

## Workshop for Consideration of knowledge sharing platform in the Caribbean region for Improvement of Waste Management including Marine Plastic Litter

### Objectives of the workshop

This is the third workshop of the “Technical Cooperation Project on Advisor for Marine Plastic Litter Management in the Caribbean Region,” and the objective of this workshop is to discuss how to promote knowledge sharing in the region regarding waste management. In the past two workshops, we have shared information and knowledge of waste management from 5 participating countries and Japan, especially on the plastic waste issue. We all came to realize that these knowledge-sharing experiences are very beneficial to improve waste management in the region. Therefore, we would like to discuss how to institutionalize knowledge sharing in the Caribbean region. We hope all the workshop participants will bring many ideas to the floor for discussion, so that we will have more concrete idea about how to step forward in this direction.

### Participants

Antigua and Barbuda	Mr. F. Daryl Spencer, General Manager, National Solid Waste Management Authority
Grenada	Ms. Myrna Julien, Communications Manager (Online participation) Grenada Solid Waste Management Authority
Guyana	Mr. Satrohan Nauth, Director of Sanitation Ministry of Local Government & Regional Development (Online participation)
Saint Lucia	Ms. Marie Dalsan, Operations/ Landfill Manager Mr. Davis Poleon, Zonal Officer Saint Lucia Solid Waste Management Authority
Jamaica	Ms. Shannon Douse, Environmental Officer (Engineer), Pollution Prevention Branch, National Environment and Planning Agency (NEPA) Mr. Edson Carr, Projects and Planning Manager, National Solid Waste Management Authority (NSWMA)
JICA Saint Lucia Office	Mr. Ichiro Mimura, Chief Representative of JICA Saint Lucia Office
JICA Advisory Team	Mr. Ikuo Mori, Leader Mr. Makoto Yamashita, Sub-leader Mr. Satoshi Higashinakagawa, in charge of collection, transport and recycling Mr. Yukihiisa Sakata, in charge of final disposal operation and maintenance Mr. Taisuke Watanabe, in charge of organization and institution analysis (online)
International Organization	Mr. Daniele Mariani, Communication & Knowledge Management Specialist, United Nations Environment Programme (UNEP)
Regional Organization	Ms. Susanna DeBeauville-Scott, Project Manager for the Ocean Fisheries and Governance Programme, Organisation of Eastern Caribbean States (OECS) Ms. Teshia JnBaptiste, Project Coordinator, Caribbean Hub - ACP MEAs Phase III Project, Sustainable Development Programme, CARICOM Secretariat (Online participation) Ms. Analissa Rasheed, Environmental and Sustainability Management Consultant (Online participation)

### Venue:

Bay Gardens Hotel

Rodney Bay Village, Saint Lucia

Tel: +758 457 8010

## Program:

Date	Time	Activity	Remarks
3/22 Wed	9:00	Opening remarks by Mr. Ichiro Mimura, the Chief Representative, JICA Saint Lucia Office	Venue: Lantana Conference Room, Bay Gardens Hotel
	9:10	Short remarks by Mr. Ikuo Mori, JAT	
	9:25	Presentations of the pilot project results	
	9:55	1. Response to Marine Plastic Litter in Jamaica by NEPA,	
	10:25	2. Activities on Waste littering and Plastic Waste in Jamaica by NSWMA	
	10:45	Coffee Break	
	11:30	3. Formulation of a Regional Solid Management Plan in Guyana by Ministry of Local Government & Regional Development	
	12:00	RePLAST and following Program “Recycle OECS Project” by OECS	
	13:30	Lunch	
	14:15	4. Pilot project for Remediation of the Deglos Sanitary Landfill in Saint Lucia by SLSWMA	
	14:35	Coffee Break	
	15:50	Discussion on how to tackle common problems with waste in the region, especially plastic waste	
		Closure	
3/23 Thu	9:30	Explanation of Work Plan and Record ver.3 of the Project and knowledge sharing in the Caribbean Region by Mr. Ikuo Mori, JAT	Venue: Lantana Conference Room, Bay Gardens Hotel
	10:15	Presentation from UNEP by Mr. Daniele Mariani: “PROGRAMME: SUPPORT THE EFFECTIVE AND SUSTAINABLE MANAGEMENT OF SOLID WASTE IN THE CARIBBEAN. Zero Waste in the Caribbean: New Ways, New waves”	
	11:00	Coffee Break	
	11:20	Presentation on Experiences and issues with knowledge sharing in the region regarding waste management including marine plastic litter 1. Grenada Ms. Myrna Julien Communications Manager Grenada Solid Waste Management Authority	
	12:00	Lunch	
	13:30	(Continuation of the presentation) 2. Antigua and Barbuda Mr. F. Daryl Spencer General Manager National Solid Waste Management Authority	
	14:10	Coffee Break	
	14:30	Introduction of related activities of CARICOM by Ms. Teshia JnBaptiste Project Coordinator, Caribbean Hub - ACP MEAs Phase III Project, Sustainable Development Programme CARICOM Secretariat and Ms. Analissa Rasheed, Environmental and Sustainability Management Consultant	
	14:50	Group work on how to promote knowledge sharing in the region regarding waste management	
	15:20	Discussion on how to promote knowledge sharing in the region regarding waste management	
	15:50	Closure of the Workshop (Explanation of the site visit on Friday)	
3/24 Fri	8:30 all day	Site visit (Landfill Remediation Pilot Project at Deglos Sanitary Landfill)	



Zoom Links:

Time: Wednesday 22 March 2022, 09:00 St Lucia (UTC-4)

Topic: Knowledge Sharing Workshop - JICA Marine Plastic Litter Management MAR.22 AM

<https://us06web.zoom.us/j/89699688518>

Time: Wednesday 22 March 2022, 13:30 St Lucia (UTC-4)

Topic: Knowledge Sharing Workshop - JICA Marine Plastic Litter Management MAR.22 PM

<https://us06web.zoom.us/j/88317705790>

Time: Thursday 23 March 2022, 09:00 St Lucia (UTC-4)

Topic: Knowledge Sharing Workshop - JICA Marine Plastic Litter Management MAR.23 AM

<https://us06web.zoom.us/j/82050896103>

Time: Thursday 23 March 2022, 13:30 St Lucia (UTC-4)

Topic: Knowledge Sharing Workshop - JICA Marine Plastic Litter Management MAR.23 PM

<https://us06web.zoom.us/j/82645812575>



**Technical Cooperation Project on Advisor for  
Marine Plastic Litter Management in the Caribbean Region**

**Workshop for Consideration of knowledge sharing platform in the Caribbean region  
for Improvement of Waste Management including Marine Plastic Litter**

**- Short Remarks -**

22 March 2023

JICA Advisory Team



**NIPPON KOEI**

## Outline of the Project (1 / 3)

Project title	Technical Cooperation Project on Advisor for Marine Plastic Litter Management in the Caribbean Region
Target countries	Antigua and Barbuda, Grenada, Guyana, Jamaica, Saint Lucia
Vision	In the Caribbean region, efforts to improve waste management and information sharing to prevent the outflow of plastic waste into the ocean will be promoted.
Goal	To prevent the outflow of plastic waste into the ocean, the capacity to respond to waste management priorities will be strengthened in the target countries, and <b>the achievements and lessons learned from each country's efforts will be shared in the Caribbean region.</b>

## Outline of the Project (2/3)

Outcome	<p>Outcome 1: Waste management bodies in each country (central ministries, local governments, waste management corporations, etc.) grasp the current status and priority issues of waste management.</p> <p>Outcome 2: Technologies and methods applicable to solving problems identified in each country will be shared, and plans for their implementation will be formulated in some countries.</p> <p>Outcome 3: In some countries, pilot projects will be implemented to improve waste management to prevent the outflow of plastic waste into the ocean.</p> <p>Outcome 4: Information sharing on waste management will be promoted between the target countries and other Caribbean countries.</p>
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17/04/2023

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## Outline of the Project (3/3)

Activities	<p>Activity 1-1: Understanding the current situation and analysing problems</p> <p>Activity 1-2: Prioritizing issues</p> <p>Activity 2-1: Sharing of technologies and methods applicable to issues, and Japanese knowledge and experience</p> <p>Activity 2-2: Waste management plan or action plan formulation</p> <p>Activity 3-1: Selection of pilot projects or activities</p> <p>Activity 3-2: Implementation of pilot projects or activities</p> <p>Activity 3-3: Evaluation and analysis of the results of pilot projects or activities</p> <p>Activity 4-1: Preparation of seminar presentation materials</p> <p>Activity 4-2: Arrangement of issues, lessons learned, and solutions common to the Caribbean region</p> <p>Activity 4-3: Examination of information sharing framework in the Caribbean region</p> <p>Activity 4-4: Holding an information sharing seminar</p>
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17/04/2023

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# Purposes of the 3<sup>rd</sup> Workshop

Towards the final seminar in October and the future after this project

- ▶ Share information / knowledge obtained through activities conducted in the Project, especially in Jamaica, Guyana and Saint Lucia
- ▶ Find commonalities among problems in the region and ways how to tackle those problems
- ▶ Find a direction of information / knowledge sharing of solid waste / marine plastic litter management in the region

17/04/2023

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# JICA Advisory Team needs your help!

- Some of countries are not able to participate in-person or online due to their own reasons. So, active participation is expected from the floor and online.
- JAT need your help to activate discussions in order for JAT to overcome the language barrier.
- Hope that this workshop will be fruitful for all of us.

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Thank you for your cooperation in  
advance.

17/04/2023

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# **Integrated Marine Plastic Litter Prevention Pilot Project in Jamaica**

JICA Technical Cooperation Project on Advisor for Marine Plastic Litter Management in the Caribbean Region



*Managing and protecting Jamaica's land, wood, air and water*



## **BACKGROUND**

- To control the plastic waste and its entry into the marine environment, two (2) legislations to control the import, manufacturing, distribution and use of single-use plastics (specifically, expanded polystyrene, polyethylene/ polypropylene bags and plastic drinking straws)

- [NRCA \(Plastic Packaging Materials Prohibition\) Order, 2018](#)
- [Trade \(Plastic Packaging Materials Prohibition\) Order, 2018](#)

and several activities and projects such as Plastic Minimization Project and Plastic Bottle Deposit Refund Scheme have been implemented in Jamaica.

- To improve on the efforts in tackling plastic waste, Jamaica has decided on the creation of a policy to address her concerns on plastics in the Jamaican framework.
- As a result, the JICA Advisory Team (JAT) was sought for support on the way forward and in an online meeting held on 7 April 2022, JAT expressed the importance of a plastic material flow analysis for measuring and monitoring the effects of policies aimed to minimize marine plastic litter.



*Managing and protecting Jamaica's land, wood, air and water*



# BACKGROUND

## Why conduct a Plastic Material Flow Analysis?

To determine:

- how much plastic waste is leaking into the marine environment
- sources of plastic waste
- ways of reducing the leakage of plastic waste into the marine environment,
- data/information that is needed for further policy development



## How can the Plastic Material Flow be used?

- To explain the necessity of the policy to stakeholders
- To clarify the prioritized issue to be tackled
- To clarify the effect of the policy
- To explore the recycling market

# PILOT PROJECT IN JAMAICA

## Project Details

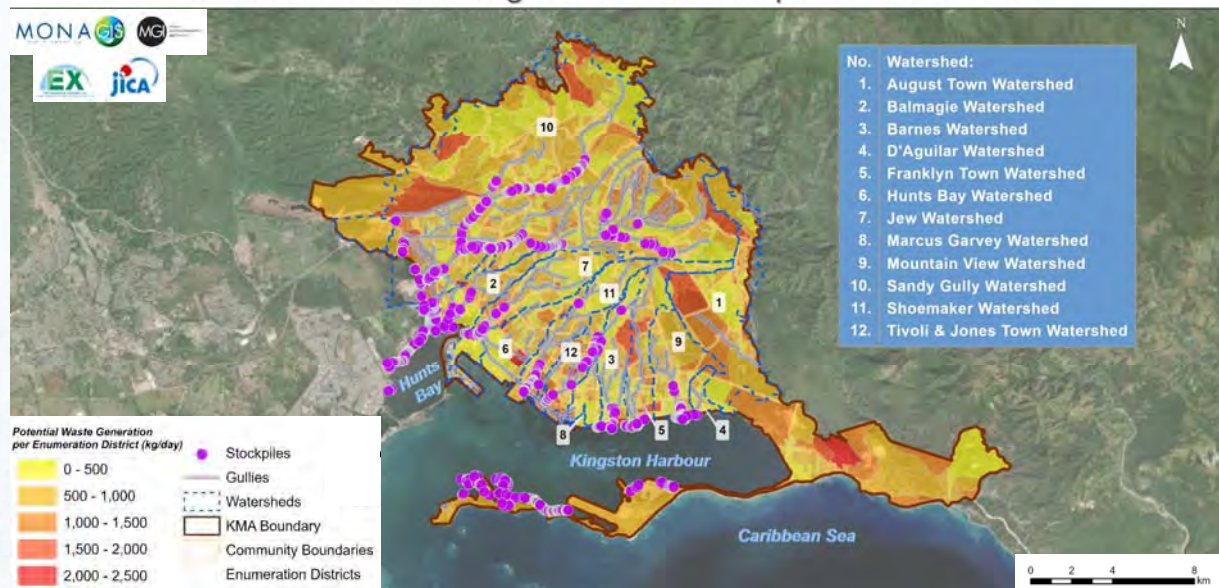
OBJECTIVE	To strengthen the capacity of relevant Agencies {National Environment and Planning Agency (NEPA) and National Solid Waste Management Authority (NSWMA)} in developing and implementing strategies and action plans for marine plastic litter reduction.
PERIOD	October 2022 to February 2023
TARGET AREA	Kingston Metropolitan Area (KMA)

# PILOT PROJECT OUTPUTS

No.	PROPOSED OUTPUTS	STATUS
1	Use of GIS to organize overland data for the Kingston Metropolitan Area (watershed population per waterway, collection routes, collection frequency, etc.)	COMPLETED
2	Creation of a plastic waste material flow chart	COMPLETED
3	NEPA makes a proposal for a plastic policy	IN PROGRESS
4	NSWMA identifies priority activities for reducing plastic waste run-off in Kingston Metropolitan Area	

## OUTPUT 1: GIS Map

### Potential Waste Generation by Enumeration District within the Kingston Metropolitan Area





## OUTPUT 2: Plastic Material Flow



## OUTPUT 2: Data Collection

### 1. Imported and exported plastics

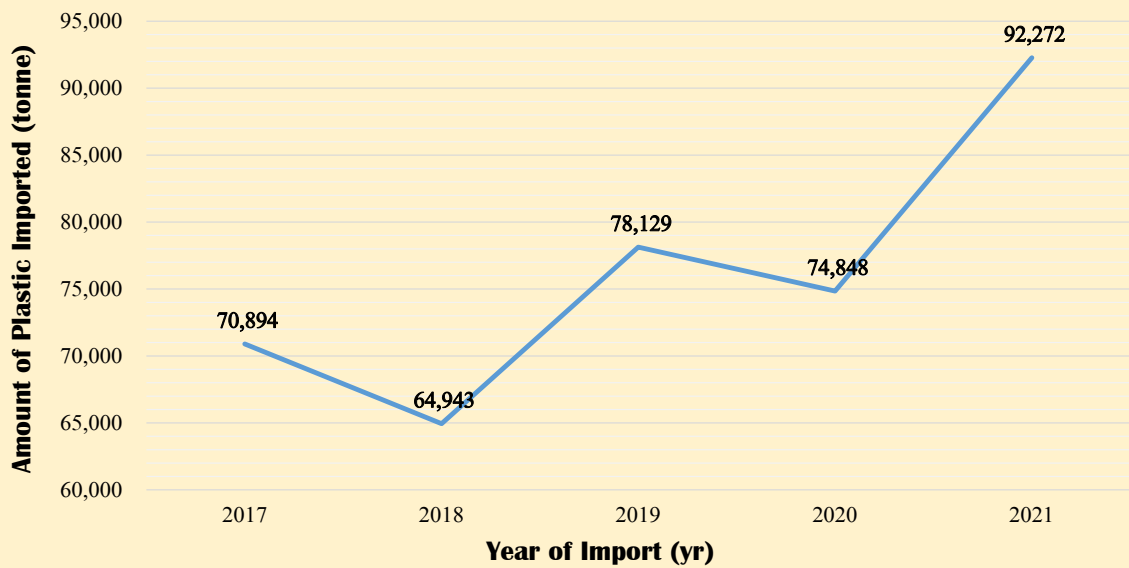
#### Major plastic imports in 2021 classified under HS codes

HS CODE	DESCRIPTION	%
3915	Waste, parings and scrap of plastics	51
3925	Plastics for builders' wares n.e.c or included	16
3919	Self-adhesive plates, sheets, film, foil, tape strip and other flat shapes, of plastic, whether or not in rolls	10
3902	Polymers of propylene or of other olefins, in primary forms	10

Source: UN Comtrade Database, 2022

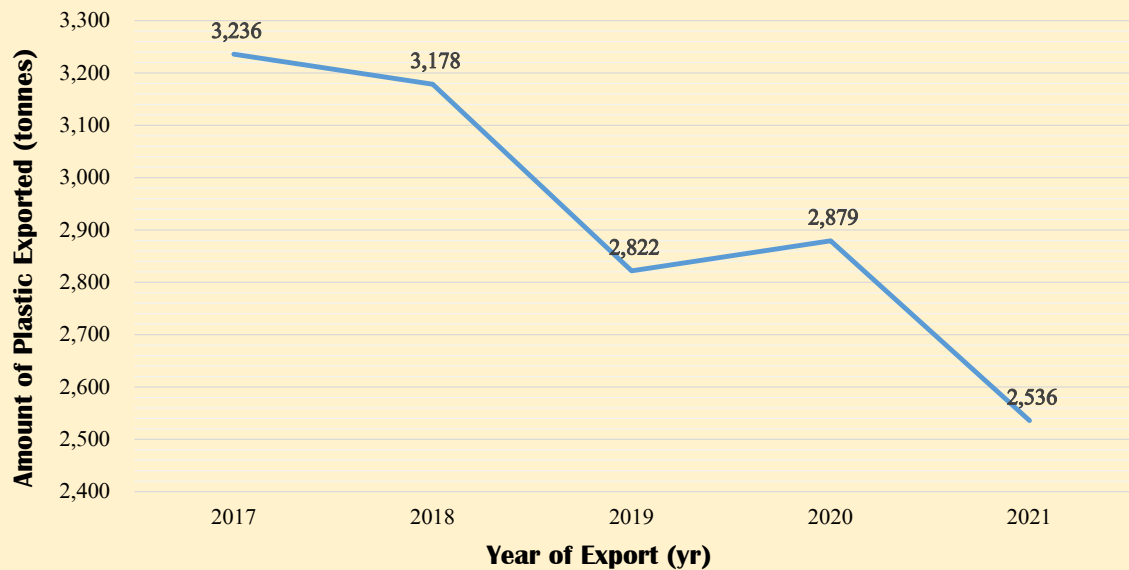
\*n.e.c – not elsewhere classified

## ANNUAL PLASTIC IMPORT IN JAMAICA



Source: UN Comtrade Database, 2022

## ANNUAL PLASTIC EXPORT IN JAMAICA



Source: UN Comtrade Database, 2022

## OUTPUT 2: Data Collection

2. **Manufacturing** – available data indicated the number of bottles sold in Jamaica in 2018.

PLASTIC TYPE	AMOUNT SOLD	WEIGHT SOLD
Clear PET	807,369,069 bottles	18,569 tonnes
HDPE	39,051,547 bottles	2148 tonnes
Other PET (blue, amber, green and black)	65,545,081 bottles	1508 tonnes
Estimated weight of plastic bottles sold in 2018		22,225 tonnes

Source: National Environment and Planning Agency, Final Regulatory Impact Assessment Report, Plastic Waste Minimization Project, 2020

Assumed weight of PET bottle = 23 g

Assumed weight of HDPE bottle = 55 g

## OUTPUT 2: Data Collection

3. **Generated plastic waste** – calculated from the total waste generated and the portion of plastic waste

$$\text{Plastic waste generated} = \text{Overall solid waste generated} \times \% \text{ Portion of plastic waste}$$

**Estimated generated plastic waste = 247,545 tonnes/yr**

ESTIMATED ANNUAL WASTE GENERATION IN JAMAICA			
Population (2019)	Household Solid Waste Generation (tonnes/yr)	ICI Waste Generation (tonnes/yr)	Overall Waste Generation (tonnes/yr)
2,734,094	1,090,923	384,549	1,475,473

Source: Development Bank of Jamaica, Jamaica Waste Characterization Final Report 2022

\*ICI – Institutional, Commercial & Industrial

## OUTPUT 2: Data Collection

- Uncollected plastic waste – estimated from the plastic waste generation and rate of non-collection of waste

$$\begin{aligned} \text{Uncollected Plastic Waste} &= \text{Total plastic waste generated} \times \left[ 1 - \frac{\text{Collected waste}}{\text{total household waste generated}} \right] \\ &= **247,545 \text{ tonnes/yr} \times \left[ 1 - \frac{* 752,737 \text{ tn/yr}}{** 1,090,923 \text{ tn/yr}} \right] \end{aligned}$$

31%

**Estimated uncollected plastic waste = 76,739 tonnes/yr**

Sources: \* National Soil Waste Management Authority, NSWMA Annual Report 2019/20

\*\* Development Bank of Jamaica, Jamaica Waste Characterization Final Report 2022

## OUTPUT 2: Data Collection

- Recycled plastic – available data on plastic recycling was solicited from Recycling Partners of Jamaica (RPJ), the major plastic bottle recycling company in Jamaica

**Recycled plastic bottles (2022) = 5,368 tonnes**





## OUTPUT 2: Data Collection

### 6. Potential plastic leakage

$$\begin{aligned}\text{Potential Plastic Leakage} &= \text{Uncollected Plastic Waste} - \text{Recycled Plastic Waste} \\ &= (76,739 - 5,368) \text{ tonnes/yr}\end{aligned}$$



**Potential plastic leakage = 71,371 tonnes/yr**



## OUTPUT 3: Plastic Policy Proposal

Terms of References were created in August 2022 for the preparation of a:

- *National Policy on Single Use Plastic Management* and
- *Legislative Framework for a National Deposit Refund Scheme for PET and HDPE Bottles*

**THANK YOU FOR YOUR  
ATTENTION!**

**Arigatou Gozaimasu!**



# Activities on Waste Littering & Plastic Management in Jamaica

Mr. Edson Z. Carr  
Projects & Planning Manager NSWMA Ja.

## National Solid Waste Management Authority, Ja.

- The National Solid Waste Management Authority (NSWMA) was established in 2002 under the National Solid Waste Management Act 2001.
- NSWMA is responsible for the protection of public health by collecting, transporting, storage and disposal of solid waste island wide.

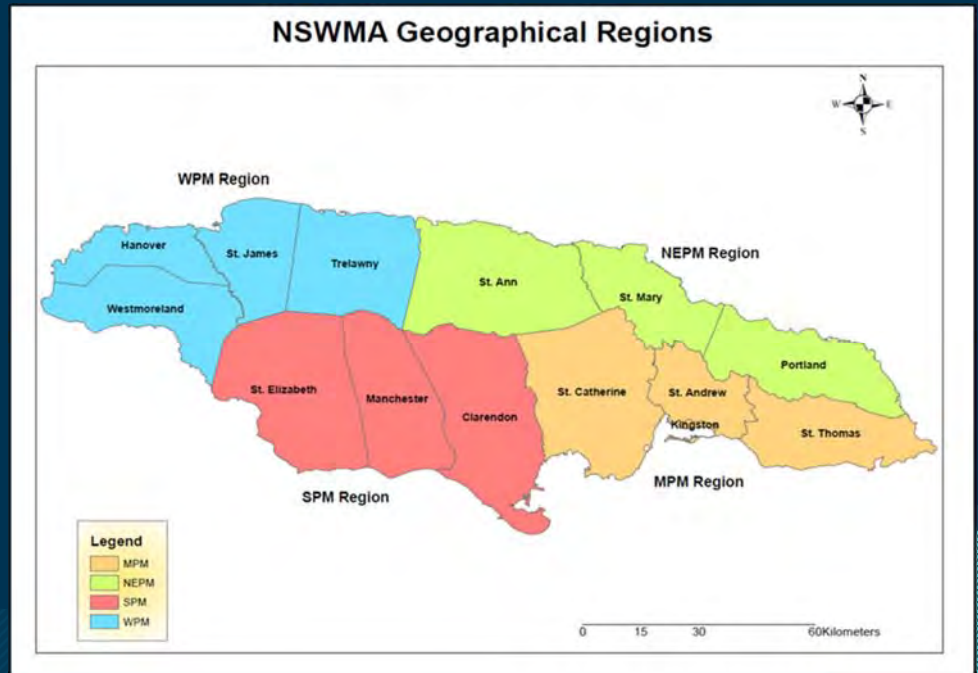




# Introduction of the NSWMA

The NSWMA operates through four regional companies. The regional offices are responsible for:

- the sweeping of roadways
- collection, transportation and disposal of residential, commercial and special waste
- maintenance of selected median strips, verges and public parks
- management of waste disposal sites islandwide
- public education and enforcement

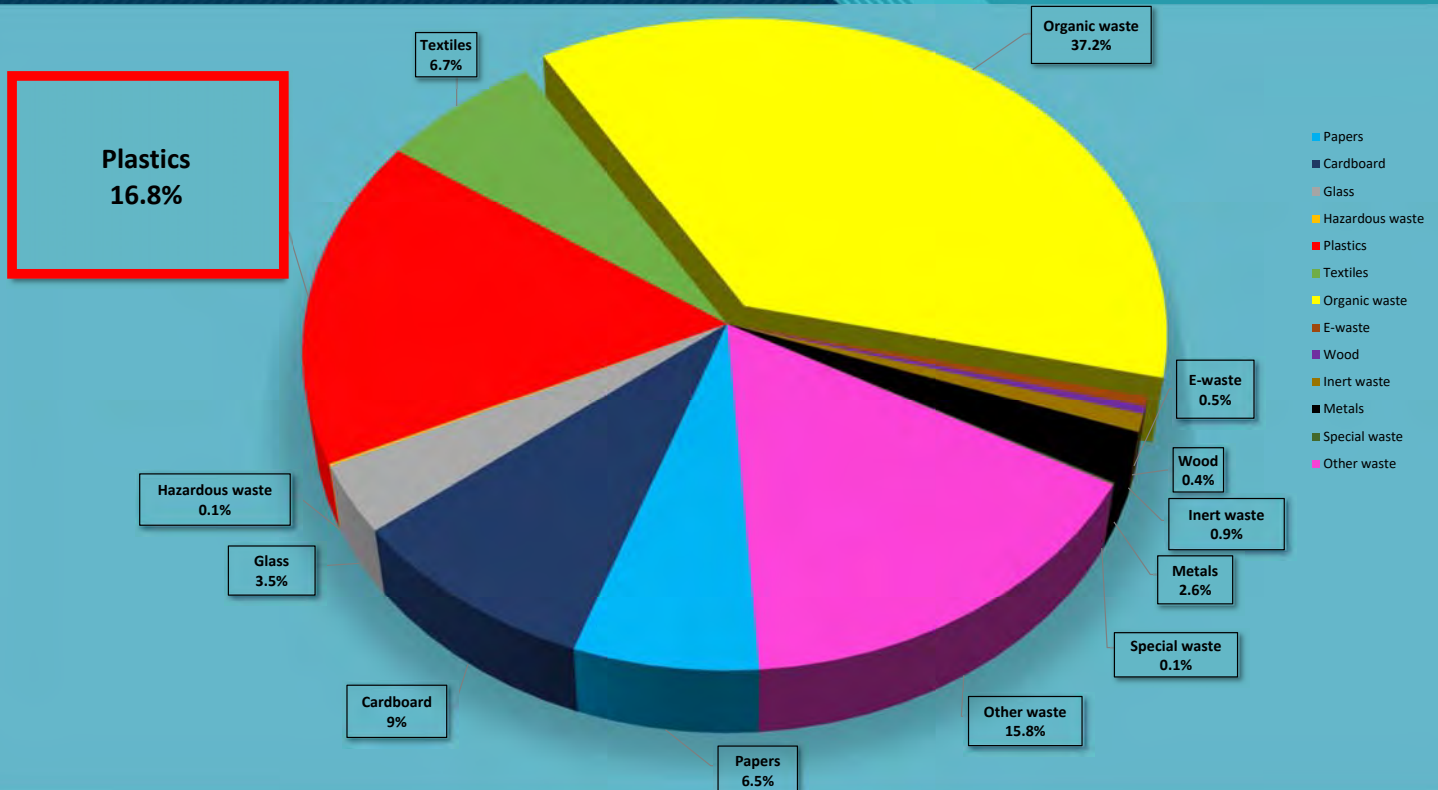


# Disposal Sites of Jamaica





# Waste Composition of Jamaica

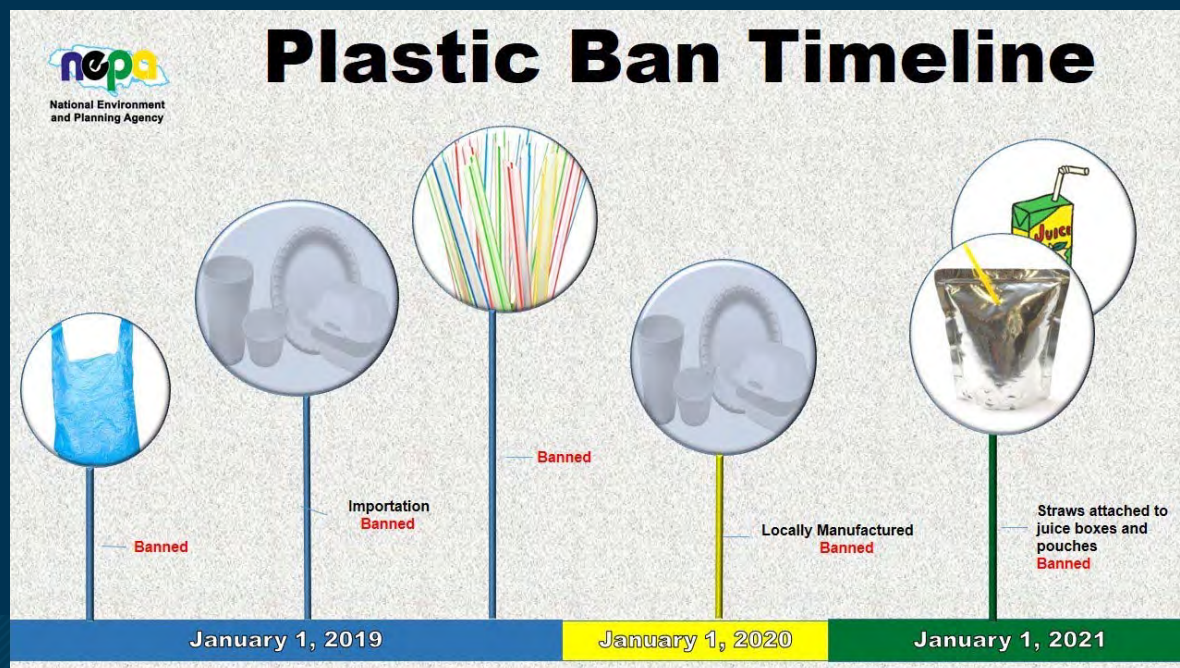


## Initiatives to Combat Plastic Waste in Jamaica

- Ban on single use Plastic
- Rae Town Recycling Pilot Project
- Northern Belt Plastic Recycling Initiative
- Clean Harbour Initiative
- Research



## Ban on Single Use Plastics - Jamaica



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## Rae Town Recycling Pilot Project

- Reduction of Marine litter along the Rae Town Fishing Village Coastline
- Reduction of the volume of garbage within the gully.
- Creation of a culture of separation at source.

Clean-up



Garbage Collection



Separation at Source



Environmental Wardens



**Between July 2020 and April 2021**  
**33,580 lb of PET Bottles collected**

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## Northern Belt Plastic Recycling Initiative

- Sensitization



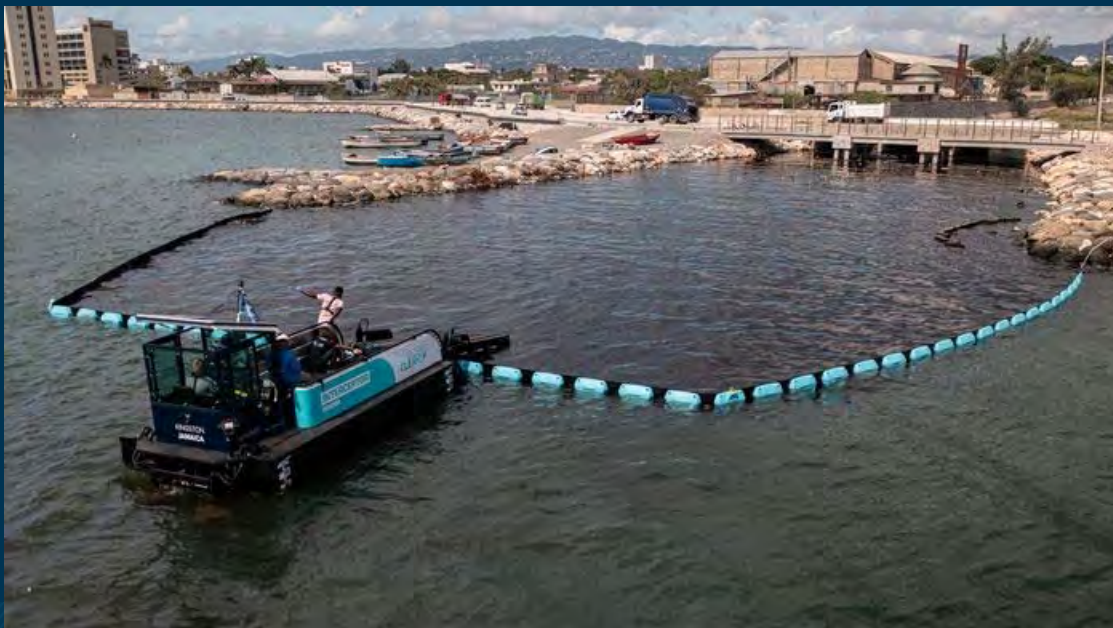
- Separation at Source



Since January 27, 2020 over  
**239,504 lbs** of PET collected

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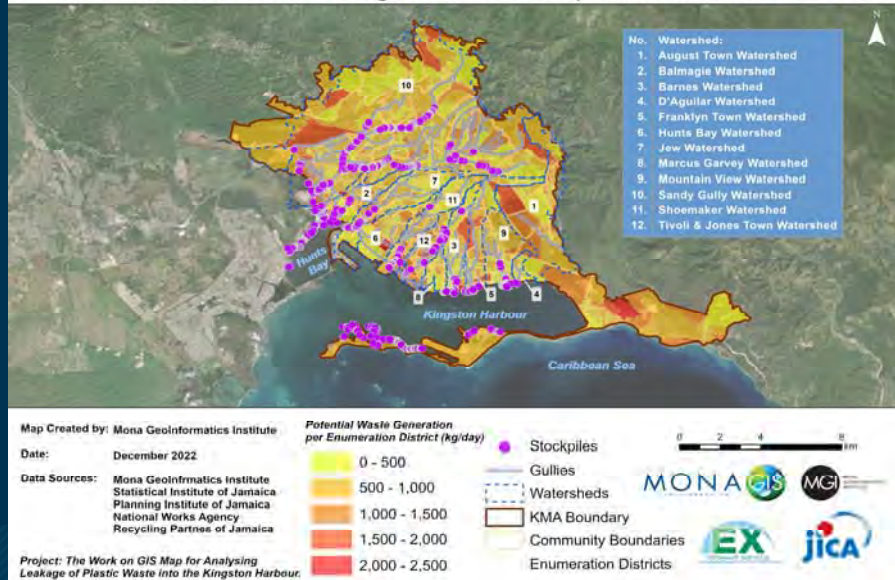
## Clean Harbour Initiative - OCEAN CLEAN UP



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## Research - “Using Data to Improve Waste Management”

Potential Waste Generation by Enumeration District within the Kingston Metropolitan Area



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## Contact Us

### National Solid Waste Management Authority

Address: 61 Half Way Tree Road, Kingston 10

Toll Free: 1-888-253-2652 Telephone: (876) 926-5170/ (876) 448-3220/ (876) 926-8559

Email: [nswma@nswma.gov.jm](mailto:nswma@nswma.gov.jm)

Download the new  
**NSWMA**  
**MOBILE APP**  
 Stamp Out Littering and Illegal Dumping!

Download now on

Available on the App Store  
 GET IT ON Google Play  
 @NSWMA

Let's work together to keep Jamaica clean by using our app to report any trash you see in public space.

Report

National Solid Waste Management Authority

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**Thank You!**



# FORMULATION OF A REGIONAL SOLID MANAGEMENT PLAN IN GUYANA

## PROGRESS OF SWM PLAN IN REGION 5

Satrohan Nauth

Director of Sanitation

Minister of Local Government & Regional Development

22<sup>nd</sup> March, 2023

## AGENDA

- Background
- Current situation of SWM in Region 5
- Waste Amount & Composition Survey
- Time & Motion Survey
- Main Issues of SWM in Region 5
- Vision & Strategic direction
- Future Waste Flow
- Planning Strategy
- Further Action

## BACKGROUND

- In Guyana, the plans for solid waste management is in the developmental stage.
- Disposal facilities are being developed in several regions.
- Local Democratic Organs (80) and private sector provide collection services.
- In order to have a more holistic approach to solid waste management regional plans are being developed.



## OBJECTIVES

- 1) To identify current situation of SWM in region 5
- 2) To identify the future waste generation and waste flow
- 3) To examine solutions to the current issues and prepare a plan based on the future waste flow
- 4) To determine a budget for the implementation of the plan

## AREA OF REGION 5

- Region 5 (Mahaica-Berbice) comprising of an area of 3,885 km<sup>2</sup>.
- Bounded by:
  - Region 4 to the west
  - Region 6 to the east
  - Region 10 to the south
  - Atlantic Ocean to the north
- 90 % of population of Region 5 lives on the Low coastal Plain.
- Population of around 45,500 (estimation base)



## CURRENT SITUATION OF SWM IN REGION 5 (COLLECTION AND TRANSPORTATION)

- NDC has the responsibility for collection and transportation
- Collection frequency varies – Some once every week, others every two weeks
- Collection rate is around 60%-80%
- NDC use tractor trailers for collection
- Private service providers use compactor trucks and charge a fee.





## OVERVIEW OF CURRENT SITUATION OF SWM IN REGION 5 (FINAL DISPOSAL)

- Some NDCs have disposal sites where open dumping & burning is practiced.
- There are a few waste pickers in some final disposal sites
- Though the final disposal site is small, there are issues regarding environmental deterioration



## WASTE QUANTITY AND COMPOSITION SURVEY

- Waste generation rate (kg/person/day)
- Bulk density (kg/litre)
- Physical composition (wet-base)
- Three components: combustible, moisture and ash contents  
(Measurement of moisture and calculation of the others)
- Lower calorific value (kJ/kg) (by calculation)

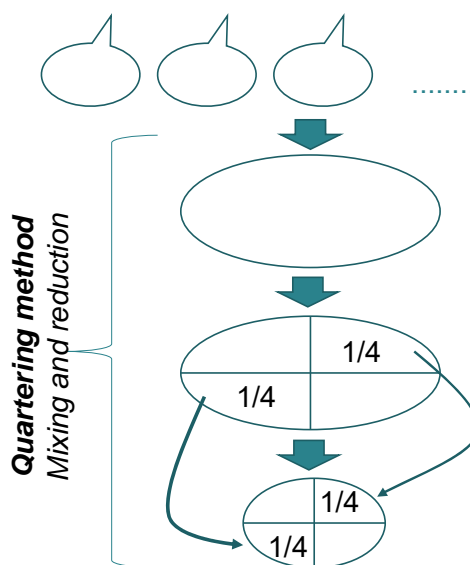
## 4.2 NUMBER OF SAMPLES

- In total, 882 samples was taken for the Waste Amount Survey, and 21 samples for the Waste Composition Survey.
- The waste quantity survey was conducted for seven (7) consecutive days after the complete collection of waste at the first day . The waste composition survey was conducted in the following samples collected mode; 1st day, 3th day and 4th day.

Generation Source	No. of Households per NDC	No. of Hotel, Restaurant, Shop, Institution per NDC	Waste Amount Survey			Waste Composition Survey			
			Samples/ Day	Days of Sampling	Samples Total	Household sampling. No./day	Other sampling. No./day	Days of Sampling	Samples Total
			A+B	-	CxD	-		-	FxG
	A	B	C	D	E	F		G	H
Mahaicony/Abar y NDC	30	12	42	7	294	1	4	3	21
Bath/Woodley Park NDC	30	12	42	7	294	1		3	
Blairmont/Gelder land NDC	30	12	42	7	294	1		3	
<b>Total</b>	<b>90</b>	<b>36</b>	<b>126</b>	<b>-</b>	<b>882</b>	<b>-</b>		<b>-</b>	<b>21</b>

### WASTE COMPOSITION SURVEY (PHYSICAL COMPOSITION WET-BASE) AND BULK DENSITY

30 samples



Bulk density about 40 litres



# WASTE COMPOSITION SURVEY (BULK DENSITY AND PHYSICAL COMPOSITION WET-BASE)

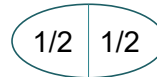


Physical composition (wet-base) 15 categories



Mixing and dividing into halves

## WASTE COMPOSITION SURVEY (MOISTURE CONTENTS)



Measure Before Drying



Measure After Drying



## CALCULATION METHOD

$$[\text{Bulk Density}] = [\text{Waste (wet base)}] / [\text{Volume}]$$

$$[\text{Physical Composition (wet-base)}] = [\text{Each categorized waste (wet base)}] / [\text{Waste (wet-base)}]$$

$$[\text{Moisture contents}] = [\text{Waste (wet-base)}] - [\text{Waste (dry-base)}]$$

$$[\text{Combustible}] = [\text{Waste (wet-base)}] - [\text{Moisture contents}] - [\text{Ash contents}]$$

$$[\text{Lower Calorific Value}] = 190 \times [\text{Combustible}] - 25 \times [\text{Moisture Contents}]$$

## WASTE AMOUNT SURVEY (RESULT)

Item	Household
Planned sample number	90
Actual and effective sample number	65
Average [kg/person/day]	0.31
Upper limit [kg/person/day]	0.98
Lower limit [kg/person/day]	0.04

Item	Restaurant	Shop	Institution (School)
Planned sample number	9	9	9
Actual and effective sample number	1	6	8
Average [kg/ day/ staff]	0.61	1.14	0.37
Upper limit [kg/ day/ staff]		1.66	1.08
Lower limit [kg/ day/ staff]		0.57	0.08

## WASTE COMPOSITION SURVEY (PHYSICAL COMPOSITION)

Item	Household	Restaurant	Shop	Institute
Kitchen waste	41%	32%	6%	14%
Wood/grass	1%	0%	0%	4%
Recyclable paper	0%	0%	72%	9%
Non recyclable paper	12%	7%	12%	31%
Recyclable plastic	5%	26%	2%	8%
Non recyclable plastic	17%	18%	7%	12%
Recyclable glass	3%	4%	1%	5%
Non recyclable glass	3%	9%	0%	0%
Metal	3%	3%	0%	2%
Textile	2%	0%	0%	1%
Leathers	0%	0%	0%	1%
Bulky waste	0%	0%	0%	0%
Ceramics/stone	1%	0%	0%	0%
Hazardous and infectious	11%	0%	0%	13%
Others	0%	0%	0%	0%

## WASTE COMPOSITION SURVEY (BULK DENSITY)

Composition	Mahaicony/Abary NDC			Bath/WoodleyPark NDC			Blairmont/Gelderland NDC		
	Day 1	Day 3	Day 4	Day 1	Day 3	Day 4	Day 1	Day 3	Day 4
Volume (L)	40	40	40	40	40	40	40	40	40
Weight (kg)	8.85	9.06	7.20	8.69	5.77	6.12	9.84	9.45	6.85
Bulk density (kg/L)	0.22	0.23	0.18	0.22	0.14	0.15	0.25	0.24	0.17

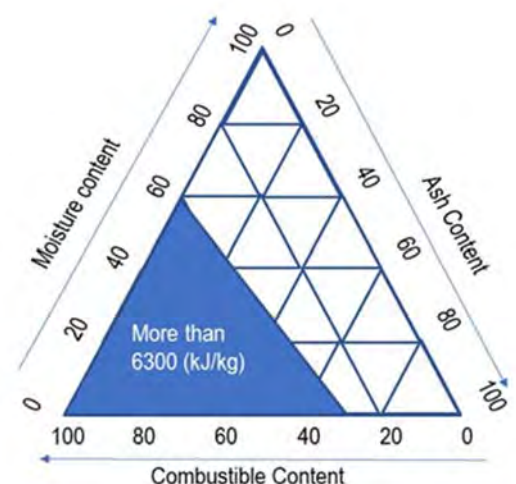
Composition	Restaurant			Shop			Institute		
	Day 1	Day 3	Day 4	Day 1	Day 3	Day 4	Day 1	Day 3	Day 4
Volume (L)	—	40	40	40	40	40	40	40	40
Weight (kg)	—	6.93	6.57	6.32	6.33	6.36	6.48	6.28	6.37
Bulk density (kg/L)	—	0.17	0.16	0.16	0.16	0.16	0.16	0.16	0.16

## WASTE COMPOSITION SURVEY (THREE COMPONENTS)

Item	Household	Restaurant	Shop	Institute
Moisture: W[%]	38	32	39	47
Combustible: B[%]	46	46	47	39
Ash: A [%]	16	22	14	14

Item	Household	Restaurant	Shop	Institute
Lower calorific value [kJ/kg]	7,821	7,917	7,954	6,257

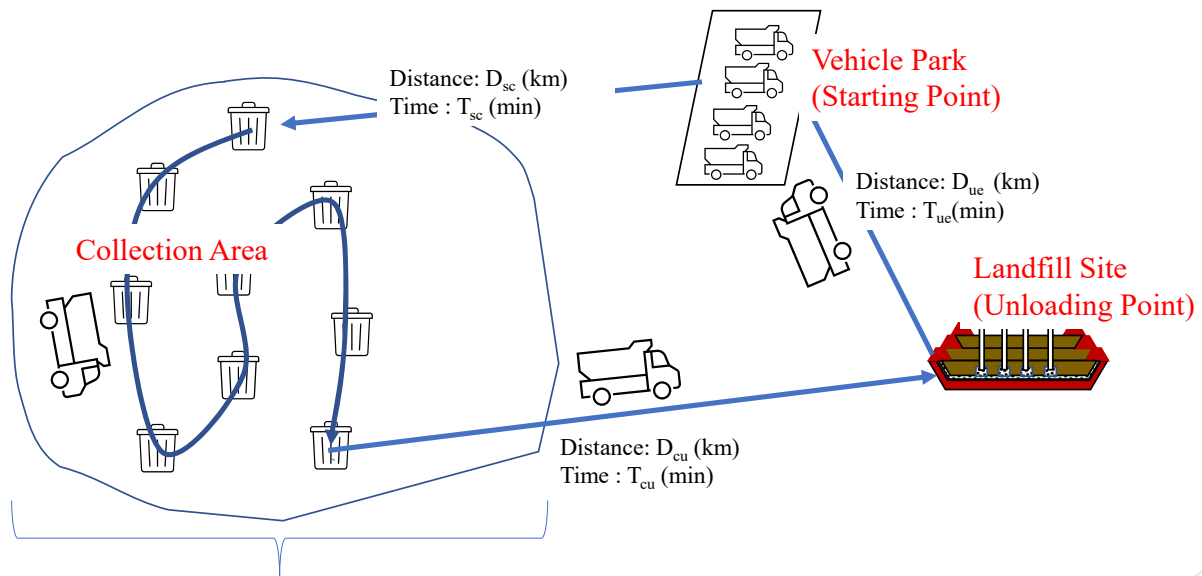
The result of moisture, combustible and ash contents based on this waste composition survey show that the waste in region 5 is possible range of waste incineration by the comparison between the result and above ternary diagram. However, total amount of waste is 20 to 25 [ton/day]. It is very small waste amount for considering Waste to energy incineration in region 5.



Source: National Institute for Environmental Study of Japan



# TIME AND MOTION SURVEY (METHODOLOGY)



Total Distance in Collection Area:  $\sum_i D_c (i - 1, i)$  (km)

Total Moving Time in Collection Area:  $\sum_i MT_c (i - 1, i)$  (min)

Total Loading Time in Collection Area:  $\sum_i LT_c (i)$  (min)

# TIME AND MOTION SURVEY (TYPE OF TARGET VEHICLE)



## TIME AND MOTION SURVEY (COMPACTOR VEHICLE)



Activity	Loading time	Time (second)
Loading of plastic bin	Minimum time	4.9
	Maximum time	106.0
	Average time	29.7

Item	Speed [km /h]
Maximum Speed	80.5
Average Speed	54

Activity	Location	Time (second)
Unloading of compacted waste	Waste unloading point (landfill site)	130

## TIME AND MOTION SURVEY (SKIP VEHICLE)



Activity	Location	Time (second)	Skip number
Loading time of container	Waste collection point	33~37	1
Unloading of container	Waste collection Point	40~42	1
Loading time of container	Waste collection Point	130~135	2
Unloading time of container	Waste collection Point	140~145	2

Item	Speed [km/h]
Maximum Speed	62.5
Average Speed	24.0

## TIME AND MOTION SURVEY (SMALL TRACTOR)

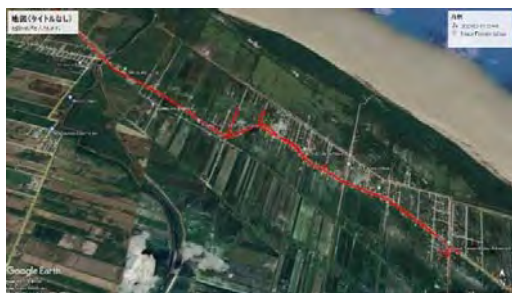


Activity	Item	Time (second)
Loading of plastic bin	Minimum loading time	5.8
	Maximum loading time	127.2
	Average loading time	35.2

Item	Speed [km/h]
Maximum Speed	20.1
Average Speed	14.4

Activity	Location	Time (second)
Unloading of compacted waste	Waste unloading point (landfill site)	37

## TIME AND MOTION SURVEY (TRUCK)



Activity	Item	Time (second)
Loading of plastic bag	Minimum loading time	1.7
	Maximum loading time	74.8
	Average loading time	16.8

Item	Speed [km/h]
Maximum Speed	70
Average Speed	50.5

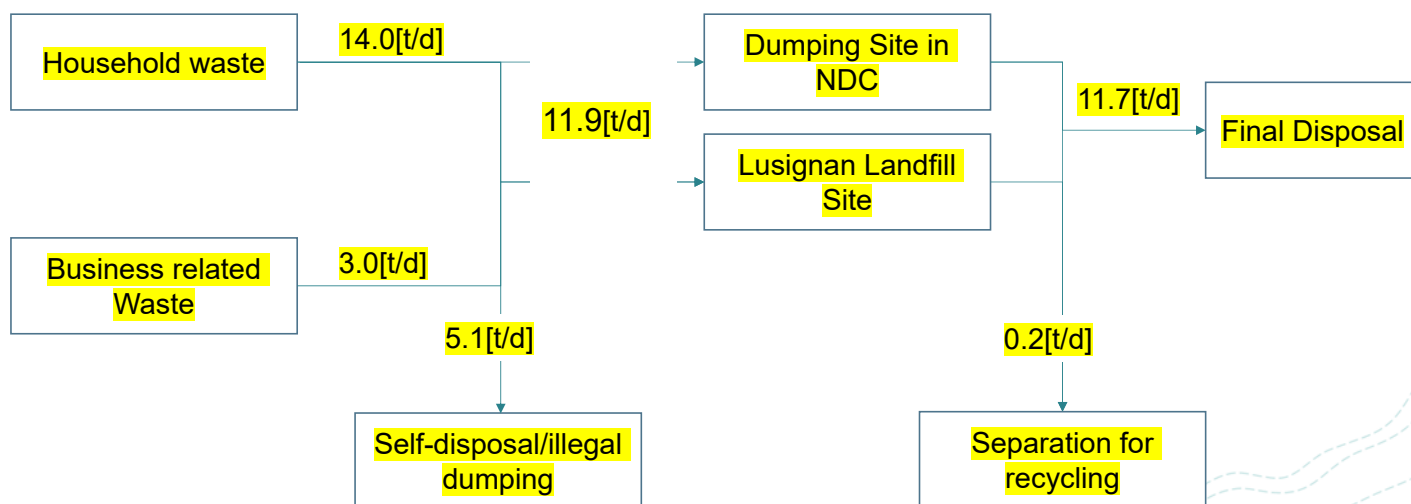
Activity	Location	Time (second)
Unloading of compacted waste	Waste unloading point (landfill site)	590



## TIME AND MOTION SURVEY

Type of vehicle	Average speed [km/h]	Average loading time [second]	Unloading time [second]
Compactor vehicle	54	30	130
Skip vehicle	24	35	84
Small tractor trailer	14.4	35	37
Truck without dump function	50.5	17	590

## ESTIMATED CURRENT WASTE FLOW (2023)



## IDENTIFIED MAIN ISSUES (I)

### Law and regulations

- SWM Bill which defines the establishment of a National Solid Management Authority, has not been enacted
- No administrative rules or guidelines for collection, transportation, recycling, and final disposal are fragmented and not harmonized.

### Organizational Structure

- At the national level, the MLGRD implements waste management, but the planning and implementing agencies are integrated, and the number of staff is insufficient compared to the nature of the work.
- Both the NDC and private companies are conducting collection, but the private companies are collecting from sources that are paying fees, and the NDC is unable to ascertain which households are relying on the private companies for collection.

## IDENTIFIED MAIN ISSUES (II)

### (3) Discharge, collection and transportation

- The collection system using tractor trailers is inefficient
- Monitoring of collection has not been implemented.

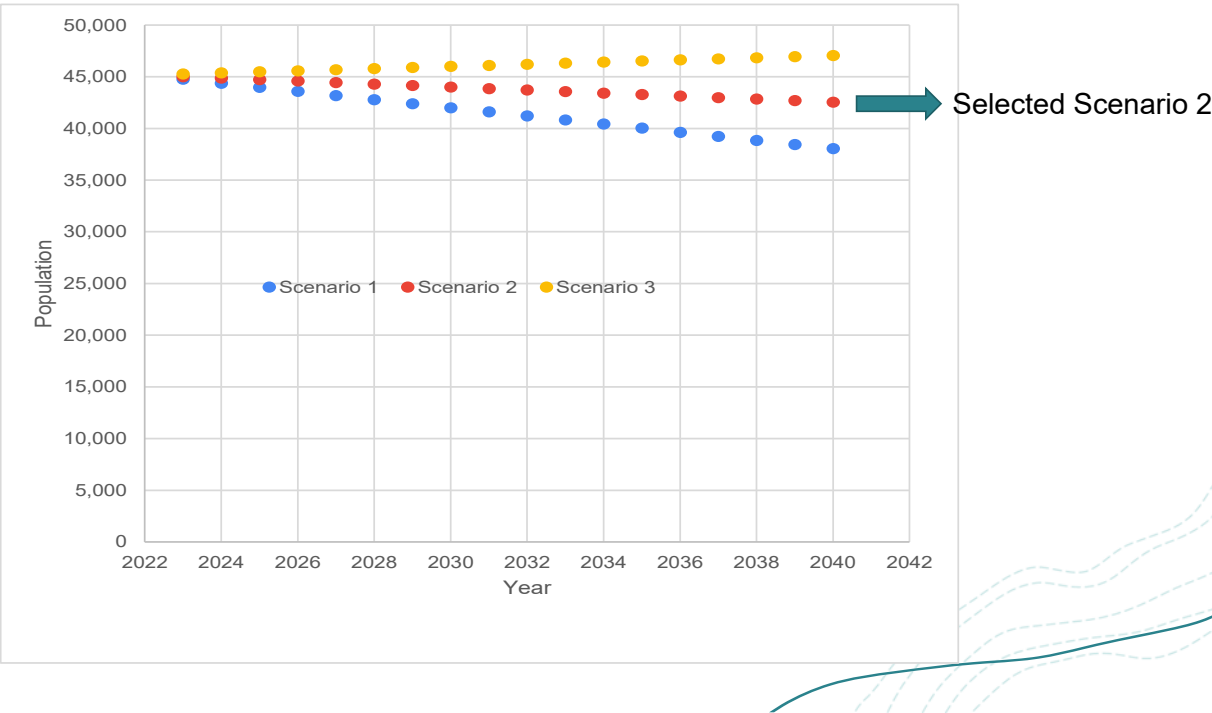
### (4) Treatment and disposal

- The current disposal sites at each NDC are open dumping sites
- A new sanitary landfill is currently planned for Blairmont.

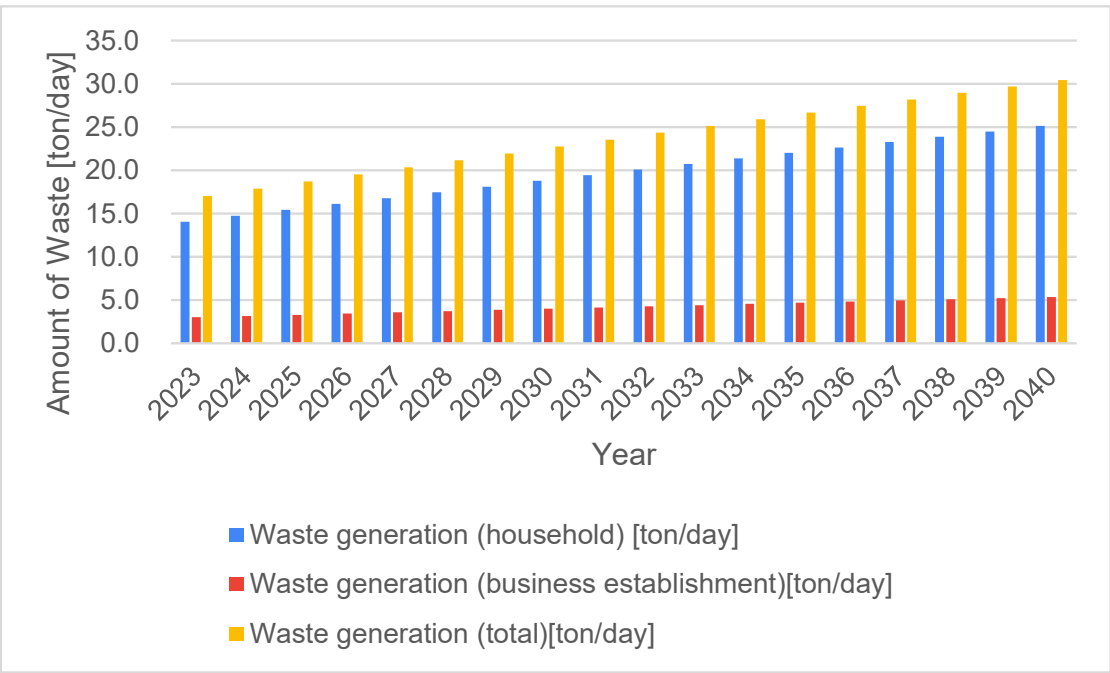
### (5) 3Rs, Resource Recovery

- Guyana currently has limited recyclable waste. Due to fluctuations in market prices, they are not currently being collected as valuable resources.
- Due to comingled collection of waste and the lack of separate collection system, some of the recyclable waste is not recovered.

