventing pollution and improving waste management in ports and maritime transport, and</li> <li>▪ Preventing multiple sources of pollution, including plastics, impacting ecosystems and economies in enclosed ecosystems such as bays, gulfs, closed seas.</li> </ul>

<sup>2</sup> <https://www.worldbank.org/en/programs/problue>



#	Project/Activity Name	Partners/ Institutions	Countries Involved	Brief Description
4	<b>Unleashing the Blue Economy of the Eastern Caribbean Project (UBEEC) (2022 onward)</b>	World Bank	Antigua & Barbuda, Dominica, Grenada, Saint Lucia, St. Vincent and the Grenadines	<p>An offshoot of PROBLUE, the aim of this project is to improve the competitiveness of the economies of participating countries through diversification of key economic activities and enhancing the productivity of marine assets and strengthening their resilience for long term sustainable growth. The three priority areas selected for intervention are:</p> <ul style="list-style-type: none"> <li>▪ Reducing marine pollution (waste management/plastics)</li> <li>▪ Fisheries and aquaculture (local and export markets)</li> <li>▪ Sustainable tourism</li> </ul> <p>Regarding priority area one, “Reducing Marine Pollution” the objective is to support clients in the Caribbean region to understand the sources of solid waste/marine litter in the region and to provide a comprehensive picture of marine pollution at national and regional levels to assist client countries in informing policy makers to protect their valuable coastal and marine natural capital and to obtain the full benefits of a Blue Economy.</p> <p>The assignment consists of the following activities:</p> <ul style="list-style-type: none"> <li>▪ Conduct sector rapid assessment on solid waste collection, recycling, treatment, disposal in the selected countries with a holistic overview of each country’s Solid Waste Management (SWM) sector throughout the value chain including, inter alia, institutional, legal, and regulatory frameworks, financial and technical capacity and measures, private sector engagement, and the current waste stream and system;</li> <li>▪ Expand the knowledge on marine plastic debris sources, transport (import/export &amp; waste collection), and impacts (environmental, economic, social including behavioural change) in the participating countries;</li> <li>▪ Provide recommendations of national action plans to inform plastics-related policies and investment solutions for the OECS region.</li> </ul>
5	<b><a href="#">Caribbean Platform for Marine Litter Management</a> Regional Node</b>	UNEP Cartagena Convention Secretariat and its Land-Based		<p>The Caribbean Platform for Marine Litter Management is an initiative of the UN Environment CEP, providing support to several programmes aimed at reducing marine pollution in the region. A co-host of this initiative is the Gulf and Caribbean Fisheries Institute (GCFI) working closely to support the Global Partnership for</p>

#	Project/Activity Name	Partners/ Institutions	Countries Involved	Brief Description
	Ongoing resource mobilisation to support ML in the region	Sources of Marine Pollution Protocol and GCFI		<p>Marine Litter as they seek to implement the Caribbean Regional Action Plan for Marine Litter Management.</p> <p>Five initial project concepts have been developed and are in various stages of implementation:</p> <ul style="list-style-type: none"> <li>▪ Piloting marine litter reduction strategies for major Caribbean cultural/ musical/ sporting events;</li> <li>▪ Links between marine litter and the prevalence of mosquito-borne public health concerns;</li> <li>▪ Occurrence of micro-plastic in the intestinal tract of commercially exploited fish from Grenada;</li> <li>▪ Innovations and cost analysis of options for marine litter action; and</li> <li>▪ Regional assessment of marine litter initiatives in the Caribbean.</li> </ul>
5.1	<b>Regional Marine Litter Management Strategy 2019-2021</b>	GPML Caribe, GCFI	<b>Regional – Wider Caribbean Region</b>	The Caribbean Node of the Global Partnership on Marine Litter (GPML-Caribe) enlisted national and regional marine litter experts to assist with the development of a Marine Litter Management Strategy for the region. This strategy identified priority actions which can be used as the basis for developing new project proposals and assist in resource mobilization efforts whilst supporting both the implementation of the Regional Action Plan for Marine Litter Management in the Wider Caribbean Region (RAPMaLi) and implementation of the Protocol on Land Based Sources of Pollution (LBS Protocol) of the Cartagena Convention. The final version of the Regional Marine Litter Management Strategy was finalized in 2021, endorsed by the Conference of Parties to the Cartagena Convention, and is available in English, Spanish and French.
5.2	<b>The Global Partnership on Marine Litter – Caribbean Node <a href="#">GPML-Caribe</a></b>	The Gulf and Caribbean Fisheries Institute (GCFI) And UN Environment	Several countries of the Caribbean	<p>The GPML-Caribbean node represents a partnership for national and regional organizations, governments, research, and technical agencies and individuals, that work together to reduce the quality and impact of marine litter in coastal zones of the Wider Caribbean Region. The Gulf and Caribbean Fisheries Institute (GCFI) is currently the co-host together with UN Environment of the GPML-Caribe.</p> <p>Vision of the GPML-Caribe: A healthy Caribbean Sea without risk from marine litter</p>

#	Project/Activity Name	Partners/ Institutions	Countries Involved	Brief Description
				<p>Mission of the GPML-Caribe: To provide leadership, information, and resources in the efforts to reduce marine litter in the Caribbean Sea</p> <p>Roles of the GPML-Caribe:</p> <ul style="list-style-type: none"> <li>▪ Sharing best practices and case studies</li> <li>▪ Updating key actors on state of knowledge of technical marine litter issues</li> <li>▪ Facilitating discussions on barriers and solutions, especially online</li> <li>▪ Encourage regional-level proposals to compile best practices, gap analyses (e.g., socio-economic aspects), assimilate guidance on technical methods and protocols</li> </ul> <p>Projects:</p> <ul style="list-style-type: none"> <li>▪ Enhancing the Whitehouse &amp; Bluefields Solid Waste Reduction Project in Jamaica (Building on the sandals project)</li> <li>▪ Launching the Caribbean Clean Seas Campaign (2019 – 2020) in Collaborations with CYEN</li> <li>▪ Developing a harmonized approach to marine litter monitoring in the Caribbean</li> <li>▪ Piloting marine litter reduction strategies for major Caribbean events- Carnival in Trinidad and Tobago</li> <li>▪ The Occurrence of Micro-Plastic in the Intestinal Tract of Commercially Exploited Fish from Grenada (Expanded on earlier work)</li> </ul>
6	<b>Prevention of Marine Litter in the Caribbean Sea (PROMAR)</b>	Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety (BMU)  Adelphi Research UNEP-CEP	Dominican Republic, Costa Rica, Colombia, British Virgin Islands, Guyana, St. Kitts and Nevis, Suriname, Trinidad and Tobago,	This project aims to develop a comprehensive regional marine litter plastic waste project that will contribute to the reduction in the generation of plastic pollution and litter entering the marine environment and promote a shift towards more closed loop management practices including recycling and reuse. This initiative also aims to provide a better understanding of the generation of plastic waste and will make recommendations for the undertaking of viable technical solutions to prevent marine litter and transition to more circular economy structures with improved waste collection and management systems. It will be supported by increased public awareness of the issues that lie at the heart of the plastic

#	Project/Activity Name	Partners/ Institutions	Countries Involved	Brief Description
				pollution problem while fostering changing habits and adopting best practices and lessons learned from previous marine litter and plastic waste projects.
7	<b>ACP MEA Project Phase 3</b> Potential model for scaling up	EU/UNEP/CCS	Must focus on the ACP countries 15 contracting parties – primarily NGOs in the ACP countries.	<p>This project is a partnership between the European Union, the Organization of African, Caribbean and Pacific States (OACPS), United Nations Environment Programme (UNEP) and the Food and Agriculture Organization of the United Nations (FAO). The programme aims to build capacity in 79 countries in Africa, the Caribbean, and the Pacific (ACP) to support them in fulfilling their obligations as parties to Multilateral Environmental Agreements (MEAs), to address the environmental challenges they face and to reap the benefits of improved environmental governance at national and regional levels. Currently in its third phase, one of the project outputs is to reduce the influx of waste (plastics and other forms of human and industrial, liquid and solid waste) entering the marine environment in the four regions developed. New Fact Sheets, Infographics on Solid Waste, Microplastics, Plastics are currently being finalized and a Community Based Marine Litter/Plastics Grant Programme will be launched in 2021 in collaboration with the Regional Caribbean Marine Litter Node.</p> <p>The project includes 3 Community Based Projects focused on preventing Marine Litter as well as supporting at least three Contracting Parties to develop Marine Litter Action Plans.</p>
8	<b>Implementing Sustainable Low and Non-Chemical Development in Small Island Developing States (ISLANDS) programme</b>	The Basel Convention Regional Centre for Training and Technology Transfer (BCRC Caribbean) together with UNEP, IADB, FAO, and UNDP.	Antigua and Barbuda, Barbados, Belize, Dominican Republic, Guyana, Saint Kitts and Nevis, Saint Lucia, Suriname, and Trinidad and Tobago.	<p>The GEF-funded ISLANDS program’s overarching objective is to support small island developing states (SIDS) to enter a safe chemical development pathway by strengthening their ability to control the flow of chemicals, products, materials into their territories and to unlock resources for the long-term management of chemicals and waste, including integrated chemicals and waste management, in SIDS.</p> <p>The US \$11 million GEF ISLANDS Programme which was approved in 2019 and launched at the beginning of October 2021, is set to be implemented over five (5) year starting October 2021. The programme consists of four components. These are:</p>

#	Project/Activity Name	Partners/ Institutions	Countries Involved	Brief Description
				<ul style="list-style-type: none"> <li>▪ <b>Component 1:</b> Preventing future build-up of chemicals in the SIDS environment</li> <li>▪ <b>Component 2:</b> Safe management and disposal of existing, historically produced wastes posing an immediate risk to people and natural resources</li> <li>▪ <b>Component 3:</b> Promoting systems for future management of wastes and chemicals entering SIDS by adopting and putting into practice 3R approaches including increased recovery of resources from wastes by adopting the principles of sustainable consumption and production</li> <li>▪ <b>Component 4:</b> Sharing knowledge and experience across all regions to address issues common to all SIDS and to stimulate inter regional cooperation to combat major global level challenges posed by wastes such as plastics, electronics, and other major pollutants</li> </ul>
9	<p><b>Reducing Marine Pollution in the Eastern Caribbean (ReMLit)</b></p> <p>Implementation period: 2018-2022</p> <p>Overall Cost: 7 million Norwegian Kroner (approximately US\$ 3 million)</p>	OECS, with funding from NORAD	Antigua and Barbuda, Commonwealth of Dominica, Grenada, Montserrat, Saint Lucia, Saint Vincent and the Grenadines.	<p>The ReMLit project is an OECS-wide project that is seeking to contribute to “Building Resilience in Marine Ecosystems Through a Reduction in Marine Litter (ReMLit) in the Eastern Caribbean”. The project, which is funded by the Norwegian Ministry of Foreign Affairs (Norad), with both a regional and national component, seeks to satisfy three main objectives:</p> <ul style="list-style-type: none"> <li>▪ enhancing policy and legislation for effective reduction and management of waste,</li> <li>▪ increasing the awareness of issues relating to marine litter and,</li> <li>▪ undertaking concrete interventions to reduce and control litter in the marine environment in participating countries.</li> </ul> <p>These objectives support priority actions under the Eastern Caribbean Regional Ocean Policy (ECROP), an OECS-wide framework for regional coordination of sustainable development, management and conservation of ocean resources.</p> <p>The national component activities for the countries involved are as follows:</p> <ul style="list-style-type: none"> <li>▪ Support national public awareness activities that promote an understanding, appreciation, advocacy, and stewardship for effective waste management.</li> </ul>

#	Project/Activity Name	Partners/ Institutions	Countries Involved	Brief Description
				<ul style="list-style-type: none"> <li>▪ Support for adoption of OECS harmonised policy and legislation for effective management of waste.</li> <li>▪ Support for enhancing fiscal policy and incentives programs (for businesses and households) to reduce plastics and Styrofoam use, and encourage recycling, reuse or/and substitution where appropriate.</li> <li>▪ Develop and implement community-based interventions that contribute to reducing marine litter, including source separation, collection and recycling programs, coastal and river clean-ups, and drainage litter management</li> </ul> <p>Under the ReMLit Project, there are three sub-projects being carried out.</p>
9.1	<b>Reducing Marine Pollution in the Eastern Caribbean (ReMLit) – Policy and Legislation</b>			<p>Under the ReMLit project, the creation of proper policies and supporting legislation at the national level is a key issue to be addressed. To address this, an OECS Regional Policy Framework is being prepared along with OECS model policy and legislation. Based on this model policy and legislation, adapted national policies and legislation will be developed in each OECS member state. The model is also intended to facilitate new business or stimulate existing initiatives which promote recycling, reuse and substitution.</p> <p>As a part of this sub-project, guidelines and best practices are also being developed, inclusive of operational practices and coordination mechanisms. National action plans for implementing the recommended guidelines and best practices are also being crafted along with recommendations for designing projects which promote a circular economy approach and facilitate waste reduction/ recycling/ diversion/disposal as well as improving pollution management and increasing the capacity of sanitary landfills.</p> <p>Additionally, an OECS Transboundary Marine Litter Strategy and Action Plan will be developed as part of this sub-project to improve the transboundary movement of plastic and other waste within the OECS region.</p>
9.2	<b>Reducing Marine Pollution in the Eastern Caribbean (ReMLit) – Education and Awareness</b>			<p>Recognizing the need for increased public awareness and education, the ReMLit project includes an education and awareness campaign which aims to increase awareness on the importance of effective and efficient waste management within the OECS region. The campaign is intended to increase awareness at all levels</p>

#	Project/Activity Name	Partners/ Institutions	Countries Involved	Brief Description
				through the design and implementation of various public communication products such as radio and television announcements, posters, flyers and short television features.
9.3	<b>Reducing Marine Pollution in the Eastern Caribbean (ReMLit)- Incentive Programme</b>			An Incentive Programme is also being implemented to develop fiscal incentives to support reductions in use of Styrofoam, single-use plastics and other waste materials. As part of this sub-project, a literature review and cost accounting exercise will be undertaken to assess the costs involved in various waste management processes as well as undertake an assessment of fiscal incentives which currently exist at the individual, household and business level in participating countries. The findings of this exercise will be used to develop an OECS Incentives Programme for Effective Waste Management. The aim of this Incentive Programme is to reduce the amount of waste being generated, encourage reuse and recycling and promote an enabling environment to facilitate new business opportunities or stimulate existing initiatives for material recycling, reuse and/or substitution.
10	<b>Eastern Caribbean Regional Ocean Policy (ECROP)</b>	GEF funded and World Bank executed	Dominica, Grenada, Montserrat, Saint Lucia and St. Vincent and the Grenadines	<p>The Eastern Caribbean Regional Ocean Policy (ECROP) and its Strategic Action Plan (SAP) endorsed by OECS Heads of Government in 2013, guides the future use of the region’s marine waters and provides a basis for enhanced coordination and management of ocean resources within the Eastern Caribbean. In 2019 the ECROP was revised to align with the UN Agenda 2030 for Sustainable Development – SDG 2030 and aims to promote and guide the future sustainable use and development of the region’s marine resources.</p> <p>ECROP has an overall objective of developing and implementing integrated ocean governance policies to leverage sustainable public and private investment in resources found in the Exclusive Economic Zone of OECS member states. It sets out a vision that reflects a desire to transition to a blue economy that contributes to society, and it outlines a set of overarching principles to guide all that is being done to achieving that vision. The policy outcomes clearly indicate what has to be achieved; the goals that will allow the OECS to know when the outcomes have been reached; a set of action items to enable the OECS to achieve its vision, outcomes and goals, and a set of indicators to measure progress in achieving the vision.</p>



#	Project/Activity Name	Partners/ Institutions	Countries Involved	Brief Description
11	<a href="#">Plastic Waste-Free Islands (2019-2021)</a>	IUCN with funding from the Norwegian Agency for Development Cooperation (Norad)	Antigua and Barbuda, Grenada, Saint Lucia	<p>The Plastic Waste-Free Islands (PWFI) project was launched by the IUCN in 2019 in collaboration with Norad.</p> <p>In February 2020, the OECS signed a Memorandum of Understanding with the International Union for Conservation of Nature (IUCN) to establish regional collaboration on the Plastic Waste Free Island (PWFI) Project. This three (3) year initiative focuses on finding practical, quantifiable solutions to addressing plastic waste and leakage from Small Island Developing States (SIDS). The project, which is funded by the Norwegian Agency for Development Corporation (Norad), is explicitly aimed at:</p> <ul style="list-style-type: none"> <li>▪ Improving knowledge of waste generation</li> <li>▪ Increasing policy effectiveness to reduce plastic waste generation and enhance disposal</li> <li>▪ Enhancing the adoption of plastic leakage reduction measures by tourism, fisheries and waste management sectors and value chain development and</li> <li>▪ Developing a PWFI Blueprint to be endorsed by regional SIDS bodies.</li> </ul> <p>The project also aims to support utilising and repurposing waste into commercially viable products for sale, thereby generating job opportunities and income.</p> <p>This approach to addressing plastic waste is unique as many efforts in the past were focused on sources from continental land, rivers and coastal areas but not necessarily from islands. As a result, six (6) target SIDS were identified, three (3) from the Caribbean region, namely Antigua and Barbuda, St. Lucia and Grenada and three (3) from the Pacific- Fiji, Vanuatu and Samoa. Between 2020 and 2021, assessments of plastic waste and leakage were conducted on all target SIDS. These assessments comprised a quantification of waste by polymer, estimating the leakage rates and conducting a material flow analysis using established procedures and a gap analysis of recommendations related to policies and activities related to tourism, fisheries and waste management sectors. Following these assessments, training of National staff in the quantification of plastic waste was conducted. Having now completed the analysis of plastic waste leakages, the</p>