# POPULATION PROJECTION

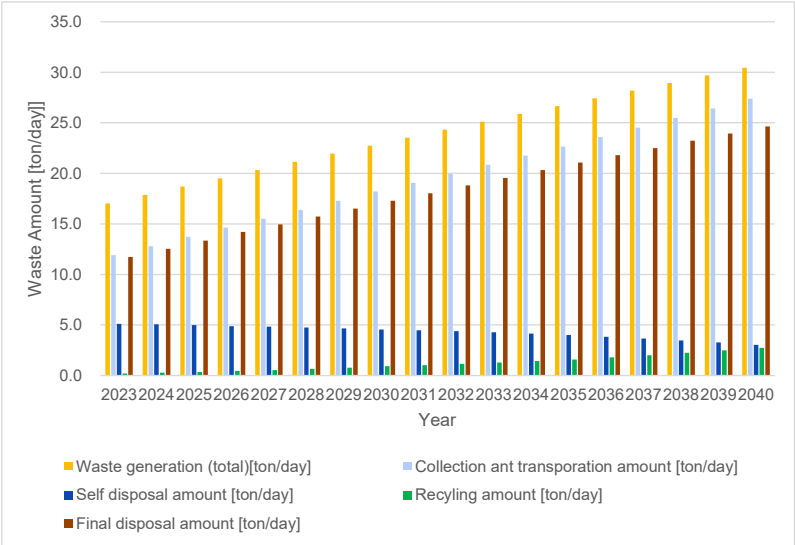


# FUTURE WASTE GENERATION

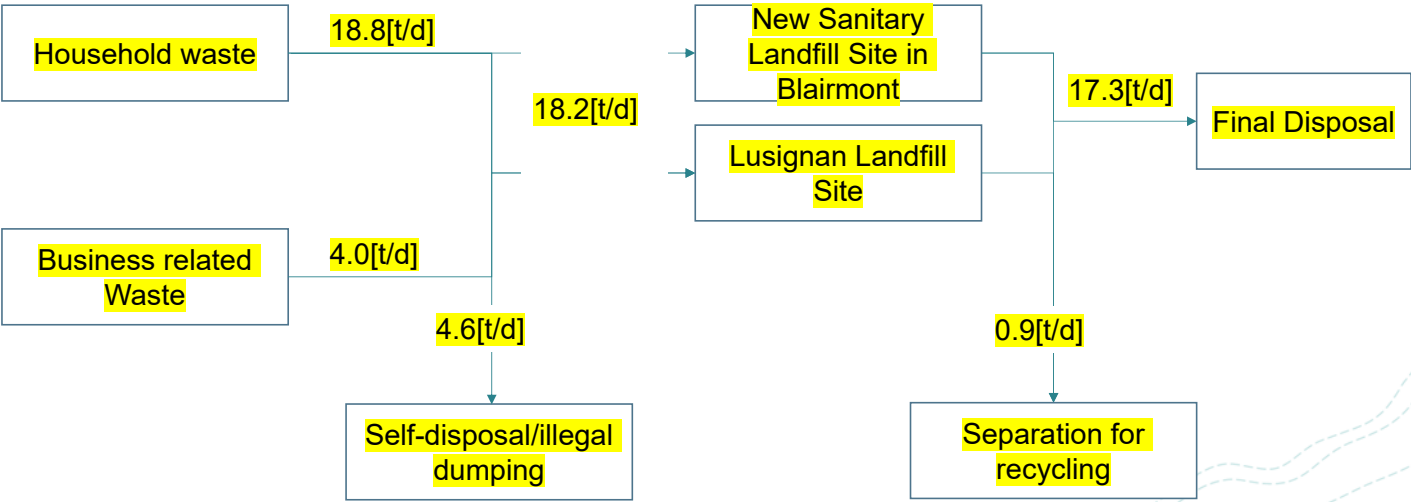


# SETTING OF FUTURE TARGET

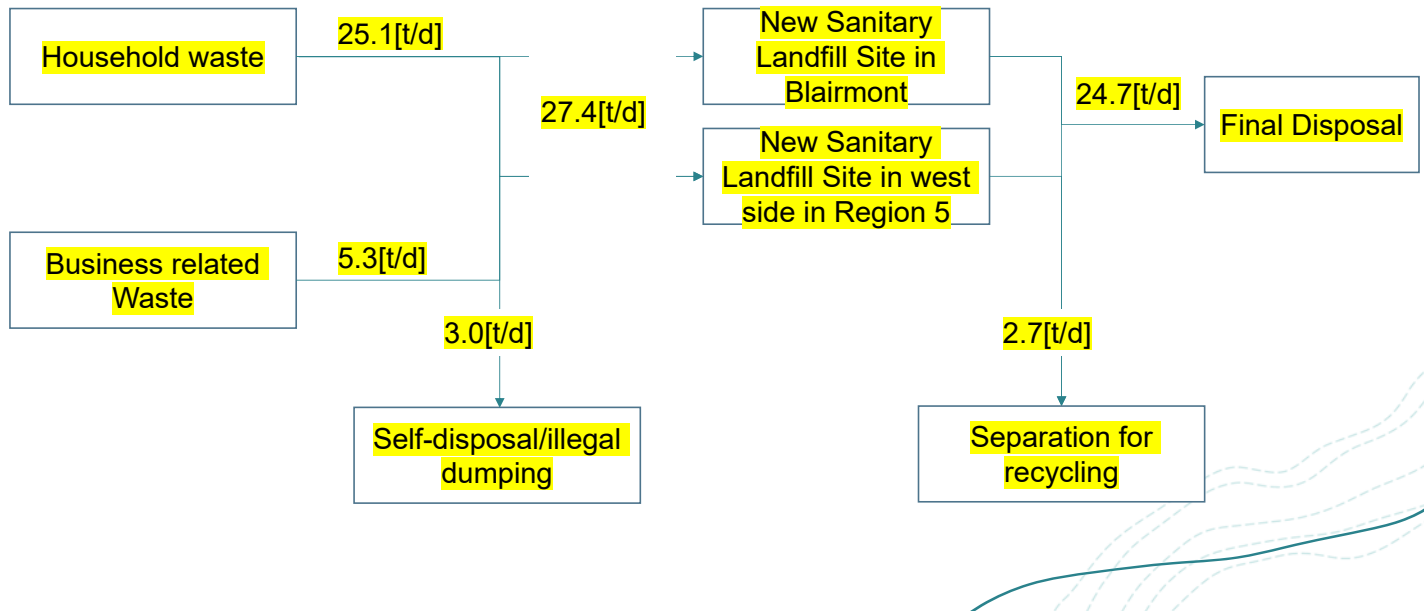
Item	2023	2030	2035	2040
Collection Rate (%)	70%	80%	85%	90%
Self-disposal Rate (%)	30%	20%	15%	10%
Recycle Rate (%)	1.7%	5.0%	7.0%	10.0%
Final disposal Rate (%)	98%	95%	93%	90%



# FUTURE WASTE FLOW (2030)



## FUTURE WASTE FLOW (2040)



## STRATEGIC DIRECTION IN NATIONAL LEVEL

### Objectives

- A cleaner environment
- Better public health protection
- Contribute to economic prosperity

### Goals

- Less litter & illegal dumping
- Less waste generated
- Better resource recovery
- Efficient and cost-effective waste collection
- Better waste infrastructure
- Strengthen human & institutional capacity

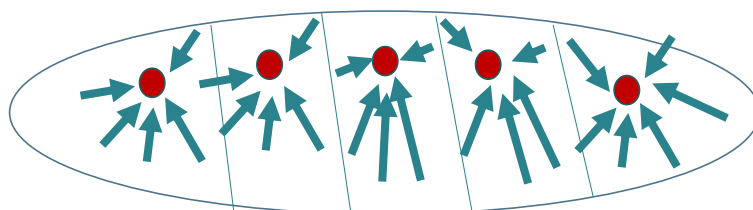




# PLANNING STRATEGY (OVERALL)

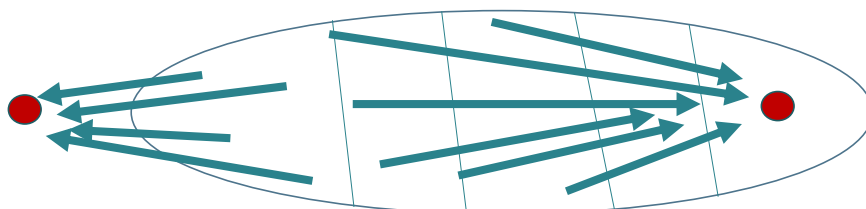
## Current situation

Mainly collection and transportation by NDC to existing open dumping site in each NDC



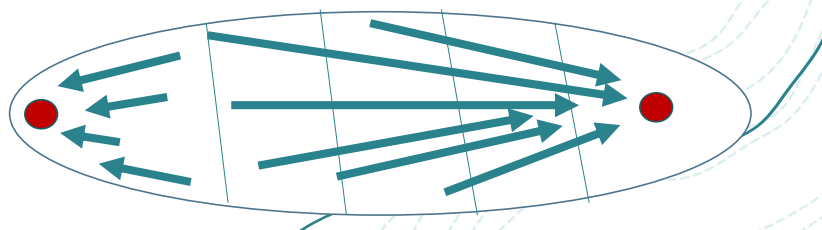
## Short and medium term

Collection and transportation by private company and/or NDC with monitoring to the new sanitary landfill site in Blairmont



## Long term

Collection and transportation by private company and/or NDC with monitoring by NDC/MLGRD to two sanitary landfill sites in Blairmont and west side in region 5



# PLANNING STRATEGY (COLLECTION AND TRANSPORTATION)

## (1) Establishment of scheduled collection

To improve the collection and transportation system toward scheduled collection with monitoring by each NDC and/or NSWMA

## (2) Improve efficiency of collection and transportation

To improve the collection and transportation efficiency from small scale tractor trailer to compactor vehicle for residents and skip for large business establishment by privatizing the collection and transportation

## (3) Improve collection rate and frequency

To improve the collection frequency to twice a week from current frequency (once a two weeks to several times a two weeks) and expand and fix the collection area



## PLANNING STRATEGY (FINAL DISPOSAL)

### (1) Development of Waste Management Facilities

To develop the sanitary landfill and recovery facility including landfill area, rainwater drainage, leachate collection and treatment system, gas ventilation pipe, sorting facilities of recyclable waste, weighing bridge, administration building, gate house, fence as well as necessary heavy equipment and environmental monitoring equipment.



### (2) Closure with environmental remediation of existing open dumping sites

To closure of open dumping site in each NDC with environmental improvement measures such as installation of rainwater drainage, final soil cover and tree planting, after the development of the sanitary landfill site



## PLANNING STRATEGY (3R (REDUCE, REUSE, RECYCLE))

### (1) Promotion of source separation and discharge of resources

To promote separation at source to residents and business establishment, and to establish a system to separately collect stored resource waste in the future

### (2) Promotion of waste reduction at source

To consider reducing the distribution of free plastic bags as a way to curb the emission of garbage.

### (3) Improve the condition of waste picking activities

To improve the condition of waste picker by officializing them and preparing sorting facilities in new landfill site, etc as well as to improve the collection efficiency

## **FURTHER ACTION**

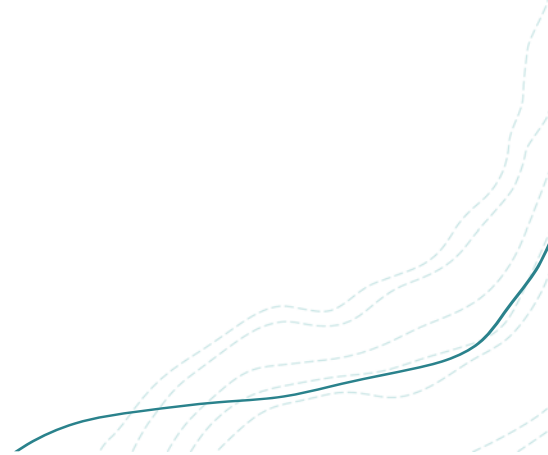
### **(1) Preparation of the following contents of Regional SWM plan in Region 5**

- Collection and Transportation Planning
- Final Disposal Planning
- 3R Planning
- Implementation Schedule
- Organization and necessary Staff
- Cost Estimation

### **(2) Preparation for the final seminar (Around Sep. or Oct.)**

- Presentation of the progress of SWM bill
- Presentation of the Regional SWM plan
- Presentation of the other progress and future action

### **(3) Others**



**THANK YOU VERY MUCH**





# Organisation of Eastern Caribbean States

## Workshop for Consideration of Knowledge Sharing Platform in the Caribbean Region for Improvement of Waste Management including Marine Plastic Litter

JICA - "Technical Cooperation Project on Advisor for Marine Plastic Litter Management in the Caribbean Region"

Saint Lucia  
March 22, 2023



Prepared by Susanna De Beauville-Scott,  
OECS Commission, Castries, Saint Lucia  
Email: [Susanna.dscott@oeecs.int](mailto:Susanna.dscott@oeecs.int)

Uhy lvhg #wuhdw| #r i#Edvhwuh#dgg #Surw fro



**RTB Art 4.2** ... Member States shall  
... co-ordinate, harmonise and  
undertake joint actions and pursue  
joint policies particularly in ...

(o) matters relating to the sea and its  
resources;  
(l) Education

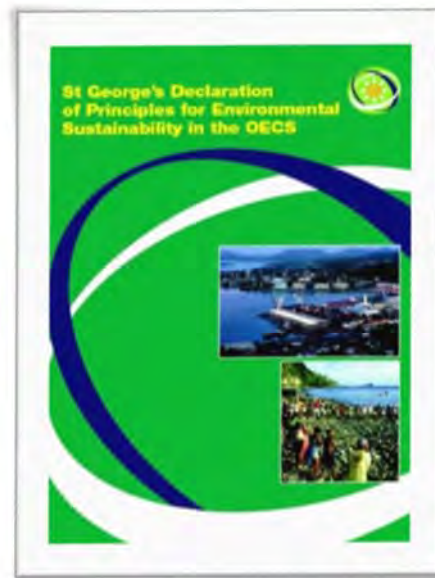
**Protocol Art 23-25** ...harmonise  
and implement policies ...

- Human and social development  
(incl. health)
- Environmental Sustainability
- Marine Resources and Marine  
Environment





## Protocol: Article 24 - Environmental Sustainability



**24.1** Each Protocol Member State shall implement the **St. George's Declaration of Principles for Environmental Sustainability** in the OECS ... for optimal social and economic benefits.



## Decisions – OECS Council of Ministers

Decisions from the 5<sup>th</sup> Meeting of OECS Council of Ministers of Environmental Sustainability (Montserrat, July 11, 2018) - The Council of Ministers (*inter alia*):

Noted the challenges and opportunities for waste management

Recommended that Member States, **as a matter of priority**:

... address new and emerging challenges for the management, reduction and recycling of **terrestrial and ship-generated waste**

... implement effective measures that contain and **reduce marine plastic pollution**





## St. George's Declaration of Principles for Environmental Sustainability in the OECS



### CHEMICALS, POLLUTION AND WASTE (CPW)



#### Goal:

Integrated approaches to **chemicals and waste management** through sustainable consumption, production and management practices that reduce waste and pollution in the environment.

#### Objectives:

- (1) Implement an **integrated approach** to waste management nationally and regionally
- (2) Promote and develop the **circular economy** nationally and regionally



## ReMLit Project Building Resilience in the Eastern Caribbean through the Reduction of Marine Litter

Title	Primary Deliverables and Accomplishments
<b>Regional Component</b>	<ul style="list-style-type: none"> <li>• Strengthening the Enabling Environment in the OECS for effective waste management.</li> <li>• <b>Design of an Incentive Programme for Reduction of Marine Litter.</b></li> <li>• OECS Regional Public Awareness and Sensitization Campaign.</li> <li>• <b>Exploring Waste Business Opportunities in the OECS</b></li> </ul>
<b>National Component</b>	<ul style="list-style-type: none"> <li>• Continued implementation of national interventions through consultancy services, recycling and waste separation equipment and public education and sensitization.</li> </ul>





## OECS Regional Waste Management Policy (Draft)

### VISION

*"a comprehensive, integrated sustainable waste management and pollution prevention and control programme in the OECS Subregion."*

Addresses **solid waste materials from all sources** (households, and public and private sector); **waste arising from disasters**; asbestos; electrical and electronic waste (e-waste); **hazardous waste** from healthcare activities; used lead-acid batteries; used oil; and **liquid wastes such as sewage**, trade wastes and animal wastes.

### Strategic Goals

- **Prevention** of Waste and Pollution
- **Increased recovery** of resources from waste and pollutants
- **Integrity and transparency**
- Increase opportunities to achieve greater responsibility through the **polluter pay principle**.
- Apply **Zero Waste Principle**
- Implement a **Sustainable Financing** Investment and Cost Management and Recovery system
- Appropriately designed **legislative, policy and institutional frameworks**
- Increase opportunities for regional and interagency **cooperation** to achieve greater responsibility through strategic alliances and the sharing and adoption of best practice
- **Public Education** and Knowledge **Capacity Development** and **Research**



## National Policies and Legislation on Waste Management



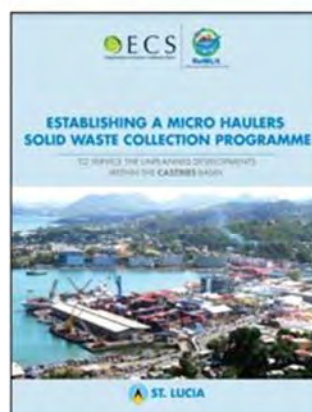
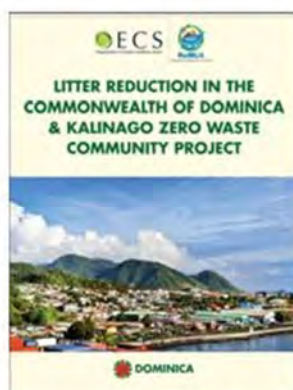
- 1994 OECS Solid and Ship-Generated Solid Waste Management Project - **national solid waste management policies and waste management legislation enacted**
- 2021 OECS Guidelines on **Marine Pollution Legislation**
- 2022 OECS ReMLit Project: National Legislation drafted:
  - Waste Management Legislation (Montserrat)
  - Litter Control and Prevention Act
  - Waste Management Regulations
  - Effluent Limitations Regulations
  - Discharge Hazardous Waste Regulations





## OECS Guidelines on Fiscal Incentives and Model Policy to Promote Waste Reduction, Effective Disposal and Management

- Consistency with International and Regional Agreements / Conventions
- Principles of Zero Waste, Circular Economy, Waste Hierarchy, Extended Producer Responsibility, Polluter-Pays-Principle
- Role of the Private Sector (e.g. PPP financing)
- Role of the Public Sector (e.g. policy formulation)
- Role of Households in source separation
- Review of role of SWMAs (e.g. make more business oriented)
- Research and evidence-based
- Engagement, and participation
- Institutional coordination
- Clear roles and responsibilities
- OECS Collaboration/Regional Collaboration





# Recycle OECS Project

Implementing Agency:  
AFD in partnership with OECS

Title	Primary Deliverables
<b>OECS Model</b>	<b>OECS Model</b> for waste separation, collection, and recycling program for the OECS, taking into account a regional approach, self financing, sustainability, and business viability.
<b>Country Pilots</b>	<b>Demonstration</b> of the OECS model in 2 countries
<b>Communications and Visibility</b>	<b>Regional Campaign</b> - Creating high visibility for the overall project, its milestones, successes, and impacts. Context – Blue, Green Circular economies



ZERO WASTE IN THE CARIBBEAN:  
NEW WAYS, NEW WAVES



## RePLAST OECS Project





## Lessons Learned

- **System of governance**, including appropriate policy, legislation, and coordination.
- A **waste management strategy** - including targets for the diversion of waste from the landfill and defined mechanisms for the recovery and processing of these wastes.
- **Public Education** – target all audiences including communities, private and public sectors, policy makers, etc.
- **Sustainable financing** system.



## Possible sources of sustainable financing

### Currently used in some OECS countries

- Household fees
- Commercial disposal Fees
- Government Subvention
- Stayover visitor environmental levy
- Cruise passenger environmental levy
- Skip service
- Disposal fees
- Septage services
- Sale of Scrap metal
- Compost and wood
- Ship Waste Disposal

### Categories noted by projects

- Extended Producer Responsibility System
- Deposit Refund System
- Establishment of Landfill User Fees
- Environmental Levy
- Direct Government Financing





THANK YOU





## Workshop for Consideration of knowledge sharing platform in the Caribbean region for Improvement of Waste Management including Marine Plastic Litter

- Pilot project: Landfilling training for stabilization of landfilled waste layer in Saint Lucia -

22, March 2023

Davis Poleon

Zonal and Landfill Supervisor,  
Saint Lucia Solid Waste Management Authority



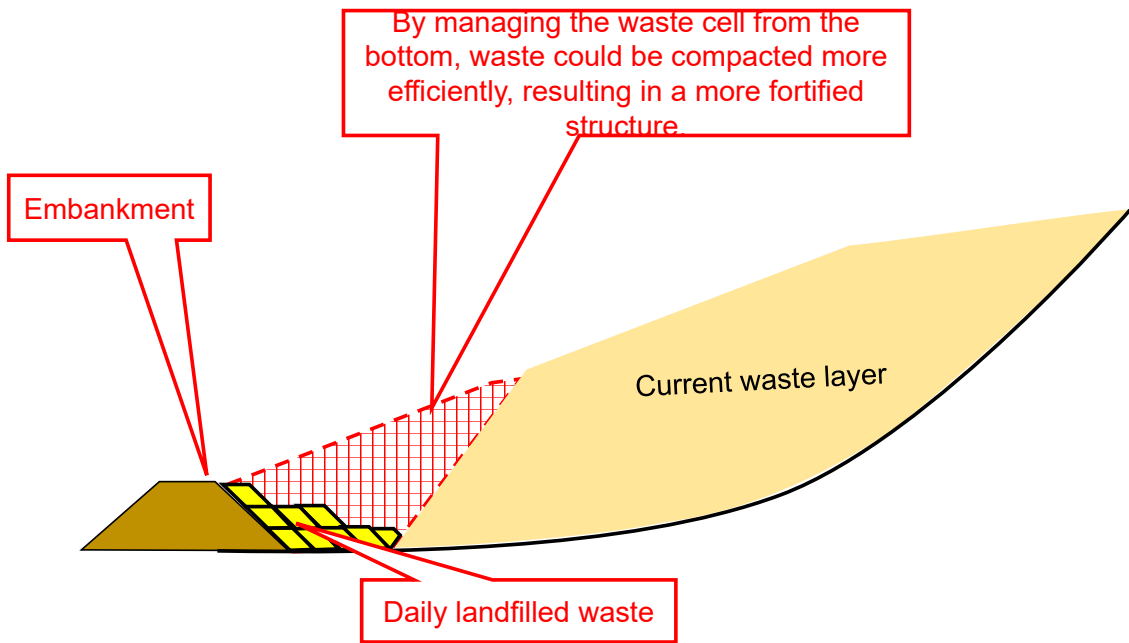
**NIPPON KOEI**

# WELCOME



# 1.Training Objective: Slope Collapse mitigation and landfill operation improvements

An embankment was constructed under the slope at the southeast end to demonstrate the method of waste management and compaction from a bottom to the top perspective.



Cross Section of the embankment and demonstrated waste cell.

## 2.Training Plan

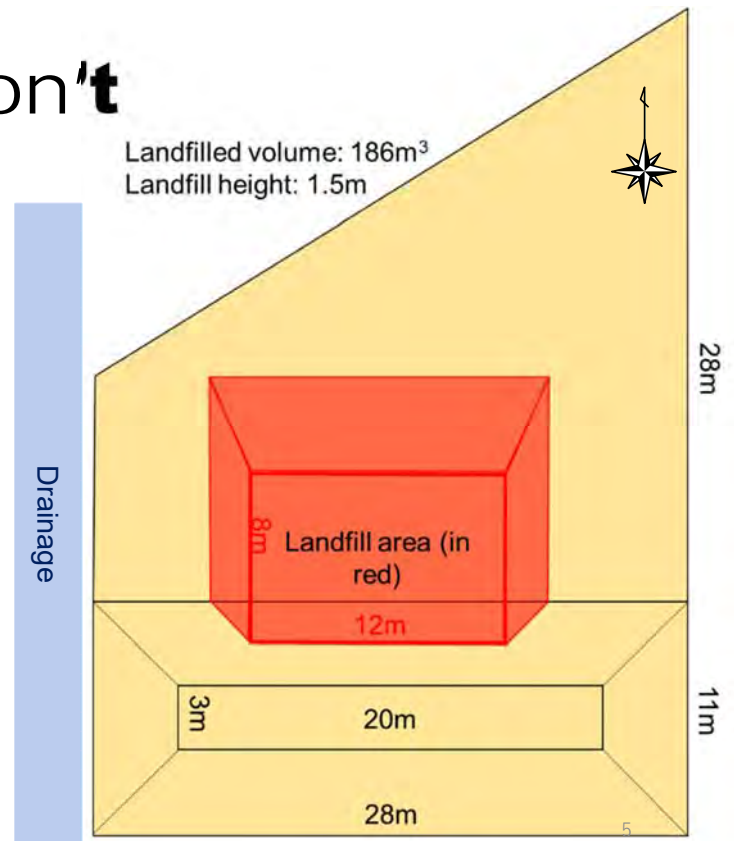
- Organization  
SLSWMA: Ms. Marie Dalsan; Training leader  
Mr. Davis Poleon; Assistant training leader  
Mrs. Cristal Peter; RCV coordinator  
Mr. Densroy William; Operation supervisor  
JAT: Mr. Sakata; Japanese expert  
Operator: Hired by the contractor (Heavy Equipment Services)
- Schedule

Date	Activity	Remarks
Feb. 20	1 <sup>st</sup> layer	4hrs training, 25 tons
Feb. 21	2 <sup>nd</sup> layer	4hrs training, 25 tons
Feb. 22	Independence Day	
Feb. 23	3 <sup>rd</sup> layer	4hrs training, 25 tons
Feb. 24	Intermediate cover	4hrs training

## 2. Training plan Con't

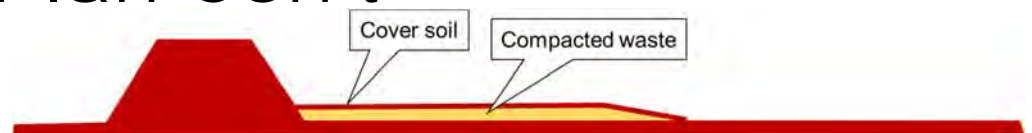
Equipment and materials

- Dozer: 1 unit KOMATSU D65PX
- Fresh waste: 75 tons in total, 25tons per day(5 RCVs per day)\*
- Cover material "soil": 140m<sup>3</sup>

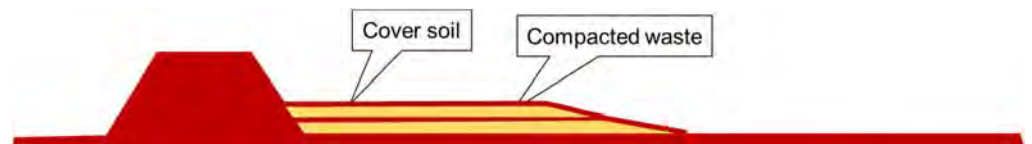


## 3. Training Plan Con't

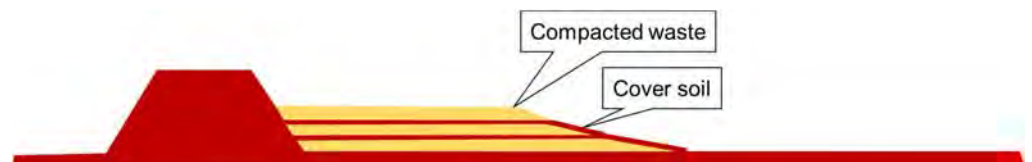
Day 1



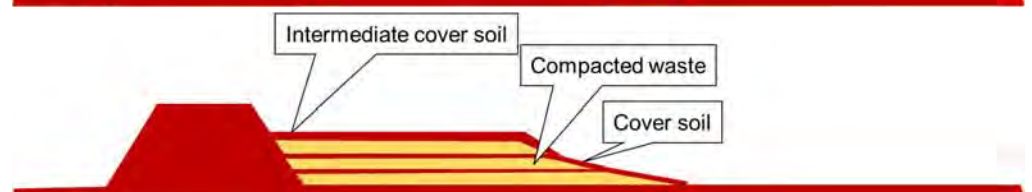
Day 2



Day 3



Day 4





# Demonstration Area “Before Use”



Embankment and adjacent ground



Access road and drainage

7

## Day 1 Highlights



RCV tipping for the preparation of the first layer



The access road was improved

8





Spreading out the waste







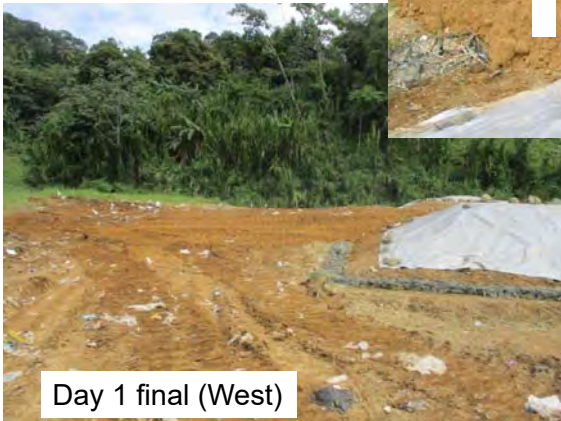




Compaction after the application of cover material



Day 1 final (center)



Day 1 final (West)



Day 1 final (East)





## Day 1 Discussion

- **Assess to active cell**
- **Thickness of waste layer before compaction**
- **Equipment (Specificity and no. of passes for compaction)**





# Day 2 Highlights



Unloading waste on day 2 but more issues with road conditions



Access road was improved again

17



Waste Compaction





Day 2 final (west)



Day 2 final (center)

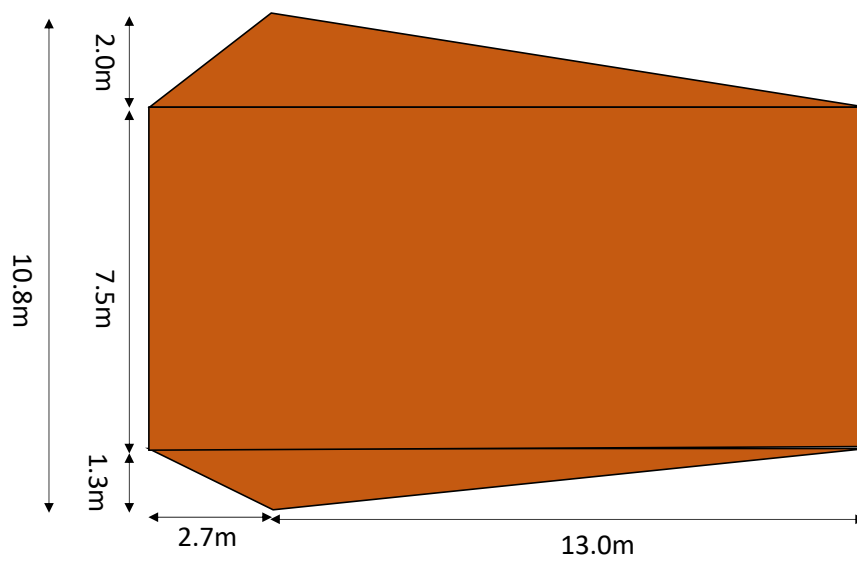


Day 2 final (east)





## Footprint of the waste landfill layer: Day 2





## Day 2 Discussion

- Frequency of cover material application
- Thickness of waste layer before compaction



## Day 3 Highlights



RCV tipping waste



Waste compaction



Compacted waste layer



Compacted waste layer





## Day 4 Highlights



Soil cover with the existing ground soil



Soil cover with excavated soil on site





Day 4 final (west)



Day 4 final (center)



Day 4 final (east)





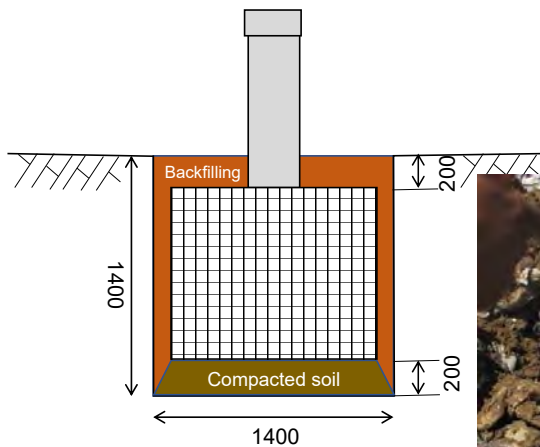
# General Discussion

- **Site conditions**
- **Equipment Compliment**
- **Practicality for the daily management of waste**
- **Cost**



## Landfill facility

Installation of gas ventilation units





# Landfill facility

Extension of gas ventilation units



31

THANK YOU!

Arigato gozaimasu!



32



**Technical Cooperation Project on Advisor for  
Marine Plastic Litter Management in the Caribbean Region**

**Workshop for Consideration of knowledge sharing platform in the Caribbean region  
for Improvement of Waste Management including Marine Plastic Litter**

**- Common Problems with Waste / Marine Plastic Litter in the Region -**

22 March 2023

JICA Advisory Team



**NIPPON KOEI**

## Purposes of Discussion

- ▶ Recognize problems with waste/marine plastic litter in each country
- ▶ Find commonalities among problems in the region
- ▶ Find ways how to tackle those problems
- ▶ Prioritize problems to be tackled, to be presented by each country



	Item <sup>1,2</sup>	Jamaica <sup>2,3</sup>	Antigua and Barbuda <sup>2,3</sup>	Grenada <sup>2,3</sup>	Saint Lucia <sup>2,3</sup>	Guyana <sup>1,2</sup>
Socio-economy <sup>2,3</sup>	Population (2018) <sup>1,2</sup>	2,934,855 <sup>2,3</sup>	96,286 <sup>2,3</sup>	111,454 <sup>2,3</sup>	181,889 <sup>2,3</sup>	779,004 <sup>2,3</sup>
	Capital <sup>2</sup>	Kingston <sup>2,3</sup>	St. John's <sup>2,3</sup>	St. George's <sup>2,3</sup>	Castries <sup>2,3</sup>	Georgetown <sup>2,3</sup>
	Area, km <sup>2</sup> <sup>2,3</sup>	10,990 <sup>2,3</sup>	440 <sup>2,3</sup>	340 <sup>2,3</sup>	620 <sup>2,3</sup>	214,970 <sup>2,3</sup>
	GDP capita (US\$) <sup>2,3</sup>	5,354.2 <sup>2,3</sup>	16,727.0 <sup>2,3</sup>	10,640.5 <sup>2,3</sup>	10,566.0 <sup>2,3</sup>	4,979.0 <sup>2,3</sup>
	Tourism (GDP) <sup>2,3</sup>	34.0% <sup>2,3</sup>	44.1% <sup>2,3</sup>	56.6% <sup>2,3</sup>	41.8% <sup>2,3</sup>	7.8% <sup>2,3</sup>
Plastic policy <sup>2</sup>	Plastic bag <sup>1,2</sup>	Restricted/prohibited/ taxation <sup>2,3</sup>	Restricted/prohibited <sup>2,3</sup>	Restricted/prohibited <sup>2,3</sup>	- <sup>2,3</sup>	- <sup>2,3</sup>
	Single use, inc. PS <sup>2,3</sup>	Restricted/prohibited/ taxation <sup>2,3</sup>	Restricted/prohibited/ taxation <sup>2,3</sup>	Restricted/prohibited <sup>2,3</sup>	Restricted/prohibited <sup>2,3</sup>	Restricted/prohibited <sup>2,3</sup>
Solid Waste Management <sup>2,3</sup>	National policy /plan <sup>2</sup>	National SWM Policy, 2000 <sup>2,3</sup>	(unknown) <sup>1,2</sup>	National Waste Management Strategy 2002- Under review <sup>2,3</sup>	Currently SLSWMA is developing strategy with the assistance of World Bank <sup>2,3</sup>	National Integrated Solid Waste Management Strategy, 2017-2030 <sup>2,3</sup>
	Waste generation (ton/day) <sup>2,3</sup>	2,641 <sup>2,3</sup>	393 <sup>2,3</sup>	126 <sup>2,3</sup>	216 <sup>2,3</sup>	510 (Georgetown) <sup>2,3</sup>
	Waste generation per capita (kg/person/day) <sup>2,3</sup>	1.02 <sup>2,3</sup>	3.54 <sup>2,3</sup>	1.9 <sup>2,3</sup>	1.2 <sup>2,3</sup>	0.6 - 1.35 <sup>2,3</sup>
	Collection rate <sup>2,3</sup>	70% <sup>2,3</sup>	97% <sup>2,3</sup>	98% <sup>2,3</sup>	100% <sup>2,3</sup>	N/A <sup>2,3</sup>
	Service provider <sup>2,3</sup>	Private sector <sup>2,3</sup>	Public sector 40% <sup>2,3</sup> Private sector 60% <sup>2,3</sup>	Private sector <sup>2,3</sup>	Private sector <sup>2,3</sup>	Private sector <sup>2,3</sup>
	Recycling/treatment <sup>2,3</sup>	MRF for PET, composting <sup>2,3</sup>	E-Waste Centre, MRF <sup>2,3</sup>	Plastic recycling, DRS for glass bottles <sup>2,3</sup>	PET recycling (RePLAST), composting <sup>2,3</sup>	N/A <sup>2,3</sup>
	Final disposal <sup>2,3</sup>	8 sites, but no sanitary landfill <sup>2,3</sup>	1 site <sup>2,3</sup>	2 sites, Fukuoka method is applied for one site. <sup>2,3</sup>	1 sanitary landfill <sup>2,3</sup>	1 sanitary landfill, many dump sites in the regions. <sup>2,3</sup>
	Waste picker <sup>2,3</sup>	Yes <sup>2,3</sup>	Yes <sup>2,3</sup>	Yes <sup>2,3</sup>	Yes <sup>2,3</sup>	Yes <sup>2,3</sup>
International Treaties <sup>2,3</sup>	Cartagena <sup>2,3</sup>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	MARPOL <sup>2,3</sup>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Basel <sup>2,3</sup>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Common problems (1/4)

All countries are members of Small Island Developing States (SIDS) in the Caribbean Region.

### ■ Small area of land

- It makes it difficult to find a new landfill due to land limitation, especially Antigua and Barbuda, Grenada and St. Lucia.
- The above makes it important to prolong the lifetime of the current disposal sites.

## Common problems (2/4)

All countries are members of Small Island Developing States (SIDS) in the Caribbean Region.

### ■ Importance of the tourism industry

- Tourism industry is a major origin of waste. There may be a room to reduce waste amount from the tourism sector.
- Tourism industry is also a major source of income for solid waste management. COVID-19 caused a significant drop in income, and it made solid waste management difficult.

5

## Common problems (3/4)

All countries are members of Small Island Developing States (SIDS) in the Caribbean Region.

### ■ High import and export costs for goods due to their remote geography

- It is difficult to make recycling business economically feasible. Quantity of recyclables collected is small, which does not make it feasible to industrialize the recycling.
- Recyclable materials must be exported to mainland for treatment. However, transport cost is very expensive.

6



# Common problems (4/4)

All countries are members of Small Island Developing States (SIDS) in the Caribbean Region.

- Living areas are close to the sea.
  - Inappropriate waste management can easily lead to waste being discharged into the sea.

7

## Problem solving (1/2)

- ▶ Prolong lifetime of landfills
  - ▶ Reduce amount of waste disposed
  - ▶ Appropriate landfill operation; Minimize risks of accidents, Maximize utilization of landfill capacity (appropriate compaction of waste, etc.)
- ▶ Encourage minimization
  - ▶ Minimize waste generation: restrict / prohibit plastics, EPR, education
  - ▶ Encourage recycling: introduction of recycling technology (MRF, Composting), secure large quantities of recyclable waste, subsidize transport costs, separate collection, EPR, education
  - ▶ Introduce treatment technology (WtE, incineration, biogas): how to cover high costs, how to secure waste composition for treatment technology

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8

## Problem solving (2/2)

- ▶ Prevent leakage of waste/plastic litter from land
  - ▶ Reduce clandestine dumping on vacant lots and watercourses by regulation, education, economic incentives
  - ▶ Appropriate landfill operation; Minimize risks of accidents, Maximize utilization of landfill capacity (appropriate compaction of waste, etc.)

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## Prioritize problems to be tackled

- Jamaica
- St. Lucia
- Guyana
- Antigua and Barbuda
- Grenada

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Thank you for your cooperation.

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11

## Technical Cooperation Project on Advisor for Marine Plastic Litter Management in the Caribbean Region

### Workshop for Consideration of knowledge sharing platform in the Caribbean region for Improvement of Waste Management including Marine Plastic Litter

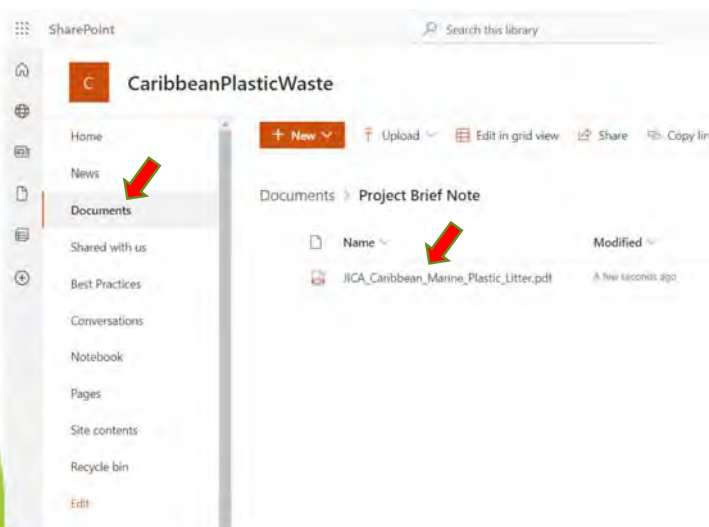
#### - Work Plan and Record ver.3 -

23 March 2023

JICA Advisory Team

## Project Brief Note

- It is uploaded on the “SharePoint”.



**JICA Project**  
**Technical Cooperation Project on Advisor for**  
**Marine Plastic Litter Management in the Caribbean Region**  
 - Sharing information on improving waste management to help prevent plastic waste from entering the ocean -

February 2023






### 1. Background

The marine plastic litter problem is mainly caused by plastic waste generated on land that enters coastal areas and the ocean due to improper treatment, causing damage to the marine environment, including ecosystems, adverse effects on tourism and fisheries, and degradation of coastal habitats. In 2015, over the world, 7.36 million tonnes were estimated to be discharged from land areas into the ocean via rivers and other waterways due to improper disposal of municipal waste. Other major sources included loss from fishing nets and fishing activities (about 650,000 tonnes per year) and so-called microplastics (less than 5 mm) (about 250,000 tonnes per year) (Ellen MacArthur Foundation, 2017). As plastic litter discharged into the ocean does not decompose and continues to accumulate for thousands of years, there

is an urgent need to promote countermeasures across the world, especially in developing countries with insufficient experience in environmental protection.

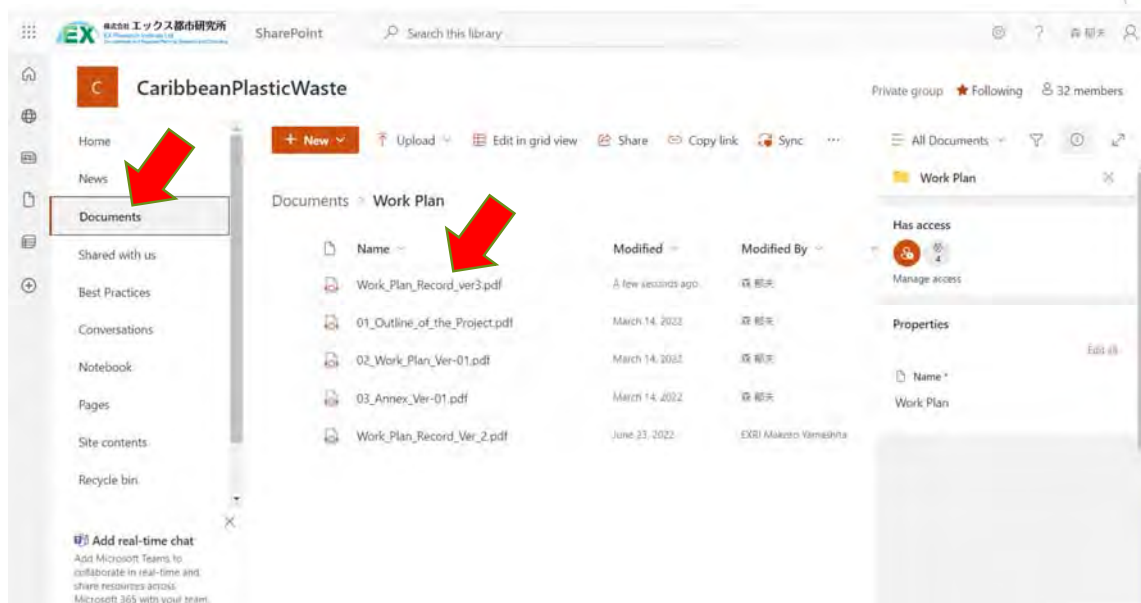
In response to this global challenge, the G20 Osaka Summit in 2019 agreed to establish a “G20 Implementation Framework for Marine Plastic Litter.” At the summit, Japan shared the “Osaka Blue Ocean Vision” and launched the Marine Initiative to realise it, expressing its support for building waste management capacity and infrastructure in developing countries.

In case that waste management system is inappropriate in coastal and island countries, waste leakage into the marine environment tends to take place due to their geographical conditions.

In the Caribbean region, it is estimated that 55% of marine litter comes from land-based sources, the

# Work Plan and Record

- ▶ Work Plan and Record ver.3 is uploaded on “SharePoint”.



## Contents (1/3)

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### ANNEX

A. Current Situation, 2020

B. Current Situation, 2022

C. Workshop Materials, March 2022

D. Agreement on activities to be carried out in the Project, March and April 2022

E. Draft Plans of Pilot Projects in Jamaica and Saint Lucia

Note: Annexes A to F are attached to the Work Plan and Record (Version 2)

G. Online Technical Meetings

H. Information and Knowledge Sharing Workshop in Jamaica (31 Aug. - 2 Sep. 2022)

I. Remediation of Deglos Sanitary Landfill Site, Saint Lucia

J. Recycling Survey in Saint Lucia

K. Waste Minimization Promotion Plan in Saint Lucia

L. Trial Implementation of Fermentation of Food Waste in Saint Lucia

M. Integrated Marine Plastic Litter Prevention Pilot Project Plan, Jamaica

N. Materials for Supporting Plastic Policy, Jamaica

O. Technical assistance to Develop a Regional Waste Management Plan in Guyana

Version 3

# Materials to be prepared (1/3)

- Texts to explain the presentation slides used in the Monthly Online Technical Meetings.

Technical Cooperation Project on Advisor for  
Marine Plastic Litter Management in the Caribbean Region  
- Syllabus for the Online Technical Meeting-

Date: 2<sup>nd</sup> Tuesday of each month

Time: Jamaica (8:00am)

Antigua and Barbuda, Grenada, Guyana (9:00am)

Japan (10:00pm)

Link: A link is to be sent to participants prior to respective online learnings.

Date	Area	Topics
2022.05.10	Semi-aerobic landfill	- Video on the semi-aerobic cell, Grenada
2022.06.14	Planning of Municipal Solid Waste Management	- Estimation of future waste amount and composition - Data / information required for planning
2022.07.12	Collection and Transport	- Collection route design - Transfer and Transport - Public Area Cleansing - Preventive maintenance of collection vehicles
2022.08.09	Environmental Impact Assessment	- Strategic Environmental Impact Assessment - Environmental Impact Assessment of projects
2022.09.13	Recycling	- Material recycling - Composting
2022.10.11	Intermediate Treatment (Part I)	- Incineration (Waste to Energy) - Other treatment technology
2022.11.08	Intermediate Treatment (Part II)	- Incineration (Waste to Energy) - Other treatment technology
2022.12.13	Final disposal (Part I)	- Landfilling plan and operation monitoring - Environmental monitoring - Preventive maintenance of landfill equipment - Final disposal site selection
2023.01.10	Final disposal (Part I)	- Landfilling plan and operation monitoring - Environmental monitoring - Preventive maintenance of landfill equipment - Final disposal site selection
2023.02.14	Financial issues	- Waste collection service fee - Tipping fee for disposing of waste
2023.03.14	Information, Education and Communication	- Information, Education and Communication regarding waste management

## (Consultation)

- Is it possible for the five countries to host the meetings to be held in the remainder of the project period ?

2023.04.11	Antigua and Barbuda	
2023.05.09	Grenada	
2023.06.13	Guyana	
2023.07.11	Jamaica (NEPA)	
2023.08.08	Jamaica (NSWMA)	
2023.09.12	Saint Lucia	

## Materials to be prepared (2/3)

- Guidance manuals to be prepared based on experiences of the pilot projects

Pilot projects	Guidance manuals (proposals)
Guyana: Formulation of a SWM plan	How to make a SWM plan <ul style="list-style-type: none"><li>- Waste flow analysis</li><li>- Surveys; WACS and T&amp;M</li><li>- Setting planning conditions; future waste generation amount etc.</li><li>- Selection of technologies</li><li>- others</li></ul>
Jamaica: Plastic policy development	How to prepare a plastic material flow <ul style="list-style-type: none"><li>- Use of UN data</li><li>- Use of local data, etc.</li></ul>
Jamaica: GIS Map	How to use / update the GIS Map <ul style="list-style-type: none"><li>- Integration of SWM data, etc.</li></ul>
St. Lucia: Improvement of the current disposal site	How to improve the management <ul style="list-style-type: none"><li>- Daily operation, gas ventilation, leachate treatment, etc.</li></ul> How to expand the landfill capacity <ul style="list-style-type: none"><li>- Designing procedures, etc.</li></ul>

## Materials to be prepared (3/3)

- Other request?



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Thank you for your attention.

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# PROGRAMME: SUPPORT THE EFFECTIVE AND SUSTAINABLE MANAGEMENT OF SOLID WASTE IN THE CARIBBEAN

**Zero Waste in the Caribbean:  
New Ways, New waves**



Funded by  
the European Union

In Collaboration with:

**CARIFORUM**

Co-Financed by:



Implemented by:



Deutsche Gesellschaft  
für Internationale  
Zusammenarbeit (GIZ) GmbH



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## Introduction to the programme



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# INTRODUCTION TO THE PROGRAMME

## Background

### Programme Overview

The 11th European Development Fund is financing this five-year regional programme

### Beneficiary

CARIFORUM Member States

### Implementing Agencies

Agence Française de Développement (AFD)

Deutsche Gesellschaft für Internationale

Zusammenarbeit (GIZ) GmbH

United Nations Environment Programme (UNEP)

### Partnership

Organisation of Eastern Caribbean States (OECS)

### Funding



EUD  
EUR 8.70 M



BMZ  
EUR 1.20 M

### Duration

Start date: 2022

End date: December 2026

Total: 5 years

### Contribution to SDGs



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# INTRODUCTION TO THE PROGRAMME

## Objectives and expected outcomes

### Programme objectives

#### Overall objective

The **overall objective** of this programme is to strengthen the EU- Caribbean partnership for cooperation in the field of circular economy in general and of solid waste management in particular; and improve the resource efficiency of Caribbean economies.

#### Specific objective

The **specific objective** is to better align solid waste management systems in Caribbean countries with circular economy principles and National Determined Contributions and make them more able to attract investments.



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# INTRODUCTION TO THE PROGRAMME

## Objectives and expected outcomes

### Programme expected outcomes

1. **Robust solid waste management legal and strategic frameworks** are developed, in the context of promoting a circular economy for the region.
2. **Capacity for sustainable consumption and sustainable waste management** in targeted areas is enhanced.
3. **Investment opportunities** in the solid waste sector are defined and facilitated.
4. **Increased awareness of the EU-CARIFORUM partnership** by Caribbean institutions and citizens, including in the field of solid waste management and circular economy.



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# INTRODUCTION TO THE PROGRAMME

## Implementing partners

Agence Française de Développement (AFD)  
Organisation of Eastern Caribbean States (OECS)



Deutsche Gesellschaft für Internationale  
Zusammenarbeit (GIZ) GmbH



UN Environment Programme (UNEP)



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# INTRODUCTION TO THE PROGRAMME

## Governance bodies: Terms of Reference

### The Regional Programme Steering Committee (RPSC)

The RPSC is set up to monitor progress in programme execution, to report on regional and national level activities, to provide strategic and policy guidance to the Programme, and oversee and validate the overall direction of the action (approve all strategic orientation, annual work plans and budgets). Co-chaired by the CARIFORUM Directorate and the EU Delegation in Barbados, comprises key stakeholders of the Programme, including a representative from NFC, and representatives from the IP (AFD, GIZ and UNEP), including the OECS Commission.

### Programme Management Committee (PMC)

The PMC is the core group, which comprises the EU and the Implementing Agencies. Project management will be the responsibility of this PMC, coordinated by UNEP. The PMC will discuss and review operational aspects, review and decide on budgetary issues, discuss and review relevant aspects of reports from IP, preparations for meetings of other governance bodies, plan technical assistances, discuss visibility measures such as participation in relevant meetings, provide guidance for the coordination of C&V activities.

### Regional Technical Advisory Committee (RTAC)

The RTAC is a scientific and technical body which provides specialist expertise to the Programme to help guide on relevant issues which need to be considered during implementation. The RTAC is an ad hoc, non-decision-making body. UNEP will be the Chair of the RTAC. Members may also be drawn from the national, regional or international bodies and relevant stakeholders, and core membership will be determined by the PMC. Each IP will nominate a technical person to interface with the RTAC.



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## Activities of the Programme



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## Status of progress and planned activities of the Programme

### Implementation of the action: AFD / OECS

#### Recycle OECS Project

**Overall objective:** to reduce plastic pollution at sea and/or ending its course in rivers or uncontrolled landfills.

- **Funded by:** European Union (EU)
- **Implementing Agency:** Agence Française de Développement (AFD)
- **Grant Beneficiary:** Organisation of Eastern Caribbean States (OECS)
- **Timeframe:** February 25, 2022 – May 18, 2025

#### Component 1: OECS model and pilots: Scope

Development of an OECS Model based on business viability and self-sustaining. Details of elements of the model including the approach, tools, protocols, mechanisms for: [structuring of the collection](#), [transportation and exportation](#), [conditions of treatment](#), [stakeholder involvement](#), [partnerships](#), [incentives mechanism](#), [monitoring](#). And pilots in two countries to demonstrate the OECS Model.

#### Component 2: public awareness

Prepare a stakeholder engagement strategy and a Communications Strategy and Implementation Plan. Roll Out of Communications Strategy and Implementation Plan, including Producing all awareness products and materials.



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## Status of progress and planned activities of the Programme

### Implementation of the action: GIZ



09/2021 – 09/2023



- **Output 1: Regional exchanges** on challenges and solutions to prevent the entry of plastic waste into the Caribbean Sea are established.
- **Output 2:** The **capacities of the private sector** for the management of plastic waste in the Dominican Republic are strengthened.
- **Output 3:** In selected **pilot areas** of the Dominican Republic, the implementation of processes to prevent the discharge of plastic waste into the Caribbean Sea is improved.
- **Output 4:** The **awareness of the population and the private sector** in the Dominican Republic to avoid the discharge of plastic waste into the Caribbean Sea has increased.



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# Status of progress and planned activities of the Programme

## Implementation of the action: UNEP

### Brief description of the action

UNEP contributes to the achievement of the following outputs:

1. Strengthened solid waste management **legal and strategic frameworks**
2. Increased **knowledge and capacity** to deliver information-based policy action
3. Enhanced coordination and **cooperation, policy dialogue, and increased awareness**

While ensuring regional coordination and cooperation:

- Regional level coordination of the programme, providing facilitating and collaboration support as relevant
- General coordination of the governance bodies, including RPSC, PMS, RTAC.
- Alignment of the programme with parallel initiatives.
- Stakeholder management over a wide range of regional and national organizations.
- Coordination of the visibility, communication, and awareness plans of UNEP and the other IPS.
- Best practices, lessons learned and successful technology options from the GIZ and AFD outputs.
- Coordination with NFPs, sectoral ministries, as well as other relevant authorities and institutions.
- Involve civil society, local communities, women, youth, disadvantaged and vulnerable groups.



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# Communication and Visibility, Policy engagement and impact



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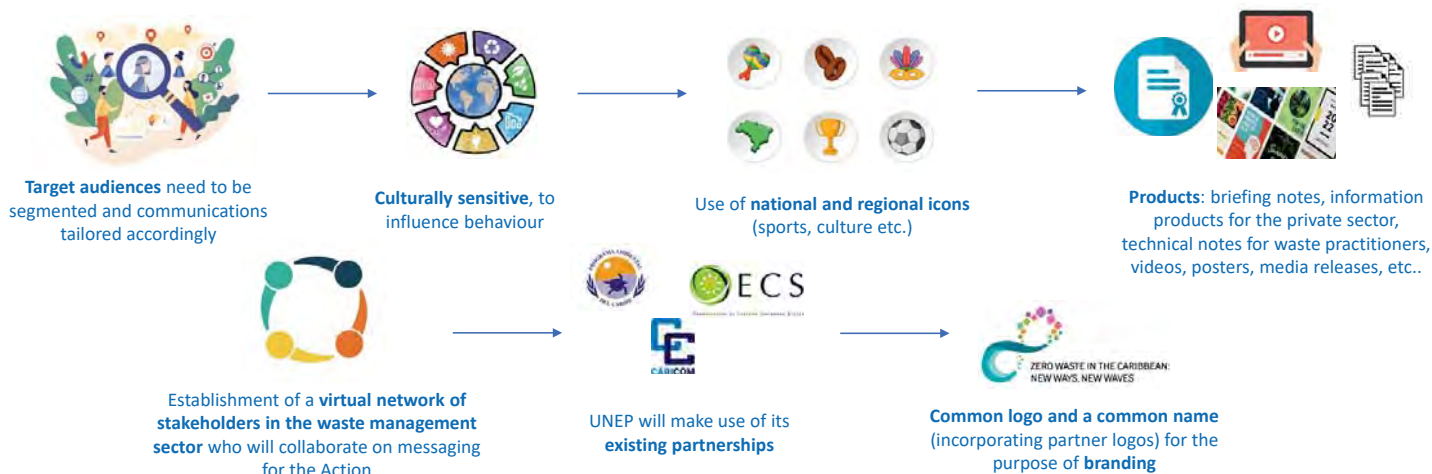
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## Communication and Visibility, Policy engagement and impact

### Communication and visibility plan – UNEP

**Main Objective:** crafting and conveying messages on waste management and circular economy



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## Communication and Visibility, Policy engagement and impact

### Common visual identity of the Programme



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## Communication and Visibility, Policy engagement and impact WEBSITE

- Being original
- Producing actionable content
- Publishing accurate information
- Telling a story
- Making the audience think
- Using visuals
- Hooking readers with intro
- Mixing up content



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## Communication and Visibility, Policy engagement and impact SOCIAL MEDIA

- **Social media contests**
  - Engaging and growth, attracting new followers and motivating them to not just follow but engage; encouraging users to submit their own photo or caption a picture and share it on their social media, tagging project accounts
- **Partnering up with known organization**
- **Host “Account Takeovers”**
  - Involving influencers or partner brand who creates content that we post on their behalf to project account in a “takeover”
- **Brand Awareness Strategy**
  - Creating valuable resources; asking for follower opinions; engaging with the audience; live; adding project logos or using brand colors in images; running UGC Campaigns (User Generated Content); creating a branded hashtag



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## Communication and Visibility, Policy engagement and impact EVENTS

### INTERNATIONAL DAY OF ZERO WASTE 30 MARCH 2023

The Day is aimed at promoting zero-waste initiatives to advance the 2030 Agenda for Sustainable Development: the United Nations Environment Programme and UN-Habitat are expected to facilitate the observance of the International Day of Zero Waste.

### WORLD ENVIRONMENT DAY 5 JUNE 2023

2023 is the 50th anniversary of World Environment Day: WED is a global platform for inspiring positive change. This year it spotlights solutions to plastic pollution.

### INTERNATIONAL WOMEN'S DAY 8 MARCH 2023

The theme for IDW 2023 is "DigitALL: Innovation and technology for gender equality".

### WORLD OCEANS DAY 8 JUNE 2023

The theme for WOD 2023 is "Revitalization: Collective Action for the Ocean".



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## Communication and Visibility, Policy engagement and impact EVENTS



- Sharing positive examples of gender equality in the Caribbean
- Inspiring a new generation of young Caribbean women
- Creating awareness of waste management and climate change among youth in the Caribbean
- Fostering the concept of how women can be protagonists and can have a positive impact in tackling pollution in the Caribbean



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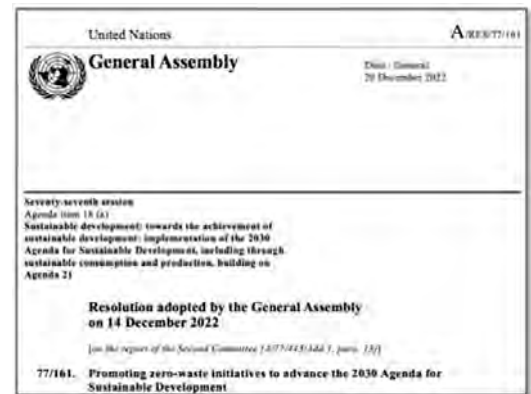


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## Communication and Visibility, Policy engagement and impact EVENTS

- The United Nations General Assembly on 14 December 2022 proclaimed **30 March as the International Day of Zero Waste**, to be observed annually. The Day is aimed at promoting zero-waste initiatives to advance the 2030 Agenda for Sustainable Development
- The **United Nations Environment Programme** and UN-Habitat are expected **to facilitate the observance of the International Day of Zero Waste**



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## Communication and Visibility, Policy engagement and impact EVENTS

- Requesting the Secretary-General to set up an advisory board, based on voluntary contributions, selected on the basis of their knowledge, experience and expertise, in consultation with Member States, for a period of three years, **to promote local and national zero-waste initiatives through the dissemination of best practices and success stories**, based on the work of, and without duplication with, relevant existing regional and global platforms, the United Nations Environment Programme
- Recommending the **continuation of the discussion on zero-waste initiatives** within the relevant United Nations entities, **on the basis of verified data on sustainable and environmentally sound waste management**, among other considerations, **within their work on sustainable consumption and production**
- Encouraging Member States, organizations of the United Nations system and other international and regional organizations **to implement zero-waste initiatives at all levels, so as to promote environmentally sound management of waste and sustainable development**
- Requesting the Secretary-General to invite the United Nations Environment Programme to include, within existing resources, in the next iteration of the Global Waste Management Outlook, a **dedicated section on zero-waste initiatives, including on activities and experiences of such initiatives**
- Convening a one-day high-level meeting**, in collaboration with the UNEP and UN-Habitat, in New York in 2023, during the seventy-seventh session of the General Assembly, **to promote sustainable consumption and production patterns, including innovative projects and programmes such as local and national zero-waste initiatives to foster the environmentally sound management of waste** in support of the implementation of the 2030 Agenda for Sustainable Development, 12 the Paris Agreement, the Convention on Biological Diversity, the New Urban Agenda and the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal



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## Communication and Visibility, Policy engagement and impact EVENTS

6. Deciding to proclaim **30 March** as International Day of Zero Waste, **to be observed annually**
7. Inviting all **Member States**, organizations of the United Nations system, other international and regional organizations and **other relevant stakeholders to observe the International Day of Zero Waste through activities aimed at raising awareness** of national, subnational, regional and local zero-waste initiatives and their contribution to achieving sustainable development
8. Inviting the United Nations Environment Programme and UN-Habitat, mindful of the provisions contained in the annex to Economic and Social Council resolution 1980/67 of 25 July 1980, to facilitate the observance of the International Day of Zero Waste
9. Stressing that the cost of all activities that may arise from the implementation of the present resolution should be met from voluntary contributions
10. Inviting all relevant stakeholders to contribute to and support the implementation of the International Day
11. Requesting the Secretary-General to bring the present resolution to the attention of all Member States, the organizations of the United Nations system and other relevant stakeholders, for appropriate observance;
12. Requests the Secretary-General to inform Member States about the implementation of the present resolution, through the report to be submitted to the General Assembly at its eightieth session under the sub-item entitled "Towards the achievement of sustainable development: implementation of the 2030 Agenda for Sustainable Development, including through sustainable consumption and production, building on Agenda 21" of the item entitled "Sustainable development"



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## Communication and Visibility, Policy engagement and impact EVENTS



2023 is the 50th anniversary of World Environment Day. Over the past five decades, the day has grown to be one of the largest global platforms for environmental outreach. Tens of millions of people take part along with governments, companies, cities, and community organizations. This year it spotlights solutions to plastic pollution.

- Spotighting solutions to plastic pollution
- Spreading and sharing Circular Economy principles
- Increasing visibility of the WED goals
- Raising awareness on UNEP mission



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## Communication and Visibility, Policy engagement and impact EVENTS



World Oceans Day reminds everyone of the major role of the oceans have in everyday life. The ocean is key to Caribbean economy and people: coastal waters are deteriorating due to pollution: "Revitalization: collective action for the ocean" is the theme for World Oceans Day 2022, a year framed by the UN Decade of Ocean Science and the celebration of the United Nations Ocean Conference, two years after being cancelled because of the pandemic.

- Informing of the impact of human actions on the ocean
- Developing a national Jamaican movement of citizens for the ocean
- Mobilizing and uniting the Jamaican population on a project for the sustainable management of the world's oceans
- Supporting public education campaign on solid waste management and plastic pollution



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# THANK YOU!



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# ANTIGUA AND BARBUDA

## Journey to ending Plastic Pollution



Prepared by:

Indira James-Henry  
F. Daryl Spencer

## Significant Achievements to date

- 1995: National Solid Waste Management Authority Act 1995
- 1999: The establishment of the NSWMA and the Environmental Services Department signaled a public awareness and attitudinal and behavioural change regarding Solid Waste Management. In excess of 5000 school children educated on the principle of recycling
- 2005: Amendment to the National Solid Waste Management Authority Act 1995
- 2005 to present: Antigua and Barbuda Waste Recycling Corporation (ABREC) have processed approximately 1.4 million lbs of plastics (693 tonnes/ 33 40ft containers)
- 2015: Environmental Protection and Management Act ( amended in 2019, repealing the 2015 legislation)
- 2016: Antigua and Barbuda became the first country within the Americas to ban Single-use-Plastics
- Amendment of the Litter Prevention and Control Act

## Significant Achievement cont.

- 2020: Beneficiary country of the regional project GEF 5558; Development and Implementation of a Sustainable Management Mechanism for Persistent Organic Pollutants in Eight (8) Caribbean Countries. Implemented by Basel Convention Regional Training Centre for Training and technology Transfer for the Caribbean (BCRC- Caribbean)
- 2020: Plastic Waste Free Island Project , Searious Business consultants collaborated with IUCN and Asia Pacific Waste Consultants (APWC) to determine the plastic waste pathways across the life cycle of different plastic types.. Antigua Grenada and St. Lucia

**THE MINISTRY OF HEALTH AND THE ENVIRONMENT**  
**ANTIGUA & BARBUDA**

**REUSABLE BAGS**



MAKING A DIFFERENCE  
ONE BAG AT A TIME

**BIODEGRADABLE CONTAINERS**



MAKING ANTIGUA AND BARBUDA  
STYROFOAM FREE

**BANNED**



USE THE RESPONSIBLE CHOICE

 <https://www.facebook.com/investingforwellness>  
<https://www.facebook.com/aandbenviron>  
<https://www.facebook.com/nationalsolidwaste>

USE THE RESPONSIBLE CHOICE



# Meaning of the Ban

- “Expanded polystyrene “Styrofoam” : is defined as food service products” to include food containers including bowls, plates, hot and cold beverages cups and cup lids, clamshell, hinge lids and all other containers made of polystyrene for food services, meat, vegetable, and fruit trays, egg cartons, coolers, and any other products made of Expanded Polystyrene and used for selling or providing food for consumption on or off the premises.
- “Shopping plastic bag” means plastic bags that are polyethylene or petroleum-based used as shopping bags. These are sometimes called single-use bags for carrying items from a store to home or off premises these bags ranges from High Density Polyethylene (HDPE), Low Density Polyethylene (LDPE), Linear Lowdensity Polyethylene (LLDPE), Medium Density Polyethylene (MDPE), and Polypropylene (PP).

# Meaning of the Ban

- The External Trade (Shopping Plastic Bags Production) Order, 2017, bans the import, distribution, sale, and use of plastic bags. Art. 3.
- The law exempts a list of plastic bags including bread wrapping, wrap for fresh meat and fish, primary packaging, medicine, laundry dry cleaning, waste disposal, etc. Schedule.
- The External Trade (Expanded Polystyrene) (Prohibition) Order, 2018, bans the use of styrofoam and promoting the use of biodegradable and reusable materials

# Measured Impact of Plastic Pollution

- **Human Health Concerns** – Leaching of styrene and ethylbenzene from food service containers
  - Department of Health and Human Services indicates that styrene “Reasonably anticipated to be a human carcinogen”
  - International Agency for Research on Cancer labels styrene a possible carcinogen;
- **Environmental Concerns-** Littering and improper waste management can increase exposure to chemical contamination
  - Animal health
  - Marine plastic litter and micro plastics contamination
  - Ingestion by wildlife
  - Environmental persistence (littering)
  - Burning leads to POPs and UOPs generation and ozone depleting substances
- **Economic Burden-** Over 2 Million lbs net weight polymers of single use plastics imported between 2015-2019

## Waste Generation

Waste generation amounts in tonnes (2020)	101, 968.14
Waste generation rate (kg/person/day)	3.54
Plastic waste generation amounts pre plastic ban (ton/day)	18.68
Waste collection coverage	97%
Recycling rate	Not determined
Recycling rates for Plastics	Not determined

Commonly recycled materials: glass, aluminium cans, steel cans, PET, tyres and metal

Annual Waste Receipt 2020													
Technician:													
Month	Waste Type												Total
	House hold	Indus	Com	Instit	Medical	C & D	Clean Bulk	Bulk Waste	Cruise Ship	Street Sweep	Sewage	Tyres	
January	2,143.67	33.64	850.18	17.87	6.53	348.10	137.78	4,575.40	130.67	80.24	1,615.92	117.30	10,057.30
February	2,370.17	58.20	1,042.90	25.35	0.88	703.37	487.67	5,684.04	190.90	86.85	1,617.64	81.3	12,349.27
March	2,212.00	17.08	942.89	164.21	0.70	571.91	86.71	5,622.63	68.34	78.83	1,686.16	78.17	11,529.63
April	1,884.43	74.66	301.77	174.44	0.51	103.67	8.34	2,858.27	0.27	77.47	868.11	24.89	6,376.83
May	1,904.52	74.32	433.41	60.13	1.78	343.54	560.03	5,722.53	-	242.31	955.88	38.09	10,336.54
June	2,123.86	33.72	552.23	65.69	0.65	352.26	33.81	4,954.62	-	220.57	1,168.32	47.69	9,553.42
July	2,212.93	23.58	581.07	84.42	1.35	454.63	70.13	7,209.66	-	196.58	1,076.17	47.58	11,958.10
August	1,978.69	24.15	577.00	42.30	3.16	584.77	115.86	10,751.97	-	56.35	1,164.09	45.49	15,343.83
September	2,062.45	107.66	568.06	19.47	1.10	900.87	383.84	9,180.17	-	37.66	1,126.02	75.94	14,463.24
October													-
November													-
December													-
Total	18,892.72	447.01	5,849.51	653.88	16.66	4,363.12	1,884.17	56,559.29	390.18	1,076.86	11,278.31	556.45	101,968.16



## Cooks Sanitary Landfill

Prior 2016



# Waste composition

- 2017 waste composition study 22.2% of waste disposed was plastics
- See plastics sub-categories by weight (lbs):

➤ PET Bottles	400
➤ HDPE (clear)	75
➤ HDPE (coloured)	150
➤ Film and Bags	950
➤ Polystyrene	200
➤ Other rigid packaging	50
➤ Other plastic products	450
➤ Composite plastics	175

## Ongoing Initiatives

- **THE EXTERNAL TRADE (EXPANDED POLYSTYRENE) (PROHIBITION) ORDER, 2018 No.44**
- **THE EXTERNAL TRADE (SHOPPING PLASTIC BAGS PROHIBITION) ORDER, 2017 No. 83**
- **LITTER CONTROL AND PREVENTION ACT, 2019 No. 3 of 2019**
- **PLASTIC WASTE FREE ISLAND (IUCN AND GOVERNMENT )**
- **ESTABLISHMENT OF A PLASTIC BOTTLE CONTAINER DEPOSIT LEGISLATIONS (CDLS)- effective recovery of recyclable and non-recyclable plastic material**
- **UPGRADE OF THE SOLID WASTE MANAGEMENT ACT TO INCLUDE HAZARDOUS WASTE TYPES, AND RECYCLABLE MATERIALS**
- **ESTABLISHMENT OF AT LEAST 4 COMMUNITY RECYCLING COLLECTION POINTS ACROSS THE ISLAND.**

# Plastic Waste Free Antigua Barbuda



**PLASTIC WASTE FREE**  
Antigua and Barbuda

 = \$0.20

Every bottle you return is recycled into a new bottle




Contribute to a Cleaner Environment

OUR ENVIRONMENT AND LANDFILL DEPENDS ON YOU!




## For more information contact:

The Ministry of Health, Wellness and the Environment  
462—5522  
Department of Environment  
562—2568  
Will's Recycling  
Willsrecycling@gmail.com

 <https://facebook.com/investingforwellness>

 ABWREC-Antigua-Barbuda-Waste-Recycling-Corporation

 <https://www.facebook.com/AandBEnviron>



**PLASTIC WASTE FREE**  
Antigua and Barbuda

**JULY 5 2021**

**STARTING: 9:00 AM TO 3:00 PM**  
**(MONDAYS, WEDNESDAYS, SATURDAYS)**



## THE MANADATE FOR THE MINISTRY OF HEALTH, WELLNESS AND THE ENVIRONMENT

The policies and programs mandated by Ministry of Health, wellness and the Environment seeks to encourage preventative health care while increasing more environmentally friendly practices aimed at an overall holistic healthy lifestyle.

Antigua and Barbuda has been selected by the International Union for Conservation of Nature, Regional Office for Mexico, Central America and the Caribbean (IUCN-ORMACC), with support from the Norwegian Agency for Development Cooperation (NORAD) and Searious Business for a Plastic Free Waste Island Project.

## What is Plastic Waste Free Islands In a nutshell...?

A project working towards driving Antigua and Barbuda circular economy to eliminate plastic leakage.



## HOW BOTTLE DEPOSIT WORKS !!!

**Step 1:** Collect your transparent Soda and Water Bottles with the code (1) PET

**Step 2:** Drop-off at any of the following locations between 9: 00 am -3:00 pm on (Mondays, Wednesdays, Saturdays)

**Step 3:** Get \$0.20 cents back for every soda and water bottle code (1) PET

## ISLAND WIDE DEPOSIT LOCATIONS !!!

### PHASE I

- 📍 Epicurean Fine Foods & Pharmacy Super-market on Epicurean Drive
- 📍 Ebenezer Plaza South Mall
- 📍 Crab Hole Liquors Cobb's Cross

### PHASE II

COMING SOON!!!!!!

## BENEFITS OF RECYCLING PLASTIC

- ⇒ Helps to protect the Environment
- ⇒ Provides financial incentives for recycling
- ⇒ Assist in the prevention of Littering
- ⇒ Job Creation
- ⇒ Creation of more opportunities to recycle other waste
- ⇒ Production of high-quality recyclable materials (chairs, tables, souvenir's, etc.)
- ⇒ Encouragement and promotion of producer and consumer responsibility



## REDEEM THROUGH



# Plastic Waste Collection under IUCN project

- Over 1 million bottles collected



## Progress report- PWFI 2022

LOCATIONS	NO. BOTTLES COLLECTED	CASH PAID (xcd)	TOTAL WEIGHT (lbs)
Epicurean	1, 419, 890	\$276, 032.30	57, 133. 83
Ebenezer			
Crabbe Hole Liquors (Cobbs Cross)			
Belmont			





## Progress Report continued

- The IUCN sponsorship of the programme through the Department of Environment (DOE) of the has ended
- National Solid Waste Management Authority now offer financial support
- So far, the authority has injected **XCD \$203, 884.24** of financial support
- Additionally, transportation for all collected recyclables facilitated by NSWMA
- Programme is still ongoing
- Second phase of project still in panning stages
  - Government contribution of physical structure to house equipment to be used for recycling not yet constructed.



## Ongoing initiatives cont.

- **In collaboration with OECS RemLit: Sound Land Based Waste Management Technologies towards a pollution free marine environment in Antigua and Barbuda**

BUILDING RESILIENCE IN THE EASTERN CARIBBEAN THROUGH A REDUCTION IN MARINE LITTER (REMLIT)



## OECS Journalist Challenge: CLEAN OCEANS

#oecsceanaction #bigocceanstates

**The Challenge**

Produce journalistic work focusing attention on:

- Ocean pollution and ocean governance in the OECS today
- The Circular Economy model and its implications for Waste Management in the OECS
- ReMLit Project interventions as catalysts for change and enablers of the transition to a Blue Economy

**Who Qualifies?**

Practicing Journalists/ Reporters/Bloggers based in the Member States of the Eastern Caribbean, in any one or a combination of Print, Broadcast and Online media.

**What Qualifies?**

Entries must be published work these formats:

- Broadcast / Print News Reports
- Special investigative print, audio or video feature stories
- Published limited short series for print, audio or video pieces
- Blog series
- Podcast series

Through the use of research, journalists should make the connection between the problems of ocean pollution in the OECS, Circular Economy and the Blue Economy showing how different stakeholders are taking action - or must act to prevent and fight the problems of Ocean Pollution as well as advance the OECS sustainable development agenda.

Share work on the Facebook page: Media for Climate Change Education Action  
<https://www.facebook.com/groups/1438731043102963>  
with the hashtag: #oecsceanaction #bigocceanstates

**Prizes XCD**

1st **5500**

2nd **4500**

3rd **3500**

**Competition Timeline**

Work published between June 8th 2021 (World Oceans Day), and September 26th, 2021 (World Environmental Health Day).

Submissions must be in English and must be available online during that period.  
Download the complete competition information kit at:  
<https://cutt.ly/OECS-Journalist-Challenge>  
**Deadline: September 26th, 2021 at 11:59 p.m. AST**

Organisation of Eastern Caribbean States

Norwegian Ministry of Foreign Affairs

## OECS JOURNALISTS

Need story leads to enter the OECS Clean Oceans Journalist Challenge?  
Register for the 90 minute

### REMLIT JOURNALISTS DEEP DIVE FORUM

August 18, 2021  
9:00 - 10:30

Use our short expert presentations to:

- Unpack the issues
- Identify key players
- Line up news-generating opportunities
- Access useful data
- Locate story leads

90 mins that equips you to WIN!

**1st Prize**  
**5500**

**2nd Prize**  
**4500**

**3rd Prize**  
**3500**

**Competition deadline extended to  
October 30th, 2021**

Email: [info@rightangleimaging.com](mailto:info@rightangleimaging.com)  
To register, receive the access login and request all competition resources

Organisation of Eastern Caribbean States

ReMLit

Norwegian Ministry of Foreign Affairs



**ReMLit**

Tackling Ocean Pollution from Turf to Surf



Norwegian Ministry  
of Foreign Affairs

# Country Interventions

Clean Oceans DEEP DIVE FORUM FOR OECS JOURNALISTS

August 18<sup>th</sup> , 2021



Tackling Ocean Pollution from Turf to Surf



**Sound Land Based  
Waste Management  
Technologies leading  
towards a Pollution  
Free Marine  
Environment**



Norwegian Ministry  
of Foreign Affairs



## The Problem & Rationale

Antigua is a small Island (108 sq. miles) with limited land space. We are dependent on imports of finished products, generally in generous packaging which ultimately remains in Antigua and must be managed as waste. Concomitantly, there is therefore a high demand on the landfill capacity. The sanitary cell at the Cooks landfill is presently closed because the capacity has been exceeded, however waste is still managed at the old unlined dumpsite within Cooks Disposal site. Therefore, plastics, other waste and the landfill leachate are seeping into the marine environment.

The goal of this project is to promote education, training, research and utilization of waste as a resource thus reducing the amount of waste polluting the Marine Environment

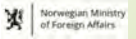
## Project /Components

### Components:

- 1) Implement a Community Based Waste Management System leading towards Marine Debris (Plastic) Reduction
  - This Waste Mgt System includes Separation, Storage, Collection and Recycling of Plastic and other recyclable products from the Fitches Creek and Jennings Communities
- 2) Design, construct and operate a pilot biogas plant at the Cooks Disposal Site with the goal of managing organic waste which will lead to the reduction in Landfill leachate generation
- 3) Education of Stakeholders in waste prevention, reduction, recycling and a litter free Marine Environment

## Expected Outcomes

- Reduction in marine pollution by sound land based solid waste management practices in the Fitches Creek Community and the Jennings Community
  - Separation, Storage, Collection and Recycling of Plastic and other recyclable products from the Fitches Creek Community and the Jennings Community
- Reduction in Landfill leachate generation by the management of organic waste through the Landfill Biogas Pilot Plant
- Educated Stakeholders in waste prevention, reduction, recycling and a litter free Marine Environment



## Progress Report

- 900 garbage bins procured and will be delivered to the authority
  - 300 to be used for recycling
  - 300 compost bins
  - 300 for regular garbage
- Education equipment delivered
- Groundbreaking for the bio-digester on the way
- Community education commenced

## *Information Sharing!*

**World Down-syndrome awareness day 21<sup>st</sup> March:**  
Staff of the authority showing their socks!



## Information sharing in Local Waste Management

- NSWMA is in the process of developing a website
- Website does exist, however no administrative access
- 2019 recruited a Marketing and Education Officer to coincide with the updated Litter Prevention and Control Legislation
- Interaction with population primarily through Facebook and Instagram
- To gain traction the NSWMA FB page is connected to the Ministry of Health and the Central Board of Health's FB pages
  - Done to have a constant flow of health information
- WhatsApp also utilized for 24-hour complaint reporting



## Facebook postings



The National Solid Waste Management Authority is seeking the public's assistance in identifying the individual/s who illegally deposited a large quantity of clothing and curtains in the Burma Area. If you have any information that could aid in our investigation, please call or WhatsApp the Litter Control and Prevention Hotline at 727-2467.

## National Bulk Waste Clean-up programme



Bulk waste being collected in Clare Hall and surrounding communities. If you require assistance in removing your bulk waste, please contact The National Solid Waste Management Authority at (268) 562-1347.



## Resources and Funding

- Financial resources for start –up companies to promote the plastic markets
- Institutional support for government and private sectors
- Establishment of small markets export facilities
- Producer responsibility extended to SIDS

## Technical/Human Capacity

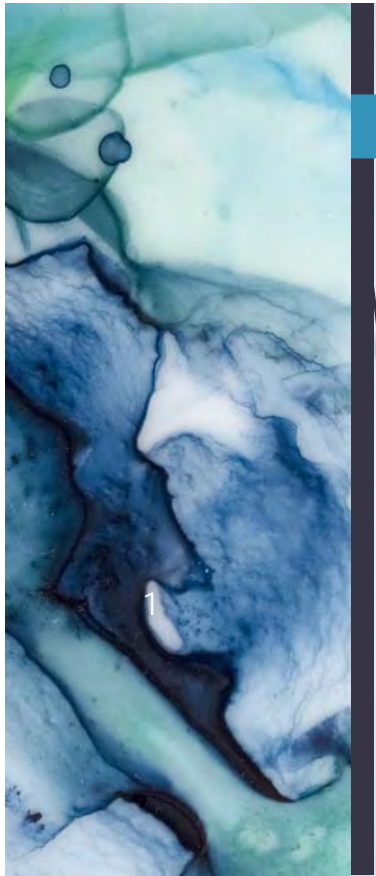
- Knowledge transfer with SIDs for new and innovative pathways in recycling technology
- Knowledge transfer with profitable upcycle products such as furniture, shoes and clothing establish within SIDs
- Technical training in creating shipping routes that small scale island states can boost the circular economy to deal with the plastic generated within the various islands.
- Educational promotion campaigns funded by producers in small scale economies being as robust as first world states

# Antigua and Barbuda Vision

- **Unified regulation among CARICOM**
- **Implementation of a legally binding treaty for all countries**
- **Inclusion of technical and financial assistance for the transition away from plastics. To include educational promotion for the reduction of plastics.**
- **Promotion and implementation of the full lifecycle of plastics**
- **Research and testing for suitable alternative materials**

**THANK YOU!**





Workshop for consideration of knowledge sharing platform in the Caribbean region for Improvement of Waste Management including Marine Plastic Litter



Presentation on the regional CARICOM ACP MEAS Phase III funded project:

**Conduct a capacity assessment survey on plastic waste management, develop technical guidelines on the management of plastic waste and develop practitioners' handbook including regional best practices in the management of plastic waste**

■ By: Analissa Rasheed (Independent Consultant)

23<sup>rd</sup> March 2023 (online)

2

## Content

About the project

Basel Convention  
plastic waste  
amendments

## About the Project

- Title: Technical assistance to support Caribbean ACP countries with enforcement and compliance with the Basel, Rotterdam, Stockholm, Minamata and Cartagena (BRSMC) Conventions
- Duration: 22 April 2022 – 16 July 2023
- Contracting Authority: The CARICOM Secretariat
- Funding Programme: ACP MEAS Phase 3
- Consortium: Independent Environmental Consultant



## Structure of the Project

- Develop national inventories and register for hazardous and other wastes (POPs and mercury), including on safe removal, newly listed POPs for reporting under the Basel, Stockholm and Minamata (BSM) Conventions
- Develop a series of audio-visual materials for targeted awareness raising for targeted audiences on environmentally sound disposal, and alternatives for mercury products and waste
- **Conduct a capacity assessment survey on plastic waste management, develop technical guidelines on the management of plastic waste and develop practitioners' handbook including regional best practices in the management of plastic waste**
- Conduct a sensitisation workshop for non-Parties in the Caribbean region to ratify the Minamata Convention



5

## Outputs

Current status of plastic waste management in the Caribbean

- Stakeholder analysis and mapping
- Capacity assessment (desktop and questionnaire)
- Cooperation mechanisms



6

## Outputs

Review of technical guidelines and best practices for the Caribbean

- Distillation of the guidelines for the region
- Best practice case studies for different areas of plastics management



funded by



30  
YEARS



Implemented by



**HUMANA**  
PEOPLE TO PEOPLE  
BELIZE

@Full Circle Belize



# Basel Convention Plastic Waste Amendments

Why is this relevant to the region?

- 15 countries are Parties to the convention
- Countries do not have the capacity (technical, financial, feedstock etc) to recycle plastics nationally
- Regional solutions will require movement of wastes – transboundary movement

## Key take aways

- Governs the movement of plastic waste covered by the convention across international boundaries (in effect from Jan 01 2021)
- Came about primarily to prevent dumping of plastics waste especially in developing countries and in the absence of a global treaty on plastics.
- Does not** ban the export, transit or import of plastic waste.



## What are the amendments?

- Only plastics which are destined for recycling operations and which consist of almost exclusively **one type of plastic** and mostly **free from contamination**
- Mixtures of **polypropylene (PP)**, **polyethylene (PE)**, and **polyethylene terephthalate (PET)** are allowed if they are destined for **separate** recycling
- All other plastics wastes exports and imports are **controlled by the Prior Informed Consent procedure. Does not imply it is banned.**
- Recycling operations refers to "if needed, **temporary storage** limited to one instance, provided that it is followed by recycling"



Suggested resource:  
<https://www.nepa.gov.jm/sites/default/files/2022-03/Basel-Convention-Plastic-Waste-Amendments.pdf>

## Thank You

### Analissa Rasheed

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### Teshia Jn Baptiste

ACP MEAs Phase III Project Coordinator,  
CARICOM

E: [teshia.jnbaptiste@caricom.org](mailto:teshia.jnbaptiste@caricom.org)

### Quick links

- CARICOM ACP MEAS Phase 3:  
<https://caricom.org/about-the-acp-meas/>
- Basel Convention Competent Authorities:  
<http://www.basel.int/Countries/CountryContacts/tabid/1342/Default.aspx>
- Basel Convention Plastic Waste Amendment:  
<http://www.basel.int/Implementation/Plasticwaste/Amendments/Overview/taid/8426/Default.aspx>



**Technical Cooperation Project on Advisor for  
Marine Plastic Litter Management in the Caribbean Region**

**Workshop for Consideration of knowledge sharing platform in the Caribbean region  
for Improvement of Waste Management including Marine Plastic Litter**

**- Information Sharing -**

23 March 2023

JICA Advisory Team



## Answers to Questionnaire

1. Information sharing in this project

1.1 Monthly Technical Online Meeting

1.1.1 About participation:

Please check (click) the box of your answer like ☒

**Q How often have you participated in the Monthly Technical Online Meeting? Check**

a. Almost all the time.

b. Very often.

c. Sometimes.

d. Rarely.

e. Never.

a.	Almost all the time	4
b.	Very often	3
c.	Sometimes	0
d.	Rarely	0
e.	Never	0



► 1.1.2 About method

- The monthly Technical Meetings were extremely **relevant to the issues being faced by waste management practitioners in the Region**. The sessions are informative and timely.
- **More time for sharing of information by participants.**
- Sometimes the online meetings clash with other work commitments so it would be great if these meetings can **be recorded and shared**. In addition, my colleagues have difficulty understanding what is being said due to the **language barrier**. Hence, the closed caption of the presentation would be helpful.
- The start time of the workshops is **outside of work hours/time for Jamaica. This should be corrected. The Q&A and discussion period should be extended also.**
- -
- **More time for discussion** would be better and also **more examples** should be given.
- Time allocation was sufficient.

1.2 Quarterly In-person Workshop

1.2.1 About participation

Please check (click) the box of your answer like ☒

Q	How often have you participated?			
a.	All three times	a.	All three times	2
b.	Twice	b.	Twice	2
c.	Once	c.	Once	0
d.	Never	d.	Never	2

### 1.2.2 Comments / Opinions on the workshop

- Although three days is a perfect timeframe to impart the information, **the travel situation in the Caribbean today create some issues.**
- Site visits and face-to-face discussions helps me to understand **what is happening in other countries.**  
It was **good for networking.**  
Helped me to understand **challenges other face.**
- The workshops are very helpful and meaningful especially **understanding other countries issues and success stories.** Meeting with other participants and building that **network is invaluable.** Also, **physically exploring other countries facilities and operations** to gain hands on experience is much appreciated.  
  
On the other hand, the sessions are very compacted and much is being done **with minimal time to process information.**
- Participation is only from a management viewpoint.
- -
- -
- The workshops were well organized.  
The field visits were well-received, affording participants **to witness some aspect of waste management** where the workshops took place.  
The daily subsistence allowance (DSA) given to participants was grossly inadequate to cover expenses.

5

### 1.3 SharePoint

#### 1.3.1 About access

How often access to the SharePoint?

Please check (click) the box of your answer like ☒

No.	Site	Very often	Sometimes	Rarely	Never
1	News	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Best practices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Documents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Very often	Sometimes	Rarely	Never
News	2	2	3	0
Best practices	3	1	2	1
Documents	1	4	2	0

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### 1.3.2 Comments / Opinions on the SharePoint

- It was **not easy to access** in the interim.
  - **Help improve my knowledge in a wide area of waste management.**
  - Presentation style was effective.
- 
- The sharepoint platform is excellent but I have not gotten enough time to utilize that platform regularly. However, having access to these information **in the future in necessary to build capacity for organisation.**
- 
- It is easy to use but **coping files and data from it is difficult.**
  - It gives me useful knowledge for my own work however at times **it is difficult to access.**
  - **Provides useful information. Information is knowledgeable and can be put into my daily work operation**
  - -

### 2 Topics having been dealt with in this project

	Very interested	Interested	Not interested	No answer
Planning of Solid Waste Management	5	2	0	0
Collection and Transport	3	4	0	0
Recycling (material recovery)	5	2	0	0
Recycling (composting)	5	2	0	0
Intermediate treatment (incineration, waste to energy)	3	4	0	0
Final disposal (Fukuoka method)	5	2	0	0
Environmental Impact Assessment	3	3	0	1
Information, Education and Communication	5	2	0	0
Financial issues	4	3	0	0



## 2 Topics having been dealt with in this project

- -
- Officers in my department who participated in final disposal, information, education and communication, and financial issues found the presentations very interesting. However, they saw **the need for more sharing of experiences and expertise by participants**.
- In Guyana, we would like to construct all of our landfills with the Fukuoka method but require **more assistance with designs and operations manual/methodology**. Also, there is **a dire need for a strong public awareness and education campaign** to curb littering and illegal dumping.
- Some of these topics are insightful but it **only gives results based on the Japanese experience**.
- Normally very useful and informative
- Topics were all knowledgeable
- -

## 3. On topics you would like the project to share with you in the future

	Very interested	Interested	Not interested	No answer
Plastic reduction policy case study	5	0	0	2
Examples of marine plastic litter measures	4	1	0	2
Examples of waste management in neighbouring countries	7	0	0	0
Waste management technologies in Japan	5	1	0	1
Waste management technologies in other developed countries	7	0	0	0
Other (please fill in here)	2	0	0	5

### 3. On topics you would like the project to share with you in the future

- -
- Conduct of waste characterization studies.  
Landfill data collection methods.  
Treatment of special waste types.
- 
- Implementing & management of successful WtE / EfW projects
- -
- -
- -

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### 4. Topics you would like to share with in the future

- Source separation
- Collections improvement
- 
- Implementing source separation.  
Plastic recycling.  
Occupational health and safety for sanitation workers.
- Upgrading Dumpsites to Landfill  
Leachate treatment systems  
Gas collection and utilization systems
- Plastics recycling  
E-waste management
- Composting  
Reduction in marine waste
- Improving landfills using a cost-effective technology  
Plastic recycling  
And waste collection improvement  
The circular economy
- Recycling in SIDS

## 5. Ideas for post-project information sharing between the five countries

- WhatsApp Group
- Establish a facebook page.
- Establish a regional waste management grouping.
- Establish a Whatsapp group
- Email group
- Continue with the SharePoint Group
- Email group  
Whatsapp group
- Networking with other waste management groups in the region
- Creating a WhatsApp group

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## 6. Ideas for information sharing in the Caribbean region

- Information can be shared through Regional Organizations such as OECS/CARICOM and Technical Associations such as CWWA.
- Quarterly E-News letter
- CWWA, JICA
- Merge with the work the IDB & World Bank does in the Caribbean & Latin America regarding to SWM
- Expect donors such as JICA, UNEP.
- All the above examples can be included
- Through OECS and CARICOM.

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## 7. Expectations for this JICA project

- Continuation of Technical Online Meetings and in person Workshops.
  - Continuation of Technical Online Meetings
  - Continuation of In-Person Workshop
  - Continuation of SharePoint
- 
- Annually workshop and continuation of sharepoint
  - Continuation of SharePoint & In-person Workshop  
Sponsored SWM projects in each island
- 
- Continuation of Technical Online Meeting  
Continuation of In-person Workshop  
Continuation of SharePoint
- 
- All of the above should be implemented.
  - Participation of more Caribbean countries in the program.  
Continuation of in-person workshops.

Thank you for your attention.

## Technical Cooperation Project on Advisor for Marine Plastic Litter Management in the Caribbean Region

- Reducing marine plastic wastes through appropriate solid waste management on the land -

Project Completion Seminar: Project's accomplishment and future application to the waste management in the Caribbean region

### Objectives of the seminar

This is the project completion seminar for the “Technical Cooperation Project on Advisor for Marine Plastic Litter Management in the Caribbean Region,” and the objective of this seminar is not only to disseminate the project's accomplishment but also to discuss future solid waste management information sharing in the Caribbean region. In the past three workshops, five counterpart countries and JICA Advisory Team (JAT) have shared information and knowledge of waste management, especially on the plastic waste issue. We all came to realize that these knowledge-sharing experiences are very beneficial to improve waste management in the region, and we also have discussed how to institutionalise knowledge sharing in the Caribbean region. In this seminar, we would like to continue our discussion on knowledge sharing, and we hope that the discussion will somewhat contribute to improvement of waste management in the Caribbean region.

### Date:

From Monday 23<sup>rd</sup> to Wednesday 25<sup>th</sup> October 2023

### Participants:

Antigua and Barbuda	Mr. Sherwin Wiltshire, Acting Landfill Manager National Solid Waste Management Authority
Grenada	Ms. Myrna Julien, Communications Manager Mr. Lyndon Charles, Integrated Resource Manager /ICT Manager Grenada Solid Waste Management Authority
Guyana	Mr. Miguel Choo-Kang, Permanent Secretary Mr. Satrohan Nauth, Director of Sanitation Mr. Kittindy Glasgow, Senior Environmental Officer Ministry of Local Government & Regional Development
Saint Lucia	Ms. Marie Dalsan, Operations/ Landfill Manager Saint Lucia Solid Waste Management Authority
Jamaica	Ms. Bethune Morgan, Manager for the Pollution Prevention Branch, National Environment and Planning Agency (NEPA) Mr. Edson Carr, Projects and Planning Manager, National Solid Waste Management Authority (NSWMA)
JICA Saint Lucia Office	Mr. Ichiro Mimura, Chief Representative Ms. Hitomi Urushihata, Project Formulation Advisor Dr. Ayodele Y. Hippolyte, Program Officer
JICA Advisory Team	Mr. Ikuo Mori, Leader Mr. Makoto Yamashita, Sub-leader Mr. Satoshi Higashinakagawa, in charge of collection, transport and recycling Mr. Yukihisa Sakata, in charge of final disposal operation and maintenance Mr. Taisuke Watanabe, in charge of organization and institution analysis (online) Mr. Paulo Queiroz Sousa, in charge of waste management

International Organization	Ms. Shanta King, Regional Project Coordinator Mr. Daniele Mariani, Communication & Knowledge Management Specialist United Nations Environment Programme (UNEP)
Regional Organization	Ms. Susanna DeBeauville-Scott, Project Manager for the Ocean Fisheries and Governance Programme Organisation of Eastern Caribbean States (OECS)  Mr. Kareem Sabir, the Senior Project Officer for Sustainable Development Ms. Amrikha Singh, Program Manager, Sustainable Development Program Mr. Tatsuya Morita, Japan International Cooperation Agency (JICA) Expert, Partnerships and Project Support Department Ms. Chie Clarke CARICOM Secretariat

**Venue:**

Exhibition Centre #1, Pegasus Suites &amp; Corporate Centre (NOT at Pegasus Hotel)

Seawall Road, Georgetown, Guyana

Tel: +592 225-2856

**Program:**

Date	Time	Activity	Remarks
10/23 Mon	9:00	<p>“Opening remarks” by</p> <ul style="list-style-type: none"> <li>- Mr. Ichiro Mimura, Chief Representative, JICA Saint Lucia Office</li> <li>- Honourable Anand Persaud, Minister of Local Government and Regional Development, Guyana</li> </ul> <p>Video message from SPREP (Secretariat of the Pacific Regional Environment Programme) &amp; introduction of J-PRISM (JICA Promotion of Regional Initiative on Solid Waste Management in Pacific Island Countries) (15 mins video)</p> <p>Remarks by Mr. Kareem Sabir, the Senior Project Officer for Sustainable Development in the CARICOM Secretariat</p>	Venue: Exhibition Centre #1 on the lobby floor at Pegasus Suites & Corporate Centre (NOT at Pegasus Hotel)
		GROUP PHOTO	
	9:30	<p>1.CURRENT SITUATION OF SOLID WASTE MANAGEMENT IN THE FIVE TARGET COUNTRIES AND OUTCOMES AND LESSONS LEARNED FROM THE PILOT PROJECTS</p> <p>1.1 “Formulation of a Regional Solid Waste Management Plan in Guyana” by Mr. Satrohan Nauth, Director of Sanitation, Ministry of Local Government &amp; Regional Development</p>	
	10:15	Coffee Break (Project video)	
	10:30	1.2 “Integrated Marine Plastic Litter Management in the Caribbean -Plastic Material Flow in Jamaica-” by Ms. Bethune Morgan, Manager for the Pollution Prevention Branch, NEPA	
	11:15	1.3 “Activities on Waste littering and Plastic Waste in Jamaica” by Mr. Edson Carr, Planning Manager, NSWMA	
	12:00	Lunch	
	13:30	1.4 Current situation of solid waste management in Grenada by Ms. Myrna Julien, Communications Manager, Grenada Solid Waste Management Authority	



Date	Time	Activity	Remarks
	14:15	1.5 Current situation of solid waste management in Antigua and Barbuda by Mr. Sherwin Wiltshire, Acting Landfill Manager, National Solid Waste Management Authority of Antigua and Barbuda	
	15:00	Coffee Break	
	15:15	2. DEVELOPMENT OF TOOLS BASED ON THE OUTCOMES AND LESSONS LEARNED FROM THE PILOT PROJECTS AND ANALYSIS AND IMPROVEMENT MEASURES FOR THE SOLID WASTE MANAGEMENT ISSUES IN THE CARIBBEAN REGION.  2.1 “Explanation of Guidance Document for Creating a GIS map for preventing Plastic Waste into the Ocean” by Mr. Ikuo MORI, JAT Leader	
	15:30	2.2 “Explanation of Guidance Document for Formulation of Regional Solid Waste Management Plan” by Mr. Satoshi HIGASHINAKAGAWA, JAT	
	16:00	Closure (Explanation of the site visit on Tuesday)	
10/24 Tue	9:00 Half day	Site visit (Haags Bosch Sanitary Landfill and recycling facility at Cevons Waste Management Inc.)	
	12:00-13:00	Lunch	Venue: Exhibition Centre #1 on the lobby floor at Pegasus Suites & Corporate Centre
10/25 Wed	9:00	(Continuation of the presentation) 2.3 “Explanation of Guidance Document for Creating a Material Flow Diagram of Plastics” by Mr. Taisuke WATANABE, JAT (Online)	Venue: Exhibition Centre #1 on the lobby floor at Pegasus Suites & Corporate Centre (NOT at Pegasus Hotel)
	9:30	3. PROJECTS AND ACTIVITIES BY INTERNATIONAL ORGANIZATIONS IN THE CARIBBEAN REGION 3.1 “Zero Waste in the Caribbean Project,” Ms. Shanta KING, Regional Project Co-Ordinator, UNEP	
	10:00	Coffee Break	
	10:15	1.6 “Pilot project for Remediation of the Deglos Sanitary Landfill in Saint Lucia” by Ms. Marie Dalson, Operations and Landfill Manager, SLSWMA	
	11:00	2.4 “Explanation of Guidance Document for Remediation of Existing Sanitary Landfills” by Mr. Yukihiisa SAKATA, JAT	
	11:30	3.2 “Fostering a Circular Economy Approach,” by Ms. Susanna DEBEAUVILLE-SCOTT, Project Manager, Ocean Governance and Fisheries Programme, OECS	
	12:00	Lunch (change layout)	
	13:30	2.5 “Analysis and improvement measures for the solid waste management issues in the Caribbean Region” by Mr. Ikuo MORI, JAT Leader	
	14:00	Discussion on how to institutionalize knowledge sharing in the Caribbean region	
	14:30	Coffee Break	
	14:45	Discussion on how to institutionalize knowledge sharing in the Caribbean region (contd.)	
	15:15	Final Remarks	
	15:30	Closure of the Seminar	

Zoom Links:

Time: Monday 23<sup>rd</sup> October 2023, 09:00 Guyana (UTC-4)

Topic: Knowledge Sharing Workshop - JICA Marine Plastic Litter Management OCT.23 AM

<https://us06web.zoom.us/j/87403045861>

Time: Monday 23<sup>rd</sup> October 2023, 13:30 Guyana (UTC-4)

Topic: Knowledge Sharing Workshop - JICA Marine Plastic Litter Management OCT.23 PM

<https://us06web.zoom.us/j/85315748381>

Time: Wednesday 25<sup>th</sup> October 2023, 09:00 Guyana (UTC-4)

Topic: Knowledge Sharing Workshop - JICA Marine Plastic Litter Management OCT.24 AM

<https://us06web.zoom.us/j/84823167183>

Time: Wednesday 25<sup>th</sup> October 2023, 13:30 Guyana (UTC-4)

Topic: Knowledge Sharing Workshop - JICA Marine Plastic Litter Management OCT.24 PM

<https://us06web.zoom.us/j/89108946482>

Contact persons:

Mr. Ikuo Mori, Team Leader of JAT, [ikuo.mori@exri.co.jp](mailto:ikuo.mori@exri.co.jp)

Mr. Makoto Yamashita, Subleader of JAT, [m.yamashita@exri.co.jp](mailto:m.yamashita@exri.co.jp)



# **FORMULATION OF A REGIONAL SOLID WASTE MANAGEMENT PLAN IN GUYANA BY MINISTRY OF LOCAL GOVERNMENT & REGIONAL DEVELOPMENT**

## **SWM PLAN IN REGION 5**

Satrohan Nauth

Director of Sanitation

Minister of Local Government & Regional Development

23<sup>rd</sup> October, 2023



# AGENDA

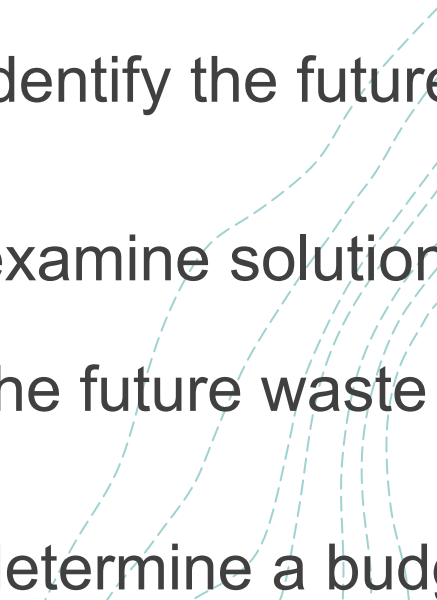
- Background
- Current situation of SWM in Region 5 including surveys
- Main Issues of SWM in Region 5
- Vision & Strategic direction
- Future Waste Flow
- Planning Strategy
- Planning of Collection and transportation, Landfill
- Implementation plan, cost estimation and cost recovery
- Conclusion and Future Action

# BACKGROUND

- In Guyana, the plans for solid waste management is in the developmental stage.
- Disposal facilities are being developed in several regions.
- Local Democratic Organs (80) and private sector provide collection services.
- In order to have a more holistic approach to solid waste management regional plans are being developed.



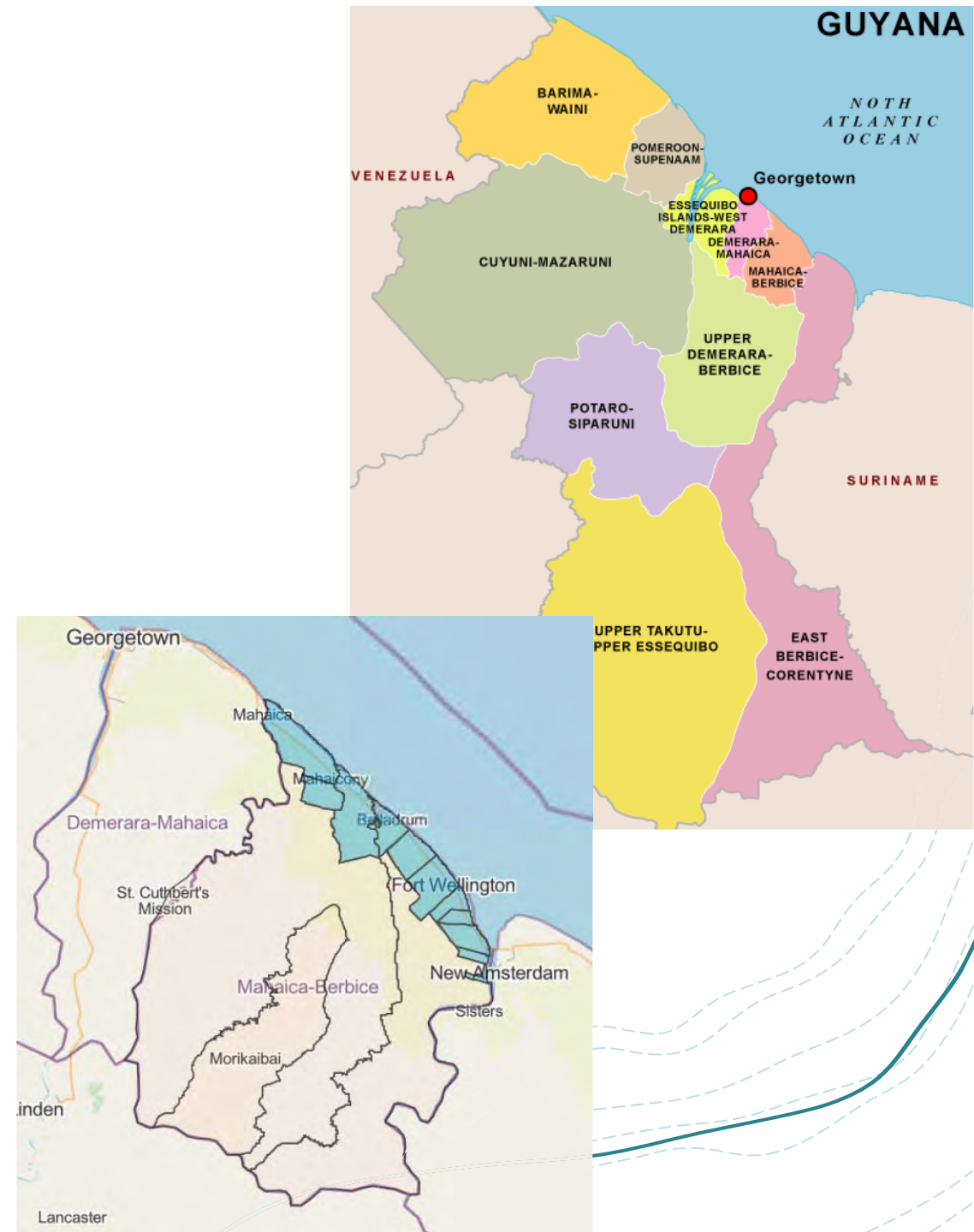
# OBJECTIVES

- 1) To identify current situation of SWM in region 5
  - 2) To identify the future waste generation and waste flow
  - 3) To examine solutions to the current issues and prepare a plan based on the future waste flow
  - 4) To determine a budget for the implementation of the plan
- 
- A decorative graphic consisting of several overlapping, wavy, dashed lines in a light teal color, located in the bottom-left quadrant of the slide.



# AREA OF REGION 5

- Region 5 ( Mahaica-Berbice) comprising of an area of 3,885 km<sup>2</sup>.
- Bounded by: - Region 4 to the west
  - Region 6 to the east
  - Region 10 to the south
  - Atlantic Ocean to the north
- 90 % of population of Region 5 lives on the Low coastal Plain.
- Population of around 45,500 (estimation base)



# PERSONNELS REGARDING SWM IN EACH NDC

Name of NDC	Driver	Waste collector (including other labor)
<b>Blairmont – Gelderland</b>	2	3 (1 Revenue Collector)
<b>Zeelust – Rosignol</b>	2	3 ( 2 permanent and 1 temporary)
<b>Woodlands - Belair Park</b>	1	2
<b>Bath - Woodley Park</b>	1	2
<b>Union – Naarstigheid</b>	1	0
<b>Seafield – Tempe</b>	1	2
<b>Profit - Rising Sun</b>	1	1 and part time staff
<b>Mahaicony - Abary</b>	1	2
<b>Hamlet – Chance</b>	1	2
<b>Woodlands - Farm</b>	1	2

# FINANCIAL SITUATION REGARDING SWM IN EACH NDC

Name of NDC/Municipality	2019		2020		2021	
	Total budget	Expenditure for SWM	Total budget	Expenditure for SWM	Total budget	Expenditure for SWM
<b>Blairmont - Gelderland</b>	19,784,893	501,981	21,418,022	384,040	25,328,893	1,041,326
<b>Zeelust - Rosignol</b>	22,417,077	14,082,542	16,148,776	13,545,945	24,403,269	15,254,940
<b>Woodlands - Belair</b>	13,235,879	714,548	15,718,587	664,400	19,097,999	602,486
<b>Bath - Woodley Park</b>	1,430,005	1,320,000	3,245,000	1,350,000	3,565,000	1,376,500
<b>Union - Naarstigheid</b>	75,738,283	3,000	100,620,329	500,050	113,030,784	22,000
<b>Seafield - Tempe</b>	23,241,530	100,000	26,186,124	100,000	26,878,738	100,000
<b>Profit - Rising Sun</b>	21,417,488	14,601,527	31,402, 253	15,744,771	32,328,707	18,576,003
<b>Mahaicony - Abary</b>	1,200,000	702,500	1,500,000	725,500	1,500,000	913,500
<b>Hamlet – Chance</b>	19,466,601	195,500	24,424,599	0	23,140,201	0
<b>Woodlands - Farm</b>	35,209,959	800,225	38,947,683	1,357,877	41,616,524	1,425,377



# CURRENT SITUATION OF SWM IN REGION 5 (COLLECTION AND TRANSPORTATION)

- NDC has the responsibility for collection and transportation
- Collection frequency varies – Some once every week, others every two weeks
- Collection rate is around 50%-70%
- NDC use tractor trailers for collection
- Private service providers use compactor trucks and charge a fee.



# CURRENT SITUATION OF SWM IN REGION 5 (COLLECTION AND TRANSPORTATION)

No.	Name of NDC/Municipality	Collection and transportation equipment		Heavy equipment for final disposal <b>(including rental)</b>	
		Type of equipment	Number	Type of equipment	Number
1	Blairmont - Gelderland	Tractor & Trailor	2	Excavator (Backhoe)	1
2	Zeelust - Rosignol	Tractor & Trailor	2	<b>Bulldozer</b>	1
3	Woodlands - Belair Park	Tractor & Trailor	2	Nil	Nil
4	Bath - Woodley Park	Tractor & Trailor	2	Backblade	
5	Union - Naarstigheid	Tractor & Trailor	2	-	-
6	Seafield - Tempe	-	-	-	-
7	Profit - Rising Sun	Compactor	1	Excavator	1
8	Mahaicony - Abary	Truck trailer	2	<b>Bulldozer</b>	1
9	Hamlet – Chance	Tractor & Trailor	1		
10	Woodlands - Farm	-	-	-	-

# OVERVIEW OF CURRENT SITUATION OF SWM IN REGION 5 (FINAL DISPOSAL)

- Some NDCs have disposal sites where open dumping & burning is practiced.
- There are a few waste pickers in some final disposal sites
- Though the final disposal site is small, there are issues regarding environmental deterioration





# WASTE QUANTITY AND COMPOSITION SURVEY

- Waste generation rate (kg/person/day)
- Bulk density (kg/litre)
- Physical composition (wet-base)
- Three components: combustible, moisture and ash contents  
(Measurement of moisture and calculation of the others)
- Lower calorific value (kJ/kg) (by calculation)

## 4.2 NUMBER OF SAMPLES

- In total, 882 samples was taken for the Waste Amount Survey, and 21 samples for the Waste Composition Survey.
- The waste quantity survey was conducted for seven (7) consecutive days after the complete collection of waste at the first day . The waste composition survey was conducted in the following samples collected mode; 1st day, 3th day and 4th day.

Generation Source	No.. Of Households per NDC	No. of Hotel, Restaurant, Shop, Institution per NDC	Waste Amount Survey			Waste Composition Survey			
			Samples/ Day	Days of Sampling	Samples Total	Household sampling. No./day	Hotel, Shop, Restaurant, Institution sampling. No./day	Days of Sampling	Samples Total
			A+B	-	CxD			-	FxG
	A	B	C	D	E	F	G	H	
Mahaicony/Abar y NDC	30	12	42	7	294	1	4	3	21
Bath/Woodley Park NDC	30	12	42	7	294	1		3	
Blairmont/Gelder land NDC	30	12	42	7	294	1		3	
Total	90	36	126	-	882	-		-	21

# WASTE AMOUNT SURVEY (RESULT)

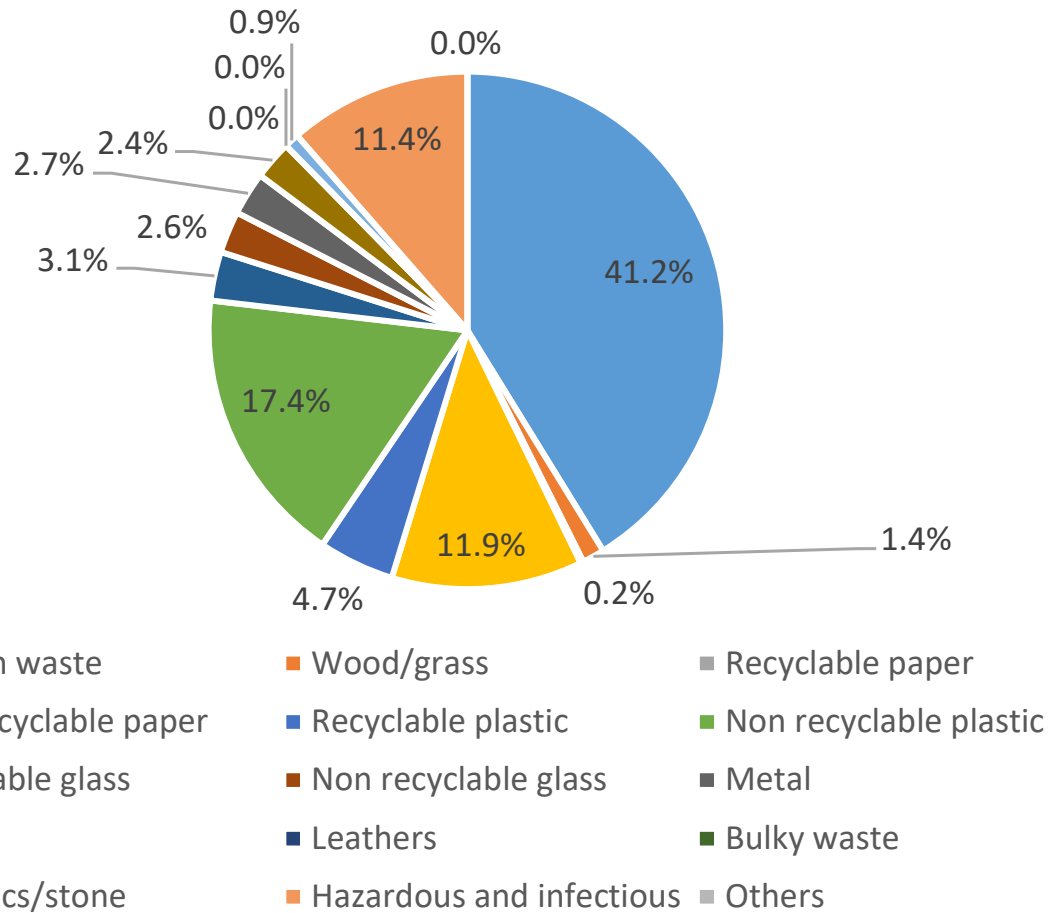
Item	Household
Planned sample number	90
Actual and effective sample number	65
Average [kg/person/day]	0.31
Upper limit [kg/person/day]	0.98
Lower limit [kg/person/day]	0.04

Item	Restaurant	Shop	Institution (School)
Planned sample number	9	9	9
Actual and effective sample number	1	6	8
Average [kg/ day/staff]	0.61	1.14	0.37
Upper limit [kg/ day/ staff]		1.66	1.08
Lower limit [kg/ day/ staff]		0.57	0.08



# WASTE COMPOSITION SURVEY (PHYSICAL COMPOSITION)

## Household waste





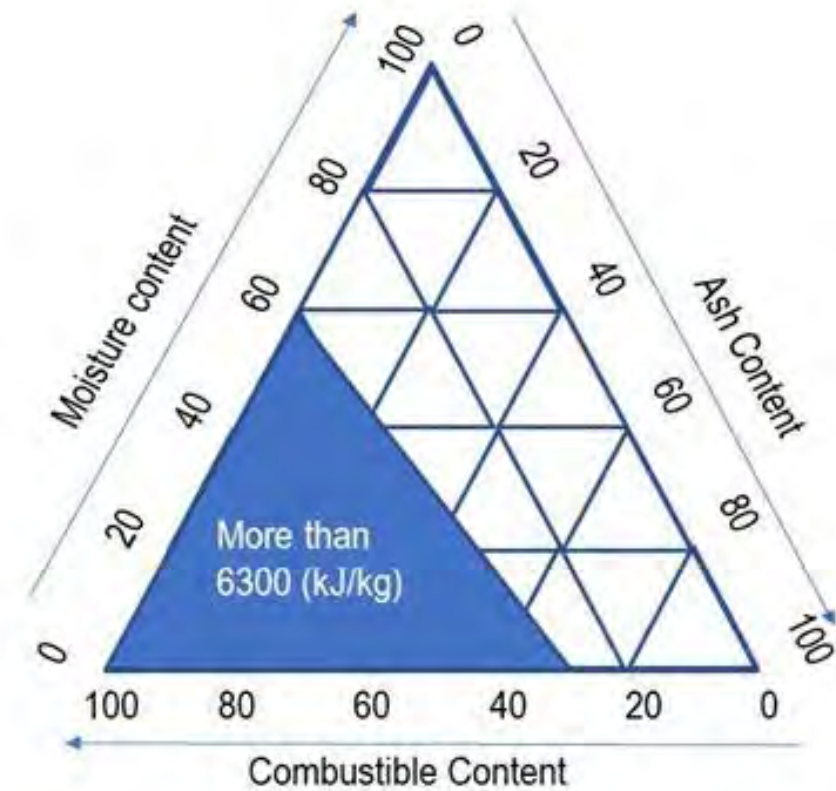
# WASTE COMPOSITION SURVEY (THREE COMPONENTS)

Item	Household	Restaurant	Shop	Institute
Moisture: W[%]	38	32	39	47
Combustible: B[%]	45	45	54	41
Ash: A [%]	17	23	7	12

Item	Household	Restaurant	Shop	Institute
Lower calorific value [kJ/kg]	7,587	7,682	9,305	6,688

The result of moisture, combustible and ash contents based on this waste composition survey show that the waste in region 5 is possible range of waste incineration by the comparison between the result and above ternary diagram.

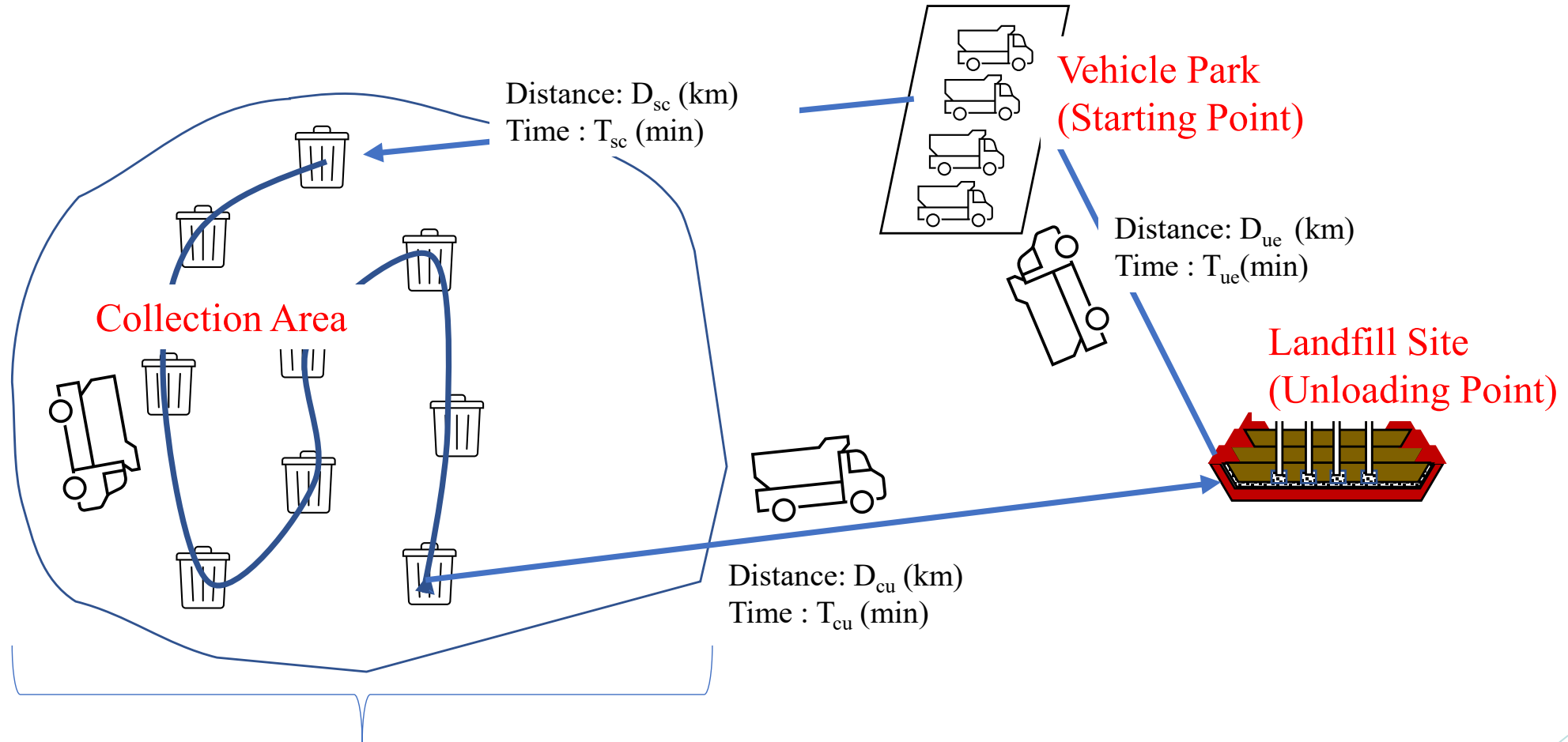
However, total amount of waste is 20 to 25 [ton/day]. It is very small waste amount for considering Waste to energy incineration in region 5.