#	Project/Activity Name	Partners/ Institutions	Countries Involved	Brief Description
				<p>project will analyse policies to address leakages, make recommendations to address those gaps, and develop strategies to support the uptake of these recommendations.</p> <p>The proposed development of a PWFI Blueprint (or roadmap) gives the initiative great potential for continuity as it can be implemented on other SIDS to achieve similar results even after the project has ended. Collaboration with the OECS is vital in this regard. This Norad funded and IUCN executed project is expected to end in December 2021.</p>
12	<a href="#">RePLAST-OECS Regional Recycling Project</a>	French Ministry of Foreign Affairs; Private partners from Saint Lucia; Solid Waste Management Authority of Saint Lucia; in collaboration with the Government of Saint Lucia and other private and civil society agencies	Saint Lucia	<p>The RePLAST-OECS Caribbean Pilot Plastic Project is a regional Plastic Waste Management and Recycling initiative designed to create a sustainable economic solution to the issue of plastic disposal in the Caribbean Small Island Developing States. By creating a system that moves from collection to export, Polyethylene Terephthalate (PET) and High-Density Polyethylene (HDPE) plastic bottles can be removed from the environment while also creating new financial flows from the export of plastic to be recycled.</p> <p>The Project was established through funding from the French government with the intention of supporting the development and implementation of a Caribbean-wide plastic waste collection and recycling system through a pilot cooperation approach between the Government of Saint Lucia, the OECS Commission and Private Sector and Civil Society entities.</p> <p>The Project was designed and is being executed by UNITE Caribbean, a Caribbean Development Cooperation consulting firm with a social mandate. The RePLAST-OECS Project aims to support the collection of plastic in Saint Lucia in select Communities, Institutions (Schools) and the Private Sector (Hotels). Since 2019, Saint Lucia has been the first pilot country to develop and test the methodology and systems to create a sustainable solution for plastic disposal in the Caribbean, involving a community-led collection system and a digital incentive scheme.</p> <p>To date, the RePLAST–OECS Project has collected 52,000 lbs of plastic bottles and facilitated an experimental shipment working with local recyclers of two 40-foot containers of baled PET bottles of approximately 26,000 pounds (lbs). This</p>

#	Project/Activity Name	Partners/ Institutions	Countries Involved	Brief Description
				<p>exported plastic waste would normally be disposed of and, as a result, has increased the life of the Landfill.</p> <p>Through targeted engagement with state agencies, the corporate sector and local communities, the Project has embraced the circular economy concept with a focus on two of its core principles – Reuse and Recycle. Though working in Saint Lucia since 2019 to develop and test the methodology and systems, the broader goal is to establish a sustainable Caribbean-wide waste management and recycling system.</p> <p>Given the successful completion of the first pilot phase in Saint Lucia, additional funding is sought out to continue and expand the Pilot Project in Saint Lucia, as well as for replication in other Eastern Caribbean states and territories in support of the broader Project goal.</p>
13	<a href="#">Circular Economy Coalition for Latin America and the Caribbean</a>	IDB, UN Environment, UNIDO Climate Technology Centre and Network, Ellen McArthur Foundation Platform for Accelerating the Circular Economy, World Economic Forum, Konrad Adenauer Stiftung	Under development	<p>Mission: To provide a regional platform to enhance inter-ministerial, multi-sectoral and multi-stakeholder cooperation, increase knowledge and understanding on circular economy, provide capacity building and technical assistance for the development of public policies for circular economy and sustainable consumption and production.</p> <p>The idea of the Circular Economy Coalition for Latin America and the Caribbean responds to the great interest and initiatives on circular economy promoted by governments, the private sector, research institutes and other social actors, as well as by the multiple initiatives of regional and international organizations that provide technical support on innovation and circular economy approaches.</p> <p>The Circular Economy Coalition’s main objectives are to create a common regional vision and perspective with an integrated and holistic approach, to be a platform for sharing knowledge and tools, and to support the transition to the circular economy with a life cycle thinking approach.</p>
14	<b>GEF Sustainable Cities Project</b> (GEF 10547) Reduce marine plastics and plastic pollution in Latin	GEF – International Waters UNEP - Waste ROLAC - Chemicals	Jamaica, Colombia and Panama	Concept approved and now in the preparation seeks to “Reduce marine plastics and plastic pollution in Latin American and Caribbean cities through a circular economy approach. It is also expected to deliver impactful development outcomes at large scale and with multiple global environmental benefits. To

#	Project/Activity Name	Partners/ Institutions	Countries Involved	Brief Description
	American and Caribbean cities through a circular economy approach			strengthen opportunities for cutting-edge support, learning and knowledge sharing. The program will be delivered through two interlinked components: <ol style="list-style-type: none"> <li>1. innovative implementation models for integrated sustainability solutions and investments in selected cities and countries; and</li> <li>2. a global platform and coordination project.</li> </ol> <p>As the country and city-level investments lead to multiple global environmental benefits, the global platform will enhance the potential for amplifying the benefits across many more cities in recipient countries.</p>
15	<b>“Fighting chemicals pollution and waste from plastics in the Caribbean tourism value chain”</b>	UNEP – Chemicals Branch for submission to the French Facility for Global Environment (FFEM).	Under development:	This is intended to build and complement the GEF ISLANDS and Sustainable Tourism project, with a focus in Saint Lucia, Saint Kitts & Nevis and Antigua and Barbuda (we also pointed out the need to coordinate with several other initiatives...). This is in formulation phase until March 2021”
16	<b>Cooperation Project between ESPACE SUD and UNEP Caribbean (United Nations Environment Program) on solid waste management.</b>	UNEP	Under development.	Facilitate exchange of experience in the OECS countries.

## 4.0 KEY ISSUES AND ACTIVITIES

Notwithstanding the success achieved by some countries in bringing some order to the management of waste in their respective countries, the increase in the generation of waste, particularly plastics was exacerbated by the COVID -19 pandemic, burdening countries with additional waste while struggling to maintain economic activity. Taking into consideration both the issues in CWMAP 2018 as well as new challenges confronting Caribbean countries, a vigorous discussion took place at the 4<sup>th</sup> HLF Meeting where the issues were reviewed, and further recommendations made for follow up action. While seven key issues were identified at that meeting, the literature review suggested that there might be additional issues countries have to grapple with in addressing waste management. In that regard, the seven key issues are reviewed below and additional issues, based on information gained from the literature review are added to the list that should form a part of the updated CWMAP. These are considered key, given the fact that countries are now faced with issues relating to landfills being overwhelmed and reaching their end of life or limited space, the critical need to consider recycling as an integrated part of waste management and consideration and application of the Circular Economy concept as a means of reducing the generation of waste.

### 4.1 Communication and Collaboration

Communicating the importance of waste management and the cost of inaction to high-level officials is fundamental in advancing sustainable solid waste management systems in Caribbean Island nations. Examples do exist where high-level government officials understand the relationship between sustainable solid waste management and a vibrant economy. However, it is still the exception and not the rule in the region. Especially, if additional funding is required to improve waste management systems.

In addition, solid waste administrators, managers, regulators, operators, and educators (Solid Waste Professionals) need to have access to information and resources, as well as communicate with each other, to develop efficiently and effectively, finance, operate and maintain solid waste infrastructures and strategies. It is also needed to provide a greater understanding of what works, what does not and how the region can improve upon these in countries that may be uniquely challenged.

Multiple organizations, universities and financial institutions provide some level of technical and financial support to Caribbean islands. This support has produced numerous reports and studies, and a measurable amount of grants and loans have been awarded. However, no database exists that catalogues all this information and assesses the effects of the research and funding on improving waste management in the region. The following are some of the institutions with a long history of working in the region.

- Basel Convention Regional Centre for Training and Technology (BCRC)
- Caribbean Development Bank (CDB)
- The Caribbean Community (CARICOM)
- Caribbean Public Health Agency (CARPHA)
- Caribbean Water and Wastewater Association (CWWA)
- GIZ
- Inter-American Development Bank (IDB)
- International Solid Waste Association (ISWA)
- Japan International Cooperation Agency (JICA)
- Pan American Health Organization (PAHO)

- Solid Waste Association of North America (SWANA)
- United Nations Environment Programme (UNEP)
- World Bank

While a platform for networking does not currently both international and regional institutions that are associated with waste management have the potential to serve as partners in solving the region's solid waste management challenges. Collaboration is essential in reducing duplication and ensuring that the limited resources are used very efficiently.

## 4.2 Strategic Planning

While proper waste management is a regional concern, the use of a systematic process that provides clear guidance, steps and helpful tools for the development and execution of a national waste strategy is limited. This lack of a strategic planning process often results in Caribbean Island nations selecting a “waste solution” without considering the systematic financial, regulatory, infrastructure, technical capacity or educational requirements to implement it.

As waste management affects all civil society, structuring a strategic planning process that includes their perspective is essential. Without input from residents, business and government officials on a new waste management system, siting facilities will be opposed, regulations will be challenged, funding requests will be rejected, and education campaigns will be ignored. Consequently, there is an urgent need for holistic solid waste planning (financial, economic, environmental, social, infrastructure and policy) and the adoption of integrated approaches toward waste management in the region.

In addition, countries receive numerous, unsolicited proposals to “solve” complex waste management problems, such as WTE or other landfill diversion technologies, that claim to eliminate the need for landfills and can be deployed at no cost to local government. Unfortunately, there are no commercially operating technologies that can divert all municipal solid wastes that Caribbean countries need to manage, from landfill disposal. Knowledgeable and committed Solid Waste Professionals operate Caribbean solid waste management systems. However, many of the companies distributing unsolicited proposals for advanced technologies communicate directly to ministries of investment or economic development, and local, Solid Waste Professionals do not have an opportunity to vet them before legal documents are executed.

The business models of these technologies typically do not include the cost to deliver waste to the WTE or recycling plant or the disposal of waste that the plant does not convert into energy or new products. Project developers typically expect the local government to bear these, systematic infrastructure and financial responsibilities. However, the government has not planned to provide this level of support and ultimately the project does not progress. In addition, many island nations do not have regulations to monitor air and water pollutants that advanced waste management technologies may generate.

Therefore, a long-term strategic plan that includes specifics on how all waste will be collected, recycled, composted, processed and/or disposed of is essential. In addition, the strategic plan should include criteria on selecting and siting solid waste facilities, as well as regulations to govern their development and operation. The strategic plan should also include estimates on the cost of providing an integrated waste management system and how this system will be funded. Finally, islands should adopt a process for ratifying strategic plans that includes the public and government officials, as well as regulations to assure that recommendations in the strategic plan are implemented.

### 4.3 Sustainable Financing

Financing from all sources - domestic, international, public and private, is critically important to advance sustainable SWM in Caribbean Island nations. While a few countries, notably Grenada and St. Vincent and the Grenadines have introduced financing mechanisms to meet the cost of the waste collection and disposal services, there is the general view among Solid Waste Professionals throughout the region that sufficient funds are not available to operate and maintain solid waste collection, processing and disposal facilities. This inadequate funding is systematically impeding the collection, processing and disposal of waste mostly because equipment now requires major repairs or replacement since operators lacked funds to repair or conduct routine maintenance on existing equipment.

For most countries, waste collection and disposal are primarily funded from the consolidated fund, and it is therefore assumed that taxes paid by households, individuals and businesses cover the cost of waste management. In several instances, that government subvention is augmented by various charges including levies on certain items. In several of the OECS countries a tourist levy was introduced in 1998 as part of the rolling out of the GEF-funded and World Bank executed OECS Solid and Ship-generated Waste Management project (1997 – 2003). However, several of the countries, under pressure and threats from the cruise industry, have either reduced or eliminated that tax. Introduced in 1998 at US\$5.00 per visitor, adjusting for inflation as well as the increasing demand to manage waste from the tourism sector suggests the need to increase the Head Tax from US\$ 5.00 per visitor to \$10 – \$15.00. It is also being suggested that the region adopt a harmonised position and unified approach, with the active support of regional and international multilateral agencies and the professional communities, to make such a charge a reality.

There is, therefore, an urgent need for sustainable financing mechanisms in most of the project countries, that is consistent with the level of investment and operational cost that are required to ensure proper waste management practices. The financing vehicles envisaged range from user fees on households (where none is currently applied) or a better application of rates that would ensure that most households are covered and that the fees paid reflect the approximate or true cost of waste collection and disposal.

### 4.4 Infrastructure

In Caribbean countries, both upstream waste collection and downstream waste disposal experience significant infrastructure challenges. Upstream waste collection systems typically require an excess of 50% of a waste authority's budget and the revenues they receive do not sufficiently fund waste collection expenditures. Lack of funds has prevented adequate maintenance and timely replacement of waste collection vehicles. Most equipment is at least 15 years old, and mechanical failures prevent efficient waste collection routing. Downstream, many of the landfills are reaching or have even exceeded maximum capacity. Examples of these include the Forres Park Landfill Site in Trinidad, constructed in 1983 with an intended life of 25 years, the Cooks landfill site in Antigua and Barbuda and the Vieux Fort Landfill Site in the South of Saint Lucia, which has now been closed. The population with access to a system of regular waste collection and properly managed landfills increased from approximately 20% in 2000 to over 50% by 2014. However, the trajectory of improving waste management in the respective countries has stalled and in fact, is regressing due to lack of national strategic planning, funding and the implementation of programmes and projects to decrease dependency on landfills. Finally, MARPOL Annex 5 requires that each of the parties to this convention



provide adequate waste reception facilities. However, many do not have adequate infrastructure to receive and safely process and dispose of ship-generated waste.

#### 4.5 Waste Pollution

Environmental pollution by solid waste negatively impacts terrestrial, coastal and marine environments, causing a range of issues for flora, fauna and humans. While a significant amount of waste including plastics and microplastics end up in the coastal and marine environment, pollution by solid waste is also a major issue for terrestrial biodiversity as well as ecosystem and human health.

Pollution in the coastal and marine environments is of concern to ecosystem health and sustainable livelihoods worldwide. Historically, a considerable amount of waste pollution was comprised of plastics and tires, and now electronic waste is becoming an increasing component of land-based sources of pollution. Each year, 275,000 tons of waste pollution ends up in Caribbean open-air dumps or local waterways. The impact of waste pollution is of relevance to island nations dependent on coastal and marine resources, and concomitantly struggling to adapt to climate variability and change.

Most Caribbean Island nations have enacted legislation to govern the operation of solid waste facilities, as well as prevent open dumping and littering. However, only a few have promulgated regulations to provide guidance to ensure laws are enforced and associated penalties for non-compliance are implemented. Enacting environmental regulations is sometimes criticized as preventing development in emerging markets; and it is true that excessively stringent measures impose market access restrictions and cause limitations on competitiveness. However, due to the fragility of island ecosystems, economic development needs to be balanced with preserving the environmental security. Finally, just replicating environmental regulations from other regions of the world has not succeeded as they do not match the technical requirements and socio-economic reality of Caribbean, and do not take the institutional capabilities of the society that has to implement them into consideration.

#### 4.6 Natural Disaster Debris

Caribbean islands struggle with the effects of disasters, many of which have increased in intensity and some of which have been exacerbated by climate change. These disasters can disproportionately affect small islands, and there is a critical need to increase preparedness to manage the extensive amount of wastes these disasters generate. Infrastructure resources and technical know-how available to individual Caribbean islands to respond to natural disaster waste has been inadequate to effectively respond to these crises. Without the necessary resources, affected islands have not fully succeeded in preventing this debris from becoming waste pollution and a health hazard.

#### 4.7 Landfill Diversion and Recycling

Caribbean island communities face unique challenges when diverting solid waste from landfill disposal, specifically:

- Markets – Using recyclables as a feedstock in manufacturing, which is the most profitable off taker of recyclable commodities (i.e., metals, glass and plastic), is virtually non-existent on island communities. Consequently, the cost of collecting, processing and most importantly, transporting recyclable commodities cannot be offset by local recycled-content feed stock sales. Further complicating the situation is that many Caribbean islands do not have deep-

water ports to attract a broker that would transport their recyclables to the more lucrative markets.

- Informal Recycling – Both the public and private sector are conducting numerous recycling activities throughout the region, some of which are formally structured. However, much of it is unorganized and very dependent on fluctuating prices in external market.
- Trade Barriers - While recyclables may be collected, many recyclers were not able to sell these materials for conversion into a new product either on or off-island. Frequently, recyclers stockpile these materials for months; and sometimes, years. During the rainy season, some of these stockpiled recyclable's run-off into waterways and become marine litter. They also provide habitat for vectors that cause diseases. Recent developments in the international markets for restricting contamination in recyclables, may require island nations to implement source-separated recycling collection programmes and for recyclers to purchase extremely high-tech processing equipment to eliminate contamination. However, even with this level of investment, island nations may not be able to sell the recyclables at a price high enough to recover their costs.
- Public Participation – Most landfill-diversion programmes, such as recycling and composting, require a certain amount of separating of recyclables at the point of generation (source separation) to produce products that have high market value. Therefore, behavioural, public awareness, education, communication, incentives and other changes are required to encourage source-separation.