Source: National Institute for Environmental Study of Japan



# TIME AND MOTION SURVEY (METHODOLOGY)



Total Distance in Collection Area:  $\sum_i D_c(i-1, i)$  (km)

Total Moving Time in Collection Area:  $\sum_i MT_c(i-1, i)$  (min)

Total Loading Time in Collection Area:  $\sum_i LT_c(i)$  (min)

# TIME AND MOTION SURVEY (TYPE OF TARGET VEHICLE)

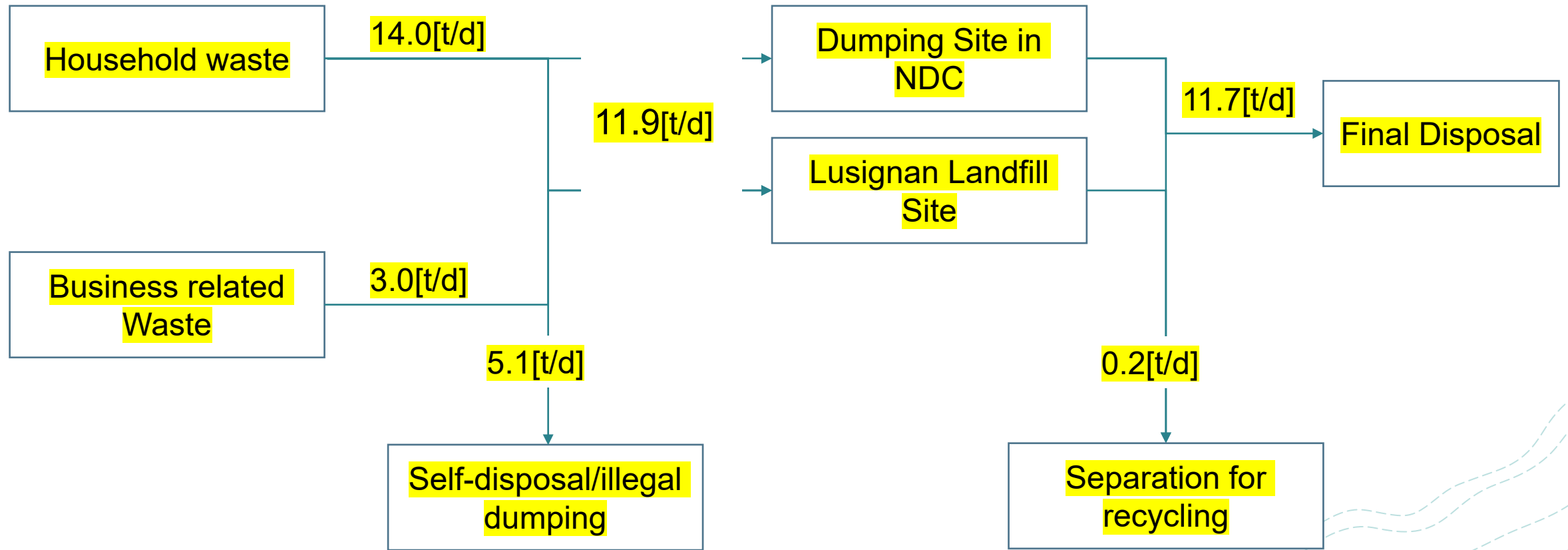


# TIME AND MOTION SURVEY

Type of vehicle	Average speed [km/h]	Average loading time [second]	Unloading time [second]
Compactor vehicle	54	30	130
Skip vehicle	24	35	84
Small tractor trailer	14.4	35	37
Truck without dump function	50.5	17	590



# ESTIMATED CURRENT WASTE FLOW (2023)

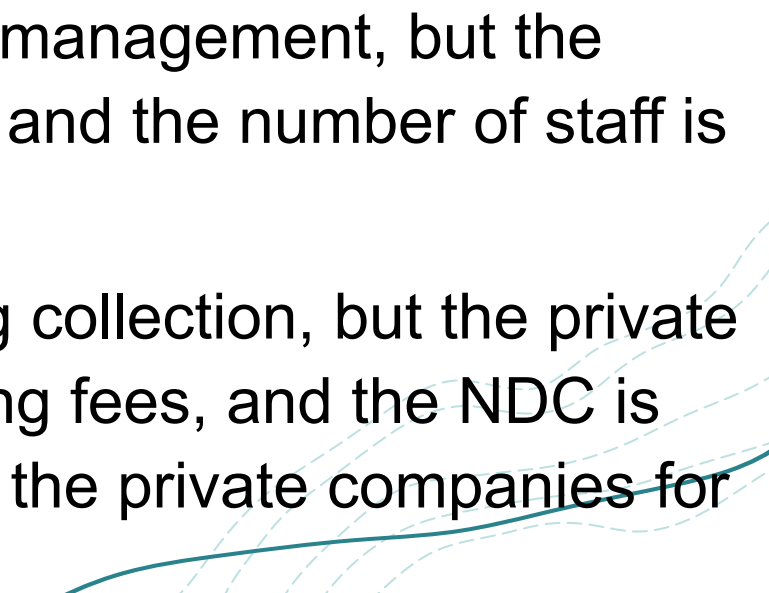


# IDENTIFIED MAIN ISSUES (I)

## Law and regulations

- SWM Bill which defines the establishment of a National Solid Management Authority, has not been enacted
- No administrative rules or guidelines for collection, transportation, recycling, and final disposal are fragmented and not harmonized.

## Organizational Structure

- At the national level, the MLGRD implements waste management, but the planning and implementing agencies are integrated, and the number of staff is insufficient compared to the nature of the work.
  - Both the NDC and private companies are conducting collection, but the private companies are collecting from sources that are paying fees, and the NDC is unable to ascertain which households are relying on the private companies for collection.
- 

# IDENTIFIED MAIN ISSUES (II)

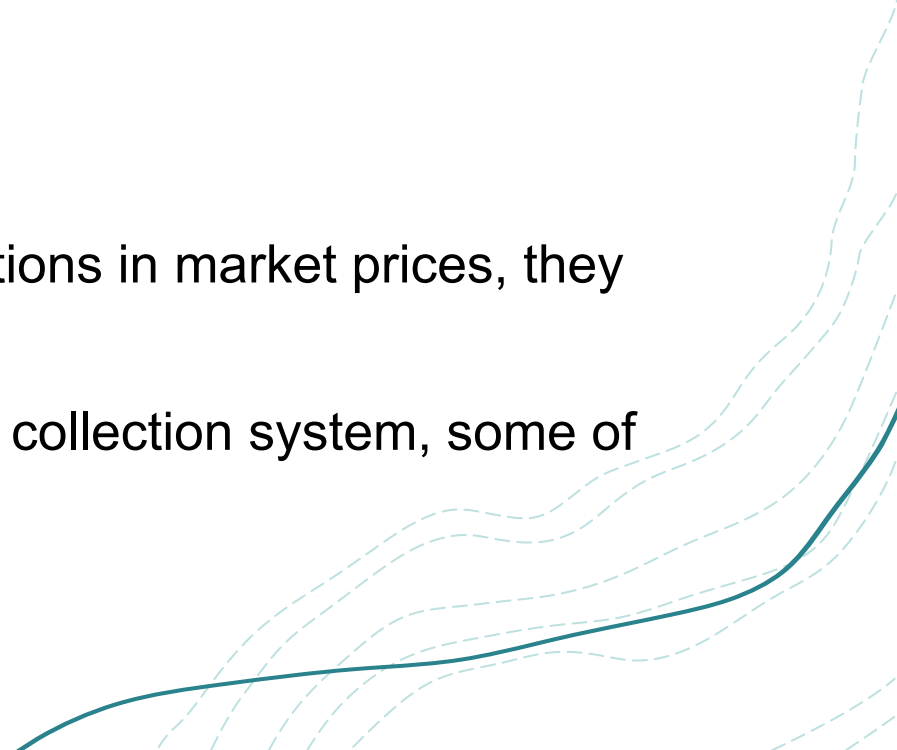
## (3) Discharge, collection and transportation

- The collection system using tractor trailers is inefficient
- Monitoring of collection has not been implemented.

## (4) Treatment and disposal

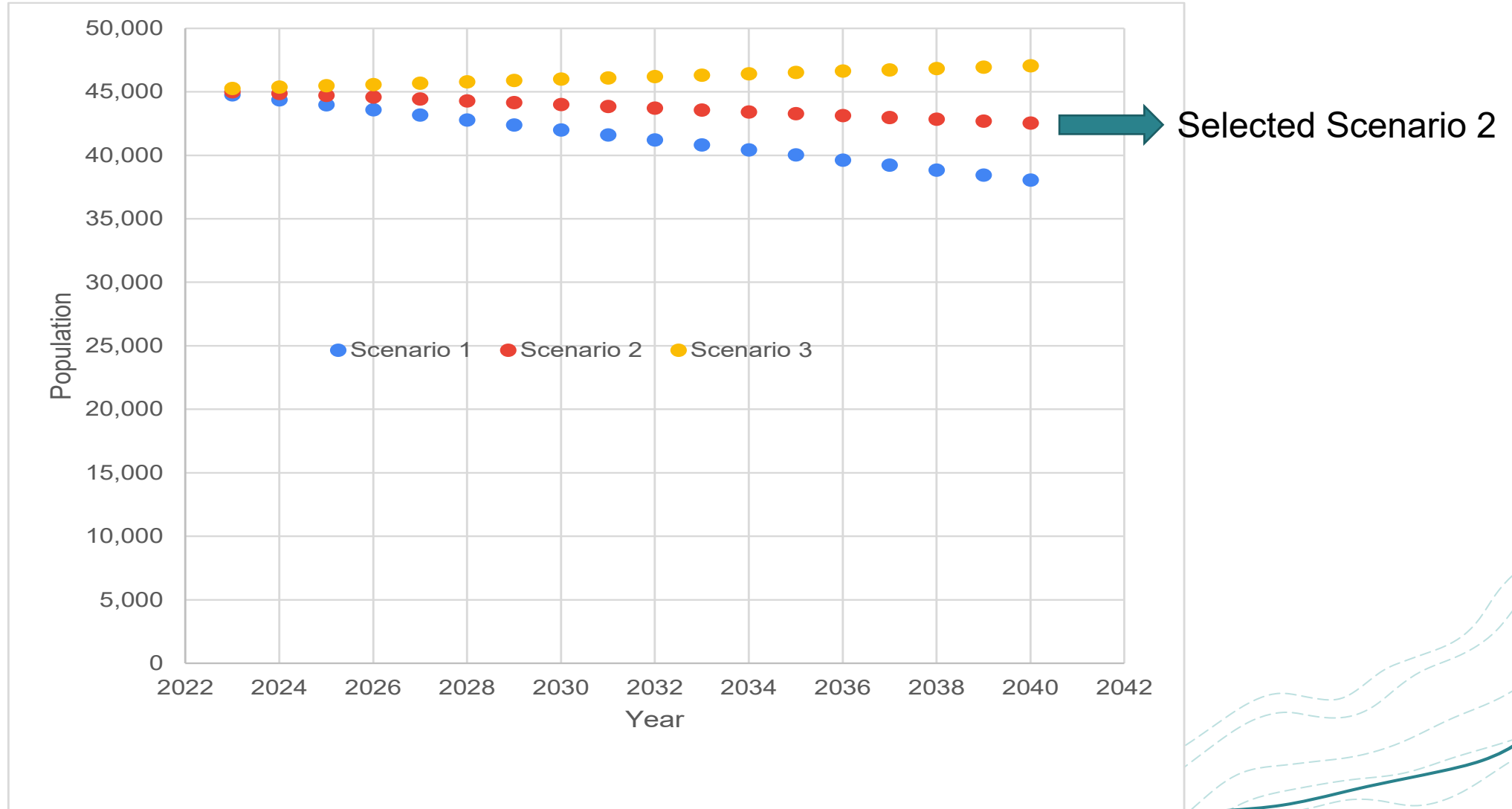
- The current disposal sites at each NDC are open dumping sites
- A new sanitary landfill is currently planned for Blairmont.

## (5) 3Rs, Resource Recovery

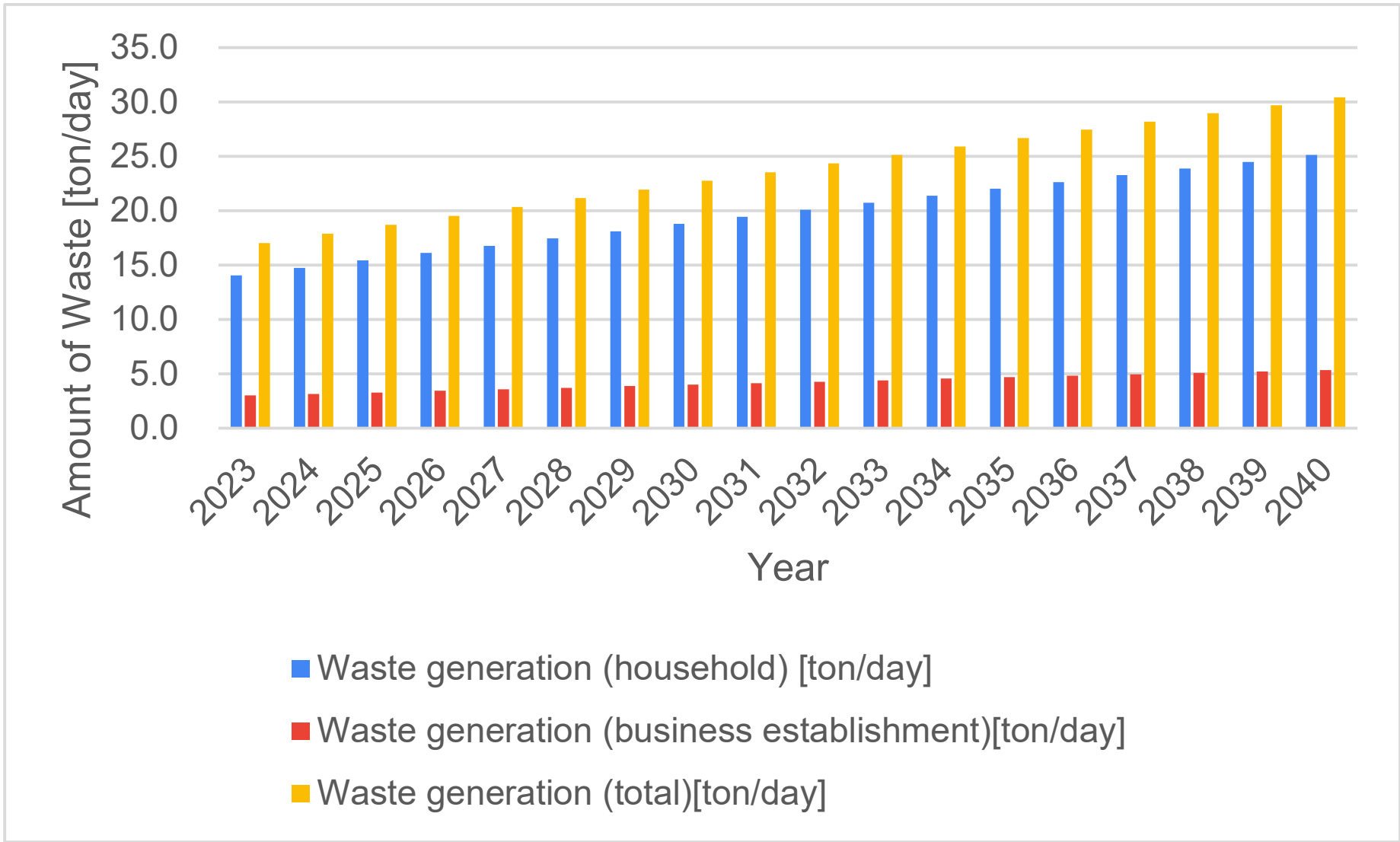
- Guyana currently has limited recyclable waste. Due to fluctuations in market prices, they are not currently being collected as valuable resources.
  - Due to comingled collection of waste and the lack of separate collection system, some of the recyclable waste is not recovered.
- 



# POPULATION PROJECTION

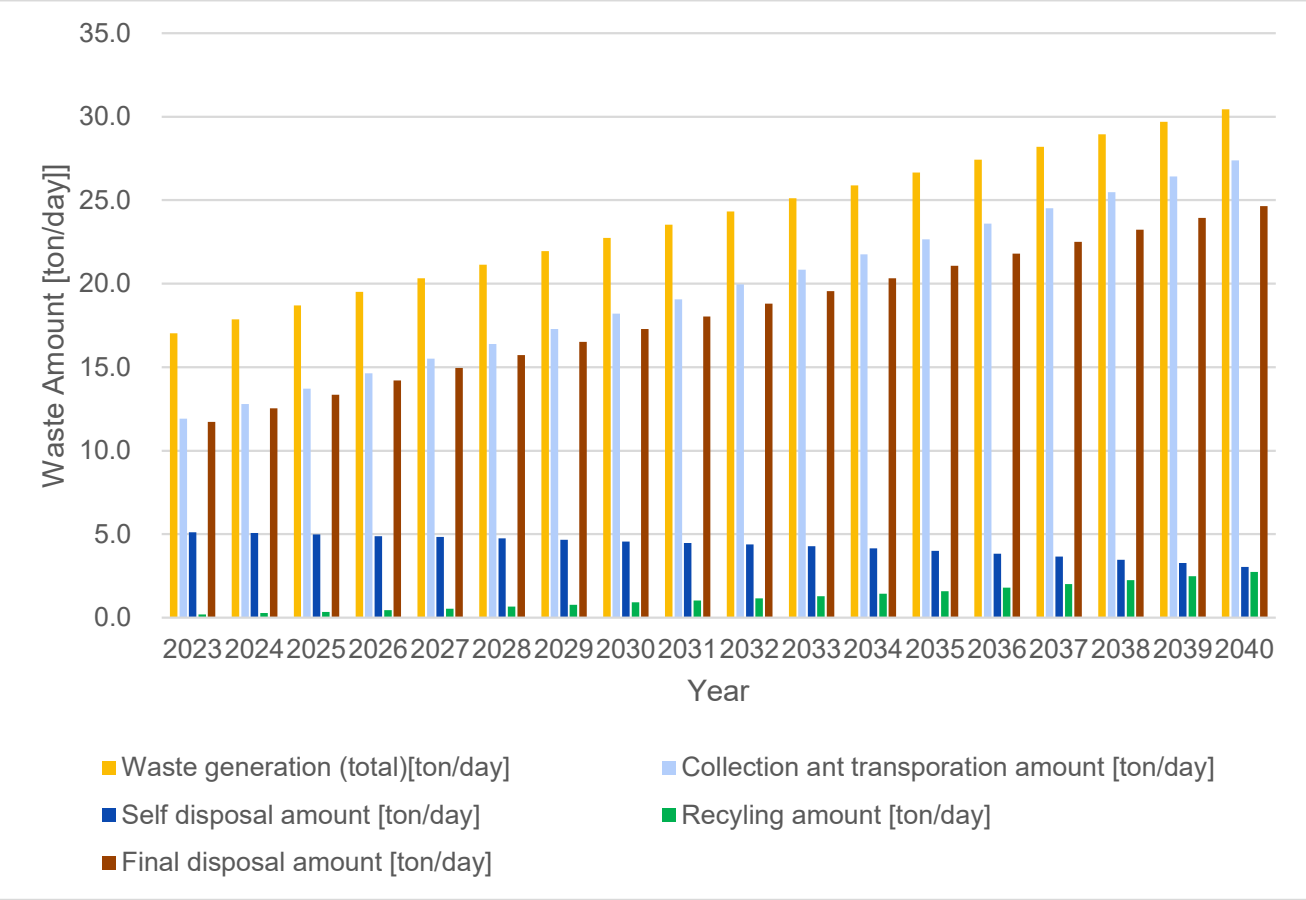


# FUTURE WASTE GENERATION



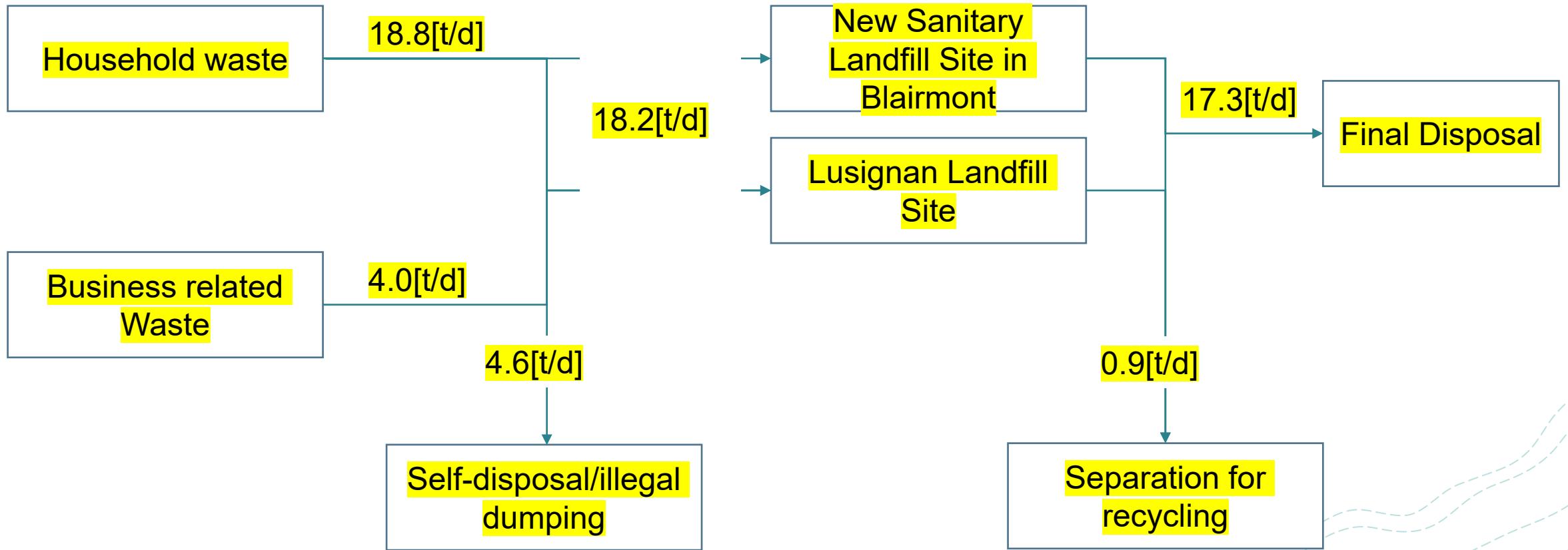
# SETTING OF FUTURE TARGET

Item	2023	2030	2035	2040
Collection Rate (%)	70%	80%	85%	90%
Self-disposal Rate (%)	30%	20%	15%	10%
Recycle Rate (%)	1.7%	5.0%	7.0%	10.0%
Final disposal Rate (%)	98%	95%	93%	90%

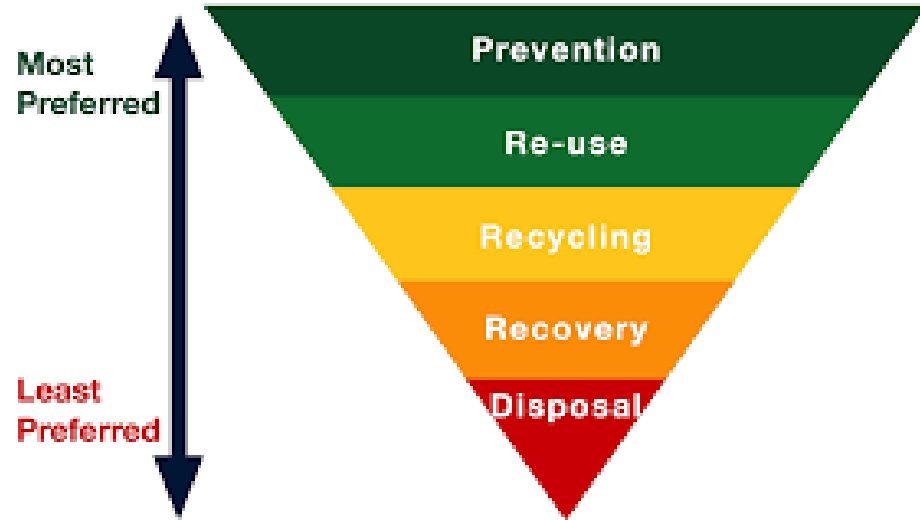




# FUTURE WASTE FLOW (2030)



# STRATEGIC DIRECTION IN NATIONAL LEVEL



## Objectives

- A cleaner environment
- Better public health protection
- Contribute to economic prosperity

## Goals

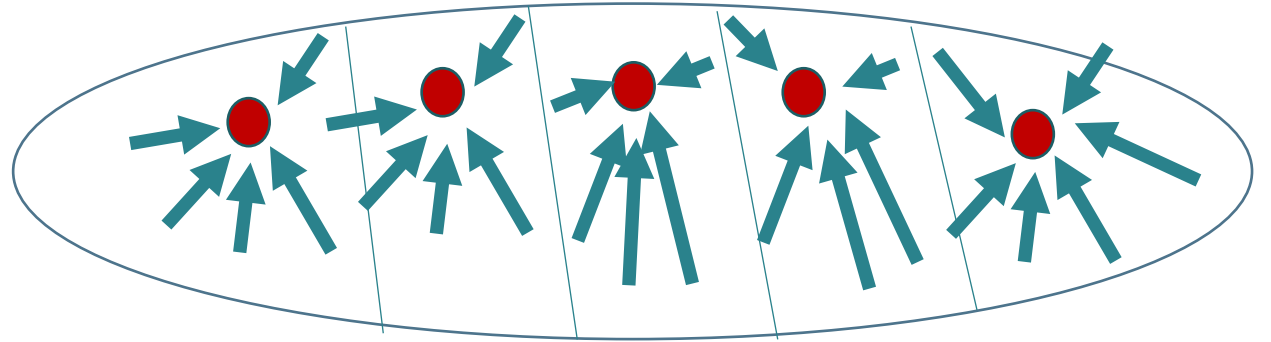
- Less litter & illegal dumping
- Less waste generated
- Better resource recovery
- Efficient and cost-effective waste collection
- Better waste infrastructure
- Strengthen human & institutional capacity



# PLANNING STRATEGY (OVERALL)

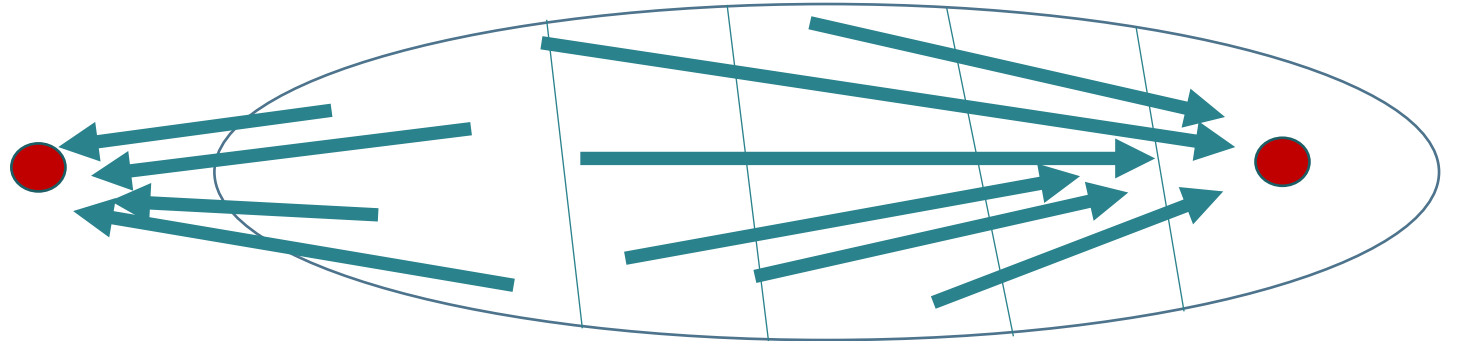
## Current situation

Mainly collection and transportation by NDC to existing open dumping site in each NDC



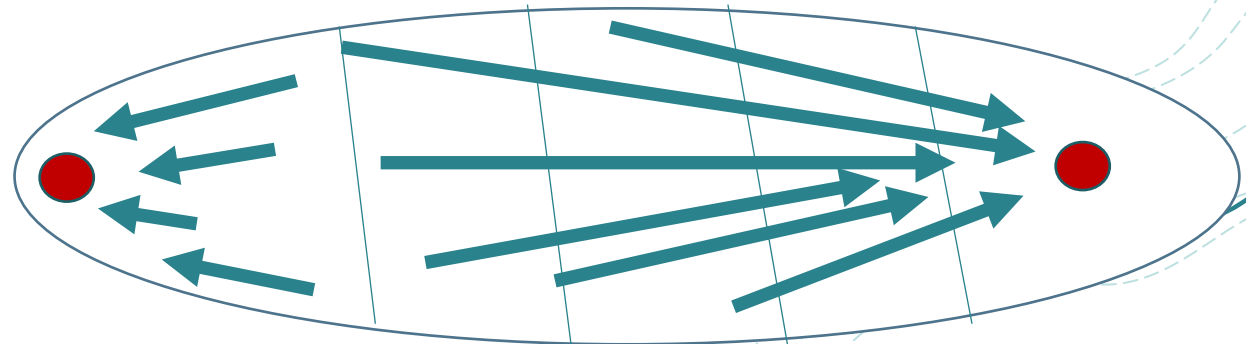
## Short and medium term

Collection and transportation by private company and/or NDC with monitoring to the new sanitary landfill site in Blairmont



## Long term

Collection and transportation by private company and/or NDC with monitoring by NDC/MLGRD to two sanitary landfill sites in Blairmont and west side in region 5





# PLANNING STRATEGY (COLLECTION AND TRANSPORTATION)

## (1) Establishment of scheduled collection

To improve the collection and transportation system toward scheduled collection with monitoring by each NDC and/or NSWMA

## (2) Improve efficiency of collection and transportation

To improve the collection and transportation efficiency from small scale tractor trailer to compactor vehicle for residents and skip for large business establishment by privatizing the collection and transportation

## (3) Improve collection rate and frequency

To improve the collection frequency to twice a week from current frequency (once a two weeks to several times a two weeks) and expand and fix the collection area



# PLANNING STRATEGY (FINAL DISPOSAL)

## (1) Development of Waste Management Facilities

To develop the sanitary landfill and recovery facility including landfill area, rainwater drainage, leachate collection and treatment system, gas ventilation pipe, sorting facilities of recyclable waste, weighing bridge, administration building, gate house, fence as well as necessary heavy equipment and environmental monitoring equipment.



## (2) Closure with environmental remediation of existing open dumping sites

To closure of open dumping site in each NDC with environmental improvement measures such as installation of rainwater drainage, final soil cover and tree planting, after the development of the sanitary landfill site



# PLANNING STRATEGY (3R (REDUCE, REUSE, RECYCLE))

## (1) Promotion of source separation and discharge of resources

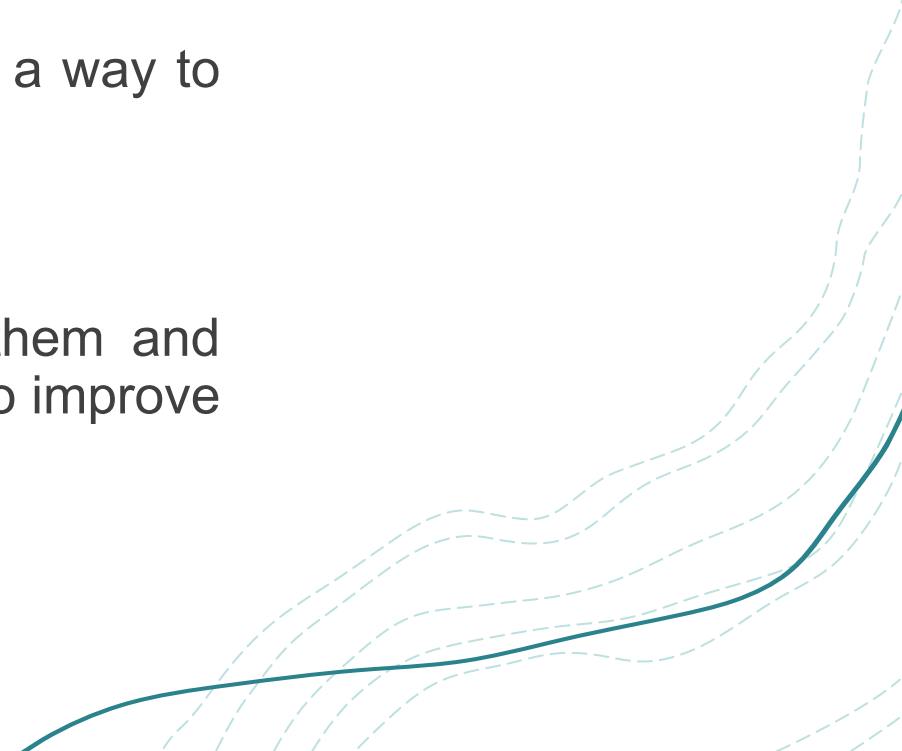
To promote separation at source to residents and business establishment, and to establish a system to separately collect stored resource waste in the future

## (2) Promotion of waste reduction at source

To consider reducing the distribution of free plastic bags as a way to curb the emission of garbage.

## (3) Improve the condition of waste picking activities

To improve the condition of waste picker by officializing them and preparing sorting facilities in new landfill site, etc as well as to improve the collection efficiency





# COLLECTION AND TRANSPORTATION PLAN

Item	10 NDC Areas in Region 5
Target NDCs in Region 5	Blairmont - Gelderland, Zeelust-Rosignal, Woodlands-Belair Park, Bath-Woodley Park, Union-Naarstigheid, Seafield-Tempe, Profit-Rising Sun, Mahaicony-Abary, Hamlet-Chance, Woodlands- Farm
Collection frequency	Twice a week
Collection vehicle	Compactor vehicle (12m <sup>3</sup> , 8m <sup>3</sup> , 4m <sup>3</sup> )
Working hour	8 hours from Monday to Saturday

According to Time and Motion Survey, large compactor vehicle is more efficient, if road is sufficient width for the vehicle

# COLLECTION AND TRANSPORTATION PLAN

The calculation is implemented based on the condition of the transportation distance in the collection areas, the distance from new landfill site in Blairmont and the distance from Lusignan landfill site as follows.

Name of NDC	Transportation distance in collection area [km]	Distance between new landfill site in Blairmont [km]	Distance from Lusignan landfill site [km]
Blairmont - Gelderland	30.8	5.4	120
Zeelust–Rosignal	51.75	10.2	115.2
Woodlands- Belair Park	27.4	15.7	109.7
Bath-Woodley Park	34.2	17.2	108.2
Union-Naarstigheid	95.4	24	101.4
Seafeld-Tempe	69.3	37.2	88.2
Profit-Rising Sun	57.15	42	83.4
Mahaicony-Abary	105.7	52.1	73.3
Hamlet-Chance	72.2	60.4	65
Woodlands-Farm	99.5	65.4	60

# COLLECTION AND TRANSPORTATION PLAN

- (1) Case 1 : In case collection vehicles can be used in all the region, the equipment used in an NDC can be utilized in the other NDCs.

Name of NDC	Necessary trip in 2030	Necessary trip in 2040
Blairmont - Gelderland	4	4
Zeelust-Rosignal	6	8
Woodlands- Belair Park	2	2
Bath-Woodley Park	6	6
Union-Naarstigheid	6	6
Seafield-Tempe	4	4
Profit-Rising Sun	4	4
Mahaicony-Abary	6	6
Hamlet-Chance	4	4
Woodlands-Farm	6	6
Total number of trips	48	50
Total number of vehicle	8	10

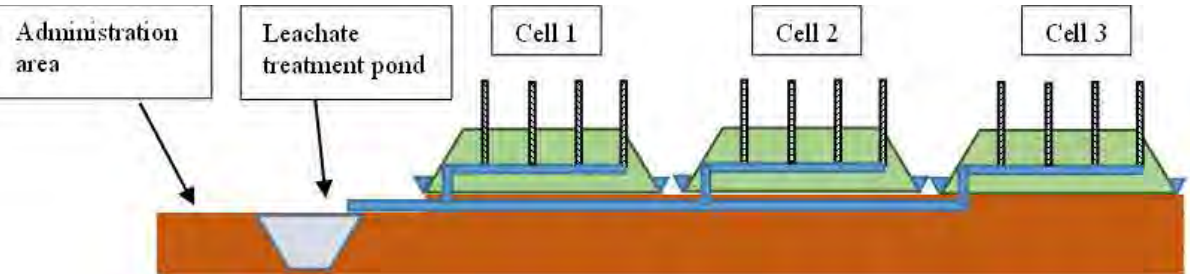
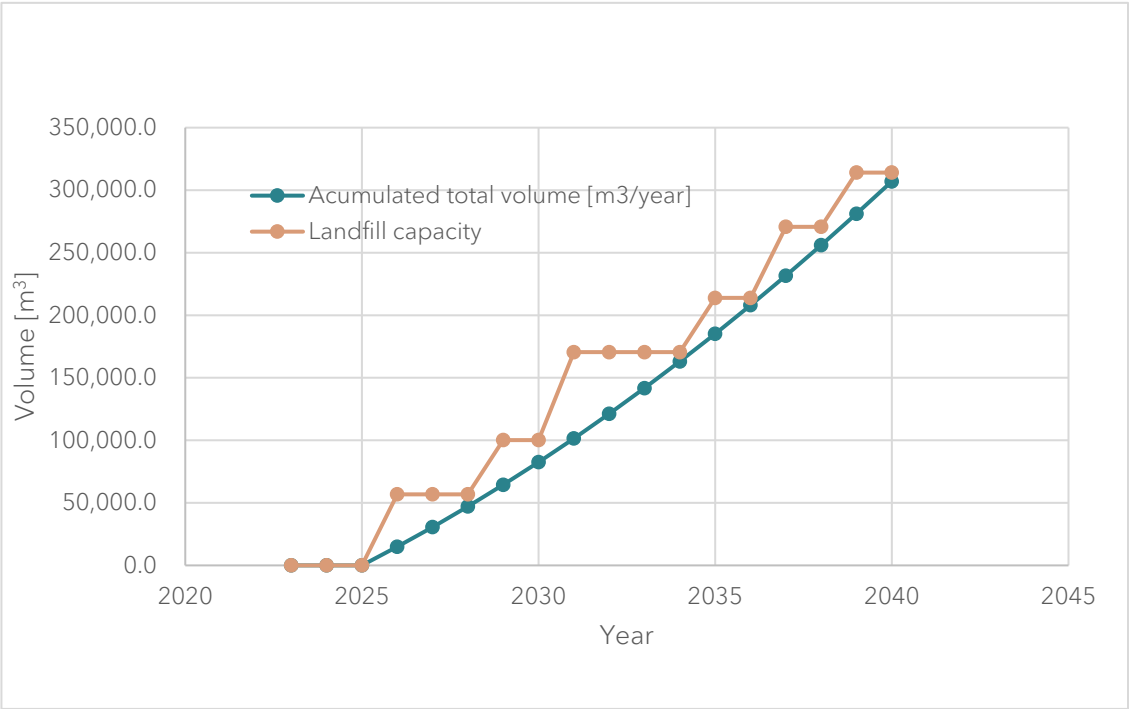
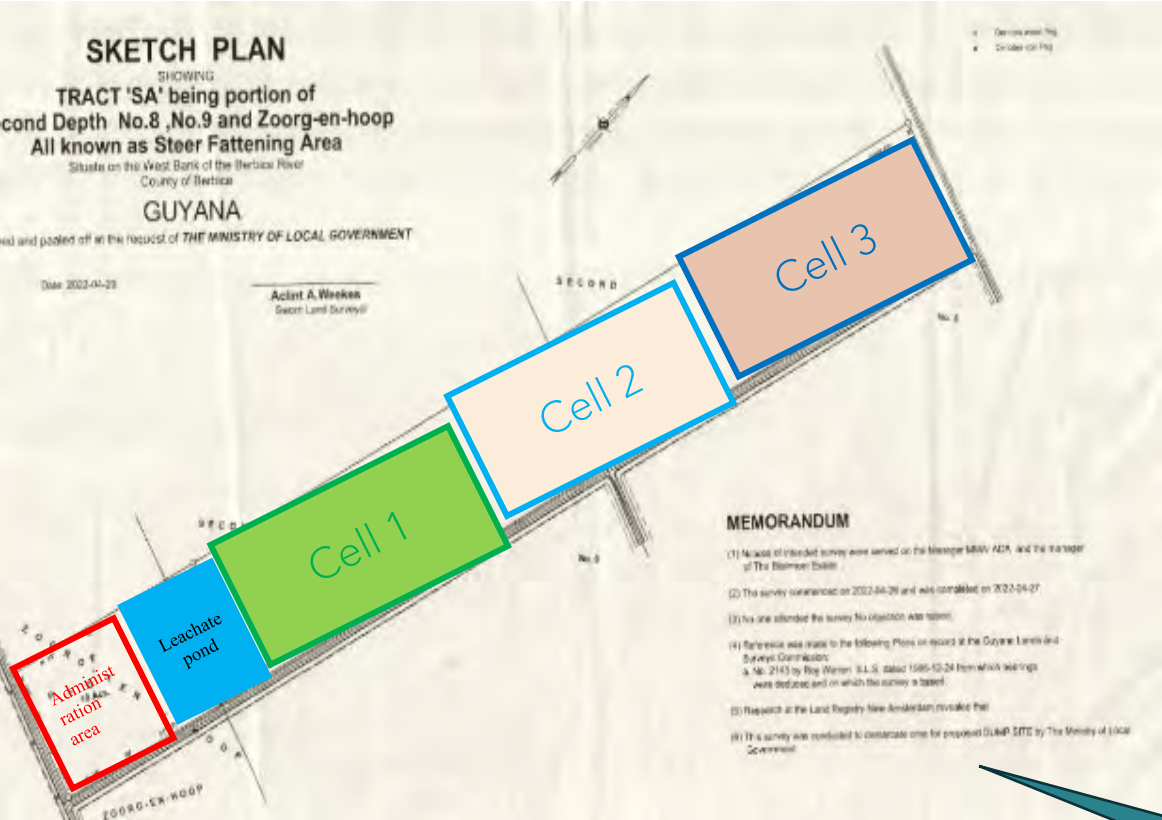


# COLLECTION AND TRANSPORTATION PLAN

(2) Case 2 In case of that collection vehicles are owned by each NDC, the equipment is used in the NDC.

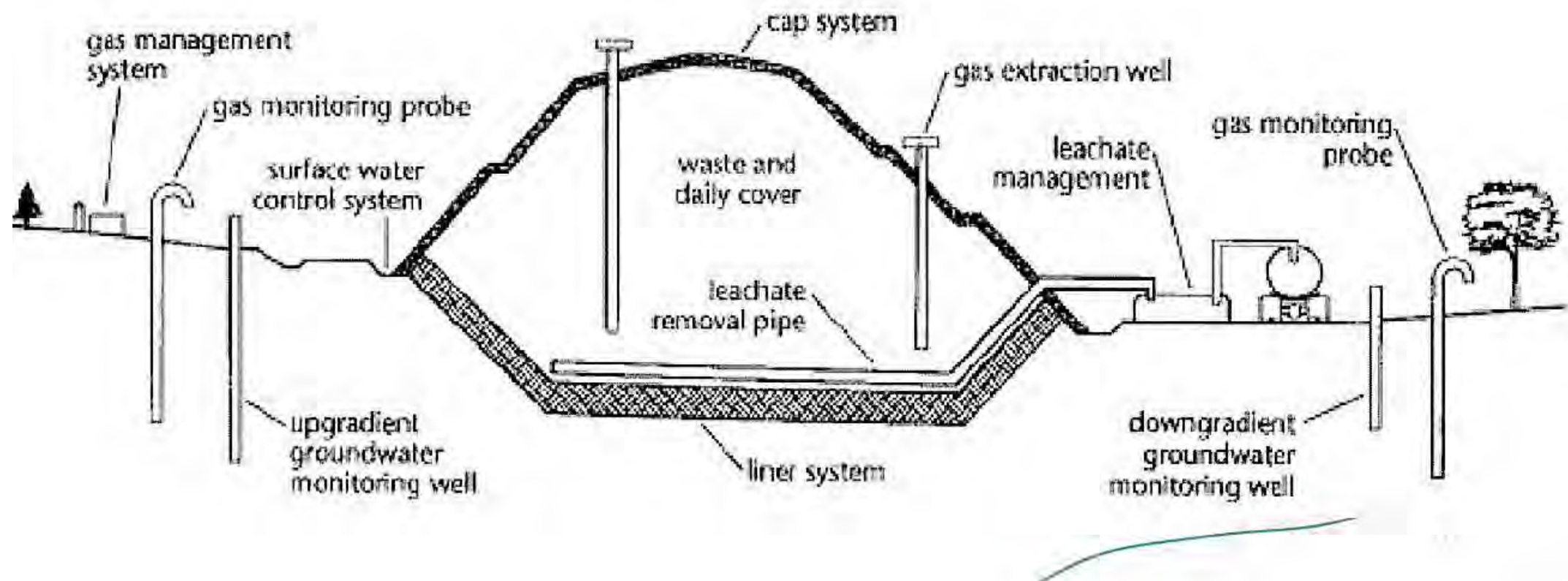
Name of NDC	Necessary trip in 2030	Necessary vehicle in 2030	Necessary trip in 2040	Necessary vehicle in 2040
Blairmont - Gelderland	4	1	4	1
Zeelust–Rosignal	6	1	8	2
Woodlands- Belair Park	2	1	2	1
Bath-Woodley Park	6	1	6	1
Union-Naarstigheid	6	1	6	1
Seafield-Tempe	4	1	4	1
Profit-Rising Sun	4	1	4	1
Mahaicony-Abary	6	1	6	1
Hamlet-Chance	4	1	4	1
Woodlands-Farm	6	1	6	1
Total number of vehicle	-	10	-	11

# FINAL DISPOSAL PLAN



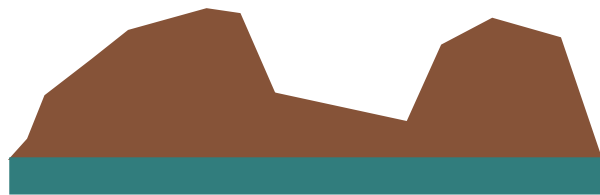
Phase by phase approach for landfill development

# FINAL DISPOSAL PLAN



# CLOSURE OF EXISTING OPEN DUMPING SITE

Existing Open  
dumping site

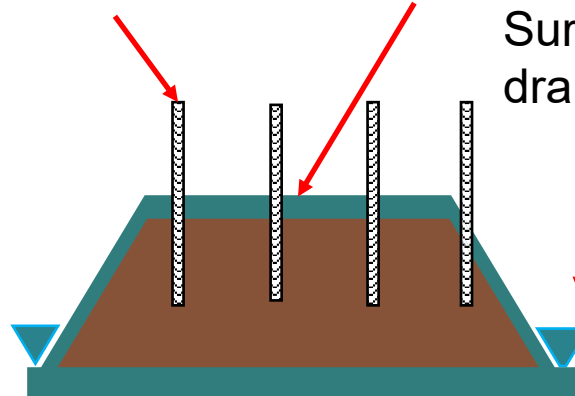


Closure of open dumping  
site with environment  
protection

Landfill gas  
exhaust facility

Final soil cover  
and vegetation

Surface water  
drainage



After long time, the land  
could be utilized for the  
other purposes





# INSTITUTIONAL SYSTEM (ORGANIZATION)

Area	Position	2030	2040
Collection and transportation	Supervisor	1	1
	Driver	8	10
	Collector	16	20
	Environmental monitor	2	2
Landfill Development	Supervisor in landfill site	1	1
	Landfill operator	2	2
	Heavy equipment operator	4	4
	Truck scale operator	1	1
	Security guard	1	1

# IMPLEMENTATION SCHEDULE

Activity		2023	2024	2025	2026	2027	2028	2029	2030	2031-2035	2035-2040
Collection and transportation	Introduction of effective collection by compactor vehicle										
	Improvement of Collection Rate and Frequency										
	Consideration of separate collection										
Final disposal	Construction of new landfill site in Blairmont										
	Closure of existing open dumping sites in each NDC										
	Consideration of new landfill site in east side in Region 5										
Promotion of recycling activity	Source Reduction Program										
	Promotion of Recycling										

# CAPEX FOR COLLECTION, TRANSPORTATION, AND FINAL DISPOSAL

Item		Contents / Detail	Number (Year 2030)	Cost [US\$]
Collection and transportation	Compactor vehicle (12m3)		8	1,872,000
Landfill development	Landfill Facility	Landfill Area, Gas ventilation pipe, Rainwater drainage, Leachate collection pipe, Leachate treatment system, Soring area, Weighing bridge and monitoring room, Washing and parking area, Gatehouse, Fence	1	6,554,000
	Landfill equipment	Bulldozer (Swamp type around 260HP)	1	299,000
		Excavator (around 150 HP)	1	184,000
		Landfill Compactor (more than 30 tons)	1	359,000
		Wheel Dozor (around 300 HP)	1	266,000
Total			-	9,534,000

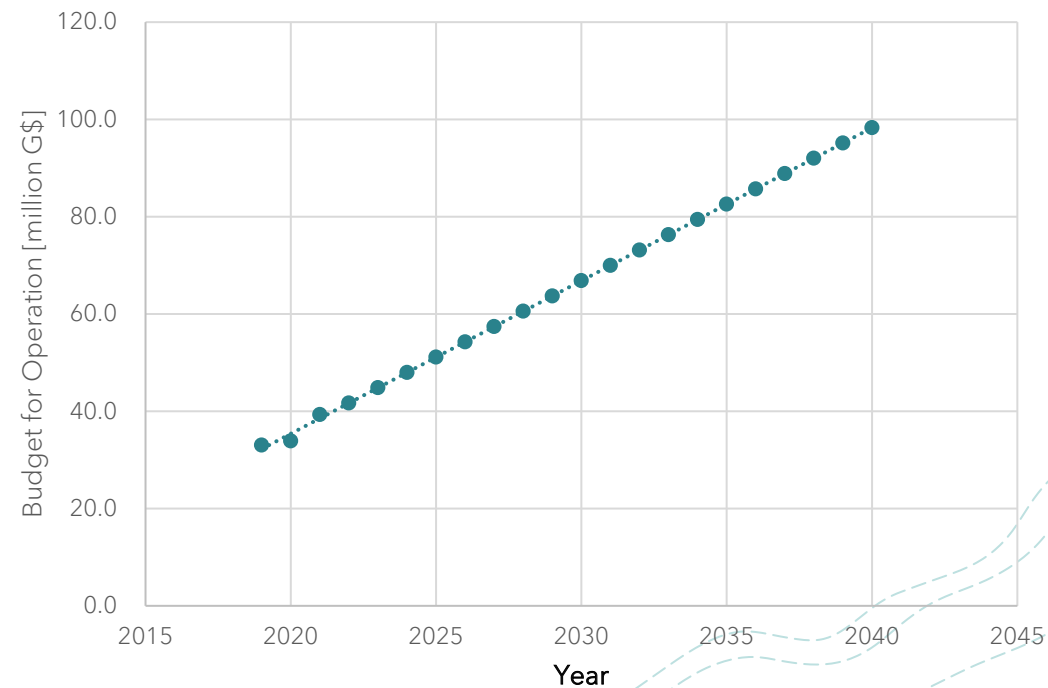
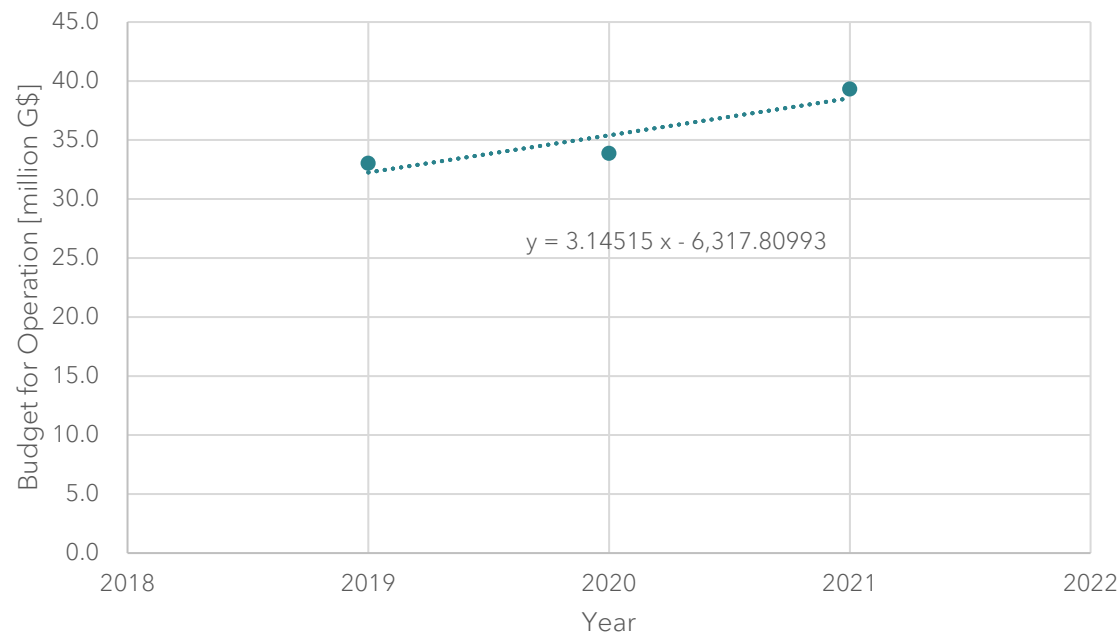
# OPEX FOR COLLECTION, TRANSPORTATION, AND FINAL DISPOSAL

Item		OPEX (2030) [US\$]	OPEX (2040) [US\$]
Personnel cost	Collection and transportation	211,200	338,400
	Landfill	81,600	81,600
Operation	Collection and transportation	34,749	37,447
	Landfill	23,877	25,734
Maintenance	Collection and transportation	5,212	5,617
	Landfill	3,582	3,860
Total	Collection and transportation	251,162	381,464
	Landfill	109,059	111,195



# FINANCIAL SITUATION

Based on total budget for SWM in every NDCs in Region 5, the future budget estimation is tentatively implemented.



# COST RECOVERY

- Estimated budget and necessary cost is compared in 2030 and 2040 as follows.
- Operation and maintenance cost should be more than the budget.

Item	OPEX (2030) [thousand US\$]	OPEX (2040) [thousand US\$]
Assumed budget	334.2	491.5
Operation and maintenance cost	353.8	488.8

# CONCLUSION AND FURTHER ACTION

## Conclusion

Regional Master Plan in Region 5 is drafted based on the existing information and the surveys such as WACS and time and motion survey.

Due to no availability of existing data including unit cost data and latest census data in 2022 or cost estimation is preliminarily implemented.

## Further Action

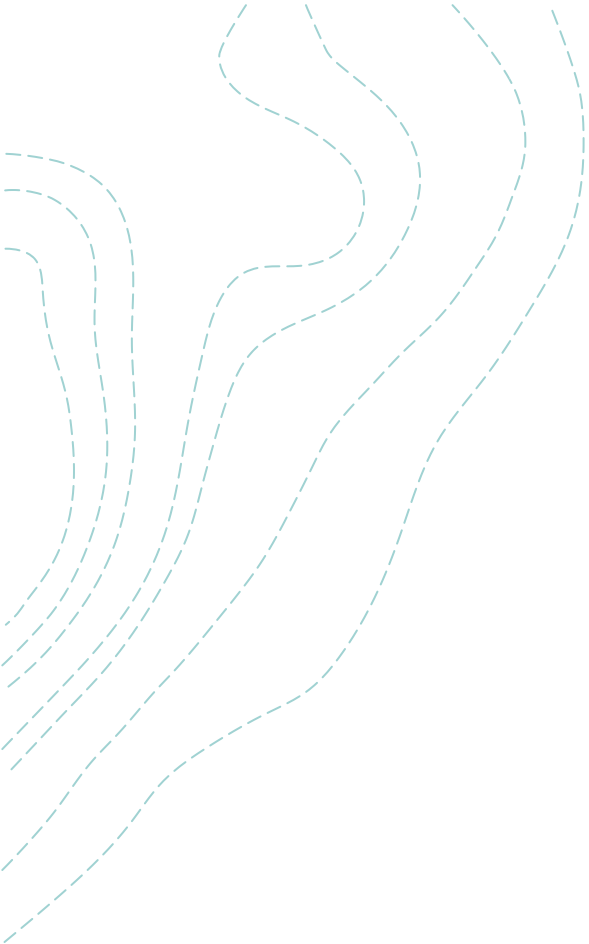
Solid Waste Management Bill is under formulation. In the Bill, it will describe the necessity of Regional SWM and the approval process, etc

This plan could not utilize the census data implemented in 2022 data. After the availability of the data, the population projection should be updated.

After obtaining updated unit cost data, the CAPEX and OPEX will be revised.

**Institutional System for Recycling Promotion such as law and regulation for EPR system will be necessary.**

This plan should be periodically reviewed, and if obtaining detailed data and updating the data, the M/P should be updated with Plan-Do-Check-Act (PDCA) cycle.



**THANK YOU VERY MUCH**





# **Integrated Marine Plastic Litter Management in the Caribbean**

## **Plastic Material Flow in Jamaica**

JICA Technical Cooperation Project on Advisor for Marine Plastic  
Litter Management in the Caribbean Region

# Presentation Outline

- Introduction & Background
- Plastic Waste Material Flow
- Assumptions and Limitations
- Comparative Analysis of Plastic Waste Data
- Way Forward
- Related Programmes and Projects
- Project Evaluation



National Environment  
and Planning Agency

*Managing and protecting Jamaica's land, wood, air and water*

# Introduction/BACKGROUND

- Jamaica enjoyed the opportunity to participate in the JICA Technical Cooperation Project for Marine Plastic Litter Management in the Caribbean Region through the involvement of the National Solid Waste Management Authority and the National Environment and Planning Agency in 2022
- The project complemented measures previously taken as a country in addressing locally the global challenges with plastic waste
  - Promulgation of two (2) Orders to address importation, manufacture, use, and distribution of select single use plastic
    - i. NRCA (Plastic Packaging Materials Prohibition) Order, 2018
    - ii. Trade (Plastic Packaging Materials Prohibition) Order, 2018
  - Execution of the multi-laterally funded and supported (UNEP and Japan) ‘Plastic Waste Minimization Project.’
  - Longstanding efforts to further augment and incentivize plastic PET beverage bottle collection efforts through a private sector implemented Deposit Refund Scheme



# Introduction/BACKGROUND

- The project effected support to the
  - Participation of Jamaica on the Inter-governmental Negotiating Committee to develop an international legally binding instrument on plastic pollution, including in the marine environment; and
  - Policy making process for the ‘National Policy for Single-Use Plastic Management’, inclusive of Terms of Reference development and guide for the review of the draft policy output.
  - Legislative Framework for a National Deposit Refund Scheme for PET and HDPE Bottles
- The planned output of the engagement with the National Environment and Planning Agency was a plastic waste material flow analysis, which is incorporated in this final presentation on the closure of this regional project.



# Purpose - Plastic Waste Materials Flow

## Purpose

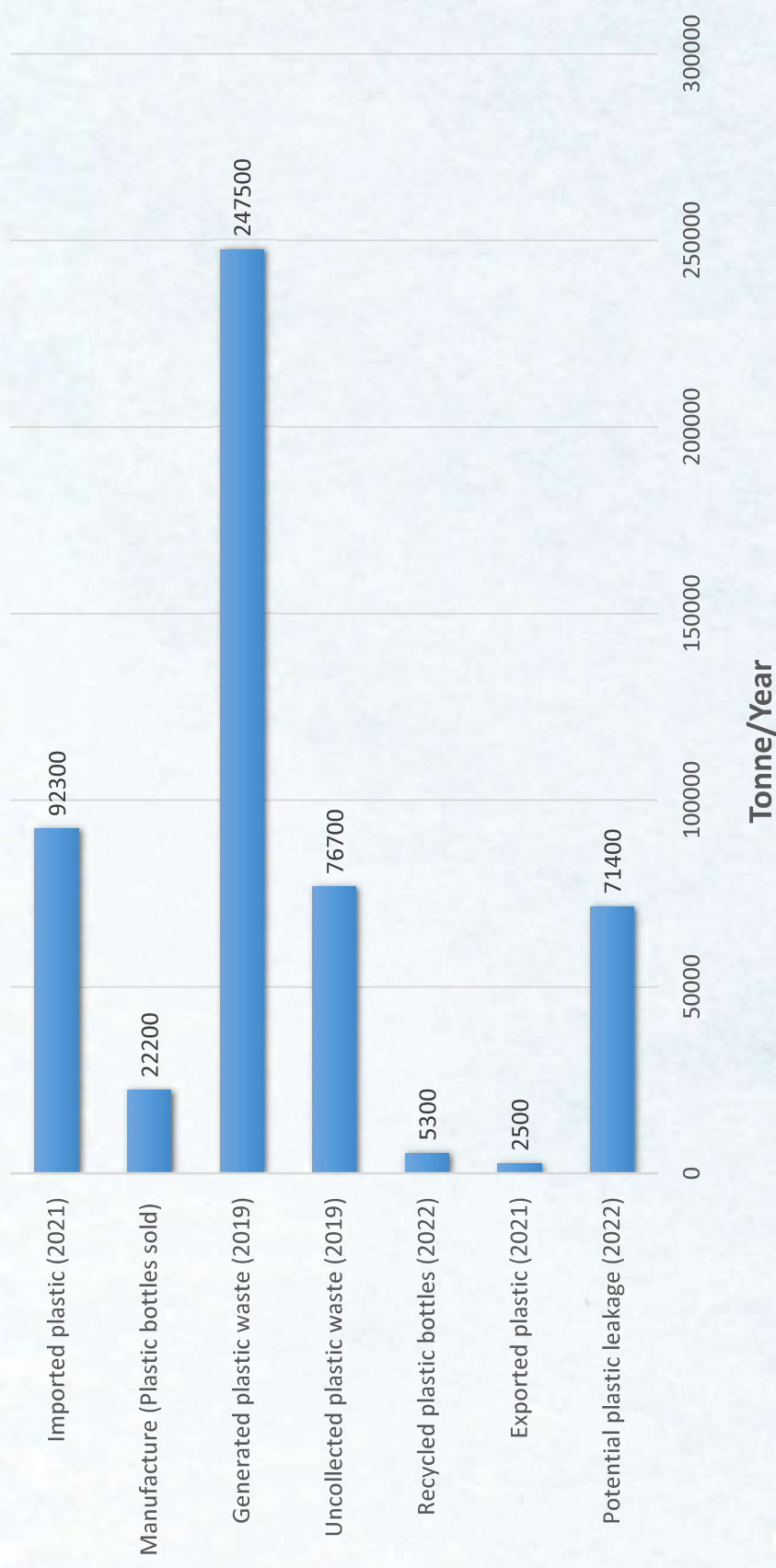
- Illustrate the sources and destinations of plastic waste
- Illustrate the quantity of plastic waste from each source and to each destination
- Illustrate the leaks to the marine environment
- Illustrate obvious areas for interventions

# Application - Plastic Waste Materials Flow

## Application

- Policy development – stakeholder sensitization, issue prioritization
- Legislation Development
- Waste data management and statistics
- Operational resource planning for
  - i. collection (i.e. trucks, collection depots/drop off centres, bins etc.) and
  - ii. processing of plastic waste for recycling, recovery, and reuse locally and export (i.e. balers and shredders)

# National Plastic Material Flow



*Managing and protecting Jamaica's land, wood, air and water*

# Potential/Rough Estimate Plastic Leakage

ASSUMPTIONS	LIMITATIONS
<p>The output of periodic exercises, such as waste characterization studies, are representative and employed best practices to allow extrapolation and estimates where empirical data was absent.</p> <p>E.g. Calculation of total plastic waste generated, collected and uncollected based on the average composition and generation data nationally.</p> <p>A measure of reasonable correlation between the plastic waste total generation and the level of imports in a year.</p>	<p>Paucity of waste data and statistics on:</p> <ul style="list-style-type: none"><li>• the quantity and type of plastics that are the scope of the project.</li><li>• the life cycle of the plastics other than at import and export.</li></ul> <p>All quantities and types of related plastics were not addressed.</p>



# Potential/Rough Estimate Plastic Leakage

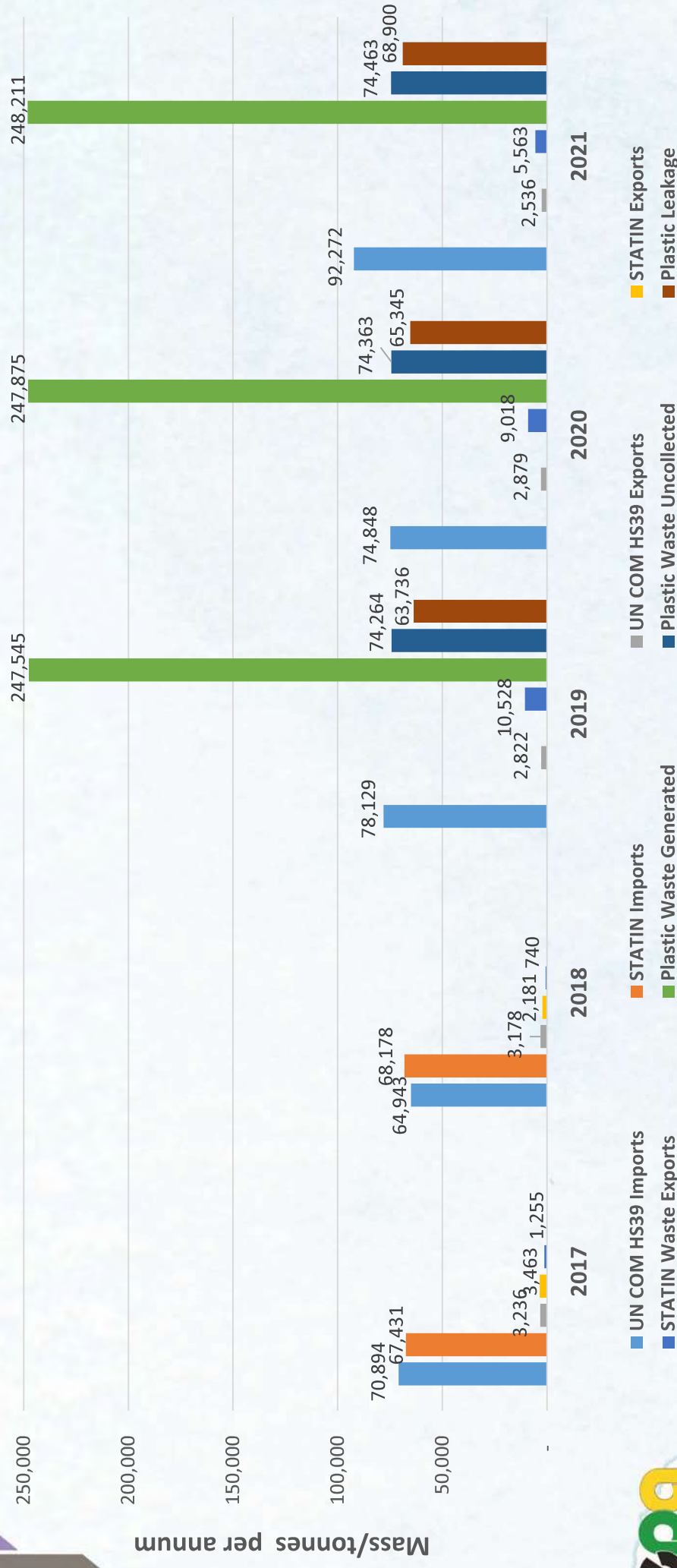
ASSUMPTIONS	LIMITATIONS
<p>Amount of plastic recycled equates to the amount of plastic bottle collected.</p> <p>NB: Calculation of the potential leakage was however the difference of the uncollected and the recycled plastic.</p>	<p>Lack of consistency and homogeneity of available data, thus lack of comparability of data sets from varying sources, and at times from the same source.</p>
<p>Plastics on land are all finally discharged to the marine environment due to dominance of hilly terrain and relatively small area of coastal plain.</p>	<p>Data available from manufacturers were the number of plastic bottles sold locally. Total mass was computed from average mass of the major bottle types.</p>
<p>PET presented the best opportunity for calculating leakage for a type of plastic.</p>	<p>Manufacturers did not provide the data for production that was not for the local markets.</p>

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# PLASTIC WASTE DISTRIBUTION 2023



# Comparative Analysis of Plastic Waste Data



*Managing and protecting Jamaica's land, wood, air and water*



# Way Forward

- Refine the plastic materials flow:
  - Include use of data from the Statistical Institute of Jamaica as opposed to only that of the UN COMTRADE database
  - Evaluate plastic exports other than plastic waste, to avoid overestimation of the plastic waste leakage.
  - Evaluate imported products or commodities in single use plastic packaging
  - Explore a factor to account for the plastic waste that is not formally collected by a collection unit, but is retrieved by the informal waste pickers, from drain cleaning, sweepers in urban space from major thoroughfares and the coastal clean-up activities.



# Way Forward

- Propose measures for addressing the data management gaps that were highlighted by the project
  - Establish a holistic national waste data management programme, inclusive of a solitary clearing house for waste data, and enhanced coordination between the waste management authorities, the Jamaica Customs Agency and the Statistical Institute of Jamaica
  - Infrastructural development (i.e. install weighbridges) to allow for the collection and collation of basic empirical data such as mass and computation of other waste indicators
  - Execution of sector relevant surveys according to best practice (methodologies and frequency)
- Incorporation of the coordinated data from the clearing house in policymaking and operational planning.

# Related Programmes and Projects

COMPLEMENTARY NATIONAL ENGAGEMENTS	STATUS
Basel Convention Plastic Waste Amendments	<ol style="list-style-type: none"> <li>1. Drafting Instructions for the amendment of the National Regulation were prepared and submitted to the Environment portfolio Ministry for review.</li> <li>2. Implemented provisional measures to guide plastic waste exporters until promulgation of the Plastic Waste Amendments</li> </ol>
Plastic waste Policy Development	<ol style="list-style-type: none"> <li>1. Stakeholder engagement conducted, and consultation report submitted by the consultant</li> <li>2. Draft National Policy on Single Use Plastic Management due end of October 2023</li> <li>3. Submission to Cabinet followed by another round of consultations as a ‘green paper’ before finalization as Policy.</li> </ol>
Deposit Refund System	<ol style="list-style-type: none"> <li>1. Legislation is an option but the decision is the responsibility of the Ministry of Economic Growth and Job Creation</li> </ol>

# Related Programmes and Projects

COMPLEMENTARY NATIONAL ENGAGEMENTS	STATUS
1. Plastic Packaging Materials Prohibition Order, 2018	Planned phase out of additional single use plastics 1. Plastic lunch boxes other than polystyrene 2. Microplastics in cosmetics
1. Global Environment Facility Project	1. Reduce marine Plastics and Plastic Pollution in Latin America and Caribbean Cities through a Circular Economy Approach. 2. Participating cities - Kingston and Montego Bay 3. City level policies will be amended to incorporate the tenets of the project
1. UNEP/IDB/EU Regional Training	1. Participation in regional training and technical exchange for Strengthening Waste Information Systems and Capacity to Generate Waste Statistics

# Project Evaluation

## The Project

- Introduced waste practitioners and regulators to vital waste management tool and indicator that was previously not a part of the local practice.
- Allowed for visualization and admission of gaps (i.e. management and data) that contribute to the challenge being experienced with marine plastic litter, and to a broader extent solid waste litter.
- Provided an output that supports the policy development process for a national plastic waste policy.
- Provided a basis for complementary technical assistance and capacity building from the JAT through briefing sessions.



# Project Evaluation

Provided a basis for complementary technical assistance and capacity building from the JAT through briefing sessions that delivered material on

1. Jurisdictional review conducted on plastic waste management legislation and regulation within the region and further afield.

2. Deposit Refund Schemes, amongst other Economic Instruments/Incentives implemented in other Caribbean Islands.

3. Waste separation practices in Japan

4. Current practices of waste management amongst the Caribbean Islands.

5. The mandate and work of the Inter-governmental Negotiating Committee to develop an international legally binding instrument on plastic pollution, including in the marine environment

# Marine Plastic Free



Edson Z. Carr



National Solid Waste Management Authority

Projects and Planning Manager



# Overview of Presentation

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- NSWMA
- Separation at Source
  - Overview of Projects
  - Updates Since St. Lucia

# National Solid Waste Management Authority

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- Effect April 1, 2002
- Creation of the National Solid Waste Management Authority
- Primary Focus – Solid Waste Management at the National Level via its Regions



# National Solid Waste Management Authority

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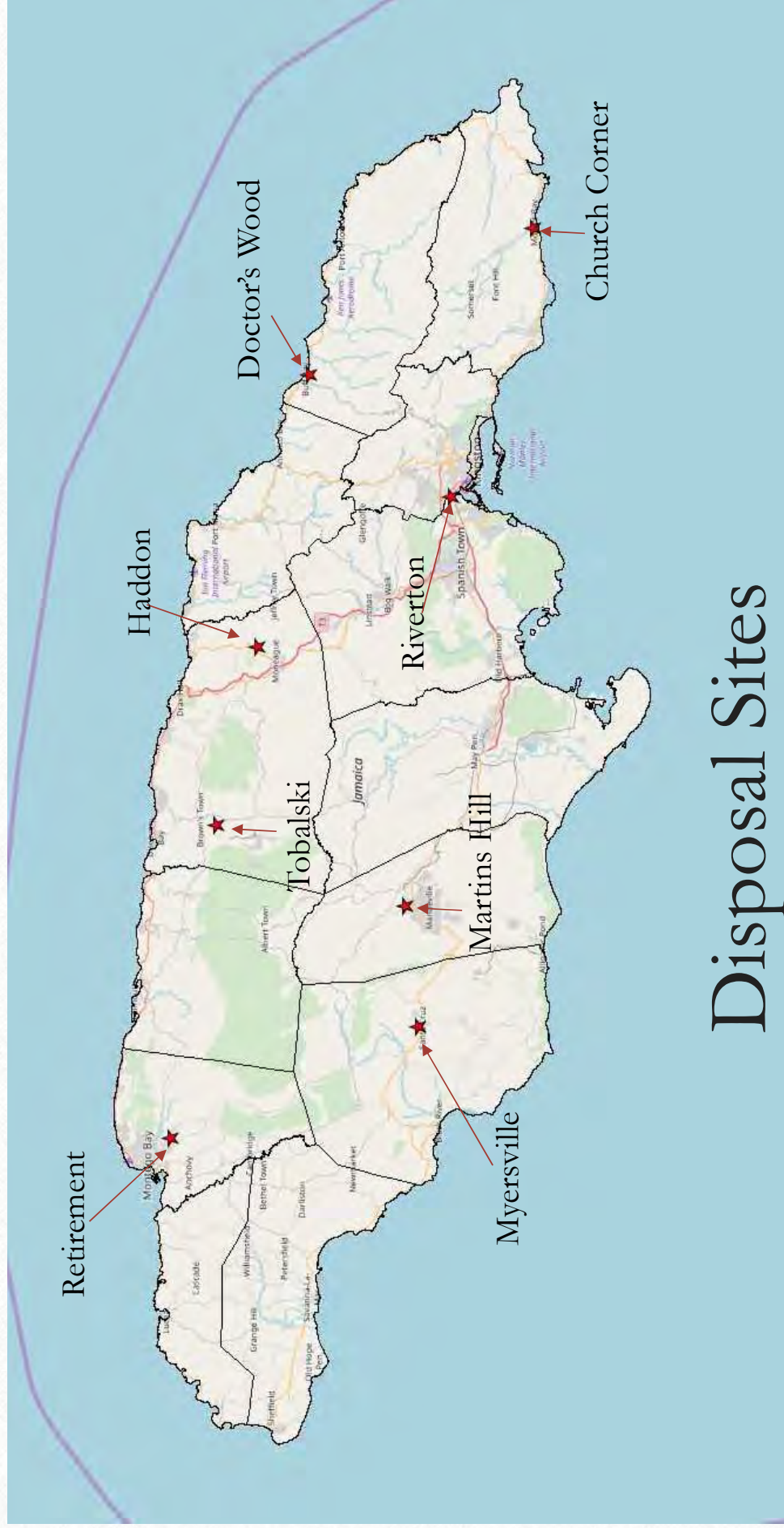
- Functions of the Authority

## Regulatory

Grant, Refusal, Renewal, Modification. Suspension  
and Revocation of Licences

## Operational

Public Cleansing: Street Sweeping, Collection,  
Transportation and Final Disposal of Municipal  
Waste, Operation of Disposal Sites



# Disposal Sites



# National Solid Waste Management Authority



- Riverton City Disposal Facility
- Kingston, St. Andrew & St. Catherine
- Population of 1,183,295



# Separation at Source

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- What is the current collection regime
- What is Separation at Source
- Benefits of Separation at Source





# Projects

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- Integrated Community Development Project (ICDP)
- Rae Town Recycling Pilot Project
- Northern Belt Plastic Recycling Initiative
- Leakage: Plastics in Kingston Harbour



# ICDP

- Skip Enclosures



- Recycling Enclosures



- Composting Enclosures



# Rae Town Recycling Pilot Project

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- Reduction of Marine litter along the Rae Town Fishing Village

## Coastline

- Reduction of the volume of garbage within the gully.
- Creation of a culture of separation at source.



# Rae Town's Project Scope

- Clean-up



- Garbage Collection



- Separation at Source



- Environmental Wardens





# Northern Belt

## Active Communities

- |                 |                   |                 |
|-----------------|-------------------|-----------------|
| • Hope Pastures | • Cherry Gardens  | • Jack's Hill   |
| • Barbican      | • Millsborough    | • Long Mountain |
| • Liguanea      | • Lower Shortwood | • Norbrook      |
| • Mona Heights  | • Beverly Hills   | • Waterworks    |
| • Havendale     | • Belgrade        | • Dillsbury     |
|                 | • Smokey Vale     |                 |

**A Total of 36 Communities in Kingston And St. Andrew**



# Northern Belt's Project Scope

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- Sensitization



- Separation at Source





# Leakage: Plastic Waste in Kingston Harbour

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# Aim of Project

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- The principal goal involved the characterisation of the potential for solid waste generation across the KMA Region
- This involved the preparation of geospatial data for the Kingston Metropolitan Area (KMA).



## RESULT: RECYCLING PARTNERS OF JAMAICA (RPJ) DEPOSIT LOCATIONS

*Island wide Plastic Bottle Deposit Points;  
Recycling Partners of Jamaica*



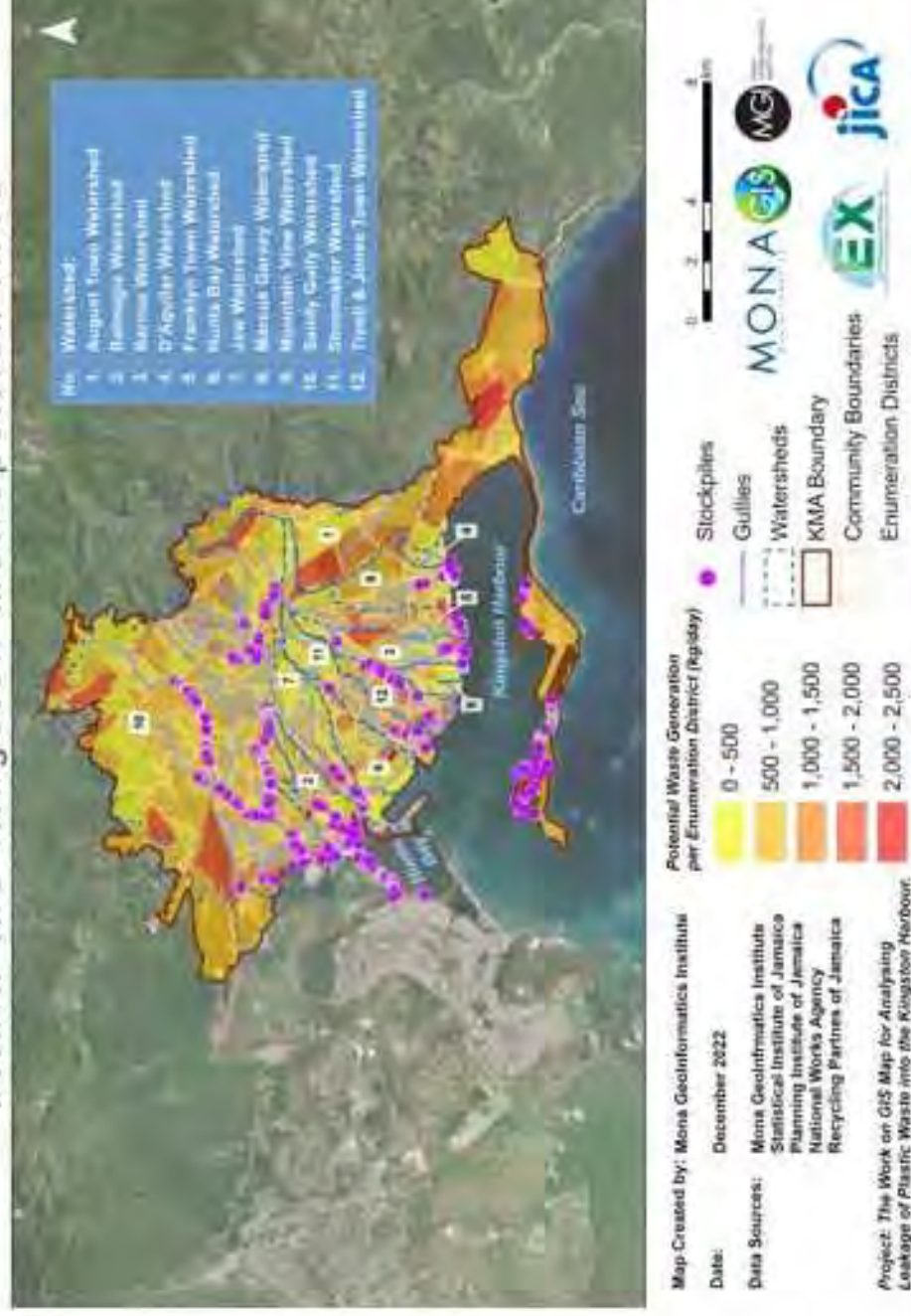
Figure 1: Location of RPJ  
Jamaica Deposit Cage  
Locations



# RESULT: POTENTIAL WASTE GENERATION BY ENUMERATION DISTRICT WITHIN THE KINGSTON METROPOLITAN AREA

Figure 2: Potential Waste Generation By Enumeration District Within The Kingston Metropolitan Area

## Potential Waste Generation by Enumeration District within the Kingston Metropolitan Area





# Updates: Since St Lucia

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- Northern Belt Project
- Since January 27, 2020 over  
**278,859 lb** (Sept 2023)

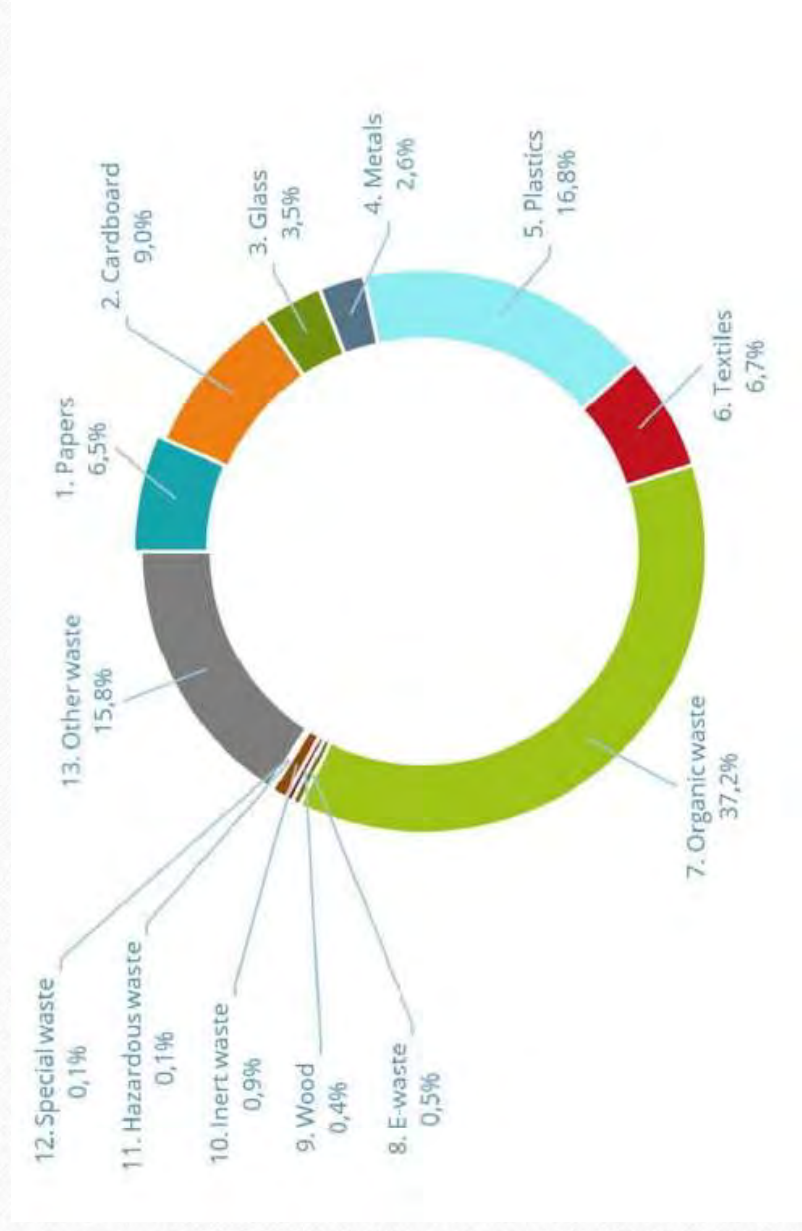
# Sensitization and Public Education

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- Continued sensitization via face to face meetings/workshops, zoom and other online platforms
- Public Education via social media, live outside broadcast and mobile app



# Waste Composition Jamaica



Plastics – 2<sup>nd</sup> Largest Waste Fractions

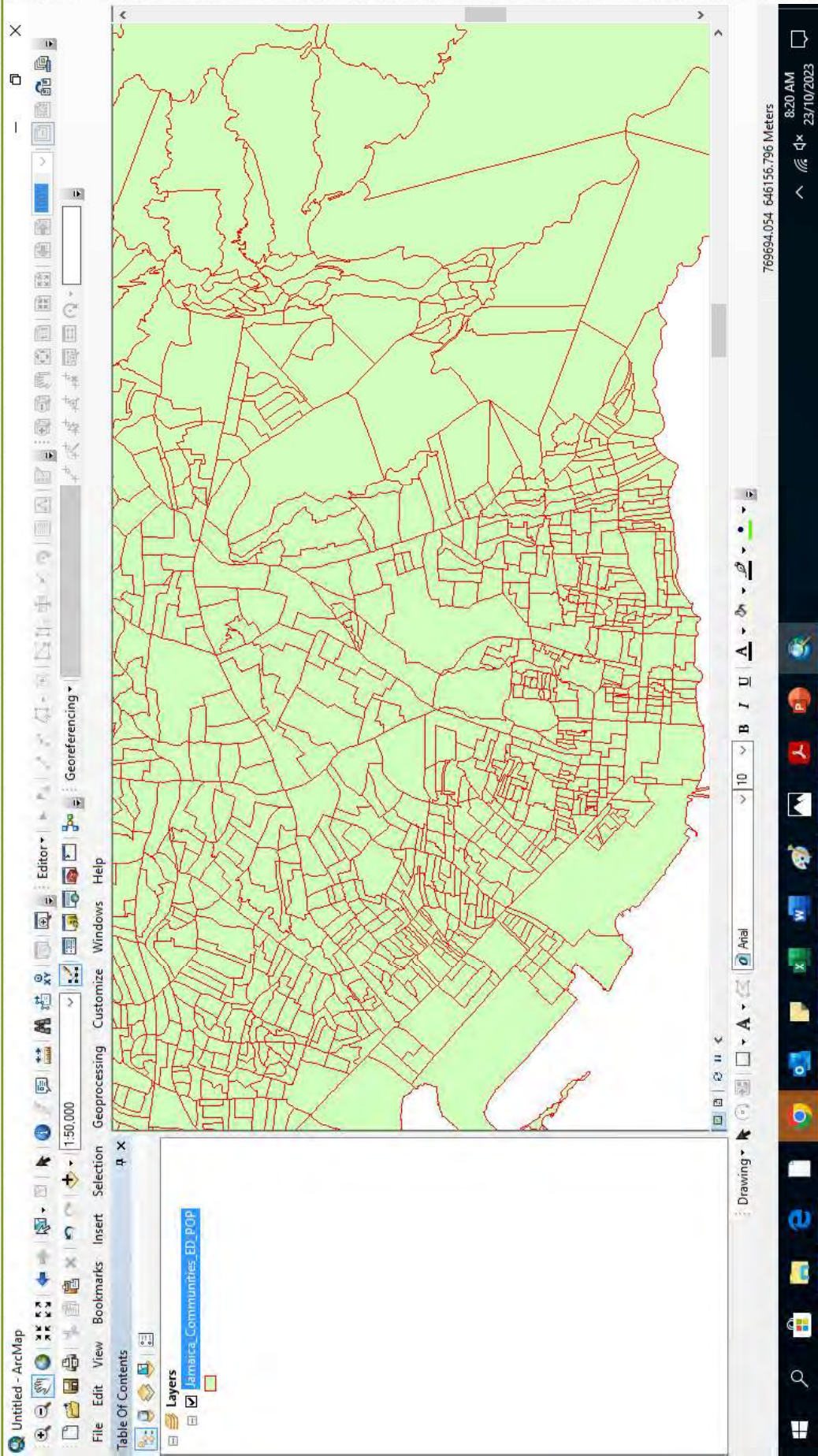
5.9% PET Bottles

0.03% Banned Plastics

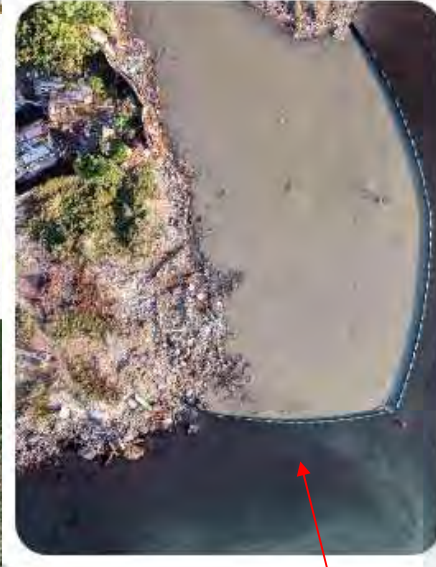
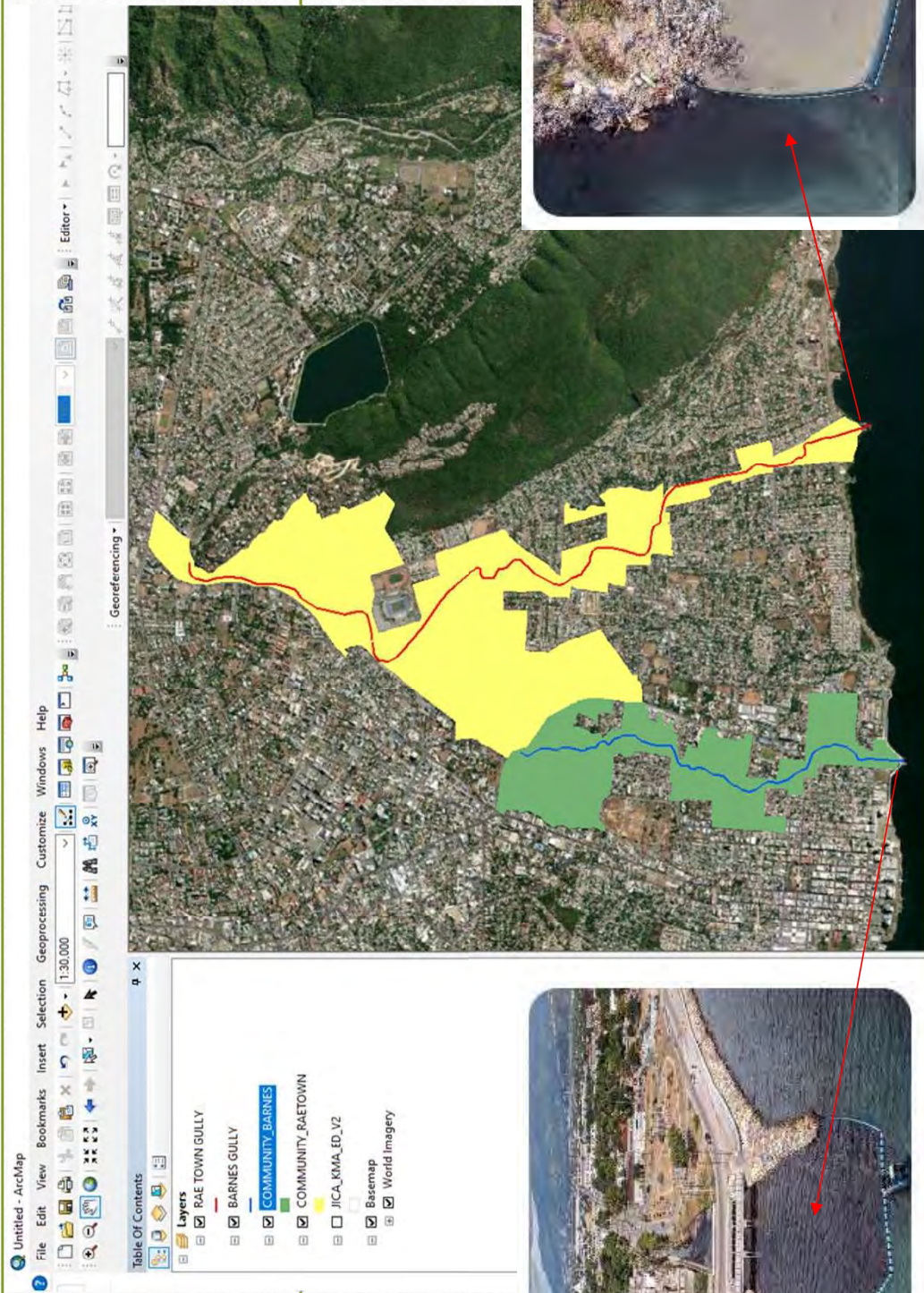
147,913 Kg (Generated Daily)

53,988,245 Kg (Generated Yearly)



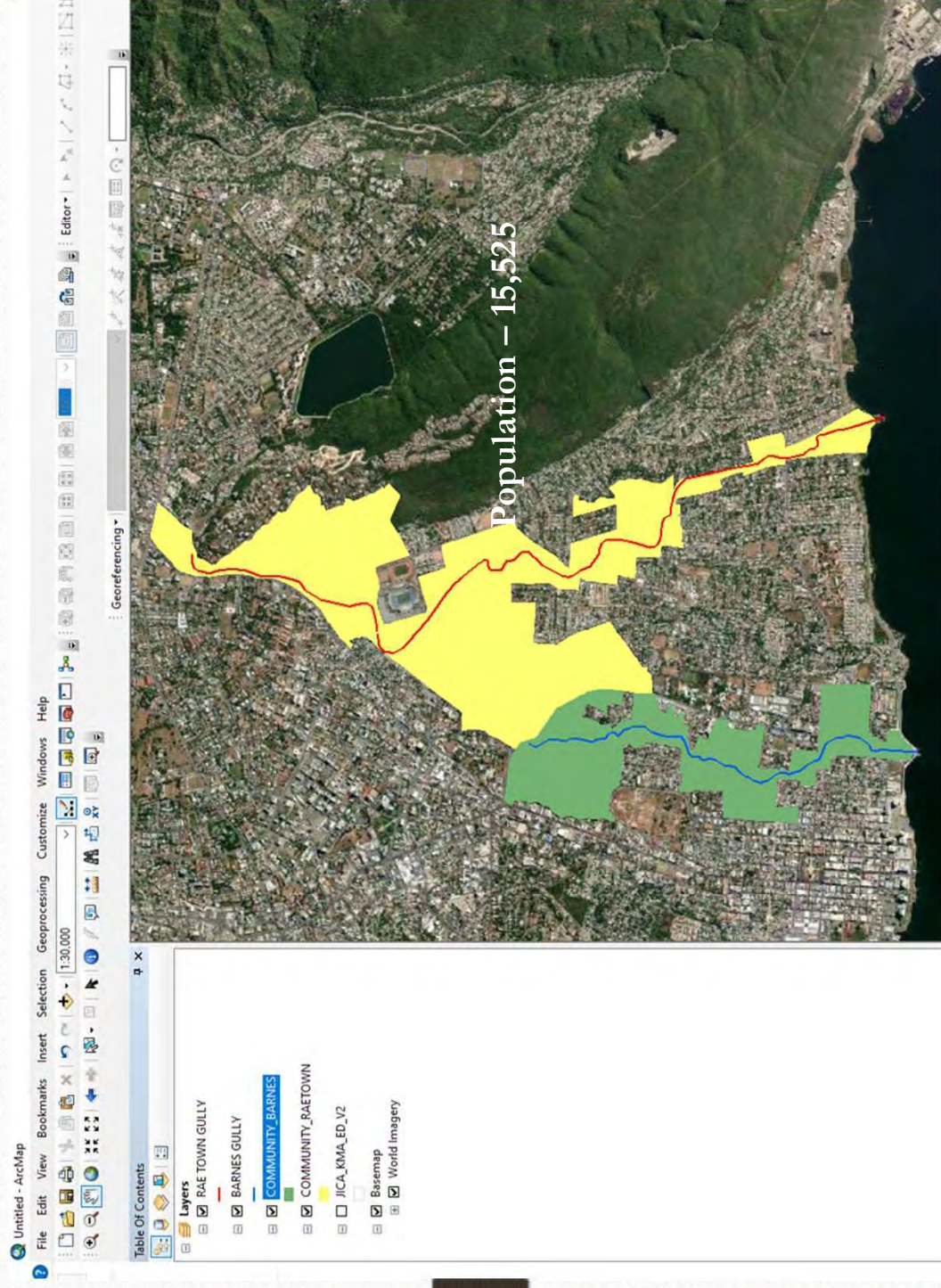






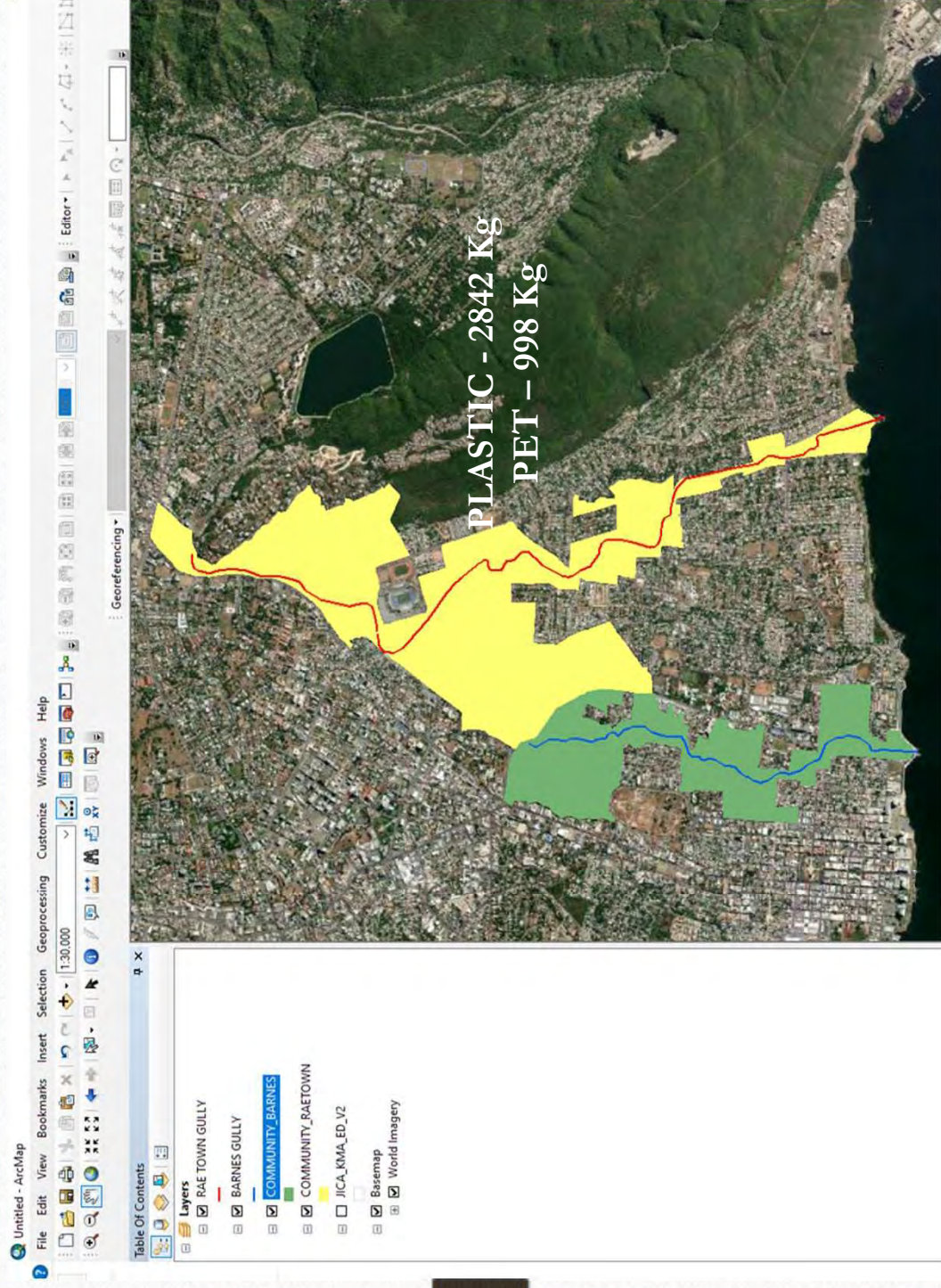


# GIS MAPPING & LEAKAGES





# GIS MAPPING & LEAKAGES





*Thank  
you*







GRENADA SOLID WASTE MANAGEMENT AUTHORITY



# Project Completion Seminar Technical Cooperation for Marine Plastic Litter Mgt.

JICA Advisory Team

Pegasus Suites and Corporate Center, Guyana. October 23<sup>rd</sup> 2023. Myrna Julien

# In this presentation



Current situation in Grenada- Waste Management.



Recent Changes



Our waste stream - Plastic waste.



Efforts to address plastic waste and Marine plastic pollution.



GSWMA Prospects for projects specific to plastic waste management.



Lessons Learned from Technical Cooperation project.



Expectations going forward



## Current Situation. Grenada

### 1. Development of waste disposal facilities.

- final landfill cell commissioning and extensive landfill upgrade.
- development of waste processing/recycling facility
- stations for derelict vehicle management



# Current situation ctd

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## 2. Institutional Strengthening & Capacity Building

- Establishment of 3 new departments within the GSWMA to meet changing needs and challenges and staff development
  - Integrated resource recovery unit.
  - Compliance /Enforcement unit.
  - Occupational Health and Safety department.
  - Consultancy for Job evaluations

# Current situation ctd

## 3. Waste generation

- recent waste characterization study outcome.
- data collection and management system.
- Occupational Health and Safety department.



# Waste management Services

- Waste collection – shift from communal to curbside. 53 out of 78 units demolished and de commissioned .
- Waste Disposal – dumpsites to sanitary engineered landfilled
- Street cleaning.
- Field Supervision





# Waste Collection & Street Cleaning Services..

Smaller zones, more zones - . Greater efficiency.



GSWMA Solid Waste Collection Zones

# Process for establishing Zones & Cost for contract

- Population size and distribution
  - Road network
  - Haulage distance
  - Regularity of services.
  - Equipment requirement
  - Labour cost
  - BOQ system with 5 year projections
- Waste Collection and Transportation – 5 years
  - Street Cleaning – 3 years &
  - Collection & Street Cleaning 5 years.
  - Collection, Transportation and Marine Transport -5 years.

## What is in our waste stream

The Last waste characterization study for review of the National Waste Management Strategy was done in 2020. For the 1<sup>st</sup> 10 months of 2023 we will cross 50,000 tonnes.

- |  |  |
|--|--|
| - Organics (Food and green waste) 25.3%          | - Metal (non-ferrous) 2%                   |
| - Hazardous waste 2.5%                           | - Metal (Ferrous) 5.9%                     |
| - Paper, Cardboard and poly coat packaging 13.9% | - Hard plastics 10.1%                      |
| - Special care waste (Pampers, tissue etc) 5.7%  | - Soft plastics 3.7%                       |
| - Glass 7.7%                                     | - Textiles 6.2%                            |
| - Refundable glass 1.9%                          | - E-waste 3.7%                             |
| - C&D waste 3.8%                                 | - White goods 0.2%                         |
|  | - Non recyclable, non hazardous waste 7.2% |



# JICA/JAT . Understanding and implementation of Integrated Solid Waste Management Plan.

- Identify gaps in GSWMA ISWMP.
- Inclusion in strategic plan for waste management (GSWMA) and ensuing annual planning and budget preparation .. prioritizing based on WM critical needs.





# Our strategic Objectives





**Table 2-6: Objectives Considered by the Revised Strategy**

#	OBJECTIVE	WASTE TYPE	TYPE OF MEASURE	SDGS CORRELATION
1	Reach an 80% diversion rate by 2035.	All Waste	Reusing, Recycling, Energy Recovery	Goal 8 – Target 8.4 Goal 11 – Target 11.6 Goal 12 – Target 12.5
2	Limit the individual production of household and ICI waste at 1.45 kg/capita/day by 2035.	All Waste	Reducing	Goal 8 – Target 8.4 Goal 12 – Targets 12.3 & 12.5
3	Send 100% of the waste to be landfilled in an engineered sanitary landfill by 2025.	Ultimate waste	Disposal	Goal 3 – Target 3.9 Goal 6 – Target 6.3 Goal 9 – Target 9.4 Goal 11 – Target 11.6 Goal 14 – Target 14.1
4	Close in an environmentally sound manner the existing non-sanitary landfills by 2025.	Ultimate waste	Disposal	Goal 3 – Target 3.9 Goal 6 – Targets 6.3 & 6.6 Goal 14 – Target 14.1
5	Process 100% of the incinerable waste that is not diverted towards another option with Waste to Energy by 2030.	Incinerable waste	Energy Recovery	Goal 7 – Target 7.b Goal 8 – Target 8.2 Goal 9 – Target 9.4 Goal 11 – Target 11.6 Goal 14 – Target 14.1
6	Process 100% of biomedical waste in a way that minimizes the risks for public health and the environment by 2023.	Biomedical	Energy Recovery, Disposal	Goal 1 – Target 1.5 Goal 6 – Target 6.3 Goal 11 – Target 11.6 Goal 14 – Target 14.1

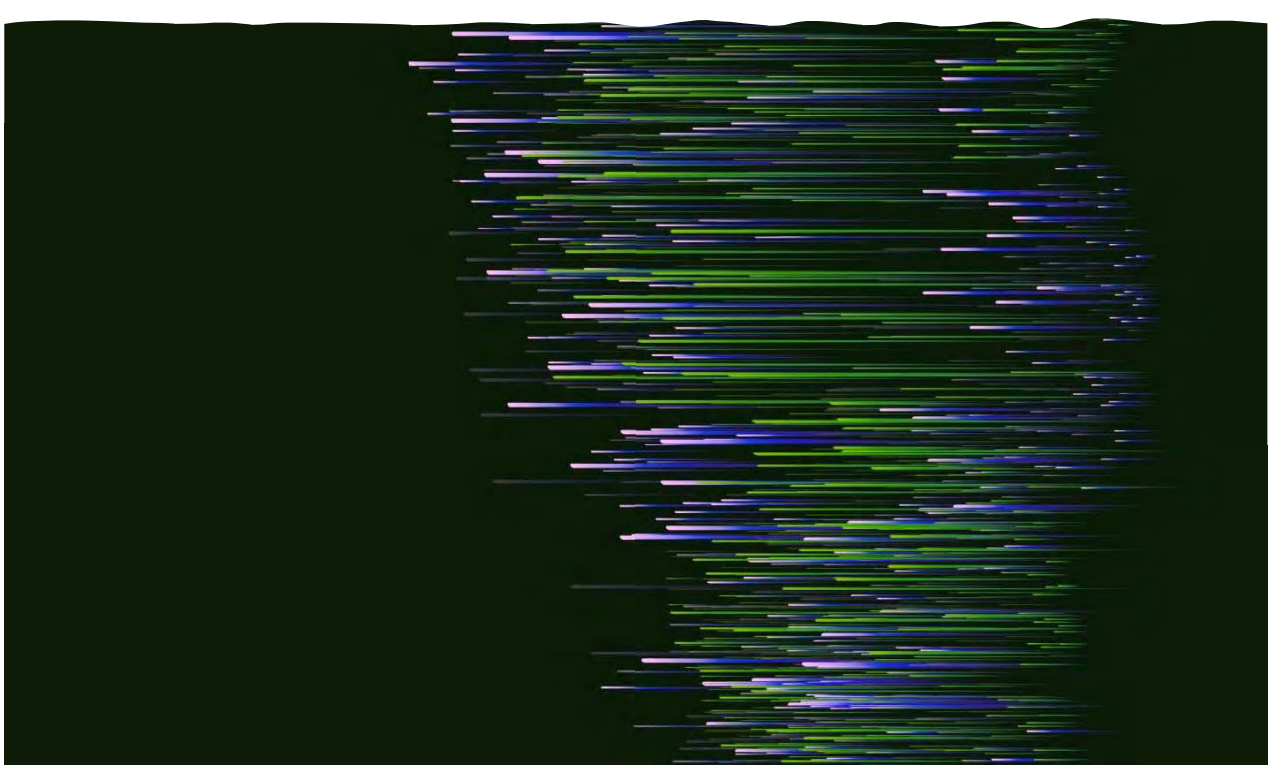
## Established/revised targets

- Strategy established and designed to support the UNSDGs.



#	OBJECTIVE	WASTE TYPE	TYPE OF MEASURE	SDGS CORRELATION
7	Enhance the segregation of waste in the health care sector to reduce the amount of biomedical waste by 50% by 2025.	Biomedical Waste	Reducing	Goal 12 - Target 12.5
8	Divert 60% of the organic waste from incineration or disposal by 2030.	Organics	Composting, Energy Recovery	Goal 2 - Targets 2.5 & 2.4, Goal 8 - Target 8.2, Goal 9 - Target 9.4, Goal 11 - Target 11.6, Goal 12 - Target 12.5
9	Capture 30% of the ferrous metals and 40% of the non-ferrous metals for recycling by 2030.	Metal	Recycling	
10	Capture 40% of the glass for recycling by 2030.	Glass	Recycling	
11	Reach a diversion rate of 20% for white goods by 2025 and of 60% by 2035.	White Goods	Reusing, recycling	Goal 8 - Target 8.4, Goal 11 - Target 11.6, Goal 12 - Target 12.5
12	Divert 70% of CRO waste from disposal by 2030.	CRO	SRV	
13	Establish a facility to treat derelict vehicles by 2025.	Derelict Vehicles	Reuse, Recycling, Recovery	Goal 11 - Target 11.6, Goal 12 - Target 12.5
14	Reach a minimum diversion rate of 65% for E-Waste by 2030.	Hazardous waste	Reuse, Recycling	
15	Reach a minimum diversion rate of 75% of the used oils, their containers and filters, as well as coolants and their containers in Grenada by 2030.	Hazardous waste	Recycling, Energy Recovery	
16	Reach a minimum diversion rate of 80% for batteries and accumulators by 2030.	Hazardous waste	Recycling	Goal 1 - Target 1.5, Goal 3 - Target 3.9, Goal 6 - Target 6.3, Goal 8 - Target 8.4, Goal 11 - Target 11.6, Goal 12 - Targets 12.4 & 12.5, Goal 17 - Target 17.17
17	Reach a minimum diversion rate of 55% for lamps containing mercury by 2030.	Hazardous waste	Recycling	
18	Reach a minimum diversion rate of 75% for paints, stains, primers, varnishes, lacquers and other similar products in 2030.	Hazardous waste	Recycling	
19	Reach a minimum diversion rate 75% of the waste pesticides and their containers in Grenada by 2030.	Hazardous waste	Disposal	Goal 1 - Target 1.5, Goal 3 - Target 3.9, Goal 6 - Targets 6.3 & 6.6, Goal 11 - Target 11.6, Goal 12 - Target 12.4

Note: SDGs are the United Nations Sustainable Development Goals. The goals and targets to which the objectives of the NSWMS are linked are depicted in Table 3.8.



Integrated Resource Recovery.

Establishment of a new department within the GSWMA with the basic functions being to forecast and have a clear understanding of Grenada's waste stream, offer directions for sustainable waste diversion initiatives and plan in consultation with stakeholder institutions including private partners, government ministries and institutions, projects aimed at waste reduction in conformity with the best practices, established national policies and sound environmental standards.

- - Derelicts vehicles – approximately 10,000 vehicles.
- - Organic Waste – commercial composting(Recycle organics), Protein from waste ( organic fertilizer and Animal feed)
- - Plastics (All grades) – Process to raw material end product – export, supply local businesses
- - Glass – Process for export - supply local businesses
- - E-Waste – Process for export – local repurpose/recondition
- - Paper/paperboard – process for export
- - Used oil – locally refine
- - Tyres – process to rubber crumbs- export, local manufacture (regional collaboration)

Support and guidance for implementing Grenada/GSWMA's Integrated Resource Recovery relies heavily on consultancies as well as the guidance, experience and expertise of team players in the industry. Zero in on Plastics

- **Plastic waste (Locally)**

- Aqua Naturals Ltd.  
Mr. Samer Alhaddad, Managing Director.
- Coca Cola Ltd. (<sup>Grenada</sup>)  
Mr. Christopher Warner . General Manager.
- NSU – UNDP funded. Carriacou.  
Mr. Richard La Flemme. Managing Director.
- Glenelg Spring Water.

- Recreate manufacturing.  
Mr & Mrs. Stephen Benjamin.
- EPR by Bottled Water producers and importers as well as the major soda beverage manufacturers/importers. (12 major water/7 major soda) *legislative review/modification recommended to capture gaps – to cover ampules.*

### **Institutional Support**

**GDBS**- Grenada Bureau of Standards.

**GIDC** –Grenada Investment Development Corporation

Ministry of Climate Resilience, Renewable Energy and the Environment-  
Government of Grenada



Support and Guidance for implementing Grenada/GSWMA's Integrated Resource Recovery relies heavily on consultancies as well as the guidance, experience and expertise of team players in the industry.

Regional/extra regional **CTD**

- External Support

- - PWFI (Plastic Waste Free Islands)

Norwegian Agency for Development Cooperation (Norad), IUCN project to promote island circular economy, demonstrate effective, quantifiable solutions to addressing plastic leakage from Small Island Developing States. (Grenada is at implementation phase.)

- Common Seas – (Clearing the Waves) Policies to reduce plastic pollution in Grenada.
- CDB/ ISWMP for Grenada (7 consultancies)
- OECS RePlast – Local experience
- OECS ReMilit Project – OECS Commission
- Recycle OECS- Businesses out of waste
- JICA/JAT – technical support, knowledge sharing and sharing regional experiences with plastics.



# Commencement of Community Waste separation. ReMlit & Recycle OECS

## Procurement and implementation of Colour Coded bins ReMlit Project



## Extension of project. Recycle OECS. commence July 25<sup>th</sup> 2023

- Aimed at reducing plastic pollution.
- Design and implement model for sustainable waste separation, collection and recycling of plastics.
- Encourage self-financing
- Business sustainability & Business viability.

**Plastic waste. 13.8% of waste stream.**

# How the JICA/JAT technical cooperation directed our IRR outlook – the experiences.

- Information sharing for effecting waste diversion. Learning from the experience of other countries. Their challenges and over coming these challenges
- Best practices to effecting waste diversion. Devising a system for collection, processing, exporting.
- Governance systems.
- Alternatives. If this does not work..what next?
- Use of technology. E.g. UWI mapping system for plastic leakage.





# Other lessons learned from the region

## Waste separation initiatives Edson Carr

- Separation at source.. Best approach to obtaining recyclable waste.
- waste enclosure system. Grenada to model.
- Establishment of recycling partners.
- Importance of sensitization. Seek and advertise sponsors.

## Challenges are unique



# Model for layout of GSWMA recycling center

- Building layout
- Equipment installation. Digital scale, loading eqpt, bailing etc.
- Storage and holding facilities
- Staffing and documentation.



# Infrastructure development and Management.

**Recycling center located at Queens Park. St. George.**



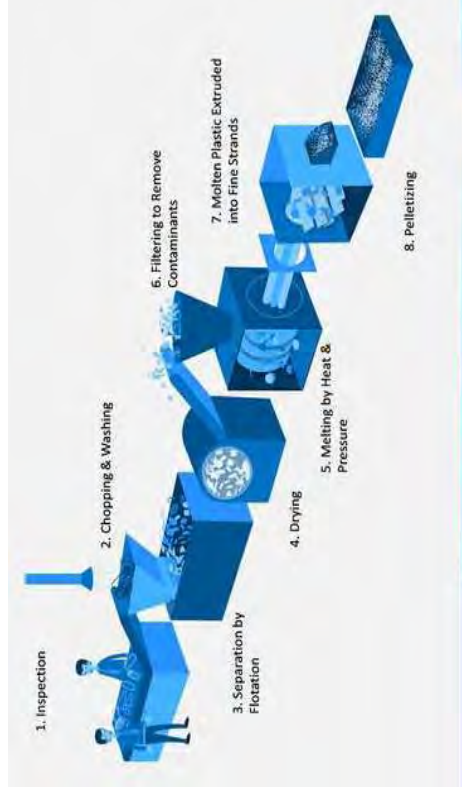
## **What will we process**

- Electronic Waste processing for export.
- To facilitate local recyclers with material selection and pre-processing.
- Storage – (Limited)
- Packaging for shipment- (Processed material, containerization)
- Plastic storage, processing, packaging for export ( Baling, shredding, washing, pelletizing, containerization)
- Aluminum –storage & processing
- Paper/paperboard – Storage & Processing



At this facility, the system for plastic resource treatment will apply the Advanced Recycling Process to the point of pelletizing.

### Proposed plastic recycling process



### Requirements & support systems

- Separation at source, RVM systems, establishment of recycling partners (collection/deposit points) Public buy-in.
- Legislative support
- Processing equipment & staff
- Transportation systems. (on-land & export)

Identified benefits of pelletizing plastic waste in the GSWMA/Grenada context.

- Raw material, the end product – ready for export, not subject to BCRC scrutiny and cross boundary issues.
- Clean product. (no public health issues)
- Where space is a challenge, pellets take up less storage space.
- Fetch a better price on external markets over other processing methods e.g. shredded or baled.
- Easily packaged/containerized. light weight.
- Flexible - Easy storage, transportation, handling. *(GSWMA has limited space)*
- Weather and impact resistant. *(Not easily airborne compared to shredded plastic or broken bales).*
- Aids in the reduction of raw material cost and demand for raw material.
- Environmentally friendly. *(During processing, storage and transportation exhibit less potential to emit micro plastics due to its smooth finish compared to shredded plastics or unprocessed baled items)*

Understanding the challenges experienced by neighbouring islands and measures taken to address same. St. Lucia and the Deglos landfill remedial work done by JAT.

- Effectively applying a filling plan with limited space available.
- Leachate management/treatment. Processes, challenges and overcoming same.
- Applying semi-aerobic system in landfilling.





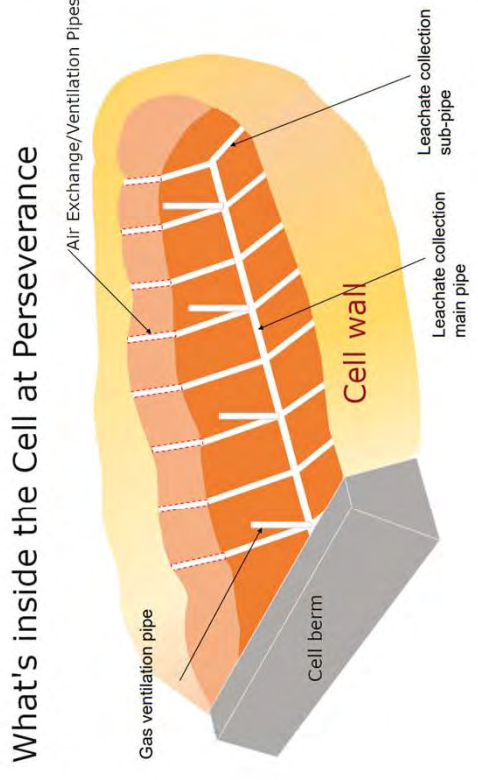
# Landfilling

Filling plan. Semi Aerobic Landfill.

Fukuoka landfill method. July 1<sup>st</sup> 2023



Cell design/layout.



We require further support for Application of appropriate filling plan.

- GSWMA landfill has new staff- Training is required for landfill staff. TNA.
- Exposure to application of actual system of FM.
- Understanding of various filling methods.
- Understanding what the waste stream is comprised of and the utilizing the appropriate treatment/disposal methods.
- Leachate treatment facility – wetland treatment system. TNA.
- Testing applications for air and water quality at landfills.

# Benefits of transfer stations to Grenada

- May be applicable as a temporary facility in times of disaster when landfill is inaccessible for extended periods.





# Introduction of the Oil fence/litter trap off Kingston harbour.

- A technique we can consider for two locations to prevent leakage.

St. John River- St. George.

Great River – St. Andrew

Charlotte River – St. John.