#### **4.8 Public/Private Partnerships and Innovation**

The private sector plays an increasingly important role in achieving sustainable SWM systems, including progressing waste management projects through public-private partnerships (PPPs). In addition, sustainable development will also depend, inter alia, on intergovernmental and international cooperation and the active engagement of both the public and private sectors. However, private sector investment in Caribbean solid waste management infrastructure facilities, such as landfills, transfer stations, recycling facilities and waste-to-energy plants is extremely limited in the region. The PPPs could also play a role in resolving issues such as the transport of secondary materials or waste from the islands, which is problematic due to high cost of transportation. In addition, there is room for other, more innovative policies such as the option to replace buying goods with buying services. As an example, buying air-condition as a service instead of buying the machine, leaving the responsibility of the machine with the company who would be providing the whole package of service to the customer, including maintenance, remanufacturing and eventually sustainable disposal.

Beyond PPPs, innovative strategies to increase landfill diversion requires local governments to foster entrepreneurship and innovation, build capacity and increase the competitiveness and social entrepreneurship of micro, small and medium-sized enterprises on each island. For all these initiatives, it is essential to promote inclusive participation of all people, including the poor, women, youth and persons with disabilities.

#### **4.9 Circular Economy**

The concept of a circular economy is not new, but it has received renewed impetus in the past five years. One of the main promoters of the concept has been the Ellen MacArthur Foundation working

with a number of major companies and institutions, such as the World Economic Forum. The circular economy approach is built on three principles:

- Eliminating waste and pollution
- Keeping products and materials in use
- Regenerating natural systems

The circular economy solutions contribute to various sustainable development goals (SDGs). It helps to meet the overall energy needs (SDG 7- affordable and clean energy) and entails GHG emission reductions (SDG 13-climate action). Furthermore, it also contributes to SDG 8 (decent work and economic growth), SDG 9 (industry, innovation and infrastructure) and SDG 12 (responsible consumption and production) through the creation of job opportunities, closed loops in industries and industrial symbiosis, and recovery of energy/material from waste.

Caribbean countries stand to benefit from a circular economy approach through, inter alia, the reduction of landfill space required for disposal of wastes, and the reduction in pollution because of keeping products and materials in use. However, there are many challenges that must be overcome in transitioning to a circular economy system. These include:

- Diseconomies of scale
- High Levels of imports of consumer goods
- Cultural norms
- Limited natural resources

Some concerted efforts at developing circular economy approaches in the Caribbean countries need to be considered. These would include:

- Focus on repair of items
- Rental versus ownership of seldomly used consumer goods
- Swap shops
- Second-hand shops

Transitioning to a circular economy does not only amount to adjustments aimed at reducing the negative impacts of the linear economy. Rather, it represents a systemic shift that builds long-term resilience, generates business and economic opportunities, and provides environmental and societal benefits.

#### **4.10 Extended Producer Responsibility**

The Caribbean has been reluctant to introduce extended producer responsibility arrangements to provide sustainable financing to the waste management industry and put more responsibility on the producers of the waste items for its management. However, EPR systems have worked to good effect in many other parts of the world and the Caribbean would do well to learn from these and emulate. EPR systems can be applied to packaging, electronic items, automobiles, batteries and tyres.

EPR is based on the principle that manufacturers (usually brand owners) and retailers have the greatest control over product design and marketing and have the greatest ability and responsibility to reduce toxicity and waste. However, in the Caribbean EPR in its truest sense may not be the most appropriate given that most of what is consumed and enters the waste stream are imported. EPR may take the form of a product reuse, buyback, or recycling program, giving authorities, several options from which to choose. Some of the measures envisaged could include take-back measures, economic

instruments e.g., advanced disposal fees, deposit-refund schemes, and a combined upstream tax/downstream incentives, subsidy and standards.

Take-back measures involve manufacturers being held responsible for taking back their products from end users at the end of the products' useful life, or partially financing a collection and recycling infrastructure.

A Deposit Refund Scheme (DRS) provide a small refund to consumers when bottles or plastic items are returned to an authorized collection point. The aim of such a system is intended to encourage recycling.

Another instrument operating under the EPR umbrella is the Advanced Disposal Fees (ADF) where non-refundable fees levied on individual products at the point of purchase or import, with the fee being built into the price of the product based on the estimated costs of collection and processing.

EPR systems have been implemented since 1970, but a significant increase in adoption can be seen in the last decade. The coverage of costs for collection, sorting, and recycling has been identified as one of the major strengths of responsibility systems because they can ease the burden on public budget, reducing the financial costs of waste management.

Products which are usually attract EPR instruments are as follows:

- Batteries
- Bottled beverages
- Carpets
- Electronic devices such as televisions, computer monitors, laptops, etc.
- Plastics
- Mattresses
- Paint
- Tires

Other revenue generating measures would include:

- Household levy
- Tax or levy on single use items
- Tax or levy on large consumer goods
- Tax or levy on items that have a low recycle value
- Deposit Refund Scheme
- Landfill disposal fee

#### 4.11 Comment on CWMAP 2018

Whilst the CWMP correctly identified several key issues of concern to Caribbean government, and the discussions coming out of subsequent HLF Meetings reinforced the need to give attention to those issues, the current review suggests that efforts to implement the recommended action have only been partially realized. Notwithstanding the fact that several reasons have been advanced for the chronic implementation deficit it is generally agreed that the following are some of the more compelling factors contributing to the success in implementation.

##### **Lack of appropriate financing mechanisms for activities:**

Whilst the document presented specific activities to be undertaken to achieve the objectives identified, it did not specify any financing mechanisms to be able to undertake these activities.

As such, the onus was left to individual waste management authorities to pursue their own financing mechanisms, and to donor organizations to individually arrange with these authorities for the undertaking of specific projects.

#### **No clearly defined implementation mechanism:**

For the successful implementation of regional and sub-regional projects, an appropriate implementation mechanism is required that will seek funding, engage waste management authorities, develop contract documents, hire consultants and/or contractors, and measure and monitor progress. Such a mechanism was not specified in the original document.

#### **Challenges of Covid-19:**

The Covid-19 pandemic has impacted all waste management authorities in several ways. Firstly, the attention that Covid-19 demanded meant that authorities had to focus their resources on combatting this pandemic, shifting their attention from developmental activities. Secondly, the restrictions created due to this pandemic slowed down many project implementation activities, resulting in delays in the completion of infrastructural upgrades in many countries. Additionally, in some countries that depended on tourism as a means of waste management financing, the reduction in tourist numbers due to the pandemic resulted in reduced revenues and cancellation of intended projects.

#### **Political will:**

While there is clear evidence that governments have supported several waste management initiatives, such as banning items that present a significant threat to the environment, there is also recognition that much more could be done. It is not uncommon to find adequate policies, laws, and regulations in some countries that are not adopted or in draft form for several years. Also, it is well established that in a region like the Caribbean, with small populations, economies of scale and effort is best achieved if there is a harmonised or cooperative effort. Among the issues best addressed at a regional level are harmonised data collection and management, standard fees regarding taxes and visitor levy, and initiatives at ensuring that manufacturers and others involved in the retail sector do much more to reduce the amount of packaging material that comes into the islands and take greater responsibility for their final disposal.

#### **Absence of ownership or lack of a Champions**

Like most initiatives involving the sustainable use of natural resources, their management, particularly the widespread participation of the public, requires champions, both at the national and regional levels. The Cartagena Convention Secretariat and other regional partners and donor agencies have been doing a tremendous job in providing financial and technical support. However, sustaining those initiatives, particularly at the national level, requires Champions. For example, in 2019, Antigua and Barbuda led the effort in placing bans on the use of plastic shopping bags, single-use plastics and Styrofoam. Later that year, they led the charge in getting the CARICOM Member States to adopt the St. John's Declaration that commits the Member States that have not yet done so to introduce measures to reduce and/or eliminate the use of single-use plastics. Thus, champions are needed to move the respective priority activities in the CWMAP forward.

## 5.0 COUNTRY SPECIFIC INITIATIVES AND BEST PRACTICES

Despite the overall challenges facing Caribbean Countries regarding waste management, there are examples of best practices within several Caribbean Countries that the other territories can look at. These best practices demonstrate methodologies which have proven to be innovative and effective in influencing change and can be used as a model for replication and upscaling. These are as follows:

### 5.1 SBRC Barbados

Sustainable Barbados Recycling Centre, Inc. (SBRC) was formed in early 2008, following the successful award of contract by the Government of Barbados. The objective was to establish a centralized location for the handling of all the waste on the island, where accurate measurements of waste quantities can be made, and where the opportunity is provided to dispose of waste in the most environmentally and cost-effective manner and to prolong the life of the Government Sanitary Landfill located at Mangrove in the parish of St. Thomas, Barbados. The contract is for a 20-year period under a Build, Own, Operate and Transfer agreement.

SBRC receives and processes the island's solid waste. The principal objective of the facility is to divert waste from the Sanitary Landfill. The immediate benefit to the Government and to Barbados is less waste going to the landfill and an extended landfill life. Long term benefits are numerous, not least being the reuse of materials, which ultimately would be replaced with imports if no recycling is implemented.

The SBRC model is an example of a successful public-private partnership (PPP) for waste management that can be replicated throughout the Caribbean. Through this arrangement the private operator focuses on the operations and management of the material recovery facility whilst government focuses on monitoring and evaluation.

### 5.2 Landfill and Transfer Station Belize

Waste management in Belize fall under the purview of the Belize Solid Waste Management Authority (BSWaMA). The Authority was formally established through the enactment of the Solid Waste Management Authority Act, 1991, Chapter 224 of the laws of Belize Revised Edition 2000. The Authority was established to ensure that solid waste generated in the country is managed in an environmentally sound manner. The Authority is currently managing a regional sanitary landfill, located at Mile 24 on the George Price Highway, and five waste Transfer Stations, namely the Belize City Transfer station, San Ignacio/Santa Elena/ Benque Viejo Transfer station, San Pedro Ambergris Caye Transfer Station, Caye Caulker Transfer Station and the Burrell Boom Transfer Station. These are located at closed/remediated dumpsites with the exception of Caye Caulker.

The Regional Sanitary Landfill is located at Mile 24 on the George Price Highway approximately 2 miles heading due North along a paved access road. This is the country's only Sanitary Landfill. The entire parcel of land where the landfill facility is located is 370 acres. This is the final disposal location for waste originating from municipalities in the Western Corridor (Belize City, San Ignacio/ Santa Elena – Benque Viejo, San Pedro Ambergris Caye and Caye Caulker). The first two Municipal Solid Waste cells (Phase I and II) occupy approximately 10 acres.

The Mile 24 Regional Sanitary Landfill was designed, constructed and supervised in accordance with internationally accepted standards for municipal solid waste landfills. The landfill has the following features:

- **A composite bottom liner:** to keep all liquids within the landfill and prevent the contamination of water sources e.g., surface and ground water. The composite bottom liner is comprised of the following:
  - **Geomembrane** synthetic material (80 mils thick plastic) which is placed on top of the compacted native clay.
  - A leachate (contaminated water) collections system which is comprised of a river gravel drainage layer (300 mm) and a network of perforated pipes are placed on top of two layers of another synthetic material known as geotextile.
  - **Leachate or liquid waste collection and treatment system:** This system is comprised of the leachate collection pipes, a submersible pump that automatically discharges leachate into the first of a series of treatment ponds.
  - **Treatment Ponds:** Three ponds (anaerobic, maturation and facultative) lined with geomembrane (60 mils) receive the leachate where it undergoes natural treatment.
- The leachate once treated and tested is discharged into the sedimentation area and eventually offsite by way of the storm water system. Prior to the discharge of leachate off site it must meet effluent standards established by the Department of the Environment.
- Additionally, the landfill facility is equipped with an administrative building, a weigh scale and scale house, mechanic workshop, upstream and downstream monitoring wells and a hazardous waste cell.

The Hazardous Waste Cell is to be used for the safe disposal of hazardous waste (prior approval required from the Operator). This cell has two composite bottom liners to prevent the percolation of leachate or contaminated water to groundwater. Each of these liners consists of, from the bottom up: a compacted clay, geomembrane, one layer of geotextile, round river gravel drainage layer (300 mm) and submersible pump.

The transfer station facilities that are operated by BSWaMA play an important role in a community's total waste management system, serving as the link between a community's solid waste collection program and a final waste disposal facility, in our case the regional sanitary landfill located at Mile 24 George Price Highway. A transfer station provides a safe, efficient, and cost-effective means to process and transfer solid waste from the waste generators to a final disposal site.

Wastes are brought to the facility by collection vehicles (garbage trucks) as well as self-haul vehicles ranging from pickup trucks to dump trucks. The waste is dumped onto a concrete floor (the 'tipping' floor) inside of the transfer station. Recyclable materials such as PET bottles (soft drink and water bottles), HDPE bottles (bleach bottles), glass bottles, aluminium and steel cans are sorted out manually and removed from the facility. The residual waste is then loaded by a front-end loader into large-capacity transfer trailers and hauled to the regional sanitary landfill.

The single regional landfill and transfer station system built by the BSWaMA through funding from the Inter-American Development Bank (IDB) demonstrates the single landfill concept that may also be applicable to the larger countries of the Caribbean such as Cuba, Jamaica, Haiti, Dominican Republic, Trinidad and Tobago, Guyana and Suriname.

### 5.3 Sustainable Financing – Grenada

Grenada, unlike most of its Caribbean neighbours utilises a variety of revenue generating mechanisms. These include a household levy that target most households, an environmental levy on all glass and plastic beverage containers imported into Grenada and a Visitor Tax levied on all cruise passengers



visiting Grenada. The environmental levy, which accounts for 59% of the total revenue, is paid by households based on electricity consumed and shows up as a charge on their electricity bill. The amount paid by each household every month is assessed as follows:

- <99KW: Subsidized by the government
- 100 – 150KW: USD 1.85
- >151KW: USD 3.7

The electricity levy is collected directly by the Grenada Electricity Services Co. Ltd (GRENLEC) and disbursed directly to GSWMA. It is estimated that at least 55% residential households in Grenada exceeded 100 kWh monthly, (or 14,000 households) exceeded 150kWh and 20% (or 8,000 households) consumed between 100KWh and 150kWh.<sup>3</sup>

In 2018, the Grenada Solid Waste Management Authority reported total expenses at US\$ 3,854,000.00 and revenues amounting to US\$ 6,112,000.00, a surplus of USD 2,258,000 in 2018, making them the only country in the region whose solid waste management operations that is not primarily dependent on government revenues, that shows a profit. According to a 2010 IDB report the waste service charge, based on the electricity consumed and billed together with the electricity bill, like what is being done in Grenada, is the method of highest return.<sup>4</sup>

#### 5.4 Single Use Plastic Ban Antigua and Barbuda

As part of the transition to a circular economy the government of Antigua and Barbuda has passed legislation namely, the External Trade (Shopping Plastic Bags Prohibition) Order, 2017, No. 83, which bans the importation and use of single use plastics. The intention is to reduce the plastic waste generated on the island. The use of compostable alternatives is preferred but no formal standards have been developed for the influx of alternative “bio-degradable” products. Based on anecdotal evidence, the imposition of this prohibition order has led to a significant decline in waste plastics entering the landfill site as well as the amount of litter being generated. Further initiatives in that regard included the imposition of a ban on mesh plastic wrappings of fruits being sold in supermarkets and the development of a Recyclable Waste Management Act, which would have regulated the way recyclable waste was managed. However, since the curtailment of normal life due to the pandemic, several of these activities have been halted temporarily.

#### 5.5 Deposit Return System (DRS) – Saint Vincent and the Grenadines

The island has been able to implement an effective system to promote the recovery of plastic for recycling. This bottle collection program has been able to realize the export of between 8-20 Ton containers yearly of PET and 2-23 Ton containers of HDPE. This has also resulted in the employment of 300 collectors, 60% of whom are women. The top 2% of women make at least EC\$3000 monthly. This system is being managed by a company called Air Inc, however, there have been several sub-

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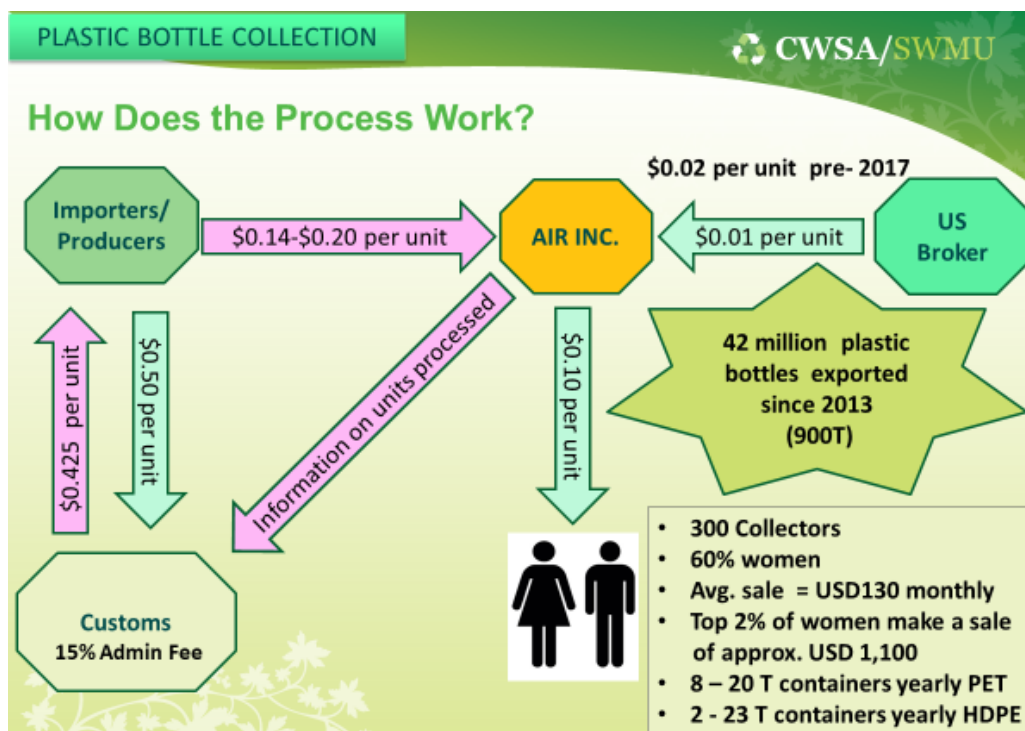
<sup>3</sup> Roberts, Diane; Country Analysis on Plastic Waste Management Grenada as part of the Study on the Applicability and Effects of Selected Instruments to Reduce the Input of Plastic Litter into the Oceans; September 2015

<sup>4</sup> Espinoza, Pilar Tello; Martínez Arce, Evelyn; Daza, Diego; Soulier Faure, Martin; Terraza, Horacio. 2010. IDB Regional Evaluation on Urban Solid Waste Management in Latin America and the Caribbean. IDB, Washington D.C.



collectors who collect from small generators and resell to the company. See diagram of how the Plastic Bottle Collection Program operates.