# Introduction to the Caribbean Plastic Waste Share Point. Valuable for:

- What is happening in the region and beyond
- Best practices and proven successes
- Pilot projects and lessons that can be applied
- Sharing of tool kits . Not necessarily of a solid waste nature, but can be applied in WM situations
- Resource center for information critical for knowledge sharing. Eg alternatives to non-biodegradable alternatives which are subject to the NBDWCA.

Thank You





# Antigua and Barbuda National Solid Waste Management Authority

**Cooks Sanitary Landfill**









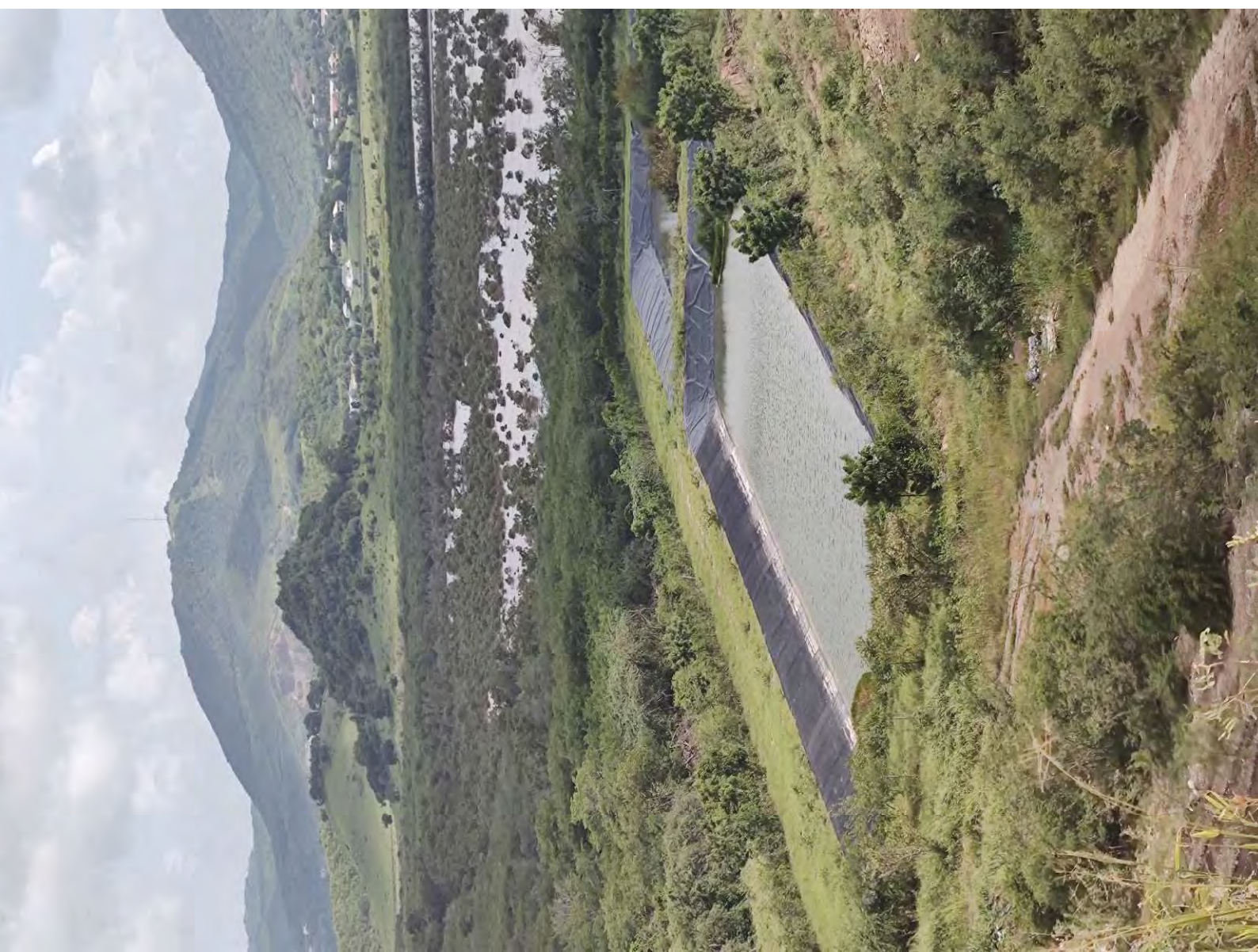
# Present

















# Present situation of solid waste management in Antigua and Barbuda

- Lack of suitable infrastructure for proper management of municipal solid waste.
- The Cook Sanitary Landfill operates on 52 acres Of land

# Major problems and cause consequences Antigua and Barbuda face in solid waste management

- The current area that house the Cooks Sanitary landfill has surpassed its maximum capacity
- Experiencing fires
- Water contamination of nearby mangrove due to leachate

# Point of view

- There is a need for an organized National Waste separation and recycling plan in Antigua and Barbuda.

Waste need to be separated at the point of generation.

- A properly structured plan can be the solution to our recycling and separation problems.



# Pictures of solid waste

- All house hold waste are co-mingled



# Issues NSWMA Confronts

- Lack of machinery
- Inadequate technical /financial assistance for improved waste management
- Inadequate trained personnel
- Inadequate collections trucks

Month	Waste Type												Total
	House hold	Indus	Com	Instit	Medical	C & D	Clean Bulk	Bulk Waste	Cruise Ship	Street Sweep	Sewage	Tyres	
January	2,143.67	33.64	850.18	17.87	6.53	348.10	137.78	4,575.40	130.67	80.24	1,615.92	117.30	10,057.30
February	2,370.17	58.20	1,042.90	25.35	0.88	703.37	487.67	5,684.04	190.90	86.85	1,617.64	81.3	12,349.27
March	2,212.00	17.08	942.89	164.21	0.70	571.91	86.71	5,622.63	68.34	78.83	1,686.16	78.17	11,529.63
April	1,884.43	74.66	301.77	174.44	0.51	103.67	8.34	2,858.27	0.27	77.47	868.11	24.89	6,376.83
May	1,904.52	74.32	433.41	60.13	1.78	343.54	560.03	5,722.53	-	242.31	955.88	38.09	10,336.54
June	2,123.86	33.72	552.23	65.69	0.65	352.26	33.81	4,954.62	-	220.57	1,168.32	47.69	9,553.42
July	2,212.93	23.58	581.07	84.42	1.35	454.63	70.13	7,209.66	-	196.58	1,076.17	47.58	11,958.10
August	1,978.69	24.15	577.00	42.30	3.16	584.77	115.86	10,751.97	-	56.35	1,164.09	45.49	15,343.83
September	2,062.45	107.66	568.06	19.47	1.10	900.87	383.84	9,180.17	-	37.66	1,126.02	75.94	14,463.24
October	2,279.62	64.04	689.28	38.83	3.39	1,077.85	193.75	4,948.33	-	251.43	1,501.98	50.52	11,099.02
November	1,984.22	87.98	713.22	21.75	0.52	880.30	196.68	5,588.15	-	262.18	1,444.50	58.92	9,254.20
December	2,239.81	45.56	713.93	53.56	2.71	568.81	476.94	4,637.25	4.85	24.04	1,641.51	56.77	10,465.74
Total	25,396.37	644.59	7,965.94	768.02	23.28	6,890.08	2,751.54	71,733.02	395.03	1,614.51	15,866.30	722.66	132,787.12
All weights are in tonnes													



Year { Jan to Sept}	Waste Type												Total
	House hold	Indus	Com	Instit	Medical	C & D	Clean Bulk	Bulk Waste	Cruise Ship	Street Sweep	Sewage	Tyres	
2016	16,235.07	137.81	7,528.82	241.87	5.93	6,189.82	600.52	29,468.67	129.77	369.84	10,577.86	595.03	72,081.01
2017	17,499.08	102.26	7,956.22	200.15	9.68	7,041.47	22,295.75	48,027.46	237.49	505.31	14,211.92	666.17	118,752.96
2018	17,301.10	110.17	8,674.04	247.28	7.54	8,625.35	6,615.43	68,322.70	688.66	1,504.33	12,250.63	634.20	124,981.43
2019	18,232.79	123.67	8,261.94	227.95	21.36	11,163.75	11,247.89	34,821.63	640.40	1,484.28	12,438.77	746.14	99,410.57
2020	18,892.72	447.01	5,849.51	653.88	16.66	4,363.12	1,884.17	56,559.29	390.18	1,076.86	11,278.31	556.45	101,968.16
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All weights are in tonnes

# Waste Category

- Household waste
- Industrial Waste
- Commercial Waste
- Institutional Waste
- Medical Waste
- Construction & Demolition
- Clean Bulk
- Bulk Waste
- Cruise Ship Waste
- Street Sweepings
- Sewage Waste
- Biomedical Waste

The largest generators of waste (by weight) are residential households, which account for 46.7% of the total waste arriving at Cooks (MSW & Sewage). The second largest generator by waste generator classification is the commercial sector (including tyres), which accounts for 14.1% of the total waste arriving at Cooks. These are followed by the hospitality, industrial, agricultural and ship/air line sectors with 12.9%, 12.6%, 10.8% and 2.7% of waste generation respectively



# Actions

- To begin consultations with all stakeholders
- Preparation of documents for presentations to funding agencies to provide financial, technical, and equipment resources
- Undertake training programs with other governmental and non governmental organizations



**THANK YOU**



## Technical Cooperation Project on Advisor for Marine Plastic Litter Management in the Caribbean Region

- Development of tools based on the outcomes and lessons learned from the pilot projects and analysis and improvement measures for the solid waste management issues in the Caribbean region-

Ikuo MORI  
JICA Advisory Team Leader



# List of documents produced in carrying out the project

- ▶ Some of the manuals have been produced in carrying out the pilot projects.
- ▶ Some technical guidelines have been produced based on the monthly online technical meetings.

## From the pilot projects

1. Guyana: Formulation of a SWM plan
2. Jamaica: Plastic policy development
3. Jamaica: GIS Map
4. St. Lucia: Improvement of the current disposal site

## From the monthly online technical meetings

1. Estimation of Future Waste Amount
2. Collection and Transport
3. Recycling
4. Intermediate Treatment
5. Final disposal
6. Financial issues
7. Information, Education and Communication
8. Environmental Impact Assessment
9. Introduction of Japanese Technology on Solid Waste Management



## 1 Objectives of this technical note

This technical note aims to provide readers with guidance on how to estimate the future waste amount, which is the first step when formulating a municipal solid waste management (MSWM) plan.

## 2 Estimation of future waste amount

### 2.1 First step: Estimation of current waste amount

#### a. Waste Generation Rate (kg/person/day)

Estimating the future amount of waste is a fundamental work for the preparation of a MSWM plan. The first step of this work is to obtain the current Waste Generation Rate (WGR), which is the amount of waste generated per person per day at present, expressed in kg/person/day. It is estimated by carrying out a Waste Amount Survey or by using weighbridge data if available.

There are basically three types of WGR as follows.

##### 1. WGR-household

= amount of waste generated by households / population

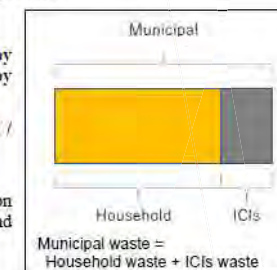
##### 2. WGR-ICIs (Institutional, Commercial and Industrial entities)

= amount of waste generated by ICIs / population

##### 3. WGR-municipal

= (amount of waste generated by households + amount of waste generated by ICIs) / population

= amount of municipal waste generated / population



The figure on the right schematises the relation between "household waste", "ICIs waste" and "municipal waste".

#### b. Waste Amount Survey

A Waste Amount Survey is usually carried out together with a Waste Composition Survey. Then, it is called a Waste Amount and Composition Survey (WACS). Even if weighbridge data is available, it is still recommended to carry out this survey. The survey provides a lot of information to improve management, prepare a waste minimization plan, etc.

The survey directly measures the amount of waste generated by each type of source, as shown in the table below. However, the survey can only measure a certain number of samples. The way waste generation sources are categorized should therefore be carefully considered. Samples should be taken from different categories so that they correctly represent the amount of waste generated by the entire city. Often, the approach used in developing countries for household waste is to divide citizens by income level. Indeed, in developing countries, the economic disparity among citizens is significant, and different income levels lead to different lifestyles and produce different amounts and compositions of waste.

Thank you very much for your  
attention.





## Technical Cooperation Project on Advisor for Marine Plastic Litter Management in the Caribbean Region

### Technical Note No.xx Use of Geographic Information in Preventing Plastic Litter from Leaking into the Ocean

Ikuo MORI  
JICA Advisory Team Leader

# Objectives of this technical note

- This technical note aims to share readers with information regarding a pilot project which tried to utilize geographical information in preventing plastic litter from leaking into the Kingston Harbour, Jamaica.



# Background

- ▶ Kingston Metropolitan Area (KMA) is lined with many waterways, known as gullies. A large amount of waste is dumped into these gullies, polluting the water quality of Kingston Harbour and the mangrove forests, which has become a social problem.
- ▶ Although it is recognised by the relevant authorities that the causes of dumping are a combination of factors such as lack of public awareness, insufficient waste collection services and others, there has been a lack of logical problem-solving initiatives based on analysis with quantitative data.
- ▶ In the pilot project in the KMA, quantitative data on waste dumping was tried to be obtained as a starting point for developing a strategy to reduce waste entering the Kingston Harbour, and an attempt was made to visualise the problem using geographical information technology.





# Geographical Information

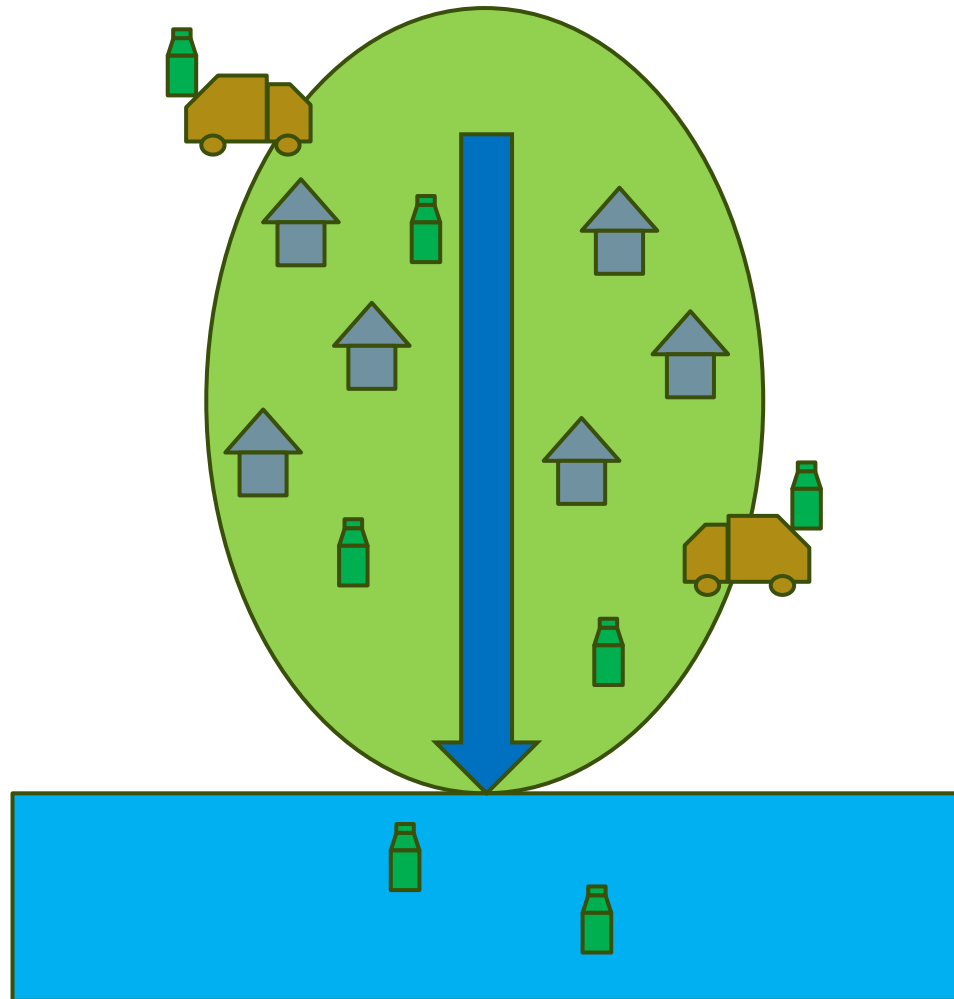
0. Name of community and enumeration district
  - i. Name of community
  - ii. Name of enumeration district
- A. Base Socio-Economic Data
  - i. Population (enumeration district)
  - ii. Population density, person / km<sup>2</sup>
  - iii. Squatter settlements
  - iv. Roads (largest road class in the enumeration district)
  - v. Income proxy, by level (Low-income, Lower-middle income, Middle income, Upper-middle income, and High income)
  - vi. Poverty
  - vii. Name of gully (watershed)
  - viii. Area of enumeration (km<sup>2</sup>)

- B. Primary Data
  - i. Number of waste stockpiles (from satellite image analysis)
  - ii. Number of plastic bottle drop/deposit points by Recycling Partners of Jamaica (RPJ)
- C. Derived waste collection data
  - i. number of waste collection days, day(s) per week
  - ii. Waste collection routes

## Data entry sheet

[illegible]

# Concept of the pilot project



Estimation of generation amount of plastic waste

- Waste generation rate
- Percentage of plastics in the waste generated
- Population of a watershed

Factors that can affect plastic leakage

- Waste collection service (frequency, route)
- Recycling deposit facilities
- Nature of residents (type of settlement, poverty)

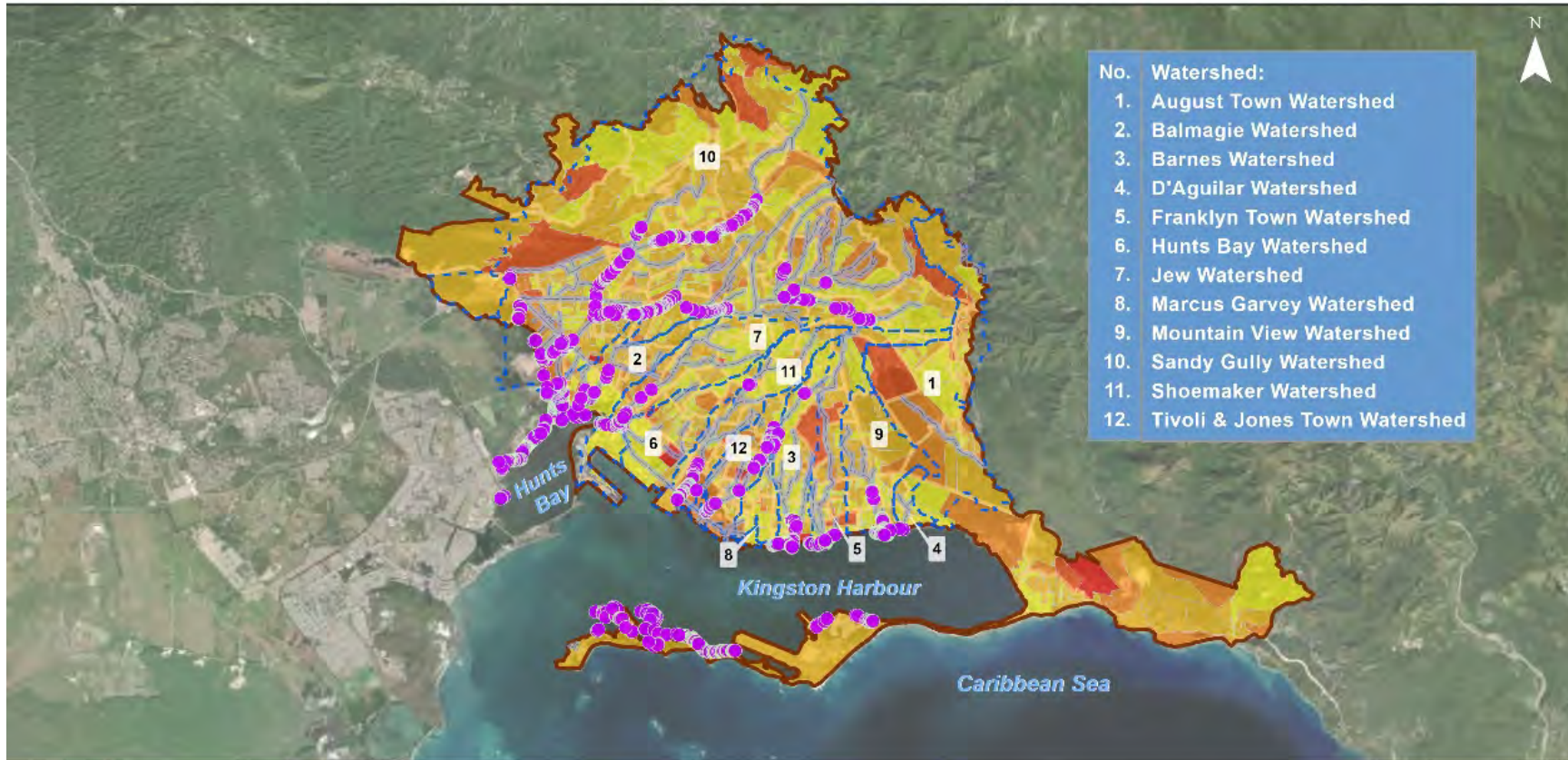
Stockpiles of waste

- Location, numbers

Amount of leakage

- Data from beach cleanup activities
- Data from the project of the Ocean Cleanup

# Potential Waste Generation by Enumeration District within the Kingston Metropolitan Area



Map Created by: Mona GeoInformatics Institute

Date: December 2022

Data Sources: Mona GeoInformatics Institute  
Statistical Institute of Jamaica  
Planning Institute of Jamaica  
National Works Agency  
Recycling Partners of Jamaica

Project: The Work on GIS Map for Analysing Leakage of Plastic Waste into the Kingston Harbour.

Potential Waste Generation per Enumeration District (kg/day)



Stockpiles

Gullies

Watersheds

KMA Boundary

Community Boundaries

Enumeration Districts

0 2 4 8 km

MONA GIS  
GeoInformatics

MGI  
MONA GEOINFORMATICS  
INSTITUTE

EX  
EX Research Institute Ltd.  
Environmental and Planning, Research and Consulting

JICA



# 5 Discussion and Conclusion

- ▶ The map produced clearly show how waste stockpiles form in the upper and middle streams of gullies and accumulate especially near the mouths, and how they pollute the mangrove forests on the other side of the gullies. The map could be used to raise public awareness and as an environmental learning tool for students.
- ▶ No clear causal relationship between potential waste generation and stockpiles was found. Detailed data on the frequency of waste collection services was not available.
- ▶ The Ocean Cleanup has collected and weighed plastics in several waterways. In the future, it is recommended that this quantitative data be linked to the data collected in this project to analyse the causal relationship between terrestrial waste management and marine litter.

Thank you very much for your  
attention.



## **Project Completion Seminar for**

**the “Technical Cooperation Project on Advisor for Marine Plastic Litter  
Management in the Caribbean Region”**

- Explanation of Guidance Document for Formulation of  
Regional Solid Waste Management Plan -**

23, October, 2023

Satoshi HIGASHINAKAGAWA

JICA Advisory Team



**NIPPON KOEI**



# Contents

1. Background and Objective
2. Contents of the Guidance Document
3. Main Points of the Document

# Background and Objectives

## 1. Background

- Considering marine plastic litter management, the management of solid waste generated in land is very important as well as generation source at watercourse and sea
- It is significant to prepare a solid waste management plan, to implement suitable solid waste management
- In case of Guiana, there is no solid waste management plan in national level and local level.
- In this sense, the formulation of solid waste management plan is indispensable for establishing suitable solid waste management.
- Regional Solid Waste Management Plan in Region 5 is drafted and should be prepared for the other regions



Necessary of Preparation of Guidance Document to  
prepare Regional SWM Plan in each Region

## 2. Objectives

- To explain the contents of regional solid waste management plan
- To guide how to prepare solid waste management plan

# Contents of the Guidance Document

- **1. Background and Objective**
  - 1.1 Background
  - 1.2 Objectives
- **2. Profile of Regions**
  - 2.1 Location and natural condition
  - 2.2 Population
  - 2.3 Economic profile and land use
- **3. Current condition of solid waste management**
  - 3.1 Institutional Arrangements
  - 3.2 Solid Waste Characterization
  - 3.3 Technical Aspects
  - 3.4 Identified Key Issues
- **4 Future Framework**
  - 4.1 Population Projection
  - 4.2 Other Socio-economic Situations
  - 4.3 Projected Waste Generation



# Contents of the Guidance Document

- **5 Planning Strategy**
- 5.1 Vision and Goals
- 5.2 Targets
- 5.3 Future Waste Flow
- 5.4 Strategy to Satisfy the Target
- **6 Technical System for Solid Waste Management**
- 6.1 Collection and Transportation and Sweeping
- 6.2 3R (Source Reduction, Reuse, Recycle)
- 6.3 Final Disposal
- **7 Institutional Arrangements for Solid Waste Management**
- 7.1 Legislation
- 7.2 Organizations
- 7.3 Finance (Revenue and Expenditure)
- 7.4 Public awareness and environmental education

# Contents of the Guidance Document

- **8 Implementation plan**
- 8.1 Implementation Schedule
- **9 Cost Estimation and Financial Aspect**
- 9.1 Initial cost (Capital Expenditure (CAPEX))
- 9.2 Operation and maintenance costs (Operation and Maintenance Expenditure (OPEX))
- 9.3 Annual Budget and Cost Recovery
- **10 Conclusion, and Recommendation**
- 10.1 Conclusion
- 10.2 Recommendation

# Current Situation of Natural Profile and Socioeconomic Condition

Item	Data Type	Purpose
<b>Population</b>	<ul style="list-style-type: none"> <li>Current and future projection</li> </ul>	<ul style="list-style-type: none"> <li>To estimate total amount by daily waste amount per person, which is obtained from Waste Amount and Composition Survey</li> </ul>
<b>Business establishment (hotel, restaurants, shops, public institutions, etc)</b>	<ul style="list-style-type: none"> <li>Number of establishments, number of employees, number of tourists, amounts of sales, etc.</li> </ul>	<ul style="list-style-type: none"> <li>To estimate waste amount from business establishment for each year</li> </ul>
<b>Economic information.</b>	<ul style="list-style-type: none"> <li>GDP per capita</li> <li>Household income</li> </ul>	<ul style="list-style-type: none"> <li>To estimate waste amount in the future</li> <li>To estimate affordability to pay for MSWM cost</li> </ul>
<b>Natural information</b>	<ul style="list-style-type: none"> <li>Temperature, precipitation, evaporation, wind direction</li> <li>Geological data, such as underground water, rivers, historical data of flooding, etc.</li> </ul>	<ul style="list-style-type: none"> <li>To estimate leachate amount from precipitation and evaporation</li> <li>To consider leachate treatment method</li> <li>To consider location of treatment facilities and landfills</li> </ul>



# Institutional Aspect (Law and Regulation and Organizations)

- (1) Law and regulation
  - To summarize the current law and regulations related to SWM

## (2) Organization

- 1) National Government
  - To present the personnels related to SWM in MLGRD including the positions, number of personnels and the main responsibilities

## 2) Local Authority

- To describe the organization related SWM in each NDC and/or municipality, which includes drivers, waste collectors, etc

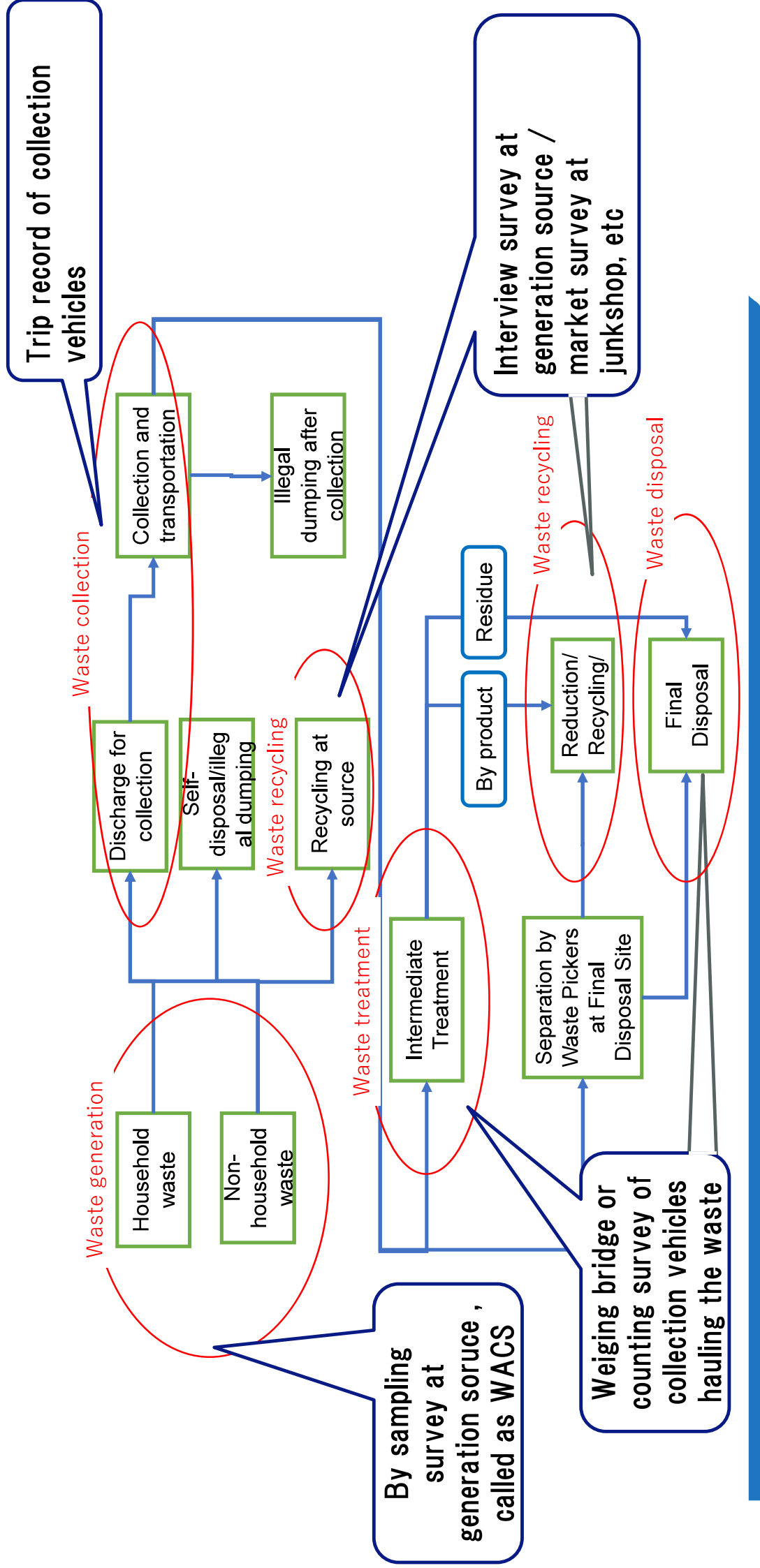
## (3) Financial Information

- To obtain the information at national level from the web site of Ministry of Finance
- To obtain the information based on the data sheet from each NDC/Municipality

Positions	Number of persons	Main responsibility
Director	1	Overall management of the Sanitation Department
Advisor for Solid Waste Management	1	Advisory services for overall waste management
Senior Environmental Officer	1	Environmental monitoring of waste treatment and disposal facilities such as landfill sites and collection areas
Environmental Officer	1	Environmental monitoring of waste treatment and disposal facilities such as landfill sites and collection areas (assisted by senior staff)
Civil and Environmental Engineers	2	Planning and design of waste treatment and disposal facilities
Overseers of landfill sites	2	Supervising at existing landfill sites such as Haags Bosch landfill site and Lusingan landfill site
Ranger	1	Implementation of security
Scale House Operator	1	Truck scale data management and monitoring

Name of NDC/Municipality	Driver	Waste collector (including other labor)
Blairmont - Gelderland	2	3 (1 Revenue Collector)
Zeelust - Rosignol	2	3 ( 2 permanent and 1 temporary)
Woodlands - Belair Park	1	2
Bath - Woodley Park	1	2
Union - Naarstigheid	1	0
Seafeld - Tempe	1	2
Profit - Rising Sun	1	1 and part time staff
Mahaicony - Abary	1	2
Hamlet – Chance	1	2
Woodlands - Farm	1	2

# Identification of Current Waste Stream



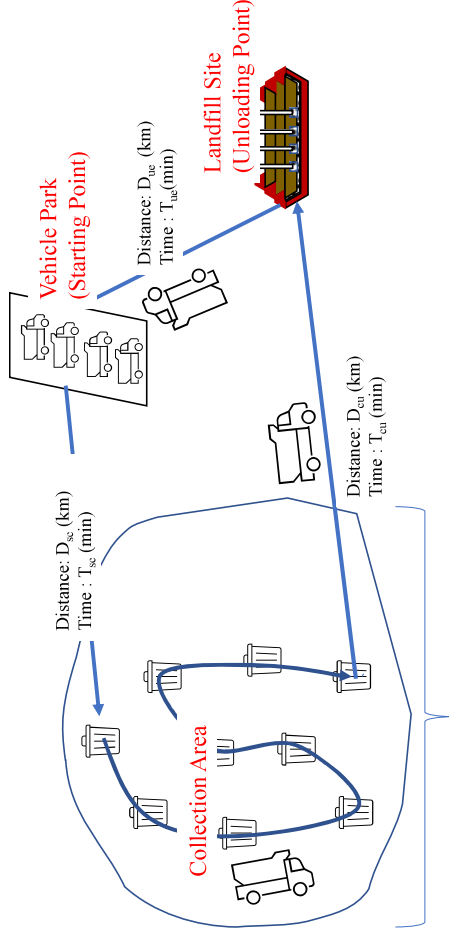
## Grasp the Current Situation of Collection and Transportation

- To survey overall current situation of collection and transportation such collection methods (waste, collection area, waste discharge methods, type of collection vehicles) by hearing in each NDC and taking the pictures for presentation.
- To survey the number and type of existing equipment of collection vehicles, dust bins, containers, etc and prepare the list of equipment
- To estimate the collection amount based on the trip records of each collection of vehicles, if available (if not available it could be estimated by the information of collection area and the data recorded in the treatment and disposal site)

No.	Type of Vehicle	Capacity [ton and/or m <sup>3</sup> ]	Average trip number [trip/day]	Average loading rate [%]	Remarks
Example	Compacter	5 [ton/day]			
1					
2					
3					
4	...				
5	...				



# Grasp the Current Situation of Collection and Transportation (Time and Motion Survey)



Total Distance in Collection Area  $\sum_i D_c (i - 1, i)$  (km)

Total Moving Time in Collection Area  $\sum_i MT_c (i - 1, i)$  (min)

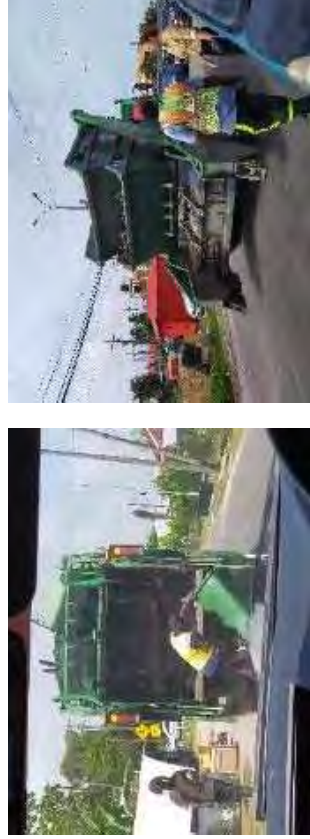
Total Loading Time in Collection Area  $\sum_i LT_c (i)$  (min)

- To select the targets vehicles for the survey
- To collect the information of target vehicles such as type, capacity, collection route, overall schedule of trip, etc
- To prepare the survey sheet
- To implement survey (time measurement, distance measurement, photo, etc) by following the vehicles utilizing

Collection Point No.	Arrival time	Loading/unloading time (min)	Departure time	Location (km)	Remark
Example	8:23	5:35	8:30		-
1 (Starting point)	-	-			
2					
3					
4					
5					

Check the watch and arrival time and taking the photo.

Check the watch and departure time and taking the photo.



## Grasp the Current Situation of Disposal and Treatment

- To implement site visit in case of disposal, treatment facility and take the pictures and obtain the list of equipment and facility drawing if available
- If there are weighing bridge data, it will be useful for analyzing the trend
- In case of that the landfill site check the number of vehicles hauling the waste to landfill site, etc. the data can be utilized for the estimation of waste to the landfill site



# Future framework (Population Projection and Waste Generation Projection)

## (1) Population Projection

- To **review existing regional plan**, if there is, and follow the population projection after its evaluation
- To estimate the population by **trend analysis of previous data**, if no existing regional plan
- To prepare **a few scenario for comparison** and finalize the population projection

## (2) Socio economic condition

- To **review existing regional plan**, if there is, and follow the plan
- To **estimate the future socioeconomic condition by quantitative indicator** such as GRDP, etc
- If there is no quantitative data and it does not seem that **the socioeconomic condition is not so different from the future trend of population**, the trend of business waste could be same as of household waste

## (3) Waste generation projection

- After setting the waste generation rate in the future, waste generation could be projected with **waste generation rate and population and/or socioeconomic indicator**



# Preparing Vision, Setting Target / Goal and Planning Strategy

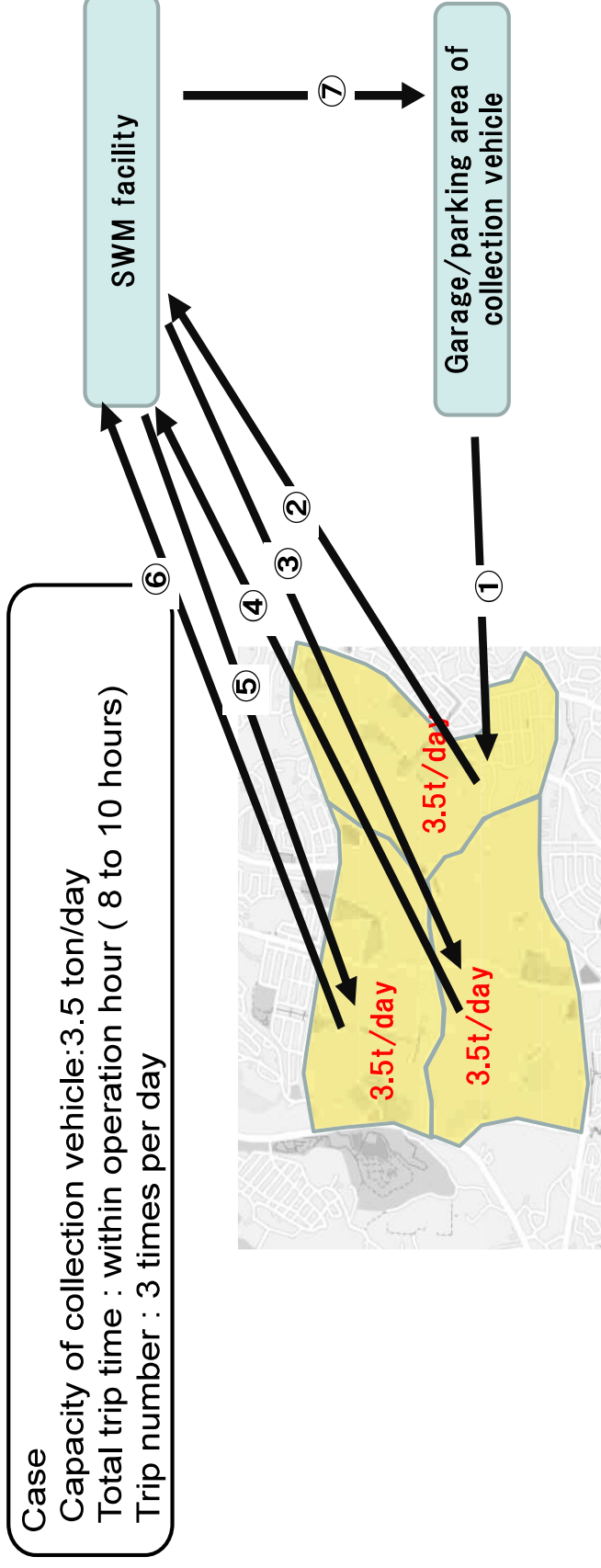
- (1) Preparing vision
  - To prepare the vision like “litter scattering prevention” or “3R promotion in the future”
- (2) Setting the target /goal
  - To set the future targets such as collection rate, recycle rate, final disposal rate, etc with consideration of current situation
- (3) Planning strategy
  - To plan strategy such as scheduled collection by compactor vehicle or semi aerobic sanitary landfill site, etc

Item	2023	2030	2035	2040
Collection Rate (%)	70%	80%	85%	90%
Self-disposal Rate (%)	30%	20%	15%	10%
Recycle Rate (%)	1.7%	5%	7%	10%
Final disposal Rate (%)	98%	95%	93%	90%



Item	2023	2030	2035	2040
Waste generation (household) [ton/day]	14.0	18.8	22.0	25.1
Waste generation (business establishment)[ton/day]	3.0	4.0	4.7	5.3
Waste generation (total)[ton/day]	17.0	22.7	26.7	30.4
Collection ant transportation amount [ton/day]	11.9	18.2	22.7	27.4
Self disposal amount [ton/day]	5.1	4.5	4.0	3.0
Recycling amount [ton/day]	0.2	0.9	1.6	2.7
Final disposal amount [ton/day]	11.7	17.3	21.1	24.7

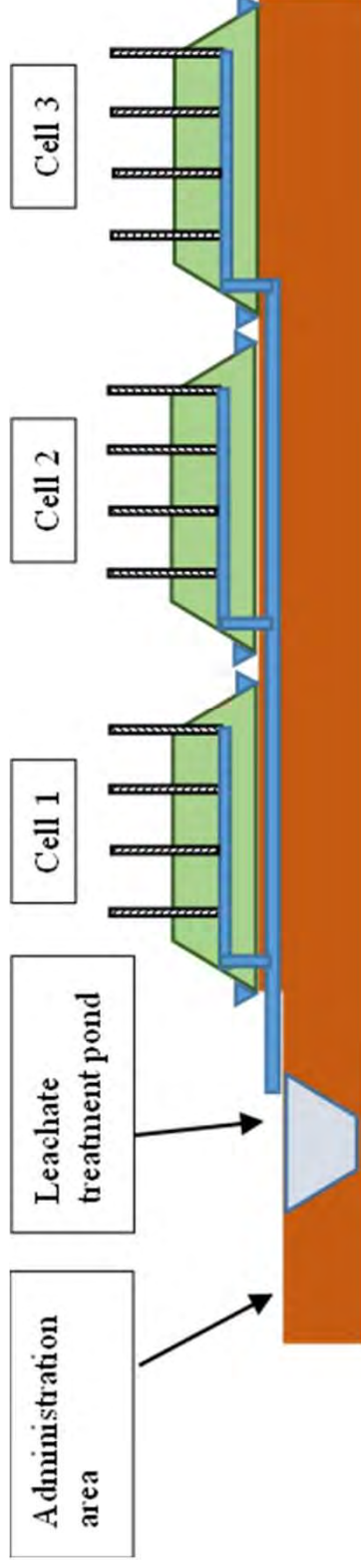
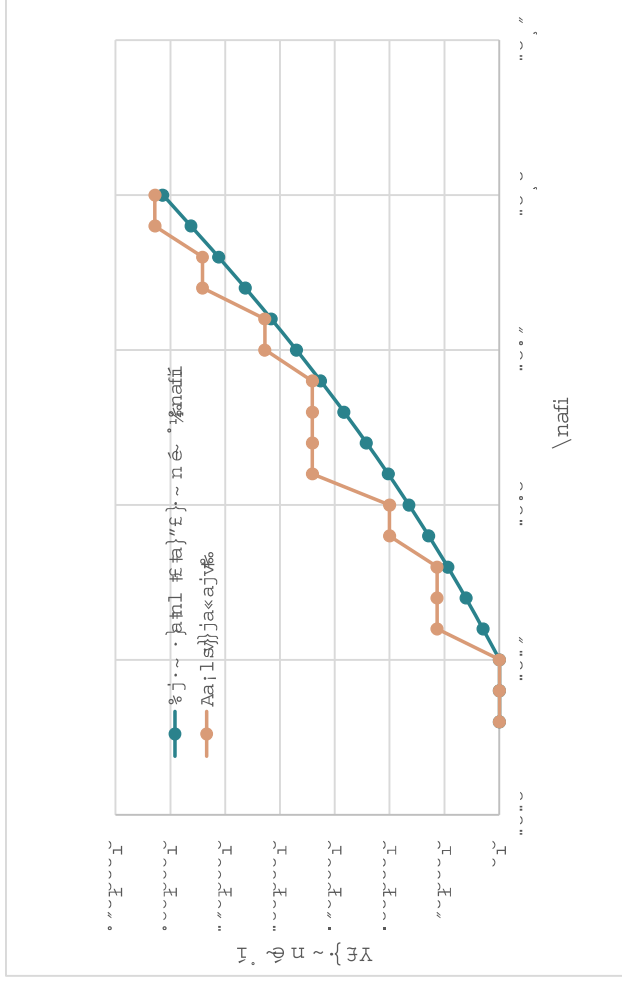
# Technical System for SWM (Collection and transportation planning)



- To divide the area suitable for each capacity of collection vehicle.
- To calculate the collection and transportation time roughly by referring the time and motion survey
- To calculate how many trips is possible for the vehicle per day and confirm the area to be covered by the vehicle
- To calculate the other areas by similar manner and calculate how many vehicles will be necessary for all the target area

# Technical System for SWM (Final Disposal Planning)

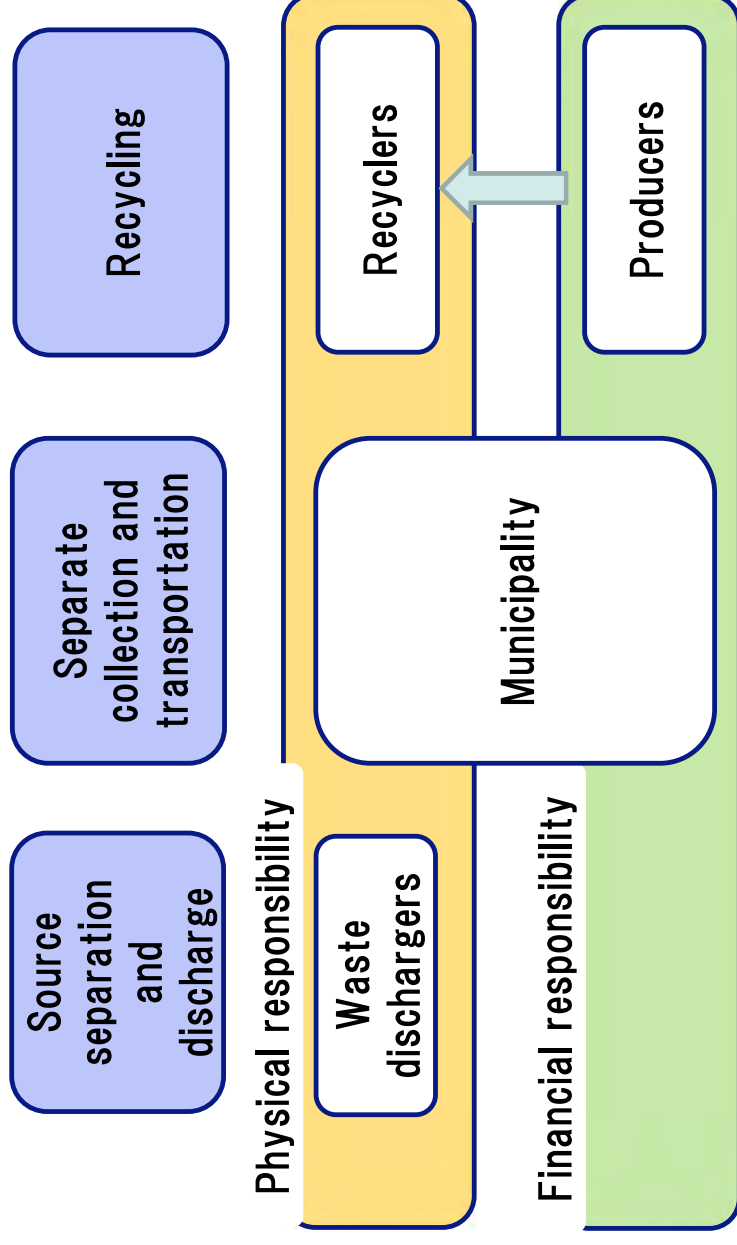
- To calculate the amount of disposed waste until the target year
- To grasp necessary area for landfill development
- To set the necessary facilities and equipment





## Technical System for SWM (Reduce Reuse, Recycle)

- Recycling market is unstable in Guyana, especially no market for plastic waste and carton
- If considering waste diversion by recycling, it will be necessary to establish the financial supporting system by national government and/or private company like importers or producers



# **Institutional Arrangements for SWM**

- (1) Law and regulation
  - Solid Waste Management Bill should be formulated and endorsed with status of Regional Solid Waste Management Plan in each region.
  - National Solid Waste Management Strategy could be modified based on the Bill.
- (2) Organization
  - Firstly, it is necessary to consider the responsible organization of each activity including planning, designing, operation and maintenance, monitoring, etc (ex. planning, designing of landfill site is MLGRD, planning, operation and maintenance of collection and transportation is private sector based on the contact after tender process, etc)
  - Future organization is prepared based on necessary personnels in each position

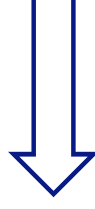
# Cost Estimation and Financial Aspects

## (1) Cost Estimation

### 1) CAPEX

- To collect unit cost of equipment and unit cost of civil and architectural work to compare the similar project including the projects in the other countries
- To refer the similar project for rough estimation in planning level
- To compare the calculated value for evaluation

In planning level, normally topographic survey or geological survey has not been implemented and then, no drawing of the facility



## 2) OPEX

Calculated based on the number of personnels and their salary

Calculated based on the electricity and fuel costs

Rate of equipment cost based on the previous experience

Item		OPEX (2030) [US\$]	OPEX (2040) [US\$]
Personnel cost	Collection and transportation	211,200	315,600
	Landfill	81,600	81,600
Operation	Collection and transportation	32,285	33,188
	Landfill	23,877	24,541
Maintenance		4,843	4,978



## **Conclusion and Recommendation**

### **(1) Conclusion**

- Guidance for planning of Regional SWM plan in each region is drafted based on the experience of the preparation process of Regional SWM plan in Region 5

### **(2) Recommendation**

- To clarify the status of Regional SWM plans in the new SWM Bill and/or updated SWM Strategy
- To prepare the Regional Solid Waste Management Plan by utilizing this guidance manual
- To update the prepared plan continuously by enhancing the change of the situation
- To format census data and/or unit cost information, waste generation data, etc as a spread sheet to update Regional SWM plans

- Thank you so much for your kind attention.

E-mail: [higashinakagawa-st@n-koei.jp](mailto:higashinakagawa-st@n-koei.jp)

# **Data Resource Guidance for Plastic Material Flow in Jamaica**

## **1 Objective**

This document provides the guidance on data and information source to update the data for the plastic material flow in Jamaica. The guidance shows the method and source to obtain data and information on each stage in the material flow.

## **2 Data source for the Imports and Exports**

The data on the Import and Exports of plastics in Jamaica can be extracted from UN Comtrade Database<sup>1</sup> by input of HS code. Plastic products are categorized under HS codes of Chapter 39<sup>2</sup> where there are 26 sub-categories from H.S. 3901-3926 (See Attachment for description). It should be noted that the amount of re-imported waste and re-exported waste can be selected at the data search and can be used for analysis (See the images below). Moreover, products containing plastic, such as electric appliances are not covered in HS 39 category.

### **Data extraction and collation method:**

5-year data from 2017 to 2021 and items in Chapter 39 from 3901 to 3926 were obtained from the database. Data from 1962 is available and periods of years can be selected depending on the need. “Partner” is selected as Jamaica, and “Reporters” are selected as All Nations for the accuracy of data. Thus, it should be noted that for the collation of data, data shown as Import is Export by Jamaica, and data shown as Export is Import by Jamaica. (For example, an imported product reported by the United States is exported from Jamaica).

Data were extracted as CSV and the sum of Imports and Exports as well as re-import and re-exports for each category were calculated in excel. The amount of re-imported items and re-exported items were deducted from total Imports and Exports respectively.

Please see the following screenshots for the selection of data on UN Comtrade Database:

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<sup>1</sup> <https://comtrade.un.org/data/>

<sup>2</sup> <https://www.tariffnumber.com/2022/39>



comtrade.un.org/data/

UNITED NATIONS DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS STATISTICS DIVISION TRADE STATISTICS

UN Comtrade Database Extract data Data Availability Knowledge base API portal

### 1. Type of product & Frequency

Type of product: ☒ Goods ☐ Services

Frequency: ☒ Annual ☐ Monthly

### 2. Classification

HS: ☒ As reported ☐ 92 ☐ 96 ☐ 02 ☐ 07 ☐ 12 ☐ 17 ☐ 22

SITC: ☐ As reported ☐ Rev. 1 ☐ Rev. 2 ☐ Rev. 3 ☐ Rev. 4

BEC: ☐ BEC

### 3. Select desired data

Periods (year): ☒ 2017 ☒ 2018 ☒ 2019 ☒ 2020 ☒ 2021

Reporters: ☒ All

Partners: ☒ Jamaica

Trade flows: ☒ Import ☒ Export ☒ re-Import ☒ re-Export

All or a valid period. Up to 5 may be selected.

All or a valid reporter. Up to 5 may be selected. All may only be used if a partner is selected.

World, All, or a valid reporter. Up to 5 may be selected. All may only be used if a reporter is selected.

All or select multiple trade flows.

**You can only select 20 items**

- ☒ 3901 - Polymers of ethylene, in primary forms
- ☒ 3902 - Polymers of propylene or of other olefins, in primary forms
- ☒ 3903 - Polymers of styrene, in primary forms
- ☒ 3904 - Polymers of vinyl chloride or of other halogenated olefins, in primary forms
- ☒ 3905 - Polymers of vinyl acetate or of other vinyl esters, in primary forms; other vinyl polymers in primary forms
- ☒ 3906 - Acrylic polymers in primary forms
- ☒ 3907 - Polyacetals, other polyethers and epoxide resins, in primary forms; polycarbonates, alkyd resins, polyallyl esters and other polyesters, in primary forms
- ☒ 3908 - Polyamides in primary forms
- ☒ 3909 - Amino-resins, phenolic resins and polyurethanes, in primary forms
- ☒ 3910 - Silicones in primary forms
- ☒ 3911 - Petroleum resins, coumarone-indene resins, polyterpenes, polysulphides, polysulphones and similar products of chemical synthesis n.e.c. in chapter 39, in primary forms
- ☒ 3912 - Cellulose and its chemical derivatives, n.e.c. or included, in primary forms
- ☒ 3913 - Natural polymers (e.g. alginic acid) and modified natural polymers (e.g. hardened proteins, chemical derivatives of natural rubber), n.e.c. or included, in primary forms
- ☒ 3914 - Ion-exchangers; based on polymers of heading no. 3901 to 3913, in primary forms
- ☒ 3915 - Waste, parings and scrap, of plastics
- ☒ 391590 - Plastics n.e.c. in heading no. 3915; waste, parings and scrap
- ☒ 3916 - Monofilament of which any cross-sectional dimension exceeds 1mm, rods, sticks and profile shapes, whether or not surface-worked but not otherwise worked, of plastics
- ☒ 3917 - Tubes, pipes and hoses and fittings thereof (for example, joints, elbows, flanges), of plastics
- ☒ 3918 - Floor coverings of plastics, self-adhesive or not, in rolls or tiles; wall or ceiling coverings of plastics, in rolls of a width not less than 45cm
- ☒ 3919 - Self-adhesive plates, sheets, film, foil, tape, strip and other flat shapes, of plastics, whether or not in rolls

All, Total, AG[X] or a valid code. Up to 20 may be selected. If you know the code number, e.g. 01 - Live animals, type 01. To search by description type a word, e.g. rice

### 4. See the results

[Get data](#) [Download CSV](#) [More information about data](#)

### 3 Data source for Plastic Manufacturing

Since there are no official statistics available, interviews with manufacturers and bottlers (who produce beverage containers from resin) were carried out to collect data. It is noted that manufacturers are declined to provide amount data.

Only available data is number of plastic bottles sold in Jamaica for 2018 in the Final Regulatory Impact Assessment Report, Plastic Waste Minimization Project, 2020 by NEPA.

To convert the number of bottles to the weight of bottles, the data on the weight of PET bottle and HDPE bottle from the article/web site data is used, while the number of bottle sold by size is not known.

When interview with manufacturers is tried, it is suggested direct push from the government is needed to collect data and collected individual data is not disclosed (keep confidentiality).

## **4 Data source for the estimation of the Volume of Plastic Waste Generation and Collection**

The estimate is based on Jamaica Waste Characterization Final Report 2022 and NSWMA Annual Report 2019/2020. It should be noted that the Jamaica Waste Characterization Final Report is based on sample collection from July 2021 to March 2022 and the waste characterization study was conducted on a spot basis. NSWMA Annual Report 2019/2020 provides the activities for 2019/2020. At the moment, DBJ prepares the SWM PPP project which covers the whole SWM operation from collection, treatment and final disposal.

### **4.1 Data on the amount of MSW, ICI and Overall waste generation**

“Overall waste generation” used in the estimation is the sum of household solid waste generation and ICI (Institutional, Commercial and Industrial) waste generation. It should be noted that while daily per capita waste generation for households is estimated by spot study and the estimation of ICI waste generation is not easy.

### **4.2 Data on the amount of plastic waste generation**

The amount of plastic waste generation for Jamaica and MPM is based on the data which the composition of the waste (including plastics) is investigated, and from this data, the waste generation amount is multiplied by the percentage of plastics in the waste (16.8% for national level) to estimate the amount of plastic waste generation.

### **4.3 Data on waste collection**

The waste collection rate (69%) is from the DBJ which set the collection rate for preparation of business case of the PPP project.

The collected amount of household waste by NSWMA can be obtained, while the collected amount of ICI waste is not known. NSWMA shows the collection amount in its annual report and it is by calculating from number of the collection vehicle, as there is no weigh bridge at the disposal site. Obtaining non-collection rate is important for the estimation of potential plastic leakage.

## 5 Data Source for Plastic Recycling

The data is based on interviews with recyclers (Recycling Partners of Jamaica (RPJ) and Jamaica Recycles). This data is mainly for plastic bottles. Other recycling amount is not known while there are waste pickers collecting plastic bags.

## 6 Data Source for the Kingston Metropolitan Area

As there is no specific data for the Kingston Metropolitan Area (KMA), data for national or MPM is used from the Jamaica Waste Characterization Final Report 2022.

Converting the national or MPM data to KMA is based on the proportion on population. The population estimate of KMA is based on Parish profiles by Jamaica Information Service<sup>3</sup>. The population of KMA is calculated as a sum of the population of St. Andrew and Kingston. As the population census for Jamaica was carried out in 2022, for the latest population, the result by the Statistics Institute of Jamaica is awaited.

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<sup>3</sup> <https://jis.gov.jm/information/parish-profiles/parish-profile-st-andrew/>,  
<https://jis.gov.jm/information/parish-profiles/parish-profile-kingston/>



# Attachment

## Chapter 39 Plastics and articles thereof

HS Code	Description
3901	Polymers of ethylene, in primary forms
3902	Polymers of propylene or of other olefins, in primary forms
3903	Polymers of styrene, in primary forms
3904	Polymers of vinyl chloride or of other halogenated olefins, in primary forms
3905	Polymers of vinyl acetate or of other vinyl esters, in primary forms; other vinyl polymers in primary forms
3906	Acrylic polymers in primary forms
3907	Polyacetals, other polyethers and epoxide resins, in primary forms; polycarbonates, alkyd resins, polyallyl esters and other polyesters, in primary forms
3908	Polyamides in primary forms
3909	Amino-resins, phenolic resins and polyurethanes, in primary forms
3910	Silicones in primary forms
3911	Petroleum resins, coumarone-indene resins, polyterpenes, polysulphides, polysulphones and other products specified in Note 3 to this Chapter, not elsewhere specified or included, in primary forms
3912	Cellulose and its chemical derivatives, not elsewhere specified or included, in primary forms
3913	Natural polymers (for example, alginic acid) and modified natural polymers (for example, hardened proteins, chemical derivatives of natural rubber), not elsewhere specified or included, in primary forms
3914	Ion-exchangers based on polymers of headings 3901 to 3913, in primary forms
3915	Waste, parings and scrap, of plastics
3916	Monofilament of which any cross-sectional dimension exceeds 1 mm, rods, sticks and profile shapes, whether or not surfaceworked but not otherwise worked, of plastics
3917	Tubes, pipes and hoses, and fittings therefor (for example, joints, elbows, flanges), of plastics

3918	Floor coverings of plastics, whether or not self-adhesive, in rolls or in the form of tiles; wall or ceiling coverings of plastics, as defined in Note 9 to this Chapter
3919	Self-adhesive plates, sheets, film, foil, tape, strip and other flat shapes, of plastics, whether or not in rolls
3920	Other plates, sheets, film, foil and strip, of plastics, noncellular and not reinforced, laminated, supported or similarly combined with other materials
3921	Other plates, sheets, film, foil and strip, of plastics
3922	Baths, shower-baths, sinks, wash-basins, bidets, lavatory pans, seats and covers, flushing cisterns and similar sanitary ware, of plastics
3923	Articles for the conveyance or packing of goods, of plastics; stoppers, lids, caps and other closures, of plastics
3924	Tableware, kitchenware, other household articles and toilet articles, of plastics
3925	Builders' ware of plastics, not elsewhere specified or included
3926	Other articles of plastics and articles of other materials of headings 3901 to 3914

Notes can be found here: <https://www.wcoomd.org/-/media/wco/public/global/pdf/topics/nomenclature/instruments-and-tools/hs-nomenclature-older-edition/2002/hs-2002/0739e.pdf?la=en>



**Project Completion Seminar: Project's accomplishment and future application to the waste management in the Caribbean region**  
**- Guidance Document for Remediation of Existing Sanitary Landfills** – Operation and Maintenance Manual in the Caribbean region

24, October 2023

Yukihisa SAKATA

JICA Advisory Team



***NIPPON KOEI***



# The remediation plan in Saint Lucia

The plan covers the following items.

- Improvement of the existing landfill structure for prolonging the service life
- Improvement of leachate treatment facility
- Improvement of stormwater drainage system
- Cost estimation and multi-phase construction
- Operation and maintenance plan

These items in the plan aim to operate and maintenance of the existing landfill properly and also aim to prolong the service life of the existing landfill as long as possible in good shape.

In order to make this plan practical, Saint Lucia Solid Waste Management Authority and JICA Advisory Team formulated “Conceptual Design for Remediation of Deglos Landfill in Saint Lucia”.

# Common issue in Caribbean Region in the field of Solid Waste Management (1)

Generally, small island countries suppose to have a common issue in the field of Solid Waste Management: That is land acquisition for final disposal.

- Insufficient land for final disposal
- Little experience on introduction of thermal treatment which can make solid waste smaller in volume to save landfill capacity
- Difficulties in stable recycling practices for recyclables; organic waste, plastics, bulky waste including home appliances and derelict vehicle (tyres are also impressive)
- Countermeasures for increasing waste to be managed

All the countries in the Caribbean region are struggling with them, however, some issues will take a long time to be solved.

Considering the background in this area, we need a priority to maintain public health: Securement of landfill capacity in near future.

## Common issue in Caribbean Region in the field of Solid Waste Management (2)

Considering the background in this area, we need a priority to maintain public health: Securement of landfill capacity in near future.

Therefore, the conceptual design has a priority:

- A) Securement of landfilling area for the coming near future
- B) Continuity of landfilling at the same landfill for the necessary duration
- C) Environmental preservation of the surrounding area

Since the only landfill is operated in Saint Lucia, as an immediate goal, prolonging the service life of the landfill is the most prioritized.

Generally, in a similar case like the situation in Saint Lucia, a comprehensive rehabilitation plan is planned for an existing dumpsite. However, prioritization is really important to commence a big project under limitations of time, budget, technology, and resource.



# Procedures of the conceptual design

- ◆ Target year of the remediation plan: Another 10 years of service life
- ◆ Boundary of the remediation project: Inside the existing premise
- ◆ Necessary capacity for landfilling
- ◆ Design conditions confirmation
- ◆ Grand layout plan of the remediation plan
- ◆ Landfill structure
- ◆ Liner structure
- ◆ Leachate treatment facility
- ◆ Monitoring facility
- ◆ Storm water drainage system
- ◆ Gas ventilation system
- ◆ Cost estimation
- ◆ O & M plan

# Necessary capacity for landfilling

Table 1 Future waste amount projection

Year	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Population	180,251	180,805	181,310	181,703	182,096	182,488	182,881	183,274	183,405	183,535	183,666	183,796
Per capita waste generation rate	1.2223354	1.2257884	1.2287795	1.2314178	1.2337779	1.2359129	1.2378619	1.2396549	1.2413149	1.2428603	1.244306	1.245664
Waste generation (ton/day)	220	222	223	224	225	226	226	227	228	228	229	229
Waste generation (ton/year)	80,419	81,116	81,318	81,670	82,003	82,548	82,629	82,927	83,097	83,488	83,416	83,566
Waste volume (0.55t/m <sup>3</sup> )	146,217	147,484	147,852	148,490	149,096	150,086	150,235	150,776	151,085	151,796	151,665	151,939
Cover soil volume (15% of landfilled waste)	21,933	22,123	22,178	22,274	22,364	22,513	22,535	22,616	22,663	22,769	22,750	22,791
Total volume landfilled (m <sup>3</sup> )	168,150	169,606	170,029	170,764	171,461	172,599	172,770	173,392	173,748	174,565	174,415	174,729
Accumulated landfilled volume (m <sup>3</sup> )	168,150	337,756	507,785	678,549	850,010	1,022,609	1,195,379	1,368,772	1,542,520	1,717,085	1,891,500	2,066,229
	1	2	3	4	5	6	7	8	9	10		

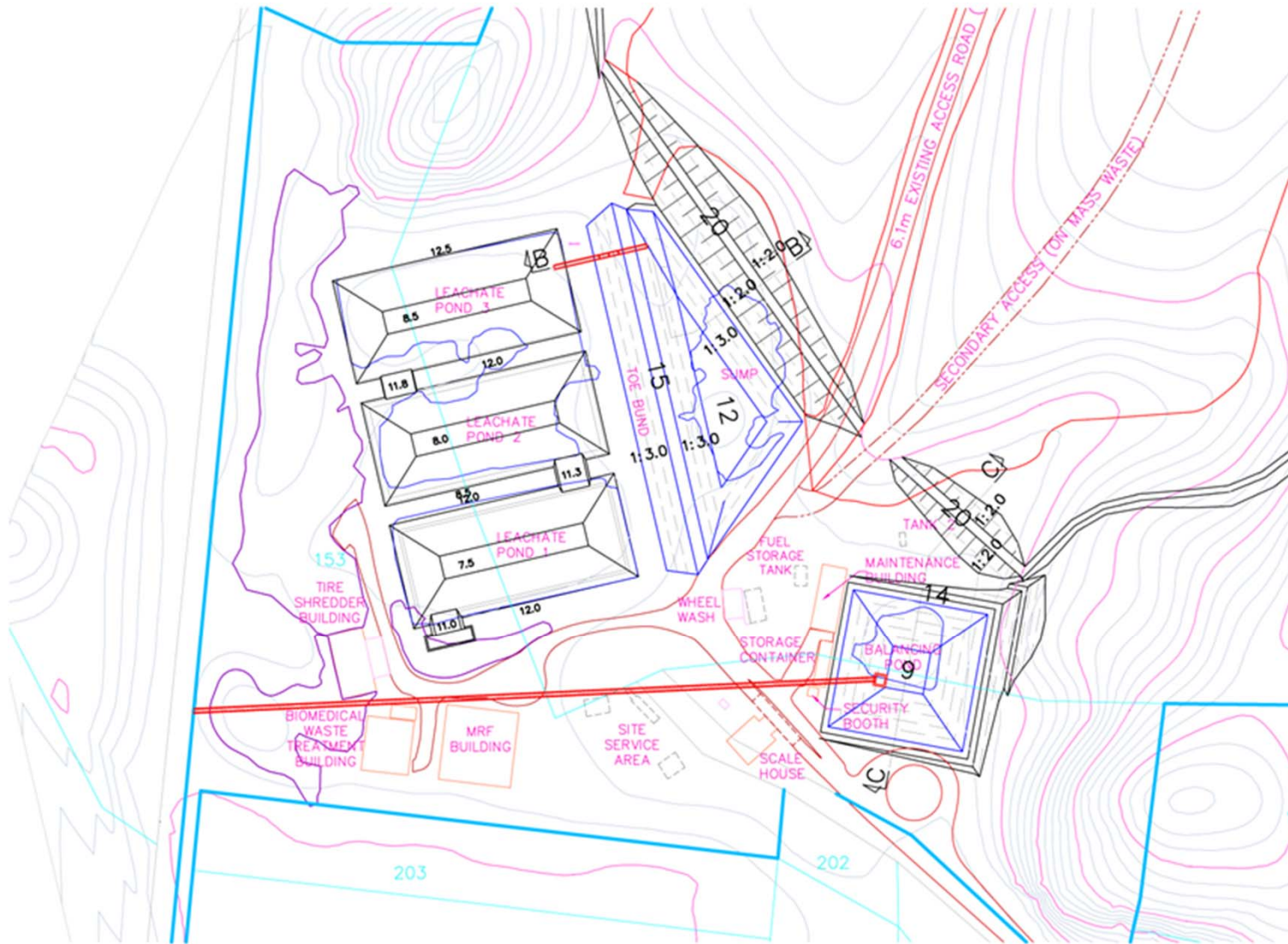
Year	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045
Population	183,927	184,058	184,188	184,319	184,449	184,580	184,711	184,841	184,972	185,102	185,233
Per capita waste generation rate	1.2469443	1.2481554	1.2493044	1.2503973	1.2514394	1.2524351	1.2533884	1.2543028	1.2551814	1.2560267	1.2568414
Waste generation (ton/day)	229	230	230	230	231	231	232	232	232	232	233
Waste generation (ton/year)	83,712	84,082	83,989	84,122	84,252	84,610	84,503	84,624	84,743	85,093	84,975
Waste volume (0.55t/m <sup>3</sup> )	152,203	152,877	152,707	152,949	153,185	153,836	153,641	153,862	154,079	154,714	154,500
Cover soil volume (15% of landfilled waste)	22,830	22,931	22,906	22,942	22,978	23,075	23,046	23,079	23,112	23,207	23,175
Total volume landfilled (m <sup>3</sup> )	175,033	175,808	175,614	175,892	176,163	176,912	176,687	176,941	177,190	177,921	177,675
Accumulated landfilled volume (m <sup>3</sup> )	2,241,263	2,417,071	2,592,684	2,768,576	2,944,739	3,121,651	3,298,338	3,475,279	3,652,470	3,830,391	4,008,066

Source of population data : (Saint Lucia Population 2022 (Demographics, Maps, Graphs) (worldpopulationreview.com)



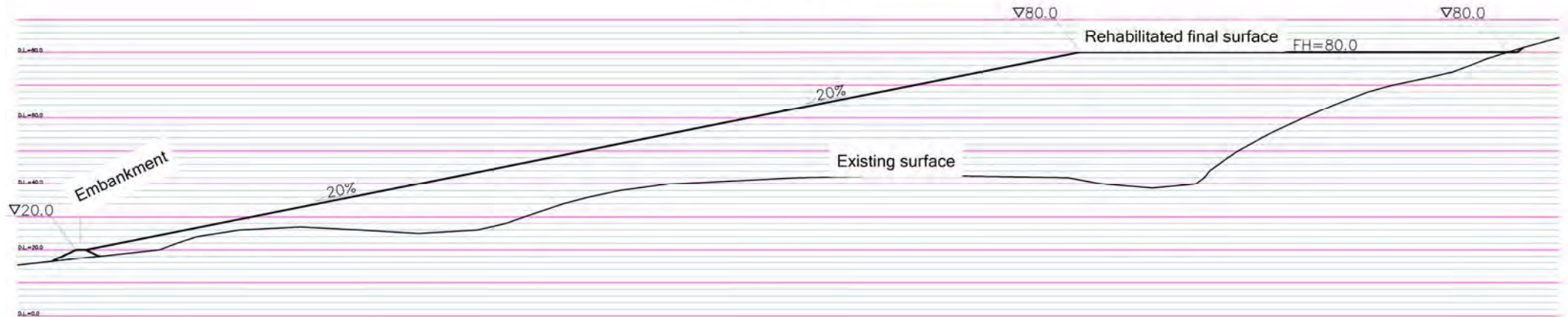


# Grand layout plan of the remediation plan

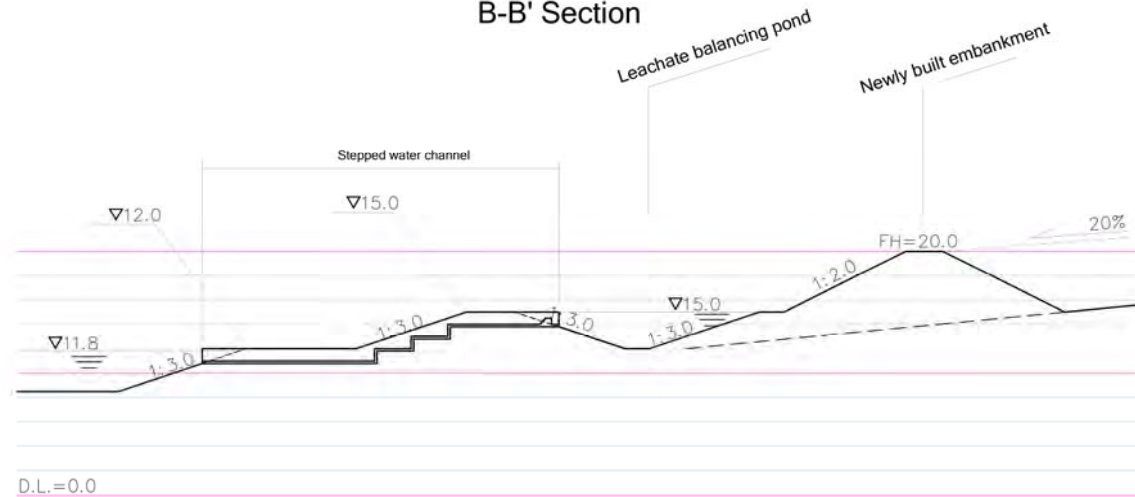


# Grand layout plan of the remediation plan

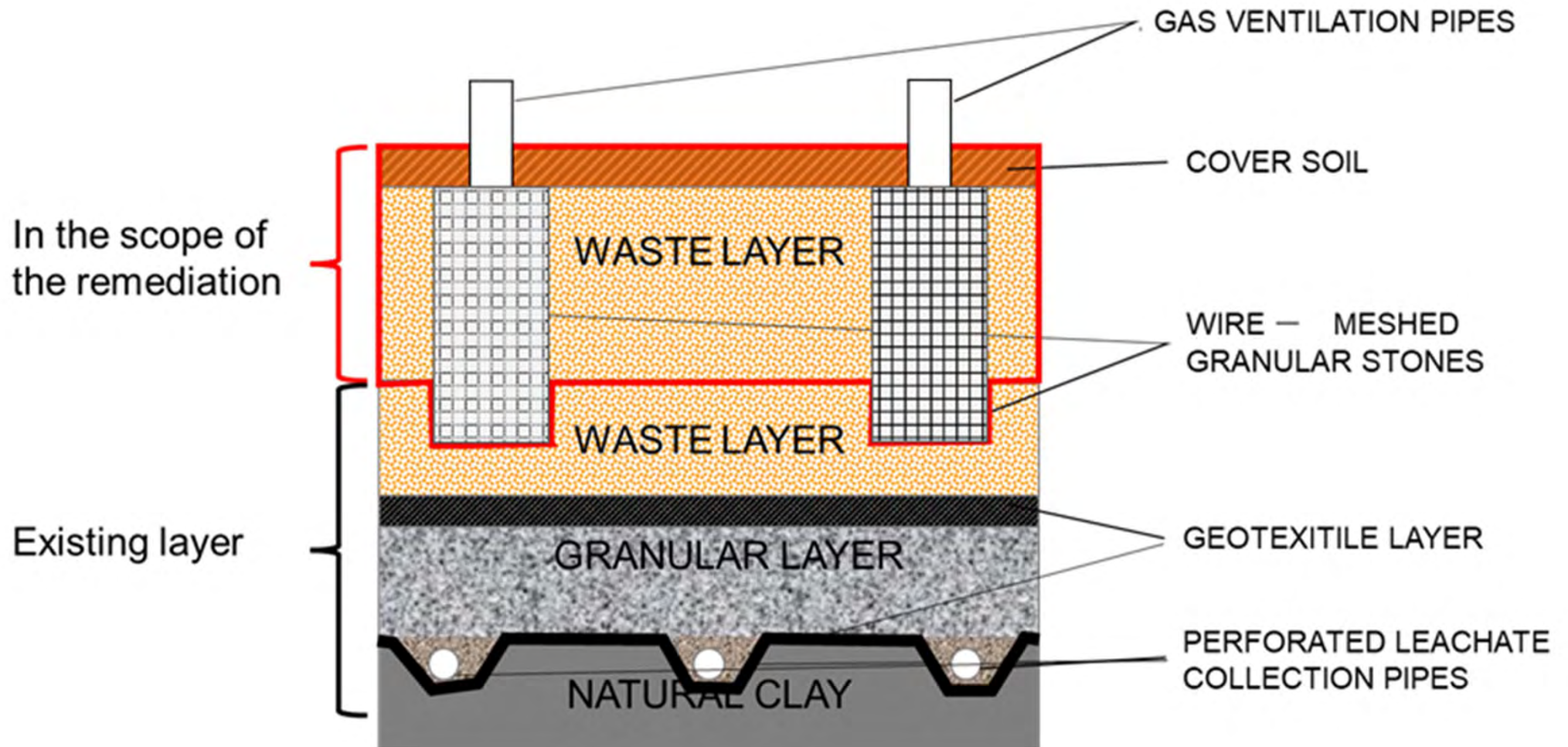
A-A' Section



B-B' Section



# Landfill structure





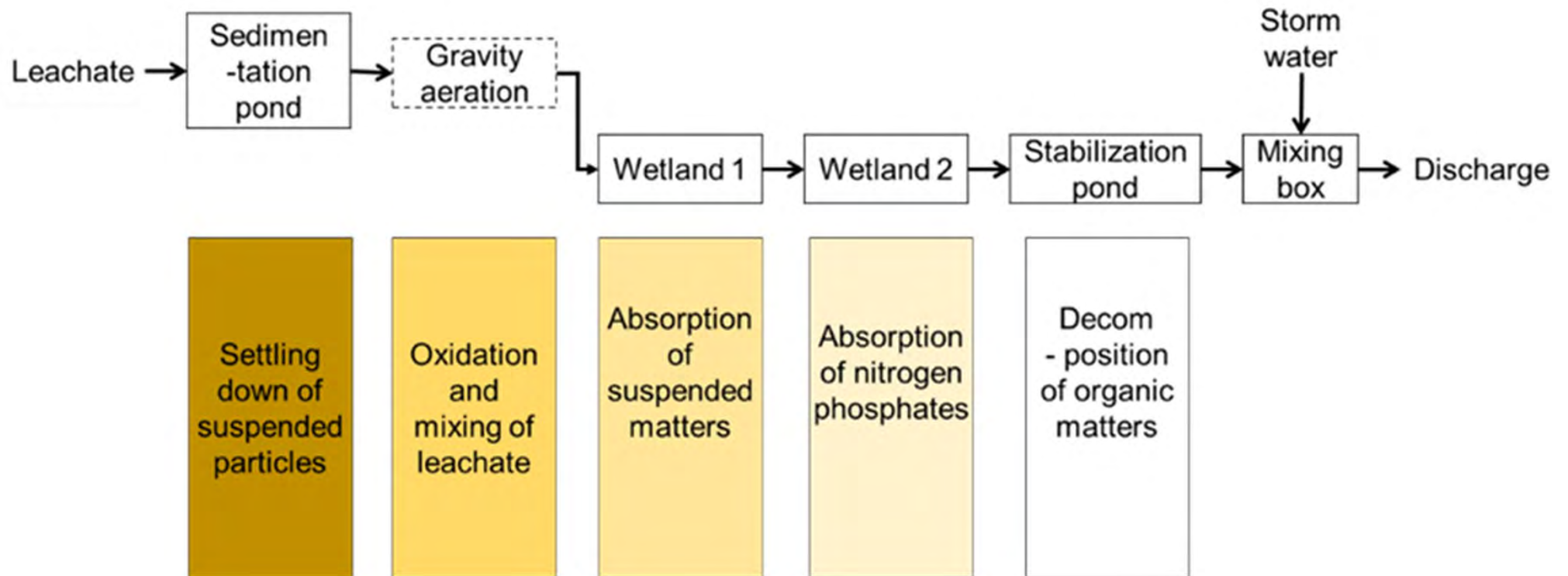
# Leachate treatment facility

## Design criteria for leachate

Parameter	Limit	Lab's recommendation
COD	90mg/l	30mg/l
BOD	60mg/l	30mg/l
Oil and Grease	30mg/l	15mg/l
TSS	60mg/l	30mg/l
TN	60mg/l as daily average	80mg/l
Nitrate	Not stipulated	5mg/l
Ammonia Nitrogen		10mg/l
Coliform	200CFU/100ml	200CFU/100ml

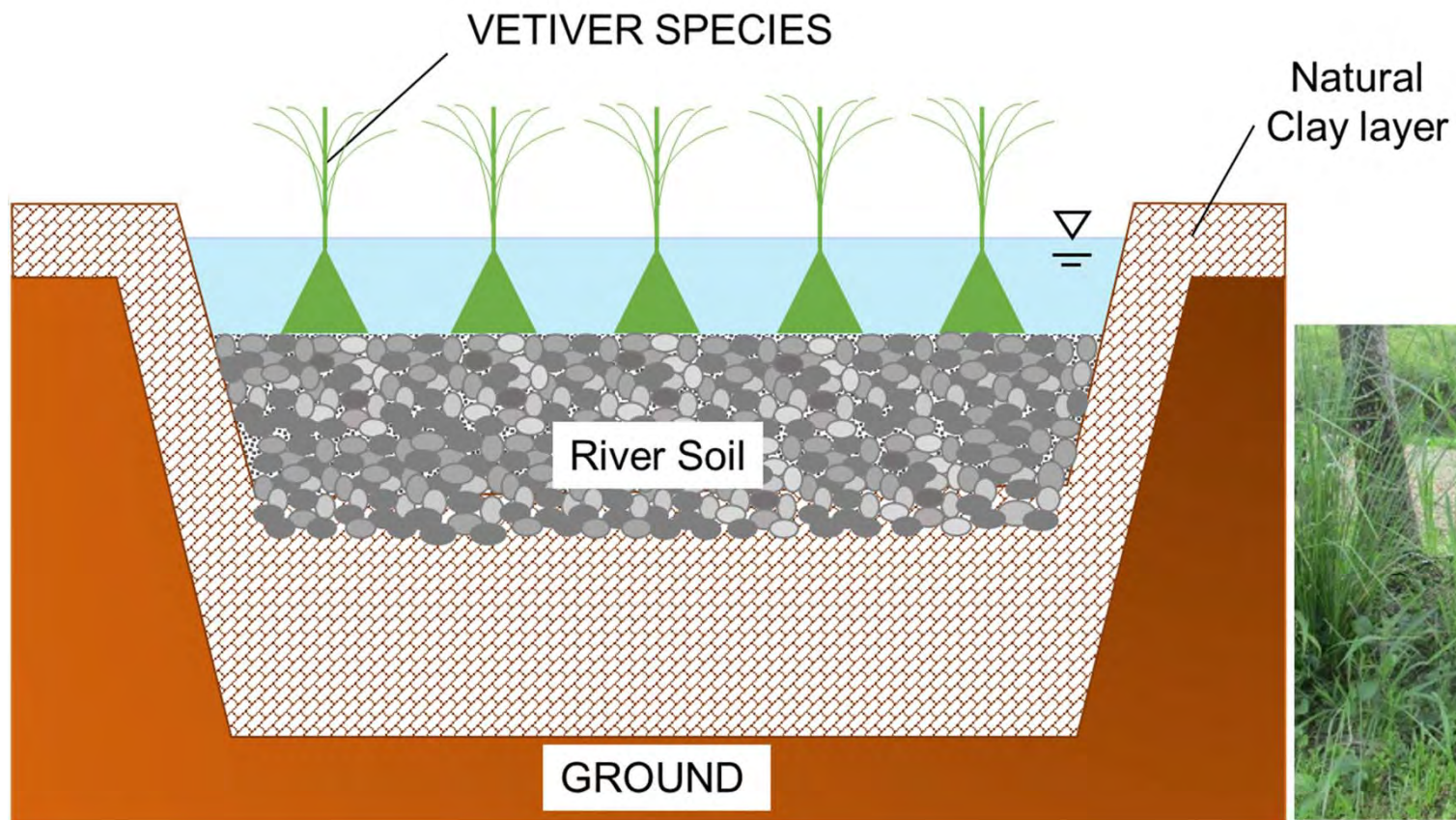
# Leachate treatment facility

## Treatment flow



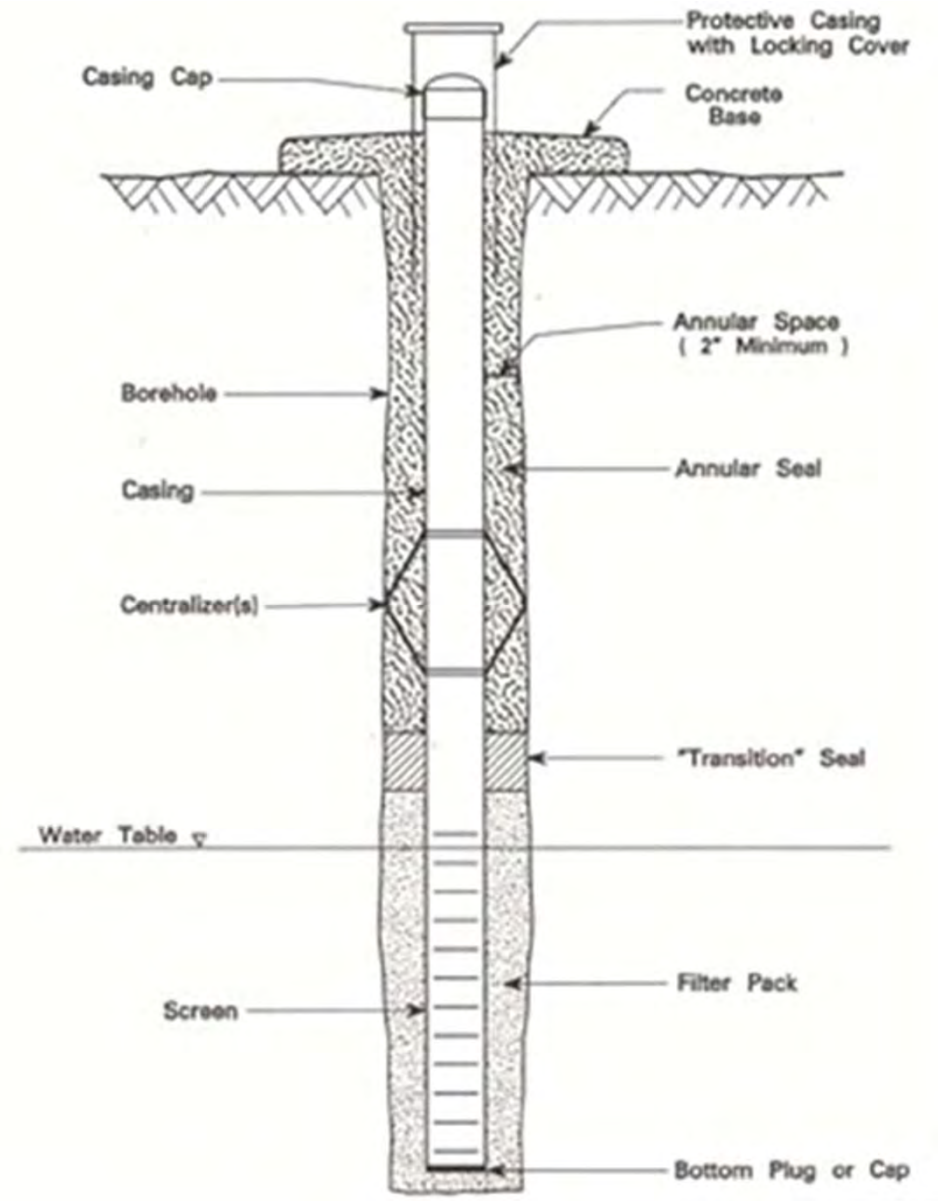
# Leachate treatment facility

## Wetland system

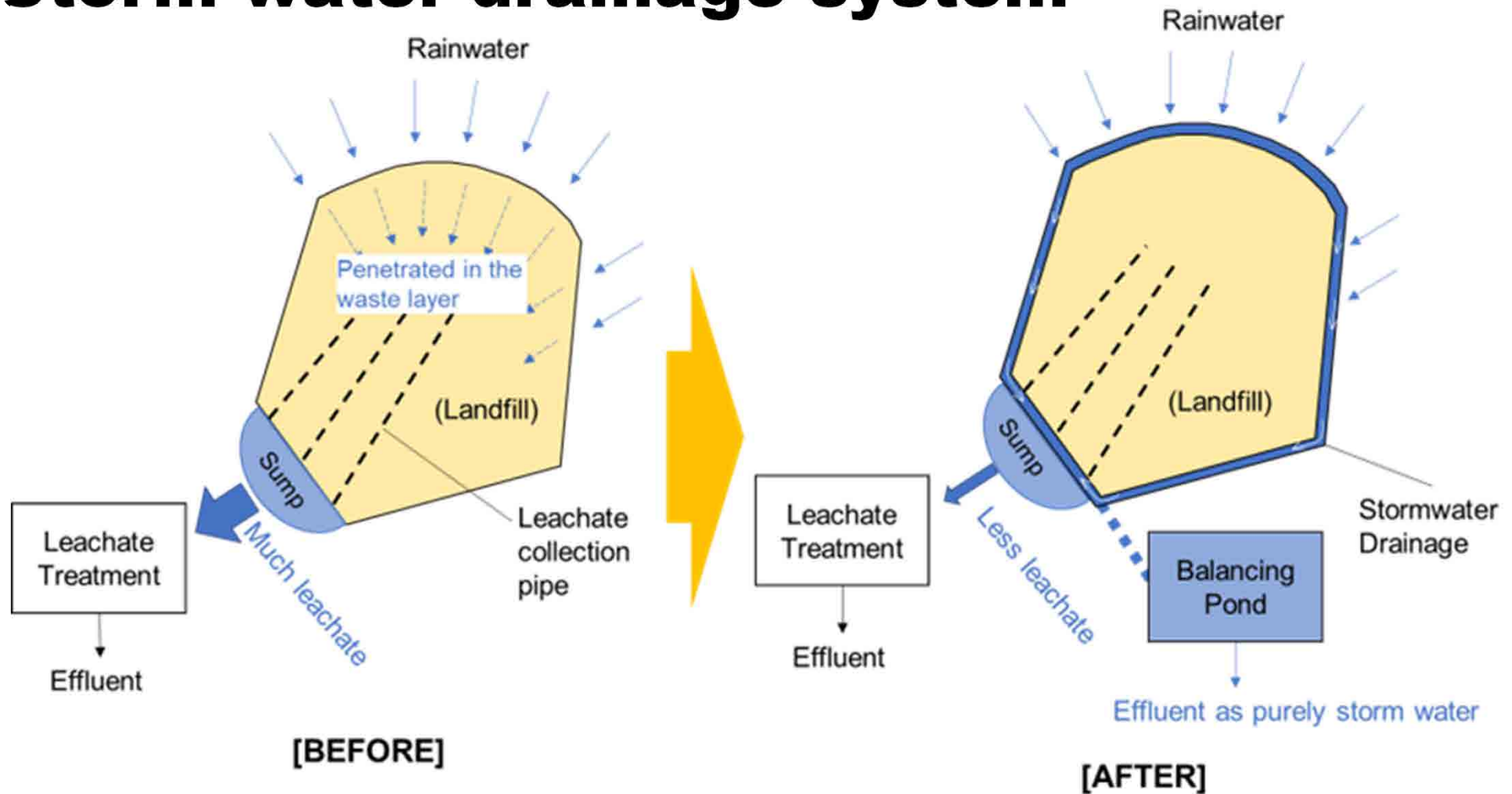




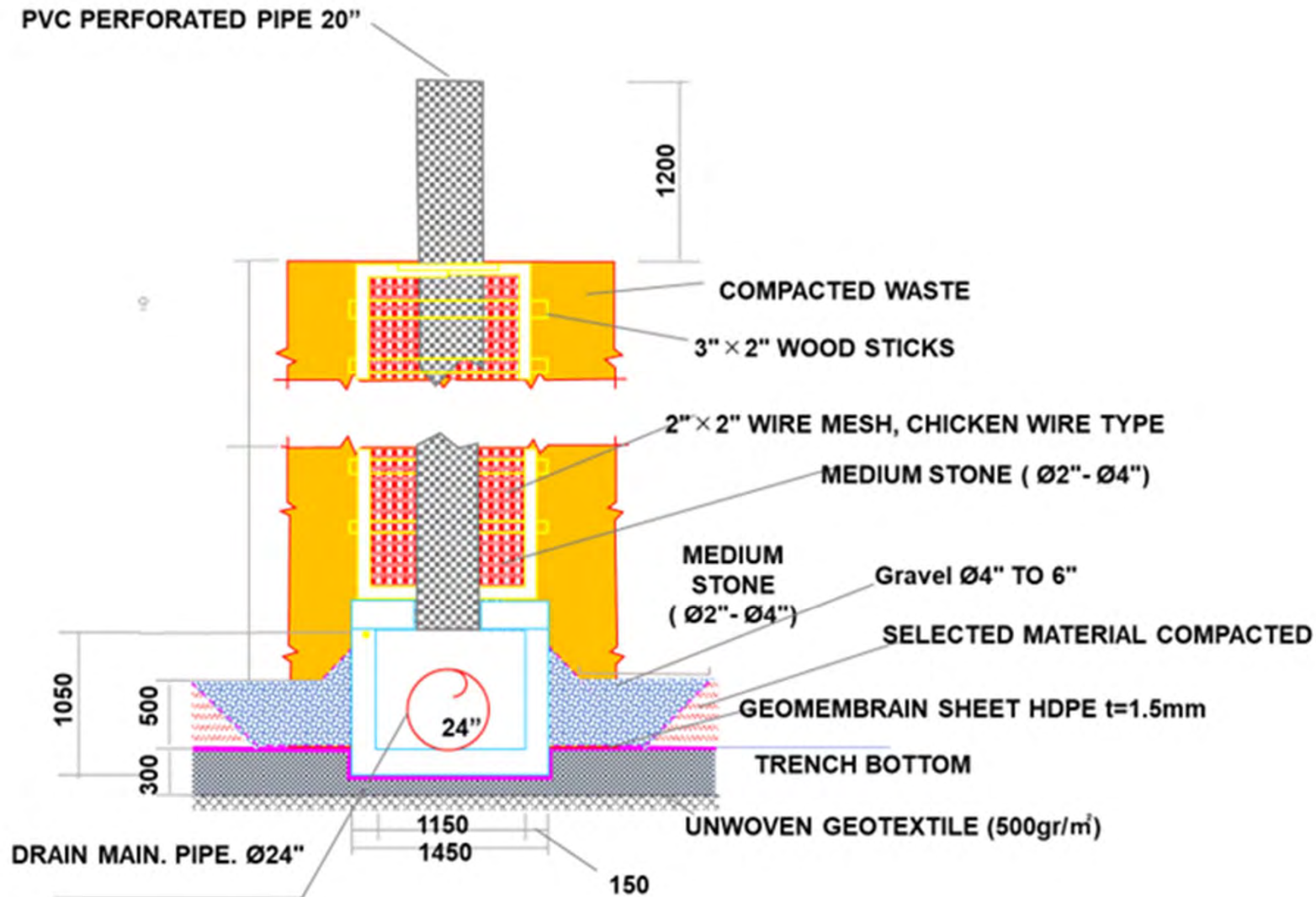
# Monitoring facility



# Storm water drainage system



# Gas ventilation system





# Cost estimation

- ◆ The overall total is approximately 6 million USD
- ◆ It will take about 2 to 3 years to complete the improvement project all at once.
- ◆ Topographic survey (about USD 30,000)
- ◆ Geotechnical survey of the embankment foundation (about USD 30,000)
- ◆ Detailed design (about 5 – 10 % of the total project cost).

# For the future development of Landfills

As explained in the slides,

- ◆ Prioritization in the waste management is the first thing.
- ◆ For the practical formulation of the design (not limited to construction design), necessary conditions should be well considered and clearly confirmed.
- ◆ All the numbers (prices, dimensions, weight, rate, etc.) are crucial.
- ◆ Although it is rough, cost estimation is a must with its evidence of each cost confirmation. We always have responsibilities to explain the plan to all the stake holders.
- ◆ In the consideration process, it is important to discriminate between “what we can do” and “ what we cannot do”.

We should think that all the plans would be enacted by the next generation.

Thank you for your attention.





## Technical Cooperation Project on Advisor for Marine Plastic Litter Management in the Caribbean Region

### - Guidance for Understanding Plastic Material Flow -

Oct. 25, 2023

Taisuke Watanabe

JICA Advisory Team



**NIPPON KOEI**

# Contents

- 1 Why plastic material flow
- 2 The case of plastic material flow in Jamaica
- 3 Potential utilization of plastic material flow
- 4 Discussion in coming plastic convention
- 5 Potential to develop capacity

# 1. Why Plastic Material Flow

## What is material flow?

- To understand the flow of material with quantity from input to output
- Such flow is not only one way but also includes circulation (recycle)

## When material flow is useful?

- To understand the quantitative situation of the material
- To look for the potential point to change the flow



# 1. Why Plastic Material Flow

## Limit and note on material flow

It is not easy to get the overall plastic quantity, for example:

- It is not easy to get the flow of the products which partly include plastic. For example, data is limited on how much plastic is used in each kind of electric products and how long the product is used (when comes to solid waste).
- Availability of statistics is limited, especially product manufacturing data.
- Covered plastic item depends on the data source.

## 2. The case of Plastic Material Flow in Jamaica

- ◆ Please refer to the presentation by Ms. Bethune Morgan, Jamaica.
- What the material flow support and what application is expected
- Assumptions and Limitations
- Way forward

## 2. The case of Plastic Material Flow in Jamaica

- ◆ Please refer to the “Data resource guidance for Plastic Material Flow in Jamaica” (uploaded to the Sharepoint page)
  - It shows information source. If you want to try, check the availability of data/information.
  - On import/export, there is Comtrade database but you can check the custom/statistics dept. may have data.
  - If there is manufacturing association, it may have some data.
  - Waste authority have a WACS (waste analysis and characterization study) data.
  - NGO has coastal clean-up activity data.



### 3. Possible Utilization of Plastic Material Flow

#### Example 1

The case when you want to explain the potential plastic leakage to the environment.

- The volume of uncollected plastic waste can be the potential plastic leakage to the environment. If you can say leakage from factories of plastic product and waste landfill is minimum.
- The volume of uncollected plastic waste can be (waste generation amount – collected waste amount) x plastic portion in waste (from waste composition study). Availability of these data is important.

# 3. Possible Utilization of Plastic Material Flow

## Example 2

The case when you want to know how much PET-bottle is recovered.

- By the survey with major beverage bottler, you may get the production/sales volume of PET bottle.
- By the survey with recyclers, you may get the recovered/recycled volume of PET bottle.
- The you can estimate the present recovery and discuss the increase of recovery/recycle of PET bottle.

(Need similar practice when you design the recycling program of PET bottle.)

# 3. Possible Utilization of Plastic Material Flow

## Example 3

The case when you analyze the ocean clean-up activity.

- In many countries, NGO organize coastal clean-up, typically by the Ocean Cleanup campaign, they publish data what and how many items are collected. The most items picked-up is PET bottle and single-use plastics follows.
- From such figures, you may link some plastic figures.

## 4 Discussion in coming plastic convention

For the INC (Intergovernmental negotiating committee to develop an internationally binding instrument on plastic pollution), zero draft text is distributed.

In the Zero draft, material flow related articles are included:

- National plans including
  - e. Reduce, reuse, refill and repair
  - h. Emissions and releases of plastics through its life cycle
  - i. Waste management
- National reporting and submission of National Plan



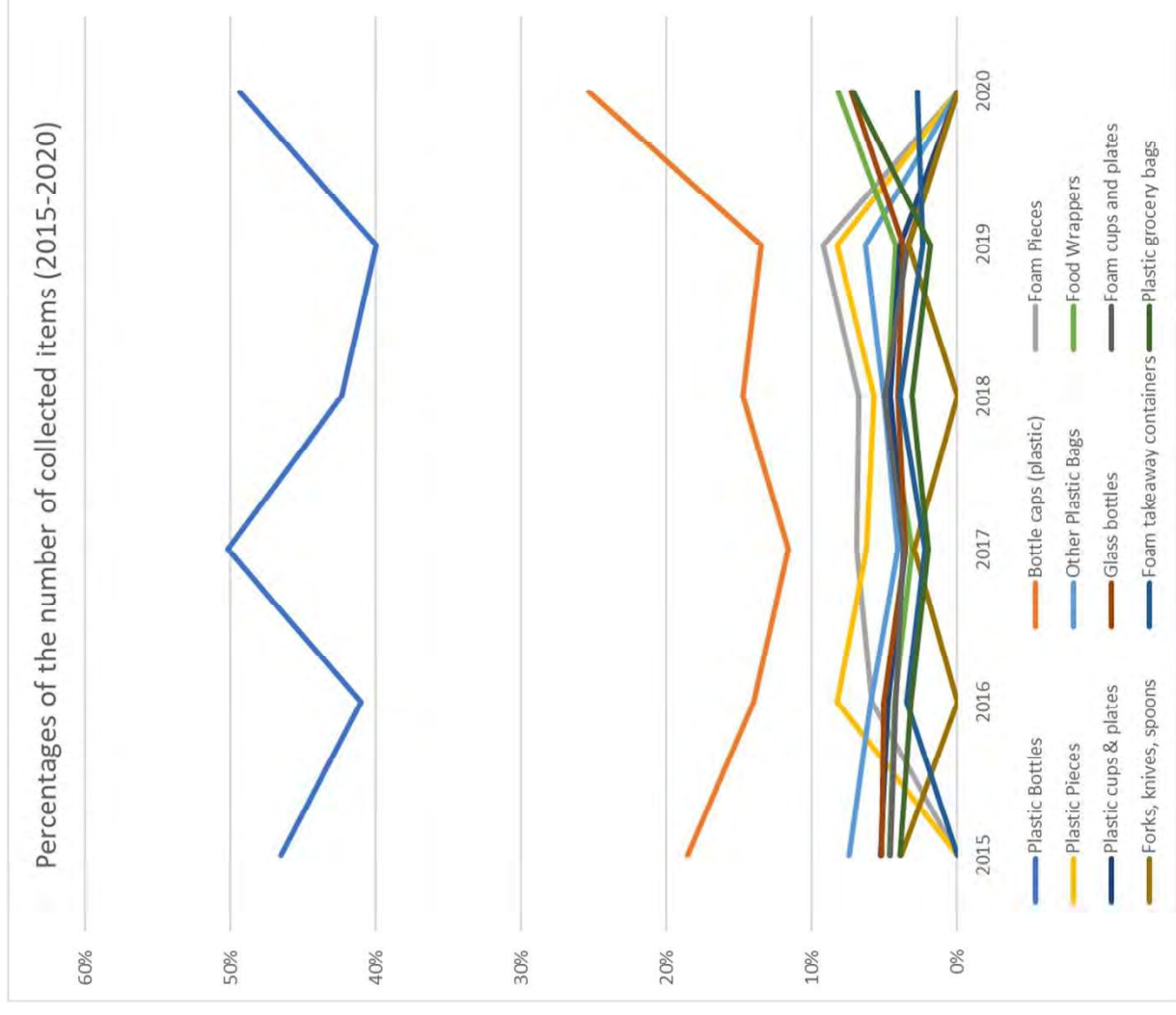
# 5 Potential to Develop Capacity

The material flow work provides not only the data but also

- Communication tool to discuss stakeholders
- Justification on why you regulate/collect/campaign plastics

Because plastic product/waste is everywhere, you can use photos/paintings/videos for your communication.

## Example of collected items by costal clean-up (data source: Jamaica Environment Trust)



# 5 Potential to Develop Capacity

The material flow work provides not only the data but also  
(For Governments or Government related authorities)

- Opportunity to think the relation bet. Env. Situation and public measures

(for example, if the Gov. ban plastic bag, plastic bag may disappear, but still plastic is everywhere.)

Need continuing effort.

***Thank you!***

***Contact: Taisuke Watanabe (Mr.)***

***[t-watanabe@exri.co.jp](mailto:t-watanabe@exri.co.jp)***





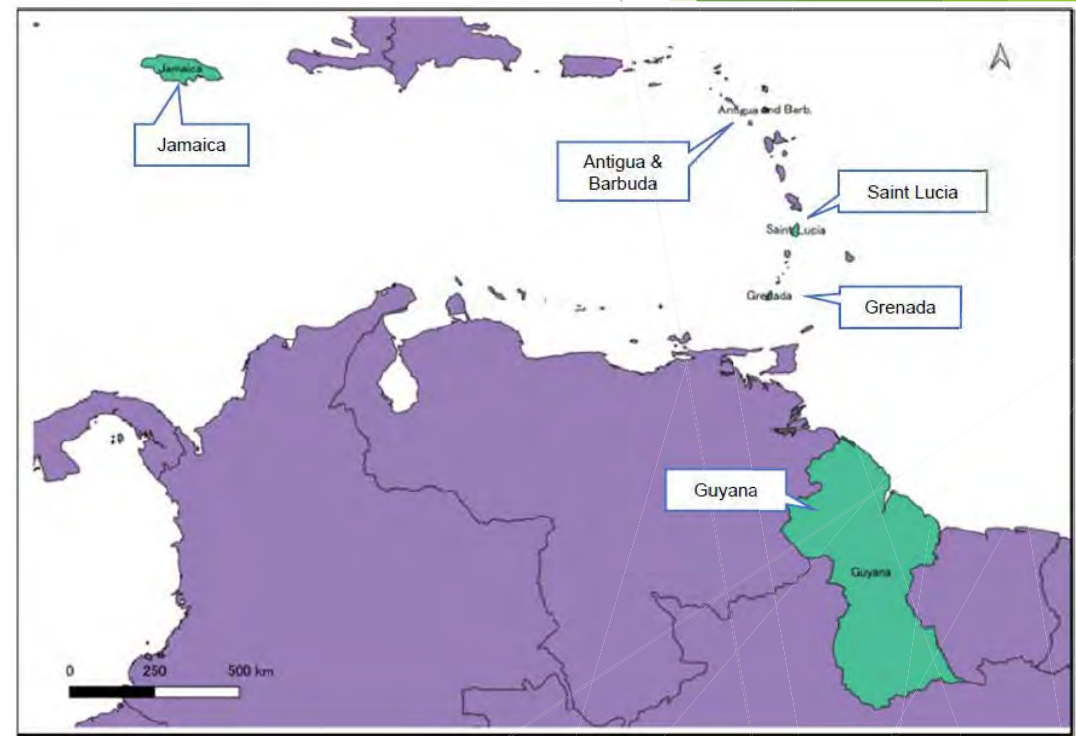
## Technical Cooperation Project on Advisor for Marine Plastic Litter Management in the Caribbean Region

**-Analysis and improvement measures for the solid waste management in the Caribbean Region-**

Ikuo MORI

# Caribbean Region

- ▶ The Caribbean is a subregion of the Americas that includes the Caribbean Sea and its islands, some of which are surrounded by the Caribbean Sea and some of which border both the Caribbean Sea and the North Atlantic Ocean. The nearby coastal areas on the mainland are often also included in the region. (Wikipedia)
- ▶ Most of the countries in the region are small island developing states, SIDS. They face high import and export costs for goods and must rely on external markets. (United Nations)
- ▶ The climate is tropical.

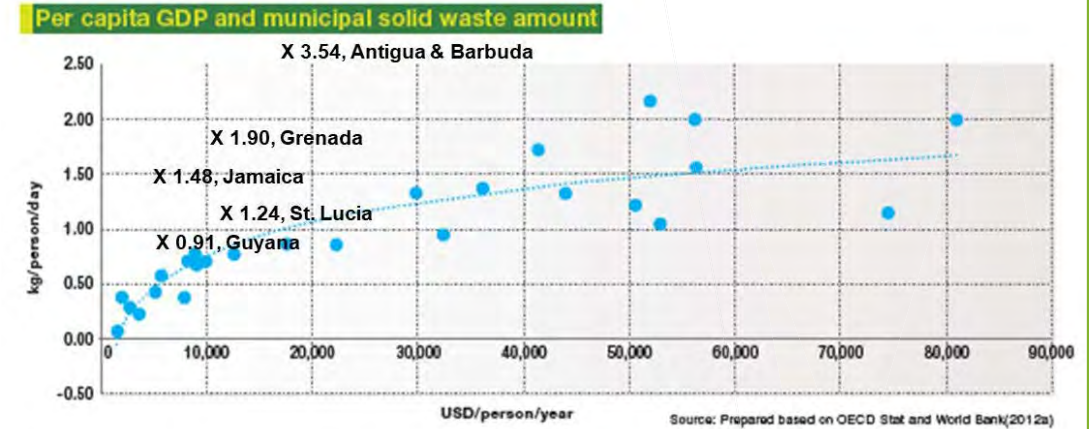


# Common challenges (1)

## Increasing amount of waste

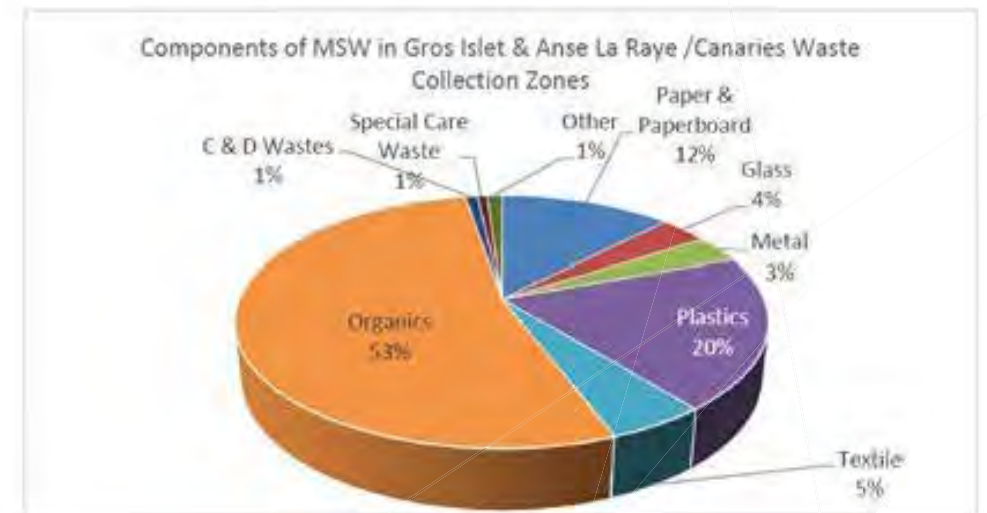
- ▶ Countries in the Caribbean region generate a large amount of waste per capita and a significant proportion of plastic, probably due to a certain level of economic development and the influence of the USA's lifestyle and culture.
- ▶ Island countries are less likely to secure new land for disposal sites due to their small land area. On the other hand, the increase in the amount of waste, especially bulky waste such as plastics, is causing serious problems in terms of decreasing the lifetime of landfills.
- ▶ In recent years, the problem of difficult-to-dispose-of materials such as waste home appliances, waste vehicles and waste tyres has also become more serious.

Figure: Waste Generation Amount per Capita



Source: Basics of Municipal Solid Waste Management in Africa, p.9 (<https://unhabitat.org/african-clean-cities-publications>) and waste generation rate reported by each country.

Figure: Waste Composition in Saint Lucia



Source: Waste Characterization Study Report by SLSWMA (2018)

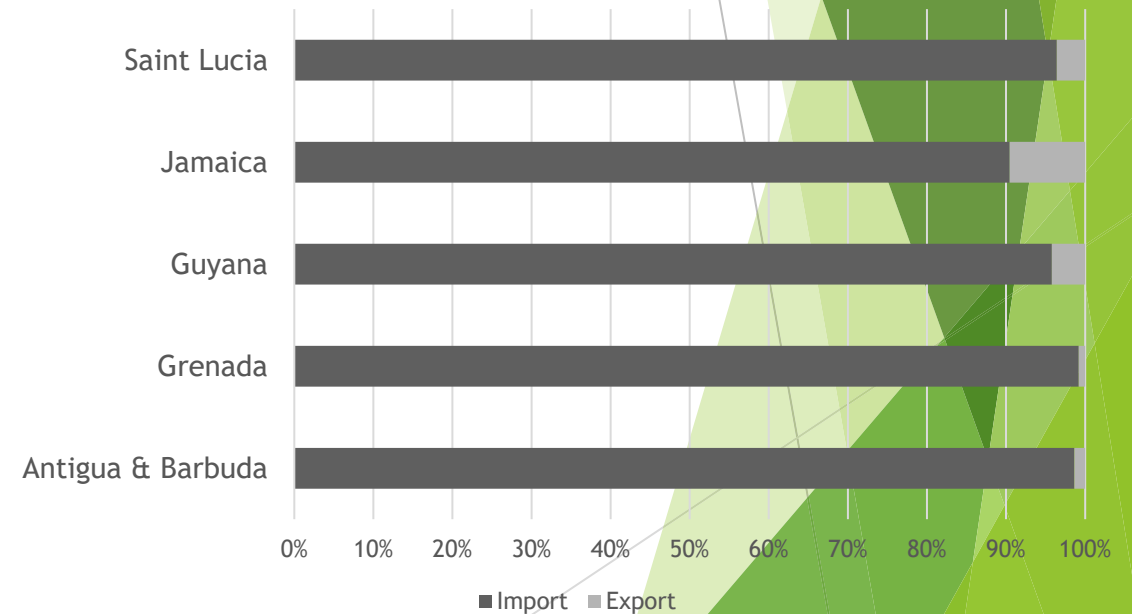
# Common challenges (2)

## One-way flow of goods

- ▶ The creation of a resource-recycling society and the promotion of a circular economy are essential for the sustainable development of a region or country.
- ▶ However, in island countries in the Caribbean region, the market is small and industries that receive recycling cannot grow. In addition, because they are far from countries with industry, transport costs are high and cannot be sent back.
- ▶ As a result, the flow of goods is a one-way from industrialized countries to the islands, and post-consumer goods accumulate on the islands as waste or flow into the environment.
- ▶ In other words, the problems of SIDS are strongly reflected in waste management.

Import vs Export

Trade (ton)	Antigua & Barbuda	Grenada	Guyana	Jamaica	Saint Lucia
Import	18,807	21,198	153,315	370,919	27,176
Export	259	174	6,741	39,181	1,009
Total	19,066	21,372	160,056	410,101	28,185



Source: UN-comtrade (<https://comtradeplus.un.org/>)

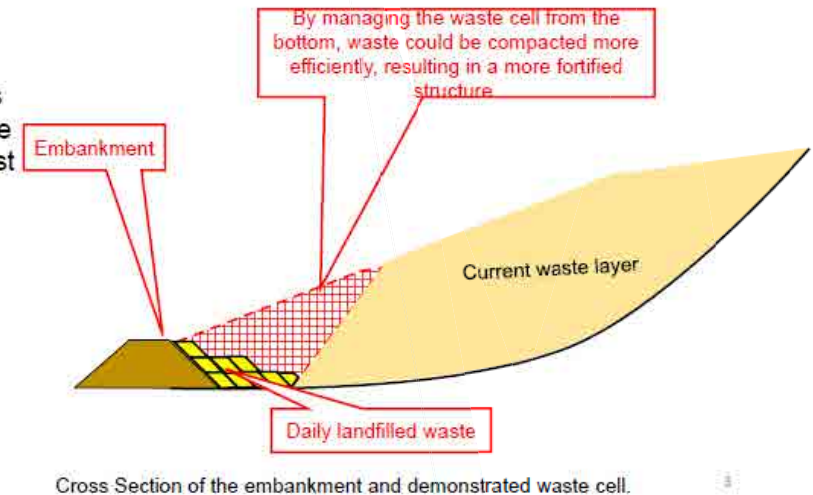


# Approaches, in Saint Lucia

- ▶ Improving landfill operations
  - ▶ Adequate compaction on slopes
  - ▶ Gas ventilation to prevent fire and accelerate waste decomposition
  - ▶ Monitoring leachate quality
- ▶ Extending the life of the landfill
  - ▶ The life of the landfill is expected to be extended by 10 years through the following measures:
    - ▶ Construction of the embankment at the bottom of the waste slope,
    - ▶ Compaction from bottom to top,
    - ▶ Modification of the access road, etc.
  - ▶ Composting is being implemented on a trial basis, and if the scale of composting is increased in the future, it is expected to further extend the life of the landfill.

## Slope Collapse mitigation and landfill operation improvements

An embankment was constructed under the slope at the southeast end to demonstrate the method of waste management and compaction from a bottom to the top perspective.

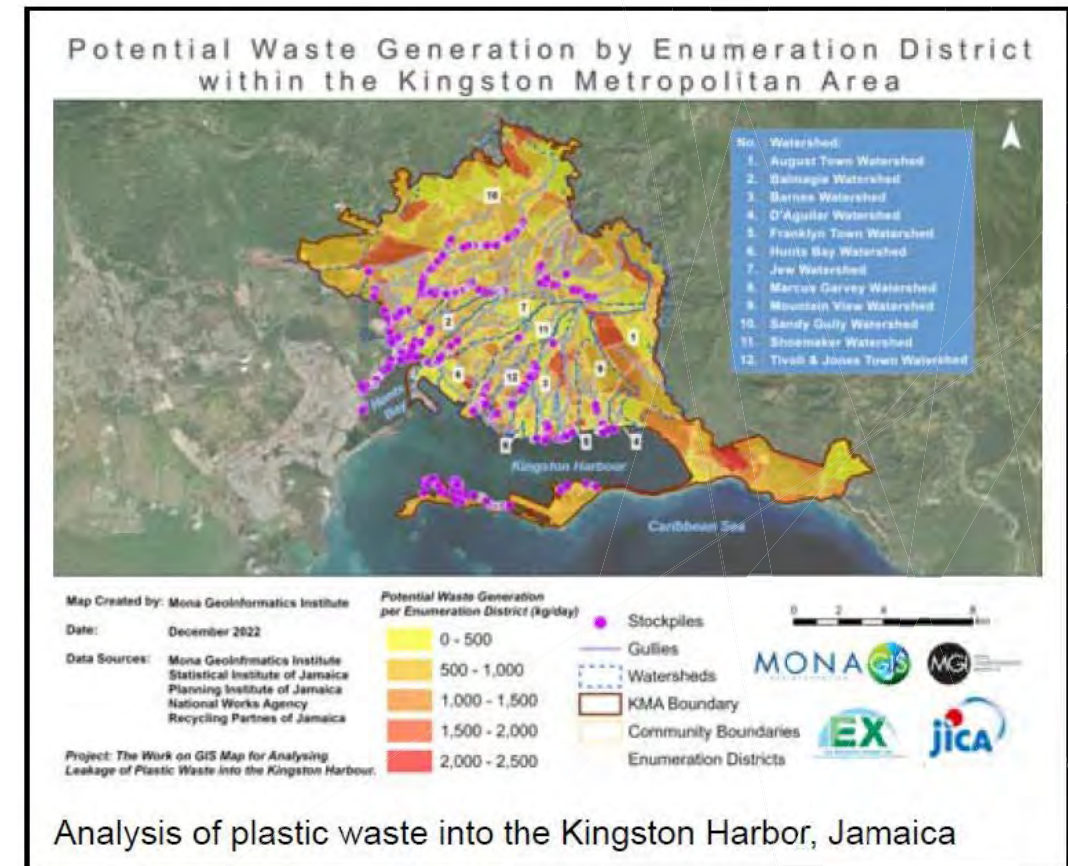


# Approaches, in Jamaica

- ▶ Plastic waste regulations
  - ▶ Jamaica has already enforced a law against single-use plastics from January 2019.
  - ▶ The government is working to expand the items covered by the single-use plastic law, and to introduce a deposit return system for plastic containers.

- ▶ GIS map for analysing plastic waste leakage into Kingston Harbour

- ▶ In Kingston, the dumping of waste into waterways and its inflow into Kingston Harbour has become a social problem with negative impacts on mangrove forests and fisheries.
  - ▶ The project used GIS to analyse the causal relationship between terrestrial collection services and community conditions and the discharge of plastic waste into Kingston Harbour.





# Approaches, in Guyana

## ► Solid Waste Management Plan

- Assisting the government in developing waste management plans.
- As a part of this pilot project, basic surveys, such as a waste amount and composition survey and time and motion survey, are conducted
- It is expected that after the project, officials of the government will develop waste management plans for other regions by themselves.