Figure 1: Plastic Bottle Collection Program in St. Vincent & the Grenadines



Source: CWSA 2020

## 5.6 Standardized Storage Bins Saint Kitts and Nevis

The Government of St. Kitts and Nevis, through the Solid Waste Management Corporation (SWMC), has completed a National Bin Distribution Programme that entailed the distribution of 12,000 standardized bins to every household across the nine parishes in St. Kitts. Each household was provided with one (1) 65-gallon bin. This program was one component of a five-point strategic plan designed to improve the overall efficiency and integrity of the SWMC’s waste collection and disposal services. The bins are Smart Bins, outfitted with modern technology to enhance the collection system and customer service. The bins are all branded with the logo of the Solid Waste Management Corporation along with important information to guide disposal practices. These bins are designed with unique barcodes and serial numbers to facilitate easier distribution and inventory control.

Additionally, trucks were outfitted with new equipment that automates the lifting of the bins on the trucks, emptying them into the vehicles. This will make the process of garbage collection more efficient and increase the level of service provided to residents.

The standardized bin system in St. Kitts represents an internationally accepted practice aimed at reducing the manual labour involved and the associated labour and health and safety challenges that this presents. It can be replicated throughout the Caribbean.

**Figure 2: Standardized Bins in use in Saint Kitts**



Source: SKN Government Media

### **5.7 Tyre Recycling Guyana**

Through the Institute of Applied Science and Technology (IAST), used tyres are processed into rubberized asphalt cement. The tyres are first debanded, and then shredded. The shredded tyres then go through a granulation process which breaks them down into very fine pieces. These then go through a series of separation processes to separate the rubber from other constituents. The rubber then goes through a heat treatment process where it is used to form the rubberized asphalt cement. This material is used to coat the Demerara Harbour Bridge and other steel bridges. In 2018, the institute acquired a mobile asphalt plant to allow the rubberized asphalt cement material to be applied to the bridges at location, since before the plates from the bridge had to be brought to the institute to be coated. The material is adhesive and elastic, therefore it lasts longer and in addition provides more friction and therefore is safer compared to the materials used currently.

Whilst further evaluation of the process and the results obtained may be required, tyre disposal presents challenges in many Caribbean countries, and this process may be suitable for replication in other Caribbean countries.

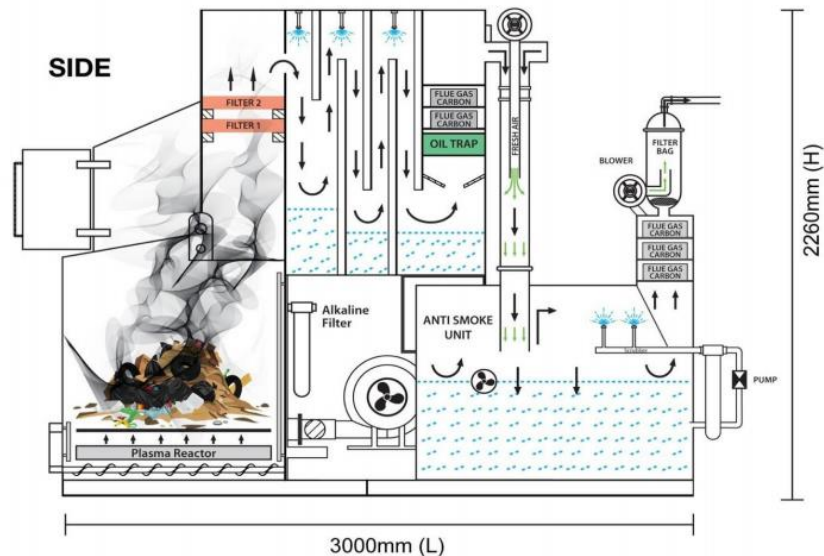
### **5.8 Pyrolysis Units Saint Lucia**

Waste Management in Saint Lucia falls under the purview of the Saint Lucia Solid Waste Management Authority (SLSWMA). Currently the main disposal method on the island is through landfilling. However, to eliminate the need for landfill disposal by 2030, the Authority plans to deploy several decentralized "Kurina" thermal decomposition systems based on the technology of pyrolysis. Four such units have already been installed at the Vieux Fort Facility. The remaining units are planned for installation in other parts of the country once the necessary approvals for land use are obtained.

The evaluation of the performance of these units is yet to be undertaken by the SLSWMA, however, should it prove feasible and cost effective, this system represents an avenue for Caribbean countries to move away from landfilling and into thermal decomposition to reduce the land space required for waste disposal.

**Figure 3: Process Flow for Kurina Pyrolysis Units**

**Process Flow Of KURINA**



Source: SLSWMA

### 5.9 Use Oil Processing Tobago

Waste oils are presently the single largest (and continuously increasing) hazardous waste stream being indiscriminately disposed of in Trinidad and Tobago's waterways and landfills, and it greatly adds to the issue of oil pollution nationwide. In this regard, the BCRC-Caribbean conceptualised a national project to develop a system for the collection, recycling and safe disposal of lubricating waste oils. This project is funded through the Trinidad and Tobago Green Fund. The project commenced in 2017 and was expected to be completed by 2019. However, the construction of the plant has been delayed, and is now scheduled for 2022.

The project's objectives included:

Assessment of the current inventory of waste oils generated on an annual basis and stockpiled in Trinidad and Tobago;

- Documentation of current approaches to waste oil disposal in Trinidad and Tobago, including any recovery or recycling initiatives already under way either in the public or private sectors;
- Identification of existing risks to human and environmental health from inappropriate waste oil disposal in Trinidad and Tobago;
- Identification of appropriate and economically viable environmentally sound methods and procedures that can apply to the specific management of waste oils in Trinidad and Tobago;

- Identification of policy, legal and financial instruments that are necessary to support the development and implementation of a waste oil management system for Trinidad and Tobago;
- Plan, design, build and operate a pilot facility to support the treatment and destruction of waste oils at a scale large enough to be used as a demonstration project that will support post-project investment; and
- Identification of appropriate small business investor(s) for potential post project upscale which includes the build, ownership and operation of a commercial-scale waste oil refining facility in Trinidad and Tobago.

An average of 1,828,020 litres of waste oil is generated annually (~4 barrels per day) in Trinidad and Tobago with 233,000 litres being generated annually in Tobago and disposed of in the Studley Park Landfill or directly to rivers and water ways. The recommended technology for environmentally sound management of the generated waste oils is a Re-refining waste oil plant: High Vacuum/ 3 stage Thin Film Wipe Evaporation /Molecular Distillation with processing capacity of 5 - 20 barrels per day. This technology would give an output of 80% API-grade 1 base oil, 10% diesel and 10% asphalt flux. Additional project outputs included the identification and assessment of strategies for national waste oil management, conceptual and basic engineering designs of the re-refining plant, a business plan to support a waste oil management system, development of National Certified Vocational Quality (NCVQ) training modules and a legislative review.

Once successful, this project can be replicated in other Caribbean countries since waste oil disposal/treatment remains a challenge in most territories.

## 5.10 Landfill Gas Recovery Guadeloupe

Clarke Energy has completed a project to supply of 2 of GE's JMS 416 containerised gas engines, landfill gas treatment including blowers, chillers and activated carbon filters, supported by project management and engineering teams. Designs incorporated guidance for civil engineering to support the installation. The La Gabarre landfill gas power plant is located near to the Pointe à Pitre Airport. La Gabarre's intercommunal landfill was created in 1973 by prefectural order. Located in the Abymes's municipality, the landfill extends over 5 hectares. Since 2010, a total of 214,870 tonnes of waste was buried on the site. The Gabarre ISDND is one of the last authorised landfill sites. The landfill gas engines were commissioned in October 2017. The equipment is adapted to the tropical climatic context of Guadeloupe, which is characterised by high temperatures, high relative humidity, electrical network support, seismic and cyclonic risk.

The electricity will be sold on the EDF SEI network, and the heat will be recovered in a biome boiler named "Evap'tar". It is a water evaporation unit using the thermal energy from the engine, this allows to limit the liquid discharge into the natural environment. The La Gabarre landfill gas power plant project is part of the rehabilitation and upgrading of the waste storage centre, and provides electricity equivalent to 4,634 inhabitants, or 30% of the population of Pointe à Pitre, from their home's wastes.

## 5.11 Green VI (British Virgin Islands)

The [Green VI](#) initiative can be regarded as an example of a regional best practice as it relates to waste reduction and waste management. When it comes to waste, Green VI reframes it this way: within natural ecosystems there is no such thing as waste. "Waste" needs to be redefined and viewed as

materials that simply become resources or raw materials for another system. With this guiding paradigm, Green VI is working in partnership with Government, local entrepreneurs and communities toward a sustainable Materials Management System. The initiative aims to craft environmentally sustainable systems through practical projects, awareness campaigns and innovative solutions to issues being faced in the BVI.

To date, the project has implemented recycling projects in Tortola and Virgin Gorda, with 5,425 tons of waste being diverted from landfills. The initiative has also certified 12 green businesses in the British Virgin Islands and planted 109 trees to aid in offsetting carbon emissions.

## 5.12 Clean Coast Bonaire

[Clean Cost Bonaire](#) can also be viewed as an example of a regional best practice in waste management. The programme, which was initiated in 2018 by Boneiru Duradero and WWF-NL. As part of the project, three sites were selected along the Bonaire coastline for monitoring using the OSPAR methodology. Clean Coast Bonaire organizes monthly clean-up activities to collect data using the OSPAR monitoring protocol. The protocol is a high-resolution survey which catalogues and characterises litter items found to identify problematic items and inform solutions to address the issues identified. The protocol also assesses the effectiveness of measures implemented by routinely monitoring the same areas to determine the effectiveness of measures.

Bonaire is rightfully famous for her spectacular underwater world & beautiful beaches. The marine litter "hot-spots" are not representative of the natural beauty that Bonaire has to offer. Clean Coast Bonaire is working hard to keep it that way. Unfortunately, marine litter washes ashore from the plastic soup of the ocean or is left behind in some areas.

In September 2019, Saba, the sister island of Bonaire, which is located 800km away, conducted their first OSPAR Marine Litter Monitoring survey at Cove Bay with support from the Saba Conservation Foundation and DCNA.

## 6.0 KEY TARGETS

While several Caribbean countries have adopted national policies and enacted legislation to address waste challenges, concerns are still expressed regarding common issues of capacity and financial constraints. However, it is generally believed that to meet a basic management threshold, all countries should update their policies, conduct waste characterisation studies and upgrade their disposal facilities to sanitary landfills. Furthermore, with new concerns regarding the high percentage of organic waste in the municipal waste, together with the increasing generation of plastic waste, countries are now encouraged to adopt recycling initiatives, both as a way of minimising the generation of waste while also limiting environmental pollution associated with the inappropriate disposal of waste. In that regard, countries of the region are being asked to meet some key targets to improve the management of waste at the national level. See table 5 below for a list of those key targets.

**Table 5: Key Targets for Countries**

No.	Target	Countries that have met this target	Countries that have partially met this target	Countries that require substantial effort to meet this target
1	Approved 5-year waste management strategies	Guyana,	Grenada, Trinidad	Antigua and Barbuda, Dominica, Saint Lucia, St. Vincent & the Grenadines Jamaica, Dominican Republic
2	All landfills to be upgraded to be sanitary landfills	Barbados, Belize, Guadeloupe, Saint Lucia, St. Vincent and the Grenadines	Antigua Grenada, Guyana, St. Kitts and Nevis,	Dominica, Trinidad, Jamaica, Suriname, Haiti, Dominican Republic
3	Waste Characterization Studies to be conducted every five years	N/A	N/A	N/A
4	Countries to establish waste recycling targets	N/A	N/A	N/A
5	Countries to establish sustainable financing mechanisms	Grenada, St. Vincent	Saint Lucia, St. Kitts and Nevis	Antigua and Barbuda, Barbados, Guyana, Jamaica, Trinidad and Tobago
6	Countries to establish organic recycling facilities	Barbados, Guadeloupe	St. Vincent	All other countries

## 7.0 CONCEPT NOTES

Faced with growing waste management challenges, countries of the region periodically request assistance to undertake specific activities. While it is recognized that those challenges are best addressed within the context of national waste management strategic plans, not all countries have the luxury of such plans to guide their operations. Therefore, in the following sections, several initiatives have been conceived and developed into Concept Notes which can be adopted either as part of a regional plan or part of a national activity based on the needs of any interested country. The Outputs, Outcomes, Deliverables and Indicators are detailed in Annex I, while an approximate cost for each Component and indicative time schedule are provided in Annex II.

### 7.1 Baseline Data and Information Management System

#### The problem

The problems of data collection for waste management in the Caribbean are two-fold. Firstly, there is insufficient information being collected. Secondly, the information being collected is not standardized and does not allow for easy comparison/benchmarking, analysis or use in decision-making processes. Information is required for a multiplicity of functions in waste management. Information on the quantities and types of waste being generated by residential and ICI sectors is required for planning purposes in the design of new landfill facilities, material recovery facilities as well as for developing optimized waste collection routing systems. Information on the costs of waste collection, waste disposal and recycling activities is also required to inform decision making and to monitor the efficacy and efficiency of operations. Continuous data gathering is required to assess the success and/or progress of new initiatives including new policies, legislation or regulations. Finally, information is required to inform investments into new technologies such as landfill gas to energy or other forms of waste to energy.

#### The proposed solution

It is necessary for all countries to have in place data collection and monitoring mechanisms. These include the physical infrastructure in place to collect data, such as weighbridges for landfill sites, material recovery facilities and transfer stations, as well as the systems and procedures to ensure that the data is collected consistently and analysed regularly. A project is required to be undertaken to assess countries existing management information systems (MIS) as it relates to waste management and make recommendations for the improvement of the systems in keeping with best practice. Once approved these recommendations must then be implemented within the individual countries. Furthermore, the information should be uploaded to a central database that will be accessible to countries of the region as well as development partners.

#### Parameters to be monitored

- Waste quantities being disposed by facility, total.
- Waste quantities being recycled by facility, total.
- Waste composition standardisation by region, by season, by income level.
- Equipment efficiency (tonnage transported as a percentage of total capacity)
- Collection time
- Collection coverage
- Costs of collection, operations, disposal, and treatment
- Amount of waste leakage/pollution, especially from plastics



### **Objectives to be met**

The main objective would be to develop a standardized waste management information system for Caribbean countries that would provide the requisite data for planning, monitoring and assessment purposes as well as for benchmarking/ranking.

### **Activities to be undertaken**

- Assessment of Country Situations
- Conduct of Gap Analysis
- Develop Methods and Procedures for data capture
- Identify equipment, personnel, training and systems required for MIS at country level.
- Identify equipment, personnel, training and systems required for MIS at regional level.
- Implement MIS improvements at country level
- Implement MIS improvements at regional level
- Test and monitor

**Approximate Cost:** \$150,000,00

**Schedule:** 10 – 12 months

## **7.2 Toolkit for Solid Waste Management Strategies**

### **The problem**

In Caribbean countries, as with the rest of the world, waste is increasing both in quantity and complexity. The challenges associated with improper waste management are becoming increasingly severe. These challenges include pollution of the terrestrial and marine environments caused by littering and illegal dumping of wastes, lack of treatment options for hazardous wastes including household hazardous wastes, leading to contamination of soil, surface and groundwater, exacerbation of flooding caused by waterways blocked with debris, loss of tourism revenue, because of unsightly natural spaces and increased health care costs due to the ill-effects of improper dumping.

A lack of a strategic approach to waste management will prolong and extend the problems currently being faced by Caribbean countries.

### **Objectives to be met**

Each country must develop and implement a waste management strategy for a minimum period of ten years to guide the waste management activities in line with the sustainable development goals, country priorities, the waste management hierarchy and the principles of a circular economy. The waste management strategy toolkit would provide the tools necessary to develop a country specific strategy.

### **Activities to be undertaken**

- Assess existing capacities of waste management authorities to develop waste management strategies.
- Shortlist countries that do not have existing or adequate waste management strategies.
- Develop toolkit based on best practice and in alignment with sustainable development goals and other relevant guiding principles.



- Conduct training sessions for waste management authorities to utilize the toolkit.
- Provide guidance to countries in developing their waste management strategies based on the toolkit.

**Approximate Cost:** \$80,000.00

**Schedule:** 8 – 10 months

### 7.3 Development of Regional Standards for Landfill Design, Operation, Closure and Post Closure

#### The problem

A sanitary landfill is an accepted and recommended method for disposal of municipal solid waste. However, in Caribbean countries there are no accepted minimum requirements for the siting, design and construction and management of sanitary landfills. Many countries, for instance, have leachate collection systems, but no leachate treatment systems, allowing the leachate after a period of retention to flow into surface waters and in some cases directly into the sea. Furthermore, in Caribbean countries, there are no standards for landfill design and operation. Countries must adopt standards from more economically advanced countries such as the USA, Canada, European Union and Japan. However, at times these standards may not be applicable to these Caribbean countries due to their different environmental, geographical and social situations. As an example, the buffer zones required to separate a landfill from a residential neighbourhood may simply not exist in some small Caribbean territories.

A regional standard is required that addresses the particulars of Caribbean countries, bearing in mind the small sizes and dense populations of many of the territories.

Standards should include both design standards and operations standards, since on many occasions, landfill sites have been designed according to an agreed upon standard but have not been operated accordingly and this has resulted in sites that were once sanitary landfills reverting to dumpsites.

The objectives of the design standard should include:

- To serve the disposal needs of a specific region, or the entire country;
- To protect surface and groundwater quality by eliminating leachate discharge;
- To protect air quality and generate energy by installing a landfill gas recovery system;
- To use landfill space efficiently and extend site life as much as is practical;
- To minimize dumping time for site users to reduce potential nuisance conditions for neighbours; and
- To provide a plan for using the land once the site is closed.

#### Objectives to be met

A regional standard that would be relevant to the environmental, economic and social conditions existing in the Caribbean countries.

#### Activities to be undertaken

- Undertake assessment of existing standards for landfill design outside the region.
- Undertake assessment of existing design criteria for landfill sites within Caribbean countries.

- Develop draft standards based on above assessments.
- Circulate standards for public comment and feedback.
- Finalize standards.

**Approximate Cost:** \$58,000.00

**Schedule:** 6 – 8 months

## 7.4 Regional Knowledge Management Hub

### The problem

Every day, solid waste and in particular, plastic waste negatively impacts the ecosystem, habitats, human health and sustainable development across the world. Despite the vast scale of the problem, the public and other important stakeholders have not been adequately engaged and educated on how they can become part of the solution.

This lack of engagement is often because communications and public awareness programs in Caribbean countries are usually sporadic and incoherent, often not linked to an overall communication strategy and not monitored for impact and sustained behaviour change. Development of public service announcements (PSAs) are often expensive, and promotion of the PSAs through traditional media and social media is often difficult given the number of competing interests. One clear gap in the public awareness value chain is the targeting of private sector entities, particularly manufacturing/retailing entities whose products make up a large percentage of the most commonly found litter items. As a result, not only are communications and public awareness programs usually ineffective, but the response from those who are most responsible for contributing to generating waste or environmental pollution, are not held responsible or contributing to waste abatement in any significant manner.

### **The Solution**

Broad public awareness can help to change the way that plastic is viewed, used and managed. Education and engagement is an indispensable part of a country's strategic action plan, especially when it is strategic and includes lessons learned, best practices being implemented in other countries around the region, consumer awareness campaigns, business awareness campaigns, documentary films, school initiatives and cleanup activities, among others.

The aim, therefore, is to increase public understanding of the issues and shape community perceptions on the dangers of plastic pollution and available solutions, thereby empowering more people and organizations to act. Community actions can include changes in individual attitudes and purchasing habits, increased sorting and recycling behaviour, responsible business processes and practices, among others. It can also lead to greater engagement and support from the business community as they gain a greater sense of responsibility.

Communicating the importance of waste management and the cost of inaction to high-level officials is also fundamental in advancing sustainable solid waste management systems in Caribbean Islands. To ensure that communication strategies are effective, a regional strategy needs to be considered where the development costs of PSAs can be shared among territories and where the use of regional

artists, sportsmen and women and other public figures can attract more interest and attention to the messages being communicated.

### **Objectives to be met**

Taking into consideration the broad set of communication tools and media that will be required to deliver the intended outcomes, a Knowledge Management Plan and Strategy that defines how all the project outputs and learning instruments will be captured and organized so that they are easily accessible by beneficiaries and intended users. The KM Plan will outline the knowledge products that will be developed including lessons learned and best practices from the around the region. It will detail strategies for targeting different sectors of society, including households, business entities that generate large quantities of packaging waste, as well as entities whose business models involves the manufacturing or retailing of packaging waste. It will also detail recommendations for sustainability and replication of results for follow-on and related initiatives. It will also consist of a communication strategy for disseminating knowledge products to a wide range of stakeholders. It is anticipated that resources will be made available for distribution in all commonly used formats ranging from conventional printed materials such as booklets, leaflets, fliers and posters to electronic media products including social media channels.

The objective of the project is to increase public understanding and shape community perceptions on the dangers of plastic pollution and available solutions, thereby empowering more people and organizations to act. Community actions can include changes in individual attitudes and purchasing habits, increased sorting and recycling behaviour, responsible business processes and practices, among others.

### **Activities to be undertaken**

- Conduct a situational analysis of knowledge management and communication/education awareness challenges and opportunities that will help to inform the preparation of the regional programme
- Develop a knowledge management and communication/public awareness strategy framework document that can be both a source for the development and dissemination of information as well as a template for the development of national strategies
- Develop a Communications Plan to craft clear messaging, increase stakeholder awareness of the waste management issues (specifically plastic pollution) and convey to the public and key stakeholders the work and outputs of waste management authorities to combat plastic pollution and to solicit buy-in among intended direct and indirect beneficiaries and other stakeholders.
- Develop a suite of awareness resources comprising of at least 15 specific products that will be produced in support of all components of the project (the number and diversity of the products will be defined during the PPG phase).

**Approximate Cost:** \$118,500.00

**Schedule:** 10 – 12 months

## 7.5 Regional Tyre Management Program

### The problem

Scrap tires present a special challenge to Waste Disposal sites. Tyres buried at landfill sites, usually rise to the surface, piercing the landfill cover and disrupting operational activities. Apart from this, the burial of large numbers of tires causes structural instability and limit the options for the future use of the landfill site. Storage of tires has its problems as well. They provide a haven for rats and other vermin and, in addition, breed mosquitoes and other vectors of disease, causing concerns for public health. Tyres also present a fire hazard since they are highly combustible and release sulphurous and nitrous oxides into the atmosphere when burnt. The used tire industry has exacerbated the problem of tyre disposal since many used tires imported into Caribbean countries for resale have only a short useful life before they must be disposed.

Tyre processing is an expensive undertaking through the purchase of shredding equipment, tyre de-beading equipment and other associated machinery.

A regional approach to tire management is required based on a centrally located processing site and an efficient and dedicated transport system to move tires from the points of generation to the processing site.

### Objectives to be met

The objective of this regional program would be the environmentally safe disposal of all tyres generated in participating countries. Such a program can be based on an extended producer responsibility system where the tyre suppliers/dealers have a responsibility for the safe disposal of tyres. These entities may charge a disposal surcharge on the tyres to the final customer to recoup their expenses for managing these use tyres. Alternatively, the system can be based on a government-imposed tax, that funds the management of the tyres.

### Activities to be undertaken

- Conduct a baseline assessment of the used tyres being generated in participating Caribbean countries.
- Explore options for location of processing site
- Explore options for inter and intra-island transport from generating sites to processing sites
- Identify and analyse options for financing, including EPR, government tax

**Approximate Cost:** \$68,000.00

**Schedule:** 8 – 10 months

## 7.6 Regional Waste Recycling Initiative

### The Problem

Several countries of the region have reported that their landfills have reached capacity or expect to reach capacity in another year or two. Given the financial constraints they all have traditionally encountered and given the devastating drop-off in GDP encountered in the last year and a half, it is not expected that these countries will consider constructing new sanitary landfills or even expansion to existing landfills given the huge cost associated with these infrastructure projects. The sensible and

immediate option is to divert waste from the landfills, particularly items like plastics and green wastes that can be recycled.

However, the accelerated growth in plastic waste suggests the need for recycling to continue, if not gather further momentum. While several countries of the region have explored various options for recycling, that enthusiasm dwindled with the closure of the Chinese market in 2018 which was the country with the largest purchases of plastic waste. Also, there is an increasing demand for “clean” recyclables, meaning processing facilities need to ensure a higher and more homogenic quality of the materials to be exported. Also, the shipping logistics and high transportations costs are some deterring factors recyclers must be concerned about. Therefore, it would make sense to develop recycling schemes on a regional level, whereby economies of scale can be created. As such, the Caribbean should assess the feasibility of a regional plant for the reprocessing of PET, possibly with the financial support of the bottling companies.

Most recycling efforts are led by (small) private companies, and non-profit organizations and little support from the respective governments. Low prices on the international market, limited storage space and processing capabilities as well as the high costs for shipping are the main factors hampering the expansion of recycling in the region. The benefits of creating a regional recycling network are clear and understood by the national SWM Agencies. Setting-up an organization, providing incentives for collection, accessible storage and dedicated collection points are critical success factors in diverting recyclable waste from the landfills are some of the possible initiatives that could reinvigorate the recycling market. Such a scheme could involve the establishment of a network of places ('redeem centres') where people can return their PET bottles or other recyclables for a small return fee. After processing (shredding/baling), the recyclable materials can be exported or sent to plants where they can be remanufactured into products that can be used locally such as plastic lumber and pavers. These products also have export potential regionally and internationally.

### **The Objective**

The objective of this exercise is to explore options for Caribbean regional recycling network and to undertake a pre-feasibility assessment of the most favourable option. The recycling network is expected to include local (national) processing centres, trans-shipment and recycling facilities and cater for all or some recycling materials, in one or more locations in the Caribbean region.

### **Activities to be Undertaken**

- Analyse and assess the findings of recent country waste audits completed for a select number of countries (Antigua and Barbuda, Grenada, Guyana, Jamaica, Saint Lucia and St. Vincent and the Grenadines, and Trinidad and Tobago) to determine the total volumes and types of recyclable materials,
- Inventory waste management and recycling facilities in each PIC
- Prioritize recycling materials according to their potential to create economic value and identify which materials would be viable for the development of sustainable business chains
- Undertake a demand analysis of recycled materials and potential markets which exist locally, regionally and internationally
- Undertake market soundings for potential operators and consider financing options including public-private partnerships
- Identify constraints and suggest measures to address the risks and constraints
- Determine at least three potential solutions, including which materials will be recycled, how and potential location/s, taking into consideration the requirements, risks and constraints.

Each option will consider port facilities, capacity, shipping networks and logistics and will include economic assessment, market assessment, technical assessment (including infrastructure needs), environmental assessment, legislative/regulatory frameworks (including international agreements) as well as political will, social and cultural issues. The options may include recommendations for different types of recycling material in different locations.

- Recommend the most favourable recycling network option/s based on a multi-criteria assessment to determine the optimum solution.

**Approximate Cost:** \$200,000.00

**Schedule:** 10 – 12 months

## 7.7 Template for Disaster Debris Management

### The problem

The Caribbean region is prone to disasters from floods, tropical storms and hurricanes, earthquakes and volcanoes. Disaster Debris Management is an important but often overlooked aspect of disaster management. Successful disaster debris management can reduce health and environmental risks, improve the timeliness of recovery efforts, reduce stress and trauma of affected persons, whilst still allowing for the proper and safe disposal and/or recycling of the debris generated. However, recent experiences show that disaster waste is often handled in an adhoc manner which creates crises for waste disposal sites and can result in the development of uncontrolled mini dumpsites.

It is important that disaster debris be properly managed to protect human health, comply with regulations, conserve disposal capacity, reduce injuries, and minimize or prevent environmental impacts. It involves advance thought, planning and coordination among individuals at various levels of government and the private sector with experience and expertise in waste management. Disaster debris management plans are required which would guide the proper removal, processing and storage of disaster debris after an emergency.

### Objectives to be met

The objective would be to develop a template for management of disaster debris management that can be easily adapted by each Caribbean territory for their local conditions and circumstances. The template should contain the following guidance sections:

- Estimating debris quantities;
- Assessing debris management options;
- Triaging debris management;
- Segregating debris into different material and waste streams and separate collection;
- Identifying debris management sites and facilities and their available capacities;
- Collecting and hauling debris from the field and/or curb;
- Removing debris from waterways and sensitive habitats (e.g., shorelines, wetlands, marshes);
- Sampling and analysis of debris;
- Characterizing debris, including identifying hazardous waste, for proper management;
- Obtaining emergency permits;
- Processing debris (e.g., volume reduction, refrigerant removal, asbestos removal);

- Packaging and labelling debris for transport;
- Transporting debris to debris management sites and facilities;
- Managing debris through reuse, recycling, treatment, and/or disposal;
- Monitoring incoming debris at debris management sites and facilities;
- Tracking debris from the original deposited point to final destination;
- Conducting debris management oversight activities, such as site visits to, inspections of, and environmental monitoring at debris management sites; and
- Communicating with the public about debris collection and other management activities.
- Capacity building and occupational safety and health...

#### **Activities to be undertaken**

- Review of existing disaster debris plans
- Identification of previous disasters and amount of debris generated
- Identification of country challenges in dealing with disaster debris
- Development of disaster debris template
- Test the template in two countries
- Finalize and launch template.

**Approximate Cost:** \$36,000.00

**Schedule:** 8 – 10 Month

## **7.8 Regional Waste Management Training Program**

### **The problem**

Many persons working in waste management in Caribbean territories have either not had formal waste management training or have had only sporadic and disjointed training for the activities being undertaken. There is a general lack of training opportunities available within Caribbean territories. Most solid waste management authorities do not invest in training for their employees and rely upon free training programs provided by international and donor agencies. Overall, there is a lack of a strategic approach to training and development for the waste management sector. Training is required at the strategic, tactical and operational levels.

### **Objectives to be met**

A multi-level training program is required which will apply to persons at non-technical, technical and professional levels. The training program would be adapted to the Caribbean context. Training would be based on a combination of theory and practice. It would provide international best practice and regional best practice examples and discuss the challenges to be overcome in meeting this best practice. Some of the areas of training required indicated in Table 4 below.

**Table 6: Training Programmes and Targets**

<b>Training Program</b>	<b>Training Level</b>	<b>Target Audience</b>
Practical Waste Management	Introductory	General Managers, Supervisors, Technicians
Landfill Management	Introductory	Landfill Managers, Supervisors, Attendants
Landfill Monitoring	Intermediate	Landfill Managers, Supervisors, Attendants
Landfill Fire Safety	Intermediate	Landfill Managers, Supervisors, Attendants
Integrated Solid Waste Management	Intermediate	Landfill Managers, Supervisors, Attendants
Sustainable Waste Financing	Intermediate	Finance Managers, Accountants, General Managers
Collection operations		
Recycling, composting...		
Hazardous Waste Management	Advanced	Landfill Managers, Supervisors, Attendants

#### **Activities to be undertaken**

- Undertake a training needs assessment for participating countries.
- Develop a training plan based on this needs assessment.
- Develop a curriculum based on this training plan.
- Identify international and regional lecturers.
- Identify training institution.
- Identify participants.
- Schedule training.
- Assess training results.

**Approximate Cost:** \$70,000.00

**Schedule:** 10 – 12 months

## **7.9 Waste Financing Strategy**

### **The problem**

The current financing strategies in most Caribbean territories is not sustainable, as most waste management authorities complain that there are insufficient funds to conduct the basic operations required. One of the issues identified is that there is no correlation between actual waste management costs and the financing arrangements established to meet these costs. Financing is usually a share of the economic pie rather than a direct mechanism to recover known costs (such as a tipping fee or user fee).

The costs for SWM are in most of the countries highly dependent on government subsidies. Charging of waste generators through household tariffs and gate fees are in many cases non-existing; and where they exist the revenues are typically not sufficient to cover all expenditures. Several countries in the OECS, introduced a tourist levy in 1998 as part of the rolling out of the GEF-funded and World



Bank executed OECS Solid and Ship-generated Waste Management project (1997 – 2003). However, several of the countries, under pressure and threats from the cruise industry, have either reduced or eliminated that tax. The recent drop in arrival of cruise passengers because of the COVID-19 pandemic has also significantly reduce the revenue stream derived from this source, pointing to the need to avoid reliance on one single source of revenue generation.

New waste collection fee structures must be assessed to establish greater cost recovery, including earmarked financing of maintenance and other operating costs. In this way, costs are fully passed on to the waste generators, which is in line with the international “polluter pays” principle. The financing vehicles envisaged ranges from increased taxes or a better application of rates that would ensure that the majority of households are covered and that the fees paid reflect both the amount of waste generated as well as their ability to pay. A financing plan should also seek to target the generators of waste as well as those whose products and packaging materials contribute to the growing amount of waste, and particularly, plastic pollution

The financial instruments being proposed are designed to incentivize waste producers to divert waste from landfills toward recycling. These financial instruments, therefore, include both rewards (recycling incentives) and charges (pay-as-you-throw and deposit refund schemes). The reward system is usually targeted at recycling initiatives as they seek to encourage recycling at the individual, home, community levels, while the pay-as-you-throw (PAYT) schemes consist of payments or rewards to encourage people to recycle more, typically with vouchers for individuals, vouchers for communities or payments to individuals. In addition to direct incentives in the form of vouchers, an effective recycling incentive is also the reduction of waste fees for residents willing to separate more waste at source or when waste recycling targets at local level are achieved.

For large generators of waste such as producers and retailers, initiatives that address the polluter pay principle are more appropriate and would include a range of instruments that form part of the Extended Producer Responsibility (EPR) system. The Organisation for Economic Cooperation and Development (OECD) defines EPR as an environmental policy approach in which a producer’s responsibility for a product is extended to the post-consumer stage of a product’s life cycle. An EPR policy is characterised by:

1. the shifting of responsibility (physically and/or economically; fully or partially) upstream toward the producer and away from municipalities; and
2. the provision of incentives to producers to consider sustainability considerations when designing their products.

### **Objectives to be met**

A suit of revenue generation measures including household levies, visitor charges, product charges that realistically captures the cost associated with management of waste, encourages recycling and circular economy ethos of not only assuming greater responsibility for the treatment and disposal of waste but encourages the minimization and eventual net-zero waste principles.

### **Activities to be undertaken**

Review the cost and revenue structure for waste management in a select number of countries and ensuring that the basis for such structures satisfies good accounting principles (full cost accounting).

Undertake an assessment of existing fiscal incentives at the national level. The assessment must examine the impact of existing fiscal incentives at the individual, household, and business (public and

private sector) level in relation to waste generation, prevention, disposal and management. This activity will require desk review, meetings/engagements with key regional and national agencies in select Caribbean countries and other relevant stakeholders, in both the public and private sector.

Prepare a report on the findings, including recommendations to address deficiencies in fostering an efficient and effective revenue generating mechanism for solid waste management, including the reduction in waste generation, and effective waste disposal and management.

Taking into consideration that waste management best practices are usually aligned with the internationally recognized Waste Hierarchy, with Prevention as a priority placed at the top of the hierarchy, and with Disposal at the bottom of the hierarchy, considered only as a last resort, identify the various financing instruments that governments in the region may find attractive. These could include:

- environmental taxes and levies
- user-pays or pay-as-you-go fees,
- product bans or a combination of measures.
- Harmonisation of taxes and levies assessed on external entities for services enjoyed and products imported

Based on the findings of the assessment prepare Caribbean guidelines on revenue generating fiscal incentives for effective solid waste management at all levels of society (including household, and private and public sector). These guidelines must consider promoting and supporting a circular economy, including fostering actions relating to waste reduction, recycling, diversion and disposal.

**Approximate Cost:** \$112,000.00

**Schedule:** 6 – 8 months

## 7.10 Hazardous Waste Management

### The problem

With few exceptions, the development of waste management systems in the Caribbean have not kept pace with the increasing quantity and complexity of waste being generated. Factors affecting these increases include population size and structure, consumption patterns and lifestyles, changes in household size and composition, changing gender roles, urbanization and shifts and expansion of economic activities. Of particular concern is the increase in the amounts of hazardous waste being generated and the limited facilities currently available for the disposal of these wastes.

A hazardous waste is a waste with properties that make it dangerous or capable of having a harmful effect on human health or the environment<sup>5</sup>. Hazardous waste is generated from many sources, ranging from industrial manufacturing process wastes to batteries and may come in many forms, including liquids, solids gases, and sludges. Hazardous waste can be liquids, solids, contained gases, or sludges or by-products of manufacturing processes or simply discarded commercial products like cleaning fluids or pesticides. See Table 5 below for the types of hazardous generated from various sectors.

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<sup>5</sup> US EPA Website, <https://www.epa.gov/hw>

**Table 7: Types of Hazardous Waste Generated from Various Sectors**

Sector	Types of Hazardous Waste Generated
Industry	Solvents, thinners, toxic gasses, heavy metals, asbestos, glues and resins, e-waste, waste oil, particulate matter
Agriculture	Expired Pesticides, Empty Pesticide Containers
Commercial	E-waste, waste oils, paints, asbestos, spent toner cartridges
Household	Cleaners, disinfectants, paints, expired/unused pharmaceuticals batteries, e-waste
Medical	Pharmaceuticals, radioactive material, contaminated needles, syringes, bandages, bodies parts.

Some hazardous substances can cause severe health effects, including:

- behavioural abnormalities,
- cancer,
- genetic mutations,
- physiological malfunctions (e.g., reproductive impairment, kidney failure, etc.),
- physical deformations, and
- birth defects.

Impacts on the environment can be just as devastating, destroying organisms in rivers and the marine environment, killing animals and plants in a contaminated area, causing major reproductive complications in animals, or otherwise limit the ability of an ecosystem to survive. Certain hazardous substances also have the potential to explode or cause a fire, threatening both animals and human populations. Some hazardous substances produce toxic effects in humans or the environment after a single, episodic release. These toxic effects are referred to as the acute toxicity. Other hazardous substances produce toxic effects in humans or the environment after prolonged exposure to the substance, which is referred to as chronic toxicity.

As such, it is necessary that Caribbean countries can treat and dispose of hazardous waste materials in a safe and effective manner. This usually requires disposal in a hazardous waste disposal site, immobilization and disposal in a municipal solid waste site or incineration.

### **Objectives to be Met**

All Caribbean countries should have the facilities, systems and legal framework to process and dispose of hazardous waste in a manner that is safe for public health and the environment. This requires the understanding of the types and quantities of hazardous waste that are being generated within each country, as well as the recommended treatment processes for each type of hazardous waste.

### **Activities to be Undertaken**

- Review of documentation related to hazardous wastes generated for each country where available.
- Conduct rapid assessment of hazardous wastes in countries where information is not currently available. This can be done through interviews with importers, generators, customs divisions, and waste authorities.
- Examine existing facilities for the disposal of hazardous wastes.
- Develop comprehensive inventory of quantities of hazardous waste in Caribbean countries.

- Identify treatment options for the hazardous wastes based on amounts and types generated. Consider regional approaches for treatment where individual country quantities are not sufficient to justify treatment at a country level.
- Develop costing for proposed treatment systems, as well as other requirements (institutional strengthening, technical capacity).

**Approximate Cost:** \$36,000.00

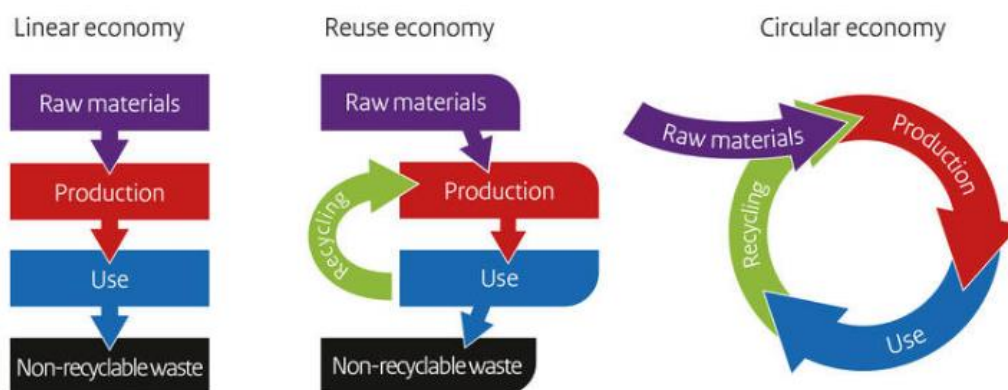
**Schedule:** 4 - 6 months

## 7.11 Circular Economy

### The problem

Economies in the Caribbean are primarily based on a linear economy model, commonly referred to as "take, make and dispose" model. In this model, raw materials are extracted from the earth and used to make consumer products which are then consumed or utilized after which they must be disposed of, usually in a municipal solid waste landfill site. The Ellen MacArthur Foundation describes the circular economy as "...gradually decoupling economic activity from the consumption of finite resources and designing waste out of the system. Underpinned by a transition to renewable energy sources, the circular model builds economic, natural, and social capital. It is based on three principles: design out waste and pollution; keep products and materials in use; regenerate natural systems." See Figure 1 below. A circular economy, it is argued, eliminates waste and pollution, keeps products and materials in use, and regenerates natural systems. According to UNEP's International Resource Panel, adopting these principles can reduce the use of raw materials by up to 99% and contributing to protecting biodiversity.

**Figure 4: Transitioning from a Linear Economy to a Circular Economy**



However, neither the linear economy nor reuse models are sustainable, given the finite nature of the extracted resources and the limited disposal space available in most countries. These problems can be addressed through a circular economy approach. In a circular economy model, waste and pollution are designed out of the process, while products and materials are kept in circulation and where natural systems are continuously regenerated. The aim of the circular economy is to decouple economic growth from resource use and associated environmental impacts.

Some Caribbean countries have begun a transition to a reuse economy, where recycling is incorporated into the economy to reduce the amount of waste being disposed of. Examples include:

- Saint Vincent and the Grenadines: Use of yard and garden waste to produce charcoal.
- Guyana: Utilization of used tyres for creating rubberized asphalt cement.
- Barbados and Guadeloupe: Industrial Composting Systems where compost is created from yard and garden waste and utilized to beautify highways and other public spaces.
- Trinidad and Guyana: Recycling of glass bottles to manufacture new bottles.
- All countries: Recycling of Used Lead Acid Batteries. In all Caribbean territories, there has been an almost 100% success rate for recycling Used Lead Acid Batteries for the recovery of lead. How can this be replicated for other products?

However, for Caribbean countries, where most consumer products are imported, and the countries have little influence over the manufacturing methods and materials utilized in the manufacturing process, this wholesale adoption of circular economy is a challenge. Some of the specific challenges that the Caribbean region faces in implementing a circular economy are:

- High levels of imports of consumer goods. These consumer goods must be packed in single-use secondary packaging to provide protection during shipping, exacerbating the amount of waste generated.
- Low levels of manufacturing within the countries. Where manufacturing exists, these are usually turn-key establishments with little opportunity for local design.
- By design, the cost of repairs to consumer goods is expensive, leading to product replacements rather than repairs, thereby generating more wastes.
- Recycling is expensive and impacted by economies of scale and challenges in obtaining markets for recycled commodities.

Recognizing the challenges that the Caribbean and other small economies in seeking to adopt CE principles, the [Regional Coalition of Circular Economy](#) was launched on 1<sup>st</sup> February 2021<sup>6</sup>. The Circular Economy Coalition's main objectives are to create a common regional vision and perspective with an integrated and holistic approach, be a platform for sharing knowledge and tools, and support the transition to the circular economy with a life cycle thinking approach. The Mission of the Coalition is to provide a regional platform to enhance inter-ministerial, multi-sectoral and multi-stakeholder cooperation, increase knowledge and understanding on the circular economy, provide capacity building and technical assistance for the development of public policies for circular economy and sustainable consumption and production. In that regard, the Coalition will support access to financing by governments and the private sector, with particular emphasis on small and medium enterprises (SMEs), to promote resource mobilization for innovation and the implementation of specific projects in the region. The Coalition provides a platform for the Caribbean region to benefit from the knowledge tools that will be generated and gain access to the financial support that is badly needed in transitioning to a circular economy.

### **Objectives to be met**

Given the technical challenges envisaged in transitioning to a circular economy model, the applicability of the CE Model advanced by the Ellen MacArthur Foundation represents a long-term but viable model for holistically addressing waste management. However, such an embrace will require some

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<sup>6</sup> Coordinated by UNEP, the Coalition is currently comprised of Colombia, Costa Rica, the Dominican Republic and Perú and is supported eight permanent strategic partners: the Climate Technology Centre & Network (CTCN), the Ellen MacArthur Foundation, the Inter-American Development Bank (IDB), the Konrad Adenauer Foundation (KAS), the Platform for Accelerating the Circular Economy Coalition (PACE), the United Nations Industrial Development Organization (UNIDO), the World Economic Forum (WEF) and UNEP.

adaptation because a key aspect of that model is premised on the "use" of raw materials and "production" of goods and packaging materials. Given that one of the purposes of the circular economy is to optimize resource yields by circulating products, components, and the materials in use at the highest utility in both technical and biological cycles, countries of the region will want to explore opportunities for the adoption of the circular economy principles. This transition will involve the adoption CE policies and supportive legislation along with practical initiatives based on best practices and lessons learned from other participating countries.

#### **Activities to be undertaken**

- Review the CE model advanced by the MacArthur Foundation and determine what changes can be made to the model to allow for greater applicability in the Caribbean with limited manufacturing and where production of goods is replaced by imported materials.
- Identify barriers to CE activities within SIDS and countries with limited manufacturing bases and significant dependence on imported products.
- Identify and assess circular economy activities currently taking place within the region and compile a portfolio of best practices which other countries can adopt.
- Develop an action plan for the adoption of the circular economy model taking into consideration the recommendations in #1 above. This plan should identify the policy, regulatory and economic framework within which the circular economy system can be developed. It would also identify existing opportunities with participating countries for the development of the circular economy.
- Explore work being undertaken by Regional Circular Economy Coalition, assess the benefits that can be attained as well as the support needed to enhance and advance CE principles and make recommendations for consideration and participation by other countries of the region.

**Approximate Cost:** \$50,000.00

**Schedule:** 6 – 8 Month

## **7.12 Waste to Energy**

### **The Problem**

Waste to Energy (WtE) as a disposal option often seems to be the most promising solution to the waste disposal challenges Caribbean countries face. Extracting energy from waste to provide electricity or fuel whilst substantially reducing the land space needed to support sanitary landfills and eliminating the threat of landfill fires, leachate generation and even waste picking often seems an attractive proposition. However, the reality is that WtE remains a costly and high technological solution that remains uneconomical, especially given the economies of scale that arise from the relatively low volumes of waste produced in individual countries.

Several countries have been considering the use of WtE as a treatment option for municipal solid waste. These include Jamaica, Trinidad and Tobago, Suriname, Barbados, Aruba, Saint Lucia and Saint Kitts.

In Suriname, through the GEF regional project "Design and Assessment of the BAT - BEP Solid Demonstration Project", a brief feasibility study was conducted on the financial and technical benefits of Waste to Energy systems compared to sanitary landfills. The results indicated that the sanitary landfill was more economically feasible and provided the least risk to implementation because of its

simplicity than a waste to energy facility. Additionally, the study showed that the costs to construct a WtE facility must be borne upfront. In contrast, a sanitary landfill can be developed in 5-year phases, spreading the cost out over a much more extended period.

In Trinidad, a feasibility study was conducted and presented in IDB's "A Unique approach for Sustainable Energy in Trinidad and Tobago". The analysis indicated that WtE treatment was not viable under the current conditions. In addition, it identified the following obstacles to WtE:

1. The price of electricity generation in Trinidad and Tobago is very low. Therefore, income from electricity sales will not be adequate to achieve a reasonable ROI for the investment and ensure sufficient income for the maintenance and operation of the plants.
2. With the current subsidies for electricity from natural gas, alternative forms of energy generation cannot compete.
3. Regulations in T&T limit the possibility of private investors for electricity generation. T&TEC must be majority shareholder in the project to feed electricity into the grid based on the existing regulations. This limits the attractiveness for private investors.
4. The current waste disposal fees are too low (approximately TT\$ 100/tonne of waste) to finance and maintain WtE plants.
5. There is a strong informal sector (scavengers) working at the landfill sites generating income for their families. These scavengers will resist technical waste treatment technologies where these technologies will eliminate their sources of income.

Caribbean territories often spend considerable time and effort exploring waste to energy technologies, only to realize in the end that the costs and/or technology requirements are too prohibitive for implementation. In addition, many waste authorities lack the technical expertise to perform the cost-benefit analyses and pre-feasibility studies required for informed decision making.

A waste-to-energy assessment tool or template can provide some preliminary guidance to these authorities that will rapidly assess the potential for waste to energy to be applied to their specific situations. This will include anaerobic digestion of organic waste and recovery and use of landfill gas from closed/rehabilitated dumpsites and/or landfills.

### **Objectives to be Met**

The objectives of a waste-to-energy assessment tool would be to provide the solid waste management authorities with the information that would allow them to quickly assess the potential for waste-to-energy to be applied within their specific environment under local conditions. Such an assessment can be divided into policy, technical, financial, legal, environmental and social, and supplier considerations.

Some of the specific requirements under each of the areas to be considered are:

#### Policy and Planning:

- Is WtE considered within the country's waste management or renewable energy policy?
- Are financial and economic incentives available to support such an investment?
- Is the WtE technology being considered appropriate to the needs of the country?
- Has the proposal been made using country-specific information, or is it generic?
- Who is responsible for feedstock guarantees?



- Have the social impacts been considered?
- Have sufficient calculations been made of future waste quantities?
- Does the country have sufficient capacity for regulating and monitoring the WtE facility?

#### Technical:

- Is there sufficient feedstock quantity for the facility to operate effectively?
- Have seasonal fluctuations of waste been taken into consideration?
- Has the moisture content of the waste been factored into consideration?
- Has there been adequate evaluation of the various technologies that can support WtE?
- Has there been updated waste quantification and qualification information to support the WtE sizing?
- How is the residual waste to be disposed of?

#### Financial:

- Has sufficient information been provided on the capital, operating, maintenance and financing costs of the investment?
- What are the unit costs per tonne? How does this compare to existing costs per tonne?
- What is the source of financing?
- What are the payment conditionalities, and over what period?
- Is the repayment supported by energy generation revenues only, or are tipping fees required?
- Are any concessions required?
- Who pays the cost of residual waste disposal?
- How are the risks allocated?

#### Legal:

- What type of contract is being considered?
- What is the duration of the contract?
- What are contractual guarantees required? Are they realistic?
- What are the penalties in the event of default?
- What contingency measures are in place?
- What international conventions will be impacted?

#### Environmental and Social:

- What emission standards will the facility be designed to meet?
- How will testing be done? Is the capacity for testing of air and effluent existing?
- Have social impacts been adequately considered?

#### Supplier:

- What experience does the company have with similar installations?
- Is the company a newly formed one, or have they been in existence for many years?
- What information is provided on the company websites or internet searches?
- Can the company provide references?
- Is the company the manufacturer of the equipment or a third party?
- Can the company provide financials for the last three years?



### Activities to be Undertaken

- Undertake a materials flow analysis in select number of countries and assess the best WtE technologies that could possibly be considered for these countries
- Review of previous reports and studies related to WtE within the Caribbean region
- Review of existing templates and guidance documents for WtE in other regions
- Development of draft assessment tool for WtE
- Testing of the tool in two project countries
- Development of final assessment tool for WtE
- Launch of the tool throughout the Caribbean

**Approximate Cost** \$55,000.00

**Schedule:** 6 - 8 months

**Table 8: Summary of Concept Notes, Schedule and Approximate Cost**

#	Concept Activity	Schedule Months	Approximate Cost (US\$)
1	Baseline Data and Information Management System		150,000.00
2	Toolkit for Solid Waste Management Strategies		80,000.00
3	Development of Regional Standards for Landfill Design, Operation, Closure and Post Closure		58,000.00
4	Regional Knowledge Management Hub	10 – 12	118,500.00
5	Regional Tyre Management Program	8 - 10	68,000.00
6	Regional Waste Recycling Initiative	10 – 12	200,000.00
7	Template for Disaster Debris Management	8 - 10	36,000.00
8	Regional Waste Management Training Program	10 – 12	70,000.00
9	Waste Financing Strategy	6 – 8	112,000.00
10	Hazardous Waste Management	4 – 6	36,000.00
11	Circular Economy	6 – 8	50,000.00
12	Waste to Energy	6 – 8	55,000.00
	<b>Total</b>		<b>1,033,650</b>

## Annex I. Key Deliverables and Benchmarks

### 1. Baseline Data Management System

Components / Outcomes / Outputs	Activities	Deliverables	Benchmarks
<b>Component 1: Strengthening the waste management information system for Caribbean countries to enable informed decision-making for planning, monitoring and assessment</b>			
<b>Outcome 1.1: Agencies with responsibility for SWM adopt an enhanced IMS to inform management decision-making in the longer term.</b>			
Output 1.1.1 Regional Waste Management Information System developed and accessible to national SWMA	<p>1.1.1.1 Conduct Regional and National Waste Management Information System Requirements Analysis;</p> <p>1.1.1.2: Design, develop and test Regional National Waste Management Information System;</p> <p>1.1.1.3: Implement/Installation and Configuration of the Regional National Waste Management Information System;</p> <p>1.1.1.4: Regional National Waste Management Information System Key Stakeholders Capacity Building.</p>	<p>Multi-disciplinary Consulting team hired to develop the Regional and National Waste Management Information System.</p> <p>Regional consultations on WMIS held to obtain inputs and consensus</p>	<p>Waste Management Info Management System developed and operationalised.</p> <p>Number of persons trained in lead regional and national agencies with responsibility for waste management</p>
Output 1.1.2 National Waste Management Information System developed and accessible through multi-stakeholder operational platforms.	<p>1.1.2.1: Install National Waste Management Information System;</p> <p>1.1.2.2: Undertake training and capacity building of Information System.</p> <p>1.1.2.3: Develop a system for the testing and monitoring of waste managing information systems.</p>	<p>National-level consultations on WMIS held to obtain inputs and consensus</p> <p>Approval of the Strategy and Operational Framework to achieve SWM informed decision-making at the national level</p> <p>National Strategy and information management training conducted for SWMA</p>	<p>Waste Management Info Management System developed and operationalised.</p> <p>Number of persons trained in national SWMA</p>

## 2. Solid Waste Management Strategy Toolkit

Components / Outcomes / Outputs	Activities	Deliverables	Benchmarks
<b>Component 1: Develop a toolkit which will empower countries to adopt a more strategic approach to solid waste management.</b>			
<b>Outcome 1.1: Provide the tools necessary to develop country specific waste management strategies.</b>			
Output 1.1.1 Capacities of Caribbean waste management authorities to develop waste management strategies are determined and countries lacking adequate waste management strategies are identified	<p>1.1.1.1 Assess existing capacities of waste management authorities.</p> <p>1.1.1.2 Develop criteria for the selection of countries based on the adequacy of waste management strategies</p> <p>1.1.1.3 Shortlist countries that do not have existing or adequate waste management strategies.</p>	<p>Multi-disciplinary Consulting team hired to conduct assessment</p> <p>Report with findings of the assessment is completed.</p> <p>List of countries needing assistance prepared</p>	Assessment report completed and countries lacking proper SWM strategies identified
Output 1.1.2 Toolkit based on best practices developed in alignment with relevant guiding principles	<p>1.1.2.1: Identify best practices and principles which will form the basis of the waste management strategies.</p> <p>1.1.2.2. Develop waste management strategy toolkit.</p>	<p>Database of waste management and recycling facilities created</p> <p>Toolkit developed, informed by best practice and in alignment with sustainable development goals and other guiding principles</p>	Best practices identified and waste management facility database created
Output 1.1.3 Guidance provided to countries to develop waste management strategies based on the toolkit	<p>1.1.3.1 Distribute toolkit to policymakers and provide guidance on how it can be utilized to develop waste management strategies</p> <p>1.1.3.2. Conduct training sessions for waste management authorities to utilize toolkit.</p>	<p>Waste management strategy based on toolkit developed</p> <p>Waste management officials/ staff trained in the utilisation of waste management strategy toolkit</p>	<p>Policymakers can develop adequate solid waste management strategies using the toolkit provided</p> <p>Waste management strategy toolkit employed in the operations of waste management authorities</p>

### 3. Development of Regional Standards for Landfill Design, Operation & Maintenance, Closure & Post-closure

Components / Outcomes / Outputs	Activities	Deliverables	Benchmarks
<b>Component 1: Creation of a regional standard that would be relevant to the environmental, economic and social conditions existing in the Caribbean countries.</b>			
<b>Outcome 1.1: Develop a regional standard for landfill design and operation (same description as above).</b>			
Output 1.1.1 Assessment of regional international design options and best practices for landfill design, operation, maintenance, closure and post-closure is completed	<p>1.1.1.1 Undertake assessment of existing standards for landfill design outside the region</p> <p>1.1.1.2 Undertake assessment of existing design criteria for landfill sites within Caribbean countries</p>	<p>Multi-disciplinary Consulting team hired to conduct assessment</p> <p>Report with findings of the assessment is completed, including details of regional and international best practices.</p>	Assessment report completed and best practices identified
<p>Output 1.1.2 Standards for landfill design, operation maintenance, closure and post-closure developed, including climate resilience considerations.</p> <p>Standards for the closure and rehabilitation of dumpsites</p>	<p>1.1.2.1: Develop draft region-specific standards based on above assessments.</p> <p>1.1.2.2 Circulate standards for public comment and feedback.</p> <p>1.1.2.3 Finalize standards</p>	<p>Draft standards developed</p> <p>Standards circulated for comment</p> <p>Comments incorporated and standards finalized</p>	<p>Best practices identified used to develop and finalize regional standards for landfill design, operation, maintenance, closure and post-closure</p> <p>Uptake and endorsement of standards by regional governments</p>

#### 4. Regional Knowledge Management Hub

Components / Outcomes / Outputs	Activities	Deliverables	Benchmarks
<b>Component 1: Creation of a knowledge management hub which stores information on regional waste management and make improvements to the public communication products of Caribbean countries</b>			
<b>Outcome 1.1: Development of a Regional Knowledge Management Hub and Public Communications Strategy</b>			
Output 1.1.1 Knowledge Management Plan and Strategy developed	<p>1.1.1.1 Conduct situational analysis of knowledge management and communication/education awareness/ challenges and opportunities that will help to inform the preparation of the regional programme</p> <p>1.1.1.2 Develop a knowledge management and communication/public awareness strategy framework document that can be both a source for the development and dissemination of information.</p>	<p>Multi-disciplinary Consulting team hired to conduct analysis</p> <p>Report with findings of the analysis is completed.</p> <p>KM and Communication/Public Awareness strategy framework document developed</p>	<p>Knowledge management and communication strategy framework document</p> <p>Uptake and endorsement of Knowledge Management Hub and Communications Strategy by regional governing bodies.</p> <p>Observed behavioural changes at a national and community levels it relates to responsible business process, practices, purchasing habits, recycling, sorting and littering.</p>
Output 1.1.2 Communications Plan Developed	1.1.2.1: Develop a Communications Plan to craft clear messaging, nudges, to increase stakeholder awareness of the waste management issues (specifically plastic pollution) and convey to solicit buy-in and behaviour change among intended direct and indirect beneficiaries.	<p>Draft Communications Plan developed</p> <p>Draft circulated for public comments</p> <p>Communications Plan finalised</p>	<p>Communications Plan developed to improve public education and awareness.</p> <p>Effectiveness of interventions is assessed and measured to adjust the plan.</p>
Output 1.1.3 Suite of education and awareness products using different media created  Suite of digital tools, artificial intelligence and internet of things applicable to waste management.	1.1.3.1 Develop a suite of education and awareness resources comprising of at least 15 specific products that will be produced in support of all components of the project (the number and diversity of the products will be defined during the PPG phase).	Suite of education and awareness resources developed and shared with countries	<p>Countries use the education and awareness resources to promote increased public awareness of solid waste management issues.</p> <p>Countries can share success stories and lessons learned.</p>

## 5. Regional Tyre Management Programme

Components / Outcomes / Outputs	Activities	Deliverables	Benchmarks
<b>Component 1: Improving the management of tyres being disposed of in Caribbean countries in order to ensure environmentally safe disposal.</b>			
<b>Outcome 1.1: Improved collaboration among agencies with responsibility for SWM regionally to implement and fund more environmentally sound tyre disposal methods.</b>			
Output 1.1.1 Baseline assessment conducted to determine the current practices employed in the disposal of tyres	<p>1.1.1.1 Conduct situational analysis of current quantities of tyres, recycling and disposal practices. Also cost recovery schemes for managing tyres.</p> <p>1.1.1.2 Conduct regional consultation on tyre disposal</p>	<p>Multi-disciplinary Consulting team hired to conduct baseline assessment.</p> <p>Regional consultations on tyre disposal held to obtain inputs and consensus</p>	Baseline assessment and recommendations for improvement and cost recovery schemes developed and presented to regional waste managers.
Output 1.1.2 Design and construction of regional tyre recycling facilities	<p>1.1.2.1: Identify and make recommendations for cost effective and environmentally efficient tyre recycling facilities</p> <p>1.1.2.2: Analyse tyre recycling options and select best economically feasible option.</p> <p>1.1.2.3 Explore options for transportation from generating sites to processing sites</p>	<p>National-level consultations on recycling plants are held to obtain inputs and consensus</p> <p>Feasibility study conducted to determine the market for product using waste tyres.</p> <p>Geophysical surveys conducted to identify suitable locations for the facility.</p>	<p>Tyre recycling facilities established and operationalised in 5 countries.</p> <p>Number of persons trained in national SWMA</p>
Output 1.1.3 Construction of the regional tyre recycling facility	<p>1.1.3.1 Acquisition of land at the chosen site</p> <p>1.1.3.2 Procure contractors to construct the facility</p> <p>1.1.3.3 Conduct environmental impact assessments and vulnerability assessments.</p>	<p>Land deed acquired</p> <p>Contracts drawn up and signed for construction phase</p> <p>EIAs and Vulnerability studies conducted</p>	<p>Land acquired for construction</p> <p>Facility constructed</p> <p>Environmental Impact Assessments and Vulnerability assessments completed</p>
Output 1.1.4 Commissioning of facility	<p>1.1.4.1 Facility opened, and operational.</p>	<p>Training of staff at facility</p>	<p>Facility is opened and disposing or recycling of tyres.</p> <p>Tyre cost recovery schemes implemented in participating countries.</p>

## 6. Regional Waste Recycling Initiative

Components / Outcomes / Outputs	Activities	Deliverables	Benchmarks
<b>Component 1: Exploring the options for a Caribbean Regional Recycling Network and undertaking a feasibility assessment to determine the most feasible option.</b>			
<b>Outcome 1.1: Identification of feasible option for a Caribbean Recycling Network.</b>			
Output 1.1.1 Volumes and types of recyclable materials available are identified	1.1.1.1 Analyse and assess the findings of recent country waste audits completed for a select number of countries	Multi-disciplinary Consulting team hired to conduct assessment  Report with findings of the assessment is completed.	Assessment report completed
Output 1.1.2 Inventory of waste management facilities and recycling facilities developed both private and public	1.1.2.1: Identify existing waste management facilities and recycling facilities, including materials collected/received and prices.  1.1.2.2: Develop a database of existing facilities	Database of waste management and recycling facilities created	Existing waste management and recycling facilities are identified and listed in a searchable database
Output 1.1.3 Potential economic value of recyclable materials identified	1.1.3.1 Conduct research on recyclable materials and identify those which are viable for the development of sustainable business models - local and for export	Economically viable and sustainable recyclable materials identified	Feasibility of different recyclable materials is explored, and most suitable materials identified
Output 1.1.4 Pre- feasibility study completed	1.1.4.1 Conduct demand analysis and identify potential markets for targeted recyclables.  1.1.4.2 Undertake market soundings for potential operators and consider financing options including public-private partnerships and industry use of recycled PET  Develop standards for recyclable materials.	Potential markets identified  Potential operators identified  Financing options identified	Pre-feasibility study is completed, and potential markets, operators and financing options have been identified

Components / Outcomes / Outputs	Activities	Deliverables	Benchmarks
	Develop social inclusion policy and framework for informal waste pickers.		
Output 1.1.5 Risks and Constrains identified	<p>1.1.5.1 Conduct risk assessments and identify constraints</p> <p>1.1.5.2 Identify Port facilities, capacity, shipping networks and logistics</p> <p>1.1.5.3 Conduct economic assessments, market assessments, technical assessments (including infrastructure needs), environmental assessments, assessments of legislative/regulatory frameworks (including international agreements) as well as assessments regarding political will, social and cultural issues.</p> <p>1,1,5,4 Produce recommendations on the most suitable recycling network option/s</p> <p>Environmentally sound disposal of un-recyclable plastics.</p>	<p>Risk assessments completed</p> <p>Facilities and available capacities identified</p> <p>Assessments completed and findings presented</p>	<p>Analysis of risks and constraints conducted to identify factors which may affect the project, including capacity limitations and other constraints.</p> <p>Recommendations on the most favourable recycling network option/s made</p>



## 7. Disaster Debris Management Toolkit

Components / Outcomes / Outputs	Activities	Deliverables	Benchmarks
<b>Component 1: Develop a template for management of disaster debris that can be easily adapted by each Caribbean territory for their local conditions and circumstances.</b>			
<b>Outcome 1.1: Improved management of disaster debris in the Caribbean.</b>			
Output 1.1.1 Inventory and analysis of disaster debris management plans conducted	<p>1.1.1.1 Analyse the current disaster debris management plans which exist in the Caribbean</p> <p>1.1.1.2 Shortlist countries that do not have existing or adequate disaster debris management strategies.</p>	<p>Multi-disciplinary Consulting team hired to conduct assessment of existing policies</p> <p>Report with findings of the assessment is completed.</p> <p>List of countries needing assistance prepared</p>	Existing disaster debris management plans analysed and countries in need of improved debris management plans identified
Output 1.1.2 previous disasters in the region and country challenges in dealing with this debris identified	<p>1.1.2.1 Identify previous disasters in the region including types and quantities of debris created, equipment used and cost of managing</p> <p>1.1.2.2 Identify country challenges faced in dealing with this debris</p>	Report on types of debris generated by past disasters compiled, including details of country issues in dealing with the debris	Understanding gained of the types of debris generated and the issues faced by countries in dealing with disaster debris
Output 1.1.3 Toolkit based on disaster debris best practices developed in alignment with relevant guiding principles	<p>1.1.3.1: Identify best practices and principles forming the basis of disaster debris management</p> <p>1.1.3.2 Develop draft toolkit/template for disaster debris management</p>	<p>Disaster debris management toolkit developed</p> <p>Toolkit submitted for comments</p>	Best practices identified and disaster debris management toolkit developed
Output 1.1.4 Toolkit tested in two Caribbean countries	<p>1.1.4.1 Test toolkit in two Caribbean countries</p> <p>1.1.4.2 Finalize and launch toolkit</p>	<p>Toolkit assessed for effectiveness and any adjustments needed made</p> <p>Finalised toolkit launched regionally</p>	Policymakers develop adequate disaster debris management plans using the toolkit provided

## 8. Regional Waste Management Training Programme

Components / Outcomes / Outputs	Activities	Deliverables	Benchmarks
<b>Component 1: Develop a multi-level training programme on solid waste management that incorporates regional and international best practices.</b>			
<b>Outcome 1.1: Increased formal and informal training of personnel in the waste management sector.</b>			
Output 1.1.1 Training needs assessment conducted in participating countries	1.1.1.1 Conduct an assessment of existing waste management training available in participating countries	Multi-disciplinary Consulting team hired to conduct needs assessment.  Training needs assessment report produced	Completed needs assessment report with region-specific recommendations
Output 1.1.2 Training plan and curriculum developed	1.1.2.1 Develop a training plan for participating countries  1.1.2.2 Develop a curriculum to be taught under the training plan	Training plan and curriculum developed	Training plan and curriculum developed to provide knowledge on waste management  Lecturers engaged and contract agreements signed
Output 1.1.3 Training institution and regional/international lecturers identified	1.1.3.1 Identify regional and local institutions which may be interested in offering the training to students  1.1.3.2 Identify regional and international personnel who have expertise in waste management and are willing to serve as lecturers	Training institutions integrate the program into their offerings  MOU with training institution  Contracts for lecturers signed	Regional training institutions advertise waste management training courses  Number of participants successfully completing the training programme
Output 1.1.4 Training programme implemented	1.1.4.1 Identify and enrol participants in the training course	Participants sign up for training classes  Classes begin	Participants benefit from specialized waste management training from industry experts

## 9. Waste Financing Strategy

Components / Outcomes / Outputs	Activities	Deliverables	Benchmarks
<b>Component 1: Create a suite of revenue generation measures that realistically captures the cost associated with management of waste, encourages recycling and circular economy principles.</b>			
<b>Outcome 1.1: Improved revenue generation measures for the waste management sector and reduced reliance on government funding for SWM.</b>			
Output 1.1.1 Cost revenue structure in selected countries reviewed	1.1.1.1 Review the cost and revenue structure for waste management in a select number of countries and determine whether such financing structures satisfies good accounting principles	Report on cost revenue structures produced	Understanding gained of existing cost revenue structures and their adequacy
Output 1.1.2 Fiscal and other incentives assessed at a national level	1.1.2.1 Examine the impact of existing fiscal and other incentives at the individual, household, and business (public and private sector) level in relation to waste reduction, generation, recovery, disposal and management  1.1.2.2 Prepare a report on the findings, including recommendations to address deficiencies identified	Report on fiscal incentives prepared	Understanding gained of the existing fiscal and other incentives which exist at the national level regarding waste management
Output 1.1.3 Caribbean guidelines on revenue generating fiscal and other incentives for effective solid waste management prepared	1.1.3.1 Develop draft guidelines on fiscal and other incentives which generate revenue and improve the effectiveness of waste management  1.1.3.2 Finalize Draft Guidelines and circulate to regional SWM authorities	Draft Caribbean Guidelines developed  Draft circulated for comments  Comments incorporated and draft finalized	Guidelines developed which enable SWM authorities to better manage waste in the region in a feasible, economically sustainable manner

## 10. Hazardous Waste Management

Components / Outcomes / Outputs	Activities	Deliverables	Benchmarks
<b>Component 1: Gain a better understanding of hazardous waste management practices and enable Caribbean countries to better manage hazardous wastes</b>			
<b>Outcome 1.1: Improved hazardous waste management in the Caribbean region</b>			
Output 1.1.1 Desk review of hazardous waste management and legal framework documentation in Caribbean countries completed	1.1.1.1 Review existing documentation compiled by the BCRC and others relating to hazardous waste management in the Caribbean	Existing hazardous waste documentation compiled	Hazardous waste documentation compiled and easily accessible for review
Output 1.1.2 Rapid assessments of hazardous wastes completed in countries where information is not currently available	1.1.2.1 Partner with the BCRC to conduct rapid assessments of hazardous wastes in countries where information is not available using interviews and other methods	Assessment of hazardous waste completed in specific countries. Report produced.	Understanding and data gained of the hazardous waste situations in countries where data was previously lacking
Output 1.1.3 Assessment of quantities of hazardous waste and existing hazardous waste disposal facilities completed	1.1.3.1 Examine existing facilities for the disposal of hazardous wastes.  1.1.3.2 Develop comprehensive inventory of quantities of hazardous waste in Caribbean countries.	Inventory of hazardous waste disposal facilities compiled  Inventory of quantities of hazardous waste compiled  Inventory reports produced	Better understanding of existing facilities for hazardous waste management and the quantities of hazardous waste which exist
Output 1.1.4 Solutions developed for the management of hazardous waste regionally	1.1.4.1 Identify treatment options for the hazardous wastes based on amounts and types generated.  1.1.4.2 Consider and provide justification for regional approaches for treatment  1.1.4.3 Develop feasibility and costing for proposed treatment systems, as well as other requirements (institutional strengthening, technical capacity).	Treatment options identified  Options for regional collaboration explored  Financial proposal developed	Feasible approaches for hazardous waste management identified

## 11. Circular Economy

Components / Outcomes / Outputs	Activities	Deliverables	Benchmarks
<b>Component 1: Facilitate the adoption of the Circular Economy Model for SIDS whose economies have limited manufacturing base and are instead reliant on importation of a significant amount of packaging material</b>			
<b>Outcome 1.1: Reduction in the generation of waste and improved ecosystem health</b>			
Output 1.1.1: CE model adapted for SIDS using importation of manufactured material as a base	1.1.1.1: Undertake a review of the CE model and make recommendations for its adaptation in SIDS	CE Model adapted for Caribbean SIDS	CE Model reviewed and necessary changes for adaptation to the Caribbean context identified
Output 1.1.2: Barriers to implementing CE in SIDS identified	1.1.2.1 Identify barriers to implementing CE in SIDS	Barriers to implementing CE identified	Understanding gained of the barriers to CE activities in SIDS
Output 1.1.3: Portfolio of CE best practices in other SIDS prepared and made available	1.1.3.1 Prepare a portfolio of CE best practices from around the region	Portfolio of CE best practices from around the region compiled	Better understanding of ongoing CE activities and best practices which can be used as a guide by other countries
Output 1.1.4: Action plan for the adoption of CE model developed	1.1.4.1 Develop an action plan and strategy for transitioning to a CE	Action plan for transitioning to CE model developed	Plan for adopting CE approaches developed
Output 1.1.5: Blueprint developed for increased Caribbean participating and benefiting from the Regional Circular Economy Coalition	1.1.5.1 Review and assess the benefits pros and cons for Caribbean participation in the RCEC 1.1.5.2 Develop a blueprint for Caribbean involvement in RCES and a strategy for accessing financial support to initiate transition to CE	Benefits for participating in RCEC developed  Blueprint developed for accessing financial support to initiate transition to CE.	Recommendations for the enhancement and advancement of CE principles and participation of countries

## 12. Waste to Energy (WtE)

Components / Outcomes / Outputs	Activities	Deliverables	Benchmarks
<b>Component 1: Development of a Waste to Energy and Waste assessment tool to quickly assess the potential for waste-to-energy to be applied within specific environments under local conditions</b>			
<b>Outcome 1.1: Improved decision-making regarding WtE</b>			
Output 1.1.1: Materials flow analysis and most suitable WtE technologies for possible use in Caribbean SIDS	1.1.1.1 Undertake a materials flow analysis of imports, exports and waste generated and projected over the next 10 – 15 years in 5 countries and determine the most suitable WtE technologies for possible use in Caribbean SIDS	Materials flow analysis report completed	Understanding gained of the types and quantities of waste materials generated in each country
Output 1.1.2: Documents related to WtE proposals in Caribbean territories reviewed	1.1.2.1 Undertake a review of WtE proposals submitted to Caribbean governments in the last five years	Assessment of Waste to Energy best practices completed	Understanding gained of previous recommendations and reports on WtE
Output 1.1.3: Templates and guidance documents for WtE in other regions reviewed and draft WtE assessment tool developed	1.1.3.1 Review templates and guidance documents for WtE in other regions and develop a draft WtE assessment tool	Draft assessment tool developed	Assessment tool developed to better evaluate WtE systems
Output 1.1.4: WtE assessment tool tested and made available to Caribbean governments	1.1.4.1 Test and finalise WtE assessment tool and make available to governments of the region	Tool tested in 3 countries Necessary changes made Final assessment tool developed	Issues are identified during testing and rectified to develop final tool

## Annex II: Estimated Cost of Concepts

	Activity	# Persons	Days	Rate	Value
<b>1</b>	<b>Baseline Data Management</b>				
	1.1 Assessment of Country Situations	2	20	500	20,000
	1.2 Conduct of Gap Analysis	2	20	500	20,000
	1.3 Develop Methods and Procedures for data capture	2	20	500	20,000
	1.4 Identify equipment, personnel, training and systems required for MIS at country level.	1	10	500	5,000
	1.5 Identify equipment, personnel, training and systems required for MIS at regional level.	1	10	500	5,000
	1.6 Implement MIS improvements at country level	2	30	500	30,000
	1.7 Implement MIS improvements at regional level	2	30	500	30,000
	1.8 Test and monitor	2	20	500	20,000
	<b>TOTAL</b>		<b>160</b>		<b>150,000</b>
<b>2</b>	<b>Toolkit for Solid Waste Management Strategies</b>				
	2.1 Assess existing capacities of waste management authorities to develop waste management strategies.	1	25	450	11,250
	2.2 Shortlist countries that do not have existing or adequate waste management strategies.	1	12	450	5,400
	2.3 Develop toolkit based on best practice and in alignment with sustainable development goals and other relevant guiding principles.	1	20	450	9,000
	2.4 Conduct training sessions for waste management authorities to utilize the toolkit.	2	30	450	27,000
	2.5 Provide guidance to countries in developing their waste management strategies based on the toolkit.	2	30	450	27,000
	<b>TOTAL</b>		<b>117</b>		<b>79,650</b>
<b>3</b>	<b>Development of Regional Standards for Landfills</b>				
	3.1 Undertake assessment of existing standards for landfill design outside the region.	1	20	400	8,000
	3.2 Undertake assessment of existing design criteria for landfill sites within Caribbean countries.	2	20	400	16,000
	3.3 Develop draft standards based on above assessments.	1	40	400	16,000

	Activity	# Persons	Days	Rate	Value
	3.4 Circulate standards for public comment and feedback.	1	20	400	8,000
	3.5 Finalize standards.	1	25	400	10,000
	<b>TOTAL</b>		<b>125</b>		<b>58,000</b>
<b>4</b>	<b>Regional Knowledge Management Hub and Communications/Public Education Strategy</b>				
	4.1 Conduct a situational analysis of knowledge management and communication/education awareness challenges and opportunities that will help to inform the preparation of the regional programme	4	30	400	48,000
	4.2 Develop a knowledge management and communication/public awareness strategy framework document that can be both a source for the development and dissemination of information as well as a template for the development of national strategies	4	30	400	48,000
	4.3 Develop a Communications Plan to craft clear messaging, increase stakeholder awareness of the waste management issues (specifically plastic pollution) and convey to the public and key stakeholders the work and outputs of waste management authorities to combat plastic pollution and to solicit buy-in among intended direct and indirect beneficiaries and other stakeholders.	1	25	450	11,250
	4.4 Develop a suite of awareness resources comprising of at least 15 specific products that will be produced in support of all components of the project (the number and diversity of the products will be defined during the PPG phase).	1	25	450	11,250
	<b>TOTAL</b>		<b>110</b>		<b>118,500</b>
<b>5</b>	<b>Regional Tyre Management Program</b>				
	5.1 Conduct a baseline assessment of the used tyres being generated in participating Caribbean countries.	2	30	400	24,000
	5.2 Explore options for location of processing site	2	30	400	24,000
	5.3 Explore options for inter-island transport from generating sites to processing sites	1	25	400	10,000
	5.4 Identify and analyse options for financing, including EPR, government tax	1	25	400	10,000
	<b>TOTAL</b>		<b>110</b>		<b>68,000</b>



	Activity	# Persons	Days	Rate	Value
6	<b>Regional Waste Recycling Program</b>				
	6.1 Analyse and assess the findings of recent country waste audits completed for a select number of countries (Antigua and Barbuda, Grenada, Guyana, Jamaica, Saint Lucia and St. Vincent and the Grenadines, and Trinidad and Tobago) to determine the total volumes and types of recyclable materials	2	25	500	25,000
	6.2 Inventory waste management and recycling facilities in each PIC	2	30	500	30,000
	6.3 Prioritize recycling materials according to their potential to create economic value and identify which materials would be viable for the development of sustainable business chains	2	20	500	20,000
	6.4 Undertake a demand analysis of recycled materials and potential markets, local, regional and international	2	20	500	20,000
	6.5 Undertake market analysis for potential operators and consider financing options including public-private partnerships	1	30	500	15,000
	6.6 Undertake a transportation logistic analysis to determine the most efficient hub(s)	1	30	500	15,000
	6.7 Identify constraints and suggest measures to address the risks and constraints	1	20	500	10,000
	6.8 Determine at least three potential solutions, including which materials will be recycled, how and potential location/s, taking into consideration the requirements, risks and constraints. Each option will consider port facilities, capacity, shipping networks and logistics and will include economic assessment, market assessment, technical assessment (including infrastructure needs), environmental assessment, legislative/regulatory frameworks (including international agreements) as well as political will, social and cultural issues. The options may include recommendations for different types of recycling material in different locations.	2	25	500	25,000
	6.9 Recommend the most favourable recycling network option/s based on a multi-criteria assessment to determine the optimum solution.	2	20	500	20,000
	6.10 Develop policy and framework for the social inclusion of waste pickers.	2	20	500	20,000
	<b>TOTAL</b>		<b>240</b>		<b>200,000</b>
7	<b>Template for Disaster Debris Management</b>				
	7.1 Review of existing disaster debris plans	1	15	400	6,000
	7.2 Identification of previous disasters and amount of debris generated	1	20	400	8,000
	7.3 Identification of country challenges in dealing with disaster debris	1	20	400	8,000

	Activity	# Persons	Days	Rate	Value
	7.4 Development of disaster debris template	1	20	400	8,000
	7.5 Test the template in two countries	1	10	400	4,000
	7.6 Finalize and launch template.	1	5	400	2,000
	<b>TOTAL</b>		<b>90</b>		<b>36,000</b>
<b>8</b>	<b>Regional Waste Management Training Program</b>				
	8.1 Undertake a training needs assessment for participating countries.	2	20	400	16,000
	8.2 Develop a training plan based on this needs assessment.	2	20	400	16,000
	8.3 Develop a curriculum based on this training plan.	1	10	400	4,000
	8.4 Identify international and regional lecturers.	1	10	400	4,000
	8.5 Identify training institution.	1	20	400	8,000
	8.6 Identify participants.	1	20	400	8,000
	8.7 Schedule training.	1	20	400	8,000
	8.8 Assess training results.	1	15	400	6,000
	<b>TOTAL</b>		<b>135</b>		<b>70,000</b>
<b>9</b>	<b>Waste Financing Strategy</b>				
	9.1 Review Cost and Revenue Structure for WM in select Caribbean Countries	4	20	500	40,000
	9.2 Undertake Examination of Fiscal Structure at National Level	4	25	500	50,000
	9.3 Prepare Report on Findings Including Recommendations	1	20	500	10,000
	9.4 Identify Appropriate Financing Arrangements	1	10	500	5,000
	9.5 Prepare Guidelines on Revenue Generating Fiscal Incentives	1	15	500	7,500
	<b>TOTAL</b>		<b>90</b>		<b>112,500</b>
<b>10</b>	<b>Hazardous Waste Management</b>				
	10.1 Review of documentation related to hazardous wastes generated for each country where available.	1	15	400	6,000

	Activity	# Persons	Days	Rate	Value
	10.2 Conduct rapid assessment of hazardous wastes in countries where information is not currently available. This can be done through interviews with importers, generators, customs divisions, and waste authorities.	1	15	400	6,000
	10.3 Examine existing facilities for the disposal of hazardous wastes.	1	15	400	6,000
	10.4 Develop comprehensive inventory of quantities of hazardous waste in Caribbean countries.	1	15	400	6,000
	10.5 Identify treatment options for the hazardous wastes based on amounts and types generated. Consider regional approaches for treatment where individual country quantities are not sufficient to justify treatment at a country level.	1	15	400	6,000
	10.6 Develop costing for proposed treatment systems, as well as other requirements (institutional strengthening, technical capacity).	1	15	400	6,000
	<b>TOTAL</b>		<b>90</b>		<b>36,000</b>
<b>11</b>	<b>Circular Economy</b>				
	11.1 Review the CE model advanced by the MacArthur Foundation and determine what changes can be made to the model to allow for greater applicability in the Caribbean with limited manufacturing and where production of goods is replaced by imported materials.	1	20	500	10,000
	11.2 Identify barriers to CE activities within SIDS and countries with limited manufacturing bases and significant dependence on imported products.	1	20	500	10,000
	11.3 Identify and assess circular economy activities currently taking place within the region and compile a portfolio of best practices which other countries can adopt.	1	20	500	10,000
	11.4 Develop an action plan for the adoption of the circular economy model taking into consideration the recommendations in #1 above. This plan should identify the policy, regulatory and economic framework within which the circular economy system can be developed. It would also identify existing opportunities with participating countries for the development of the circular economy.	1	20	500	10,000
	11.5 Explore work being undertaken by Regional Circular Economy Coalition, assess the benefits that can be attained as well as the support needed to enhance and advance CE principles and make recommendations for consideration and participation by other countries of the region.	1	20	500	10,000
	<b>TOTAL</b>		<b>100</b>		<b>50,000</b>

	Activity	# Persons	Days	Rate	Value
12	<b>Waste to Energy</b>				
	12.1 Undertake a materials flow analysis in select number of countries and assess the best WtE technologies that could possibly be considered for these countries	2	20	500	20,000
	12.2 Review of previous reports and studies related to WtE within the Caribbean region	1	10	500	5,000
	12.3 Review of existing templates and guidance documents for WtE in other regions	1	10	500	5,000
	12.4 Development of draft assessment tool for WtE	1	15	500	7,500
	12.5 Testing of the tool in two project countries	2	5	500	5,000
	12.6 Development of final assessment tool for WtE	1	10	500	5,000
	12.7 Launch of the tool throughout the Caribbean	1	15	500	7,500
	<b>TOTAL</b>		<b>85</b>		<b>55,000</b>
	<b>GRAND TOTAL</b>				<b>1,033,650</b>