# New challenges

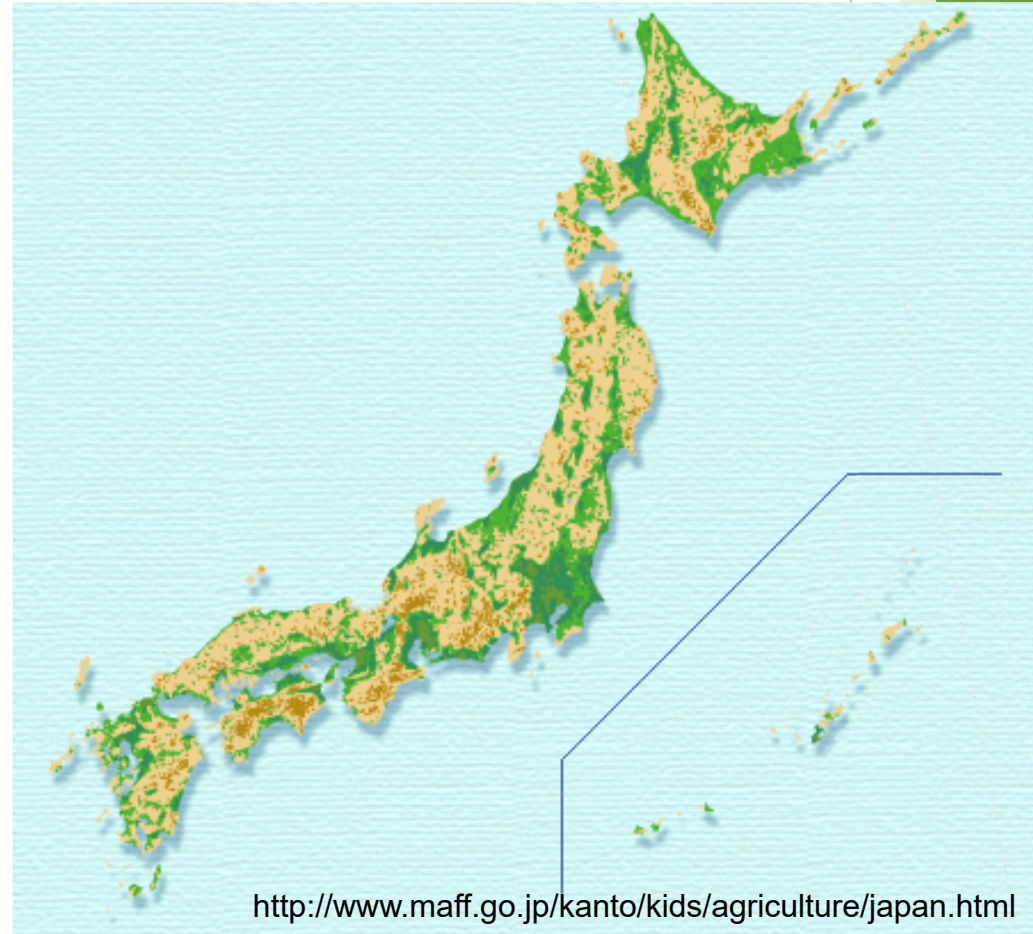
## - towards Zero Waste Society

- ▶ Conventional SWM, such as collection, transport and final disposal, must be carried out properly.
- ▶ In addition, we need to minimise waste as much as possible to reduce environmental impact and conserve limited resources.
- ▶ To do this, we need to establish new policies, use new technologies, and gain the participation and cooperation of various stakeholders.

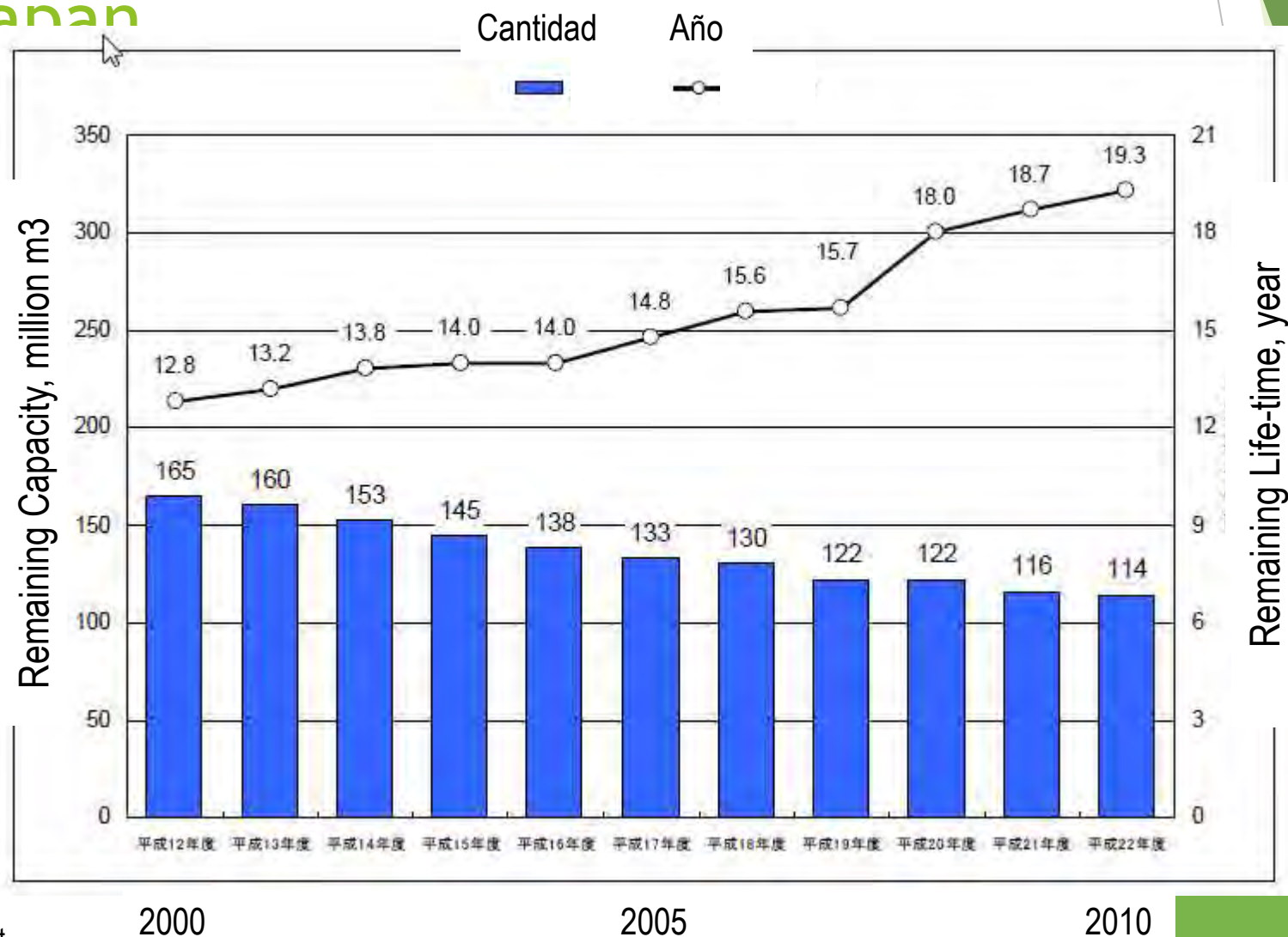


# Lack of final disposal sites

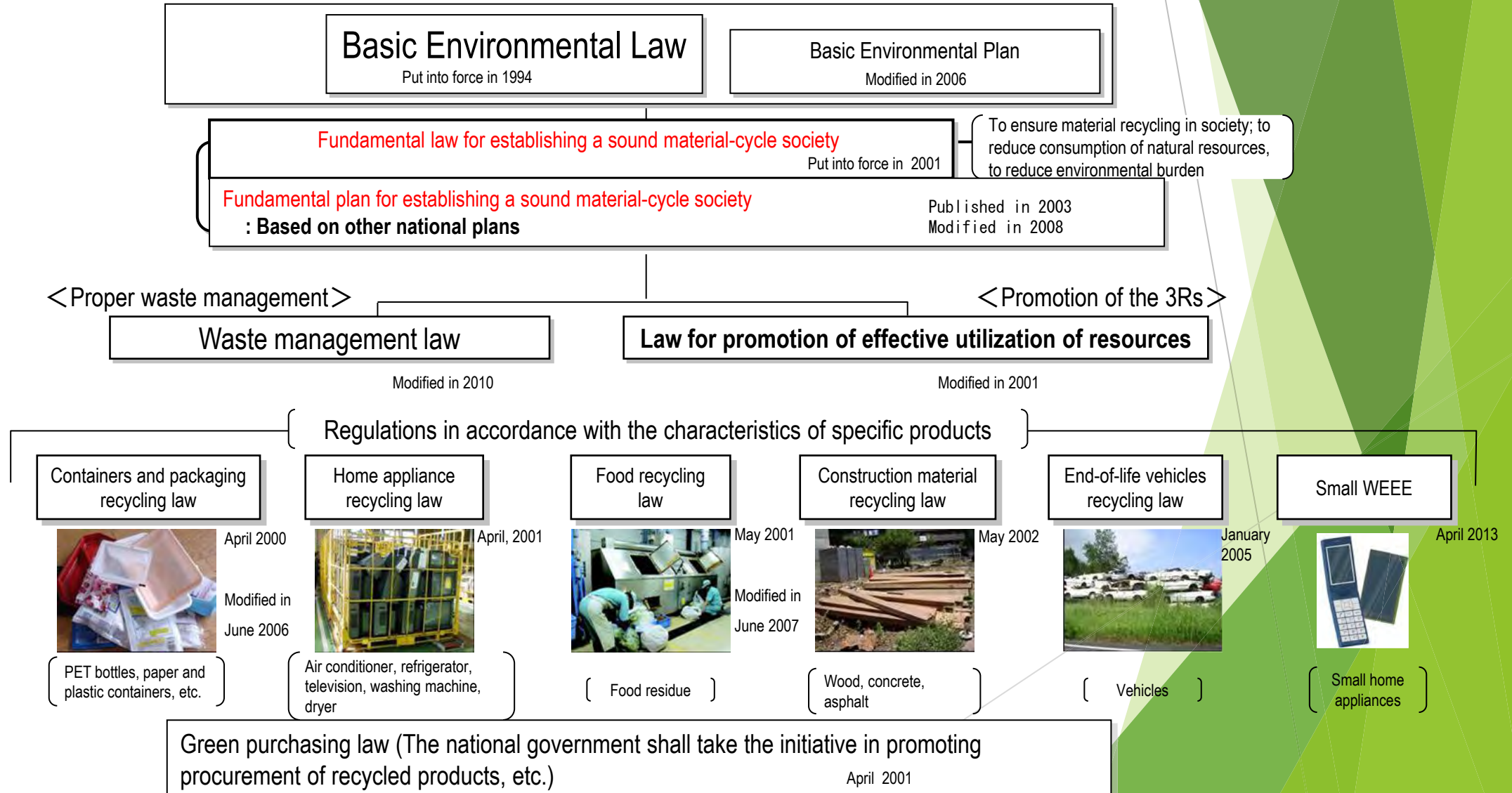
- ▶ Japan has a territory of 380,000 km<sup>2</sup>.
- ▶ 70% of the territory is mountainous and forest.
- ▶ 120 million people live in 30% of the territory.
- ▶ It's very difficult to find sites for landfills.



# Remaining Capacity and Life-time of Sanitary Landfills for Ordinary Waste in Japan



# Legislative system of the Solid Waste Management in Japan



# Incineration in Tokyo



**Shin-kouto incineration plant**  
(capacity: 1,800t/d)  
(capacity of electricity generation: 50,000kW)

**Toshima incineration plant**  
(capacity: 400t/d)  
(Capacity of electricity generation: 7,800kW)





# Compost



Source:

<http://ja.wikipedia.org/wiki/%E5%A0%86%E8%82%A5%E5%8C%96%E6%96%BD%E8%A8%AD>

# Food residue for animal feeding



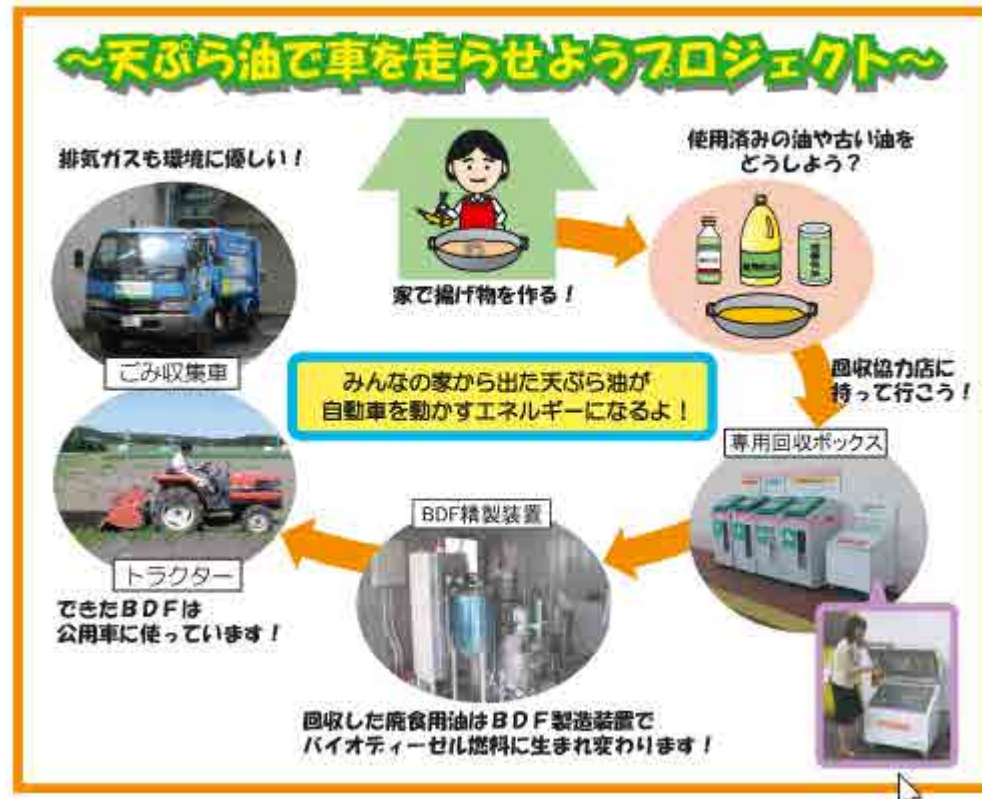


# Bio gas production from food waste



Methane fermentation

# Bio diesel made from used cooking oil



市長がBDFをごみ収集車に給油する様子（H18.9.4出発式にて）

Source:

<https://www.city.hachinohe.aomori.jp/index.cfm/24,4160,122,163.html>



# Refuse derived paper and plastics fuel (RPF)



$\phi$ 40mm $\phi$ 20mm $\phi$ 8mm	<b>Lower calorific value</b>	
	6,000kcal/kg級 :	Coal,
	8,000kcal/kg級 :	coke



Source: <http://www.jrpf.gr.jp/index.html>

# Cement plant as recycling facility



廃プラスチック (破碎不要品)



Plastics as fuel

廃タイヤ



Tire as fuel

汚泥



Sludge as raw material

廃酸・廃アルカリ



Waste acid and alkali as fuel



# Eco-cemento

Ash is used for production of eco-cement.



**Eco-cement plant**



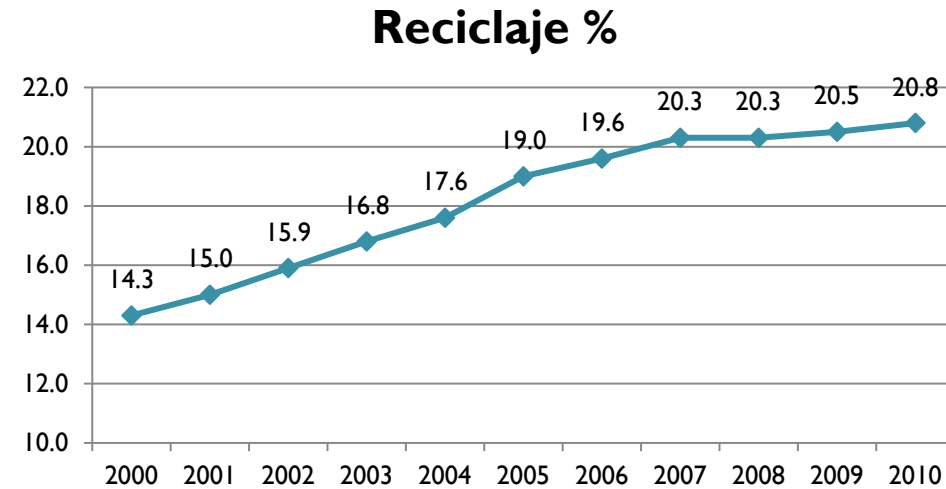
**Bench**



**Interlocking block**

# Recycling rate in Japan

## Transition of recycling rate; average in Japan

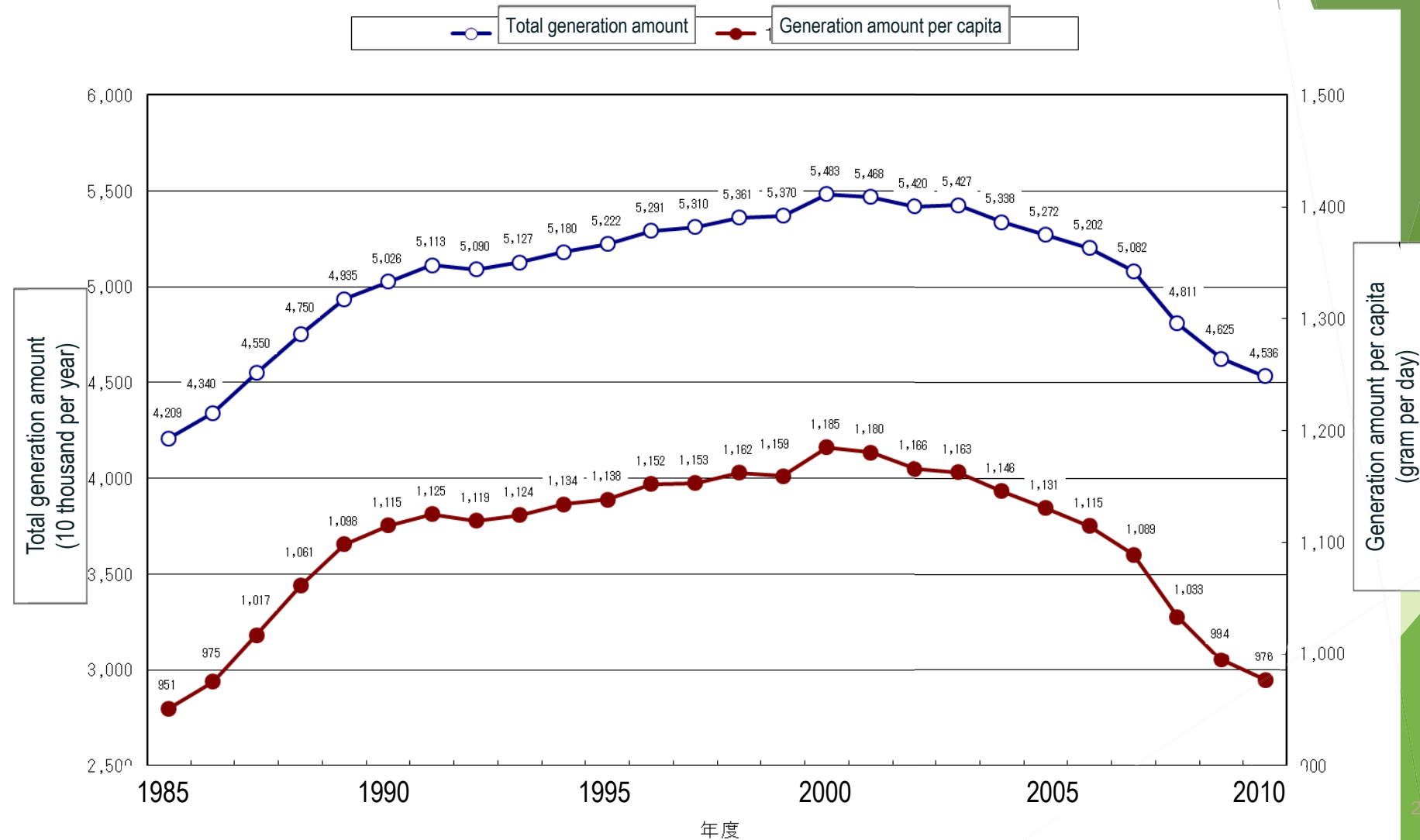


## Forerunners in recycling

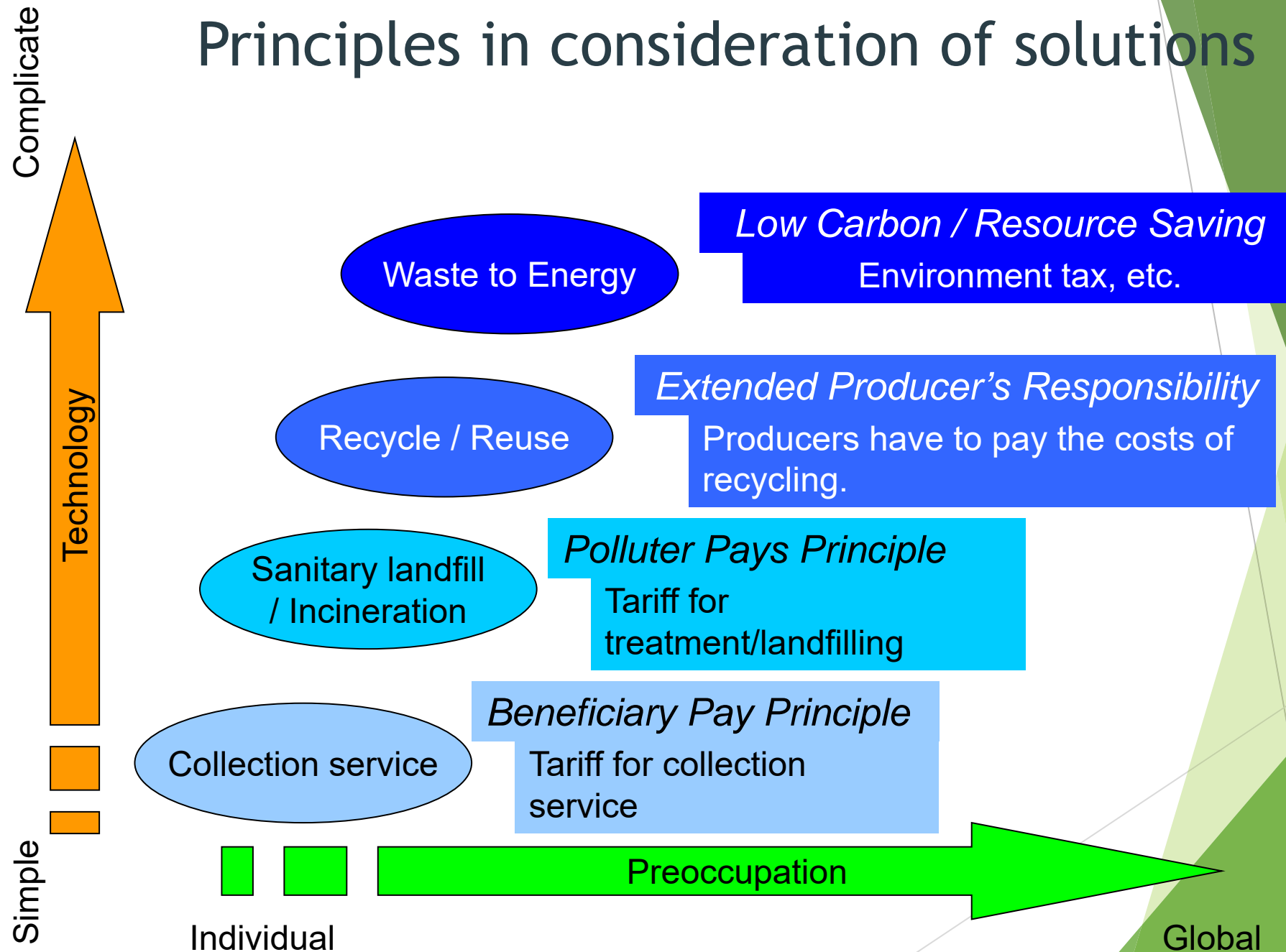
	-100,000		100,000 - 500,000		500,000 -	
1	Osaki	80.7%	Kurashiki	47.8%	Chiba	30.8%
2	Shibu	75.3%	Kamakura	46.5%	Kitakyushu	29.0%
3	Tikuhoku	66.8%	Chyofu	46.2%	Nagoya	27.9%



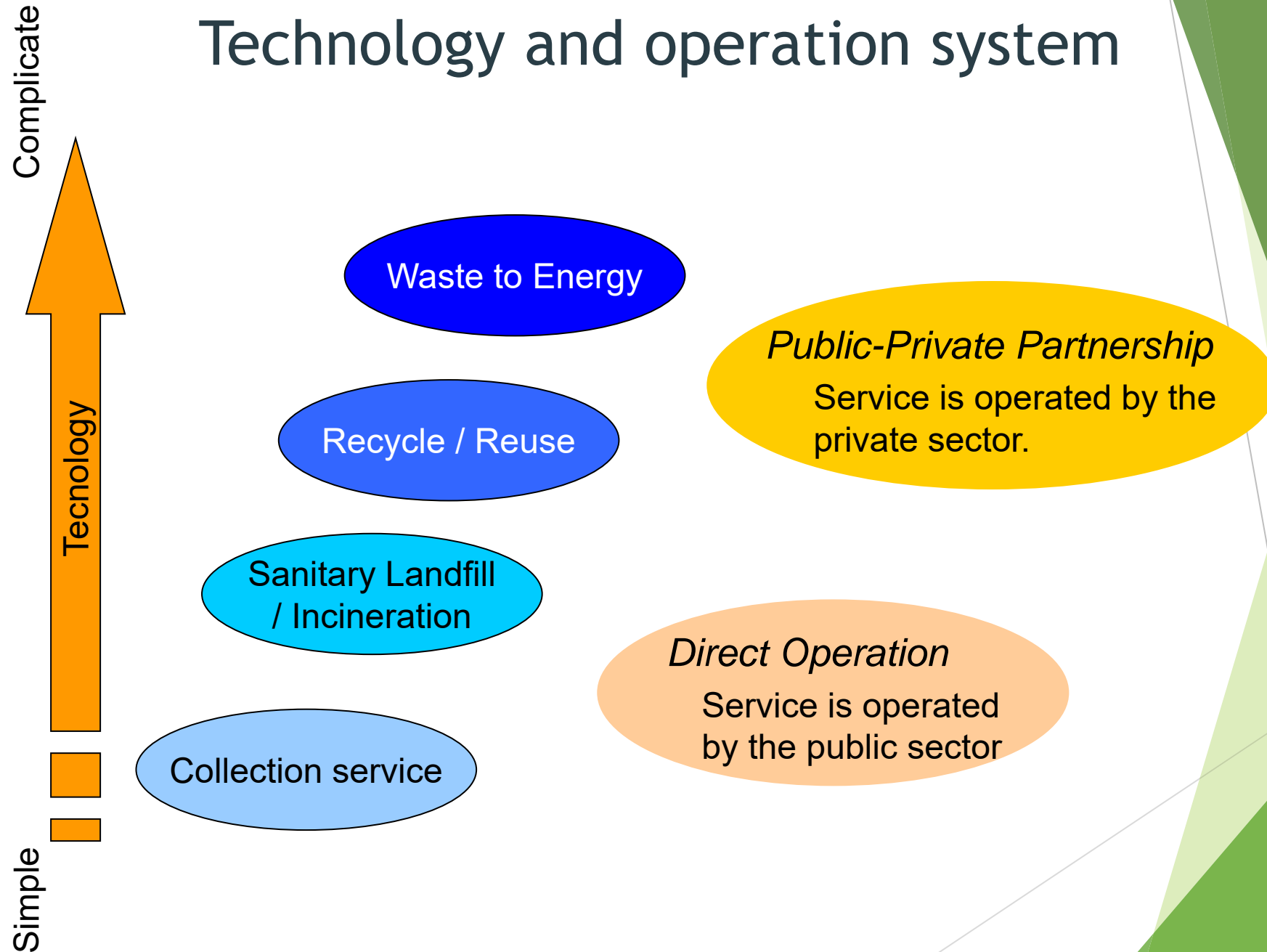
# Transition of ordinary waste generation



# Principles in consideration of solutions



# Technology and operation system



# Public-Private Partnership

## Private Sector

- ▶ Technology innovations are required in a short time.
- ▶ Operation has to be efficient, transparent and responsible.
- ▶ There is a possibility to efficiently use financial resource of the private sector.

## Public Sector

- ▶ Has to guarantee the service quality.
- ▶ Has to establish a legal/institutional system which guarantees efficiency, transparency and sustainability of the SWM.



How can we move towards a zero-waste society?

**Work together**

# Approaches, Information sharing

- ▶ Workshop and Seminar
  - ▶ 1<sup>st</sup> workshop in Saint Lucia, March 2022
  - ▶ 2<sup>nd</sup> workshop in Jamaica, August 2022
  - ▶ 3<sup>rd</sup> workshop in Saint Lucia, March 2023
  - ▶ Final seminar in Guyana, October 2023
- ▶ Monthly Technical Online Meeting
  - ▶ 17 times from May 2022 to September 2023
- ▶ Best practices
  - ▶ Shared 35 times via SharePoint (website for members only)



# Collaboration with regional institutions and private sectors

- ▶ Caribbean Community, CARICOM
- ▶ Organisation of Eastern Caribbean States, OECS
- ▶ United Nations Environment Programme, UNEP
- ▶ Mona Geoinformatics Institute (MGI) at the University of the West Indies, Jamaica
- ▶ GraceKennedy Foundation, Jamaica
- ▶ Recycling Partners of Jamaica
- ▶ Puran Brothers, Guyana
- ▶ Cevons Waste Management, Guyana

# From conventional solid waste management to zero waste society in the Caribbean

- ▶ Use fewer plastic products: ban on single-use plastics, use of biodegradable plastics (composting should be introduced at the same time)
- ▶ Extended Producer Responsibility, EPR, should be adapted for wastes which are difficult to dispose of, such as plastics, e-waste, vehicles and tyres.
- ▶ The Region, not individual countries, needs to speak up for returning difficult-to-process materials to the country of origin.
- ▶ For this reason, it is important that countries exchange information on a regular basis.
- ▶ The Caribbean as SIDS should have a voice in the consultations on the new Plastics Convention (End Plastic Pollution) currently underway at the UN.



Thank you very much for your  
attention.



# Zero Waste in the Caribbean: New Ways, New Waves



Funded by  
the European Union

In Collaboration with:

CARIFORUM

Co-Financed by:



Implemented by:



**giz**

Deutsche Gesellschaft  
für Internationale  
Zusammenarbeit (GIZ) GmbH

In partnership with:







# Introduction to the Programme



In Collaboration with:

**CARIFORUM**

Co-Financed by:



Implemented by:



In partnership with:



# INTRODUCTION TO THE PROGRAMME

## Background



### Programme Overview

The 11th European Development Fund is financing this five-year regional programme

### Beneficiary

CARIFORUM Member States

### Implementing Agencies

Agence Française de Développement (AFD)

Deutsche Gesellschaft für Internationale

Zusammenarbeit (GIZ) GmbH

United Nations Environment Programme (UNEP)

### Partnership

Organisation of Eastern Caribbean States (OECS)

### Funding



EUD  
EUR 8.70 M

BMZ  
EUR 1.20 M

### Duration

Start date: 2022

End date: December 2026

Total: 5 years



### Contribution to SDGs



In Collaboration with:  
**CARIFORUM**





# INTRODUCTION TO THE PROGRAMME

## CARIFORUM Member states



# INTRODUCTION TO THE PROGRAMME

## Objectives and Expected Outcomes



### Programme objectives

#### Overall Objective

The **overall objective** of this programme is to strengthen the EU-Caribbean partnership for cooperation in the field of circular economy in general and of solid waste management in particular; and improve the resource efficiency of Caribbean economies.

#### Specific Objective

The **specific objective** is to better align solid waste management systems in Caribbean countries with circular economy principles and National Determined Contributions and make them more able to attract investments.



In Collaboration with:

CARIFORUM

Co-Financed by:



Implemented by:



In partnership with:



# INTRODUCTION TO THE PROGRAMME

## Objectives and expected outcomes



### Programme expected outcomes

1. **Robust solid waste management legal and strategic frameworks** are developed, in the context of promoting a circular economy for the region.
2. **Capacity for sustainable consumption and sustainable waste management** in targeted areas is enhanced.
3. **Investment opportunities** in the solid waste sector are defined and facilitated.
4. **Increased awareness of the EU-CARIFORUM partnership** by Caribbean institutions and citizens, including in the field of solid waste management and circular economy.



# INTRODUCTION TO THE PROGRAMME

## Implementing partners



Agence Française de Développement (AFD)  
Organisation of Eastern Caribbean States (OECS)

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Deutsche Gesellschaft für Internationale  
Zusammenarbeit (GIZ) GmbH

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UN Environment Programme (UNEP)

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# INTRODUCTION TO THE PROGRAMME

## Governance Bodies: Terms of Reference



### The Regional Programme Steering Committee (RPSC)

The RPSC is set up to monitor progress in programme execution, to report on regional and national level activities, to provide strategic and policy guidance to the Programme, and oversee and validate the overall direction of the action (approve all strategic orientation, annual work plans and budgets). Co-chaired by the CARIFORUM Directorate and the EU Delegation in Barbados, comprises key stakeholders of the Programme, including a representative from NFC, and representatives from the IP (AFD, GIZ and UNEP), including the OECS Commission.

### Programme Management Committee (PMC)

The PMC is the core group, which comprises the EU and the Implementing Agencies. Project management will be the responsibility of this PMC, coordinated by UNEP. The PMC will discuss and review operational aspects, review and decide on budgetary issues, discuss and review relevant aspects of reports from IP, preparations for meetings of other governance bodies, plan technical assistances, discuss visibility measures such as participation in relevant meetings, provide guidance for the coordination of C&V activities.

### Regional Technical Advisory Committee (RTAC)

The RTAC is a scientific and technical body which provides specialist expertise to the Programme to help guide on relevant issues which need to be considered during implementation. The RTAC is an ad hoc, non-decision-making body. UNEP will be the Chair of the RTAC. Members may also be drawn from the national, regional or international bodies and relevant stakeholders, and core membership will be determined by the PMC. Each IP will nominate a technical person to interface with the RTAC.



In Collaboration with:

CARIFORUM

Co-Financed by:



Implemented by:



In partnership with:





# Activities of the Programme

# Activities of the Programme

## Implementation of the action: AFD / OECS



### Recycle OECS Project

**Overall objective:** to reduce plastic pollution at sea and/or ending its course in rivers or uncontrolled landfills.

- **Funded by:** European Union (EU)
- **Budget:** EUROS 2 336 448
- **Implementing Agency:** Agence Française de Développement (AFD)
- **Grant Beneficiary:** Organisation of Eastern Caribbean States (OECS)
- **Timeframe:** February 25, 2022 – May 18, 2025

### Component 1: OECS model and pilots: Scope

Development of an OECS Model based on business viability and self-sustaining. Details of elements of the model including the approach, tools, protocols, mechanisms for: [structuring of the collection](#), [transportation and exportation](#), [conditions of treatment](#), [stakeholder involvement](#), [partnerships](#), [incentives mechanism](#), [monitoring](#). And pilots in two countries to demonstrate the OECS Model.

### Component 2: public awareness

Prepare a stakeholder engagement strategy and a Communications Strategy and Implementation Plan. Roll Out of Communications Strategy and Implementation Plan, including Producing all awareness products and materials.

# Activities of the Programme

## Implementation of the action: GLZ



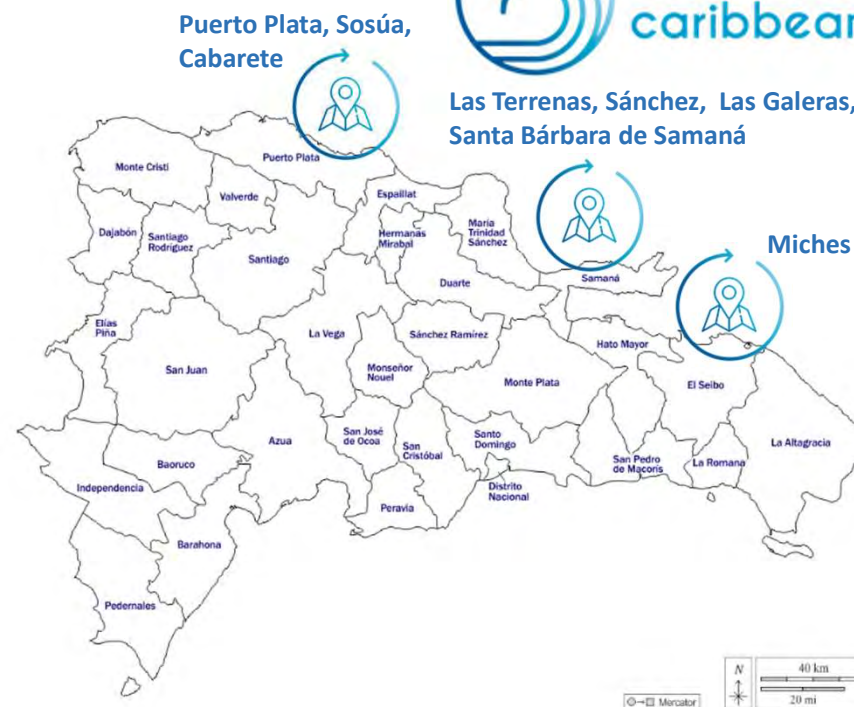
09/2021 – 09/2023



4,2 Mio. € - European Union (EU) and the Federal Ministry for Economic Cooperation and Development (BMZ)



- **Output 1: Regional exchanges** on challenges and solutions to prevent the entry of plastic waste into the Caribbean Sea are established.
- **Output 2:** The **capacities of the private sector** for the management of plastic waste in the Dominican Republic are strengthened.
- **Output 3:** In selected **pilot areas** of the Dominican Republic, the implementation of processes to prevent the discharge of plastic waste into the Caribbean Sea is improved.
- **Output 4:** The **awareness of the population and the private sector** in the Dominican Republic to avoid the discharge of plastic waste into the Caribbean Sea has increased.





# Activities of the Programme

## Implementation of the action: UNEP



### Brief Description of the Action

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UNEP contributes to the achievement of the following outputs:

1. Strengthened solid waste management **legal and strategic frameworks**
2. Increased **knowledge and capacity** to deliver information-based policy action
3. Enhanced coordination and **cooperation, policy dialogue, and increased awareness**

### While ensuring Regional Coordination and Cooperation:

- Regional level coordination of the programme, providing facilitating and collaboration support as relevant
- General coordination of the governance bodies, including RPSC, PMS, RTAC.
- Alignment of the programme with parallel initiatives.
- Stakeholder management over a wide range of regional and national organizations.
- Coordination of the visibility, communication, and awareness plans of UNEP and the other IPS.
- Best practices, lessons learned and successful technology options from the GIZ and AFD outputs.
- Coordination with NFPs, sectoral ministries, as well as other relevant authorities and institutions.
- Involve civil society, local communities, women, youth, disadvantaged and vulnerable groups.

# Activities of the Programme

## Implementation of the action: UNEP



### UNEP Outputs and actions

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#### Output 1: Strengthened solid waste management legal and strategic frameworks

- 1.1 Development of a regional guidance framework**, for the strategic planning and national action in the waste sector in Caribbean countries.
- 1.2 Development of national strategic planning and legislative frameworks**, by identifying and providing technical assistance to 5 target countries.
- 1.3 Assist with enabling frameworks and instruments**, to facilitate investment and sustainable financing of waste management.
- 1.4 Assessment of suitable waste management options**, including waste to energy.

#### Output 2: Increased knowledge and capacity to deliver informed-based policy action

- 2.1 Status of waste management and circular economy in the Caribbean.**
- 2.2 Strengthen waste information systems and digitalization of the waste sector**, by identifying and providing technical assistance to 4 target countries.
- 2.3 Knowledge generation and dissemination and capacity building:** develop a regional training, on waste management statistics and indicators.

#### Output 3: Enhanced coordination and cooperation, policy dialogue, and increased awareness

- 3.1 Mapping, engagement, and coordination with relevant stakeholders:** develop permanent database of stakeholders, contacts, initiatives and projects.
- 3.2 Promote regional cooperation and policy dialogue**, through different platforms and entities.
- 3.3 Communication and visibility and awareness raising.**





# Thank you

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## Zero Waste in the Caribbean: New Ways, New Waves



In Collaboration with:  
**CARIFORUM**







# Organisation of Eastern Caribbean States

## OECS Fostering a Circular Economy Approach

**JICA Seminar:** *Technical Cooperation Project on Advisor for  
Marine Plastic Litter Management in the Caribbean Region -  
Reducing marine plastic wastes through appropriate solid waste  
management on the land*



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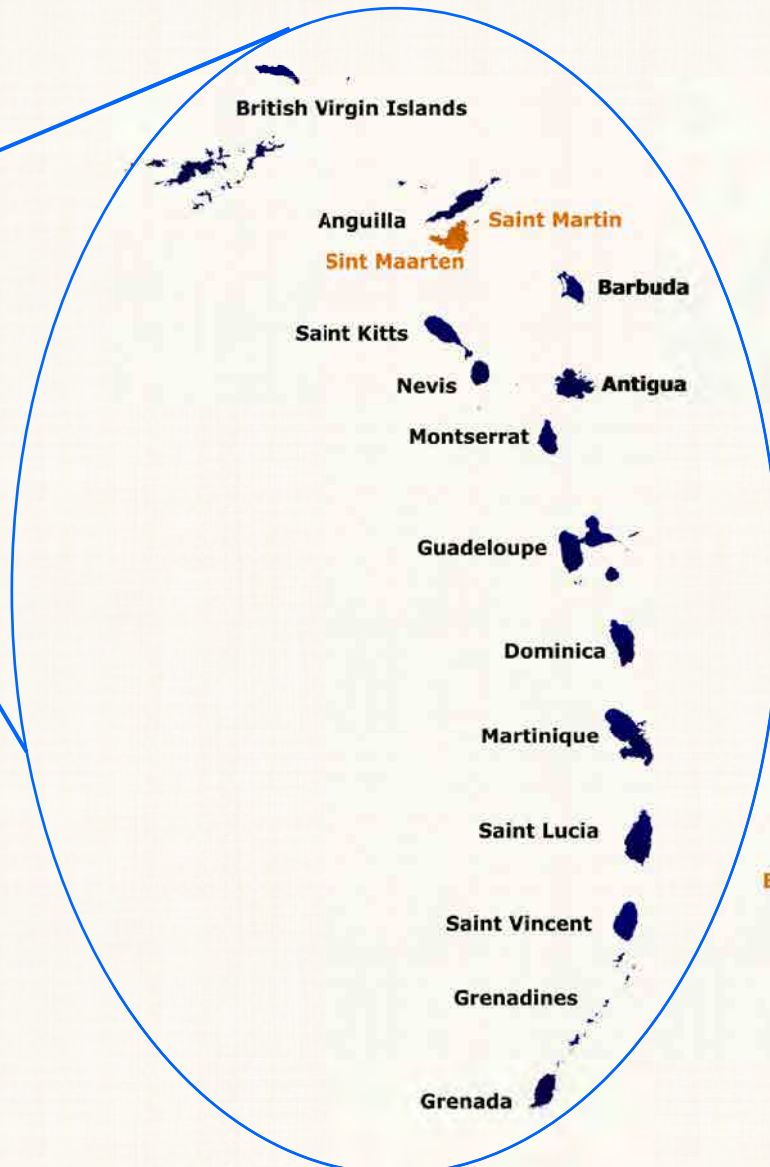


# Organisation of Eastern Caribbean States



**RTB Art 4.2** ... Member States shall ... co-ordinate, harmonise and undertake joint actions and pursue joint policies particularly in ...  
(o) matters relating to the sea and its resources;

**RTB Art14** Areas of legislative competence of the Organisation ...  
(b) environmental policy







OECS

Chemicals, Waste and Pollution  
Programme  
(CWP)

*Island System Management*

## Decisions of the OECS Council of Ministers for Environmental Sustainability (2018):

- ... address new and emerging challenges for the management, reduction and recycling of **terrestrial and ship-generated waste**
- ... implement effective measures that contain and **reduce marine plastic pollution**

## St George's Declaration (2020):

- Implement an **integrated approach** to waste management nationally and regionally
- Promote and develop the **circular economy** nationally and regionally

## CWP Priority Areas:

- Promote and facilitate circular economies – regionally and nationally
  - Harmonize policy, legislation and roadmaps
  - Increase awareness, education and outreach
  - Build capacity of Member States to effectively manage waste
  - Increase investments in plastics management
  - Support and promote green procurement
  - Create partnerships and resources for research, development, innovation and technology introduction
  - Facilitate public and private sector waste management innovative financing solutions
- 



# ReMLit Project

## Building Resilience in the Eastern Caribbean through the Reduction of Marine Litter

Oct 2019-Nov 2024

Title	Primary Deliverables and Accomplishments
<b>Regional Component</b>	<ul style="list-style-type: none"> <li>Strengthening the Enabling Environment in the OECS for effective waste management.</li> <li><b>Design of an Incentive Programme for Reduction of Marine Litter.</b></li> <li>OECS Regional Public Awareness and Sensitization Campaign.</li> <li><b>Exploring Waste Business Opportunities in the OECS</b></li> </ul>
<b>National Component</b>	<ul style="list-style-type: none"> <li>Continued implementation of national interventions through consultancy services, recycling and waste separation equipment and public education and sensitization.</li> </ul>



In partnership with:





# Recycle OECS Project

Feb 2022 - May 2025

Implementing Agency:  
AFD in partnership with OECS

Title	Primary Deliverables
<b>OECS Model</b>	<b>OECS Model</b> for waste separation, collection, and recycling program for the OECS, taking into account a regional approach, self financing, sustainability, and business viability.
<b>Country Pilots</b>	<b>Demonstration</b> of the OECS model in 2 countries
<b>Communications and Visibility</b>	<b>Regional Campaign</b> - Creating high visibility for the overall project, its milestones, successes, and impacts. Context – Blue, Green Circular economies



ZERO WASTE IN THE CARIBBEAN:  
NEW WAYS, NEW WAVES



Funded by  
the European Union

Implemented by:



In partnership with:





# UBEC Project

2022-2027

Unleashing the Blue Economy of  
the Caribbean (UBEC)

Title	Primary Deliverables
<b>Component 1 - Strengthening Governance, Policies, and Capacity building for key productive sectors/areas</b>	Development of regional policies and strategies in the areas of Tourism, <b>Waste Management</b> and Fisheries.
<b>Component 2 – Scale up Access to Finance</b>	Execution of a regional <b>Micro, Small and Medium Enterprise (MSME) matching grants</b> programme
<b>Project Management, Communication and Regional coordination</b>	Manage implementation and ensure visibility for the overall project, its milestones, successes, and impacts.



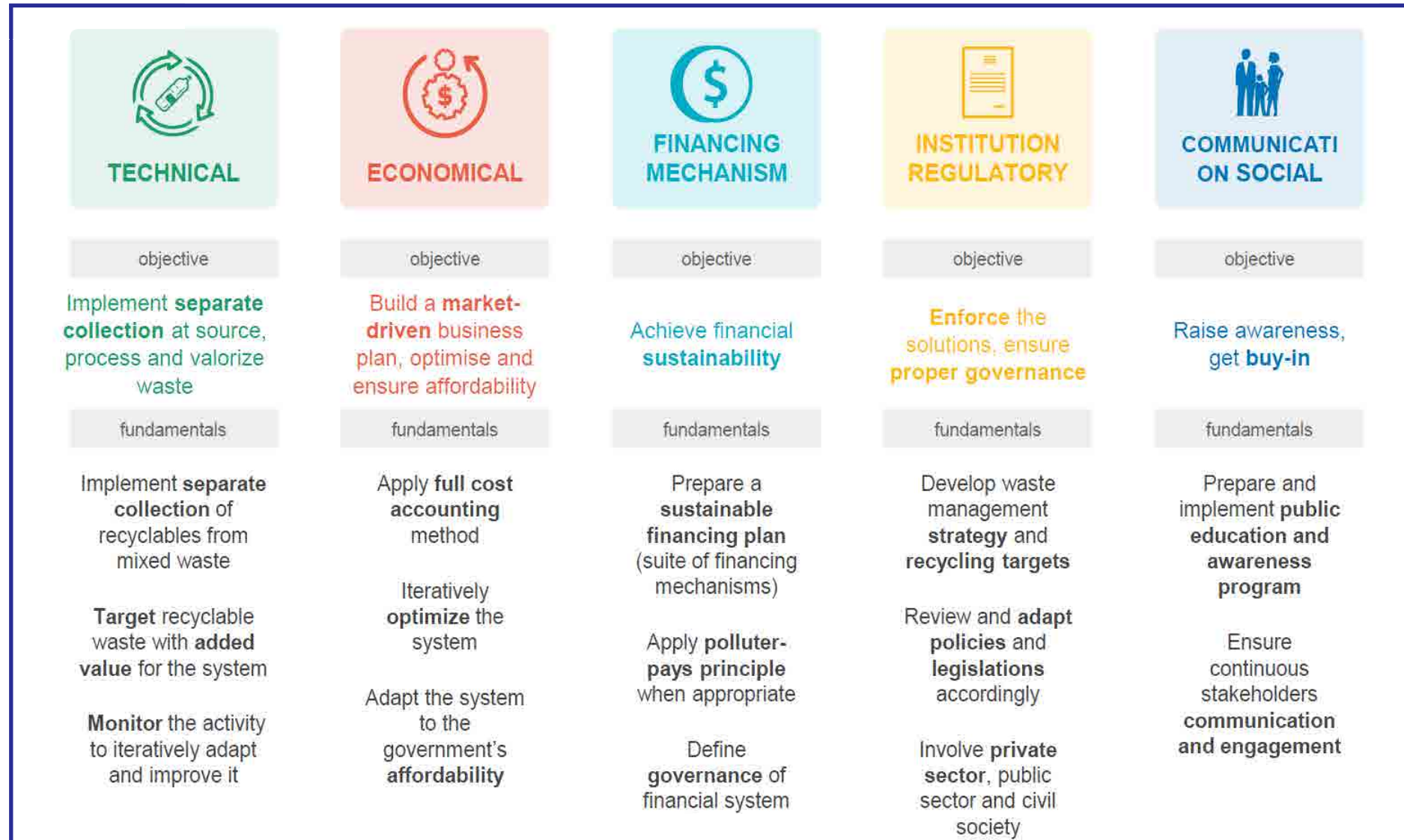
# OECS Model for Plastic Waste Separation, Collection and Management



**ReMLit**  
Tackling Ocean Pollution from Turf to Surf



Norwegian Ministry  
of Foreign Affairs





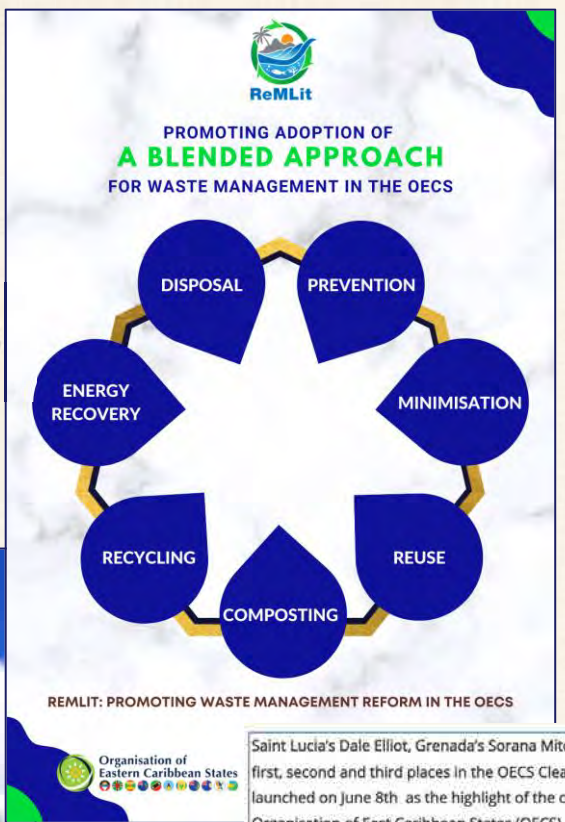
# Public Awareness Campaigns



**ReMLit**

Tackling Ocean Pollution from Turf to Surf

## Infographics



## Music Video



## Billboards



Green Actions, Blue Oceans

Saint Lucia's Dale Elliot, Grenada's Sorana Mitchell and Antigua's Joanne Hillhouse have captured the first, second and third places in the OECS Clean Oceans Journalist Challenge. The Challenge was launched on June 8th as the highlight of the commemoration of World Oceans Day by the Organisation of East Caribbean States (OECS).



## Journalist Challenge



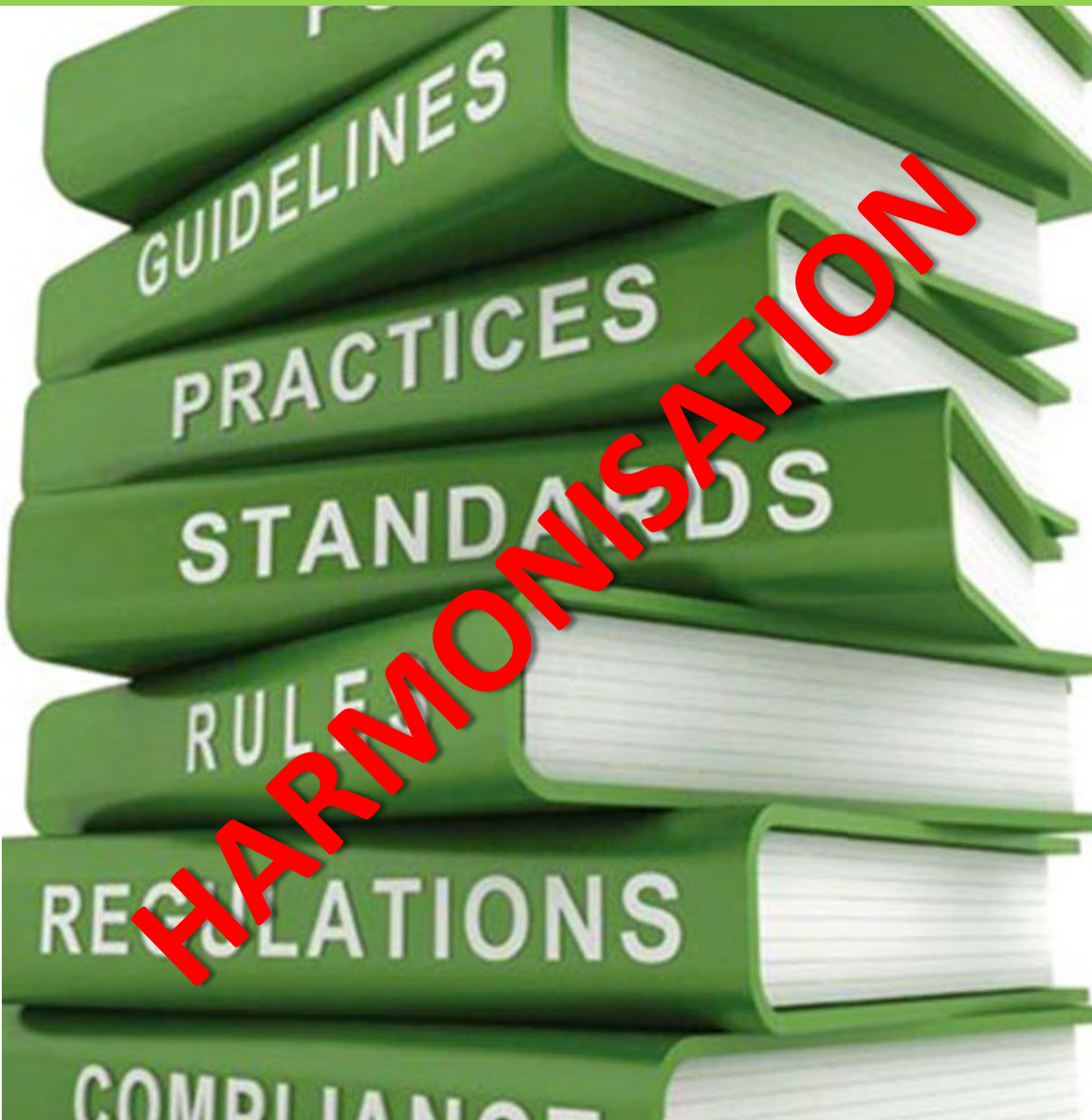
### THE CIRCULAR ECONOMY: HOW EVERYONE CONTRIBUTES

- Design products to last
- Maintain a closed-loop system by keeping products and materials in use
- Practicing the 7Rs of sustainability:





# Policies and legislation



**1994** - OECS Solid and Ship-Generated Solid Waste Management Project - **national solid waste management policies and waste management legislation enacted**

**2021** - OECS Guidelines on **Marine Pollution Legislation**

**2022** - OECS ReMLit Project drafted National Legislation:

Litter Control and Prevention Act

Waste Management Regulations

Effluent Limitations Regulations

Discharge Hazardous Waste Regulations





## Coastal clean-ups (DOM, SVG)

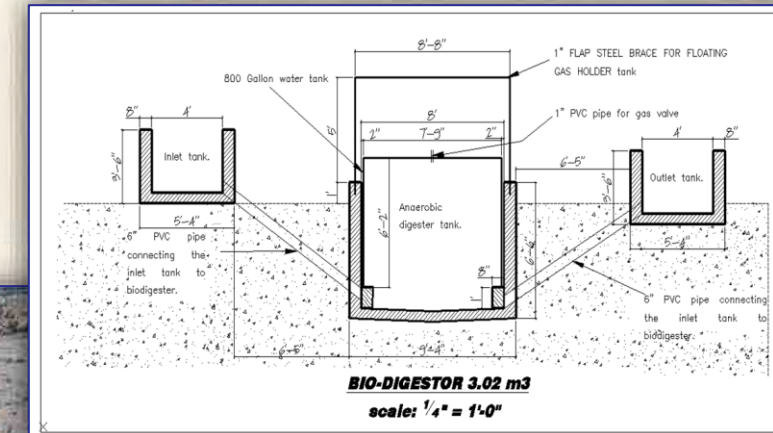


## Support to collection depots (SLU & SVG)



## Provision of bins for recyclables (ANB, DOM, GND, Mont)

## Equipment DOM & GND



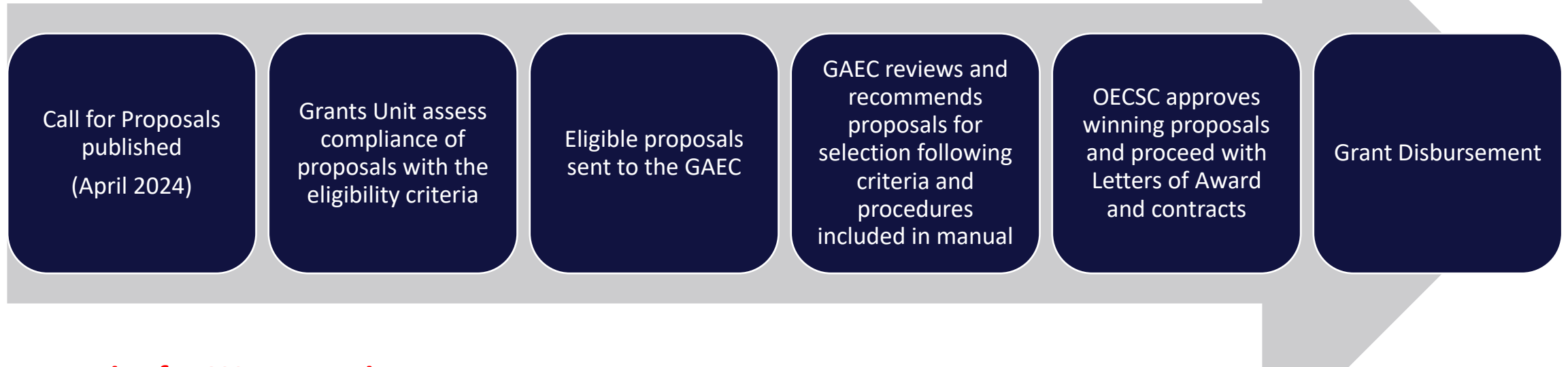
## Construction of biodigester at landfill (ANB)





# UBEC– Matching Grants for MSMEs

**Budget: USD 5.5 million**



## Opportunity for Waste Businesses

- **Window 1** - Individual firms can apply for grants ranging from \$5,000 to \$25,000 USD
- **Window 2** - Value chain groups consisting of multiple firms working collaboratively can apply for grants ranging from \$100,000 to \$200,000 USD

Grant	Business	Eligible Expenses
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> USD 5,000 – 100,000	<input type="checkbox"/> 2 years registered	<input type="checkbox"/> Goods
<input type="checkbox"/> 70% of project cost	<input type="checkbox"/> 2 years financial statements	<input type="checkbox"/> Services
<input type="checkbox"/> Technical support	<input type="checkbox"/> 30% of project cost	<input type="checkbox"/> Activities
<input type="checkbox"/> Women owned/led businesses	<input type="checkbox"/> 20% cash, 10% Kind	





# Organisation of Eastern Caribbean States

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**For more information on the Recycle OECS and ReMLit Projects visit:**

<https://oecs.org/en/blue-economy-eastern-caribbean-ocean-governance>

**More Than Just Islands Music Video:** <https://www.youtube.com/watch?v=hF61x2NKRUo>

**Case Study:** "We are Large ocean States: Blue Economy and Ocean Governance in the Eastern Caribbean:

<https://drive.google.com/file/d/108pJTSKnBeRG1in15tWPotDhzpnAyvtf/view>







## Technical Cooperation Project on Advisor for Marine Plastic Litter Management in the Caribbean Region

-Sharing information on improving waste management  
to help prevent plastic waste from entering the ocean-

Ikuo MORI and Makoto YAMASHITA

# Background

- ▶ The marine plastic litter problem is mainly caused by plastic waste generated on land that enters coastal areas and the ocean due to improper management, causing damage to the marine environment.
- ▶ A total of 1.7 million tonnes of plastic waste, including 0.3 million tonnes from marine activities, became marine plastic waste in 2019.
- ▶ In response to this global challenge, Japan shared the “Osaka Blue Ocean Vision” in the G20 Osaka Summit in 2019, expressing its support for building waste management capacity and infrastructure in developing countries for tackling the marine plastic litter problem.

# Outline of the project

## i. Project Title

Technical Cooperation Project on Advisor for Marine Plastic Litter Management in the Caribbean Region

## ii. Counterpart agencies

Antigua and Barbuda: National Solid Waste Management Authority

Grenada: Grenada Solid Waste Management Authority

Jamaica: National Environment and Planning Agency, National Solid Waste Management Authority

Guyana: Ministry of Local Government & Regional Development

Saint Lucia: Saint Lucia Solid Waste Management Authority

## iii. Cooperation period

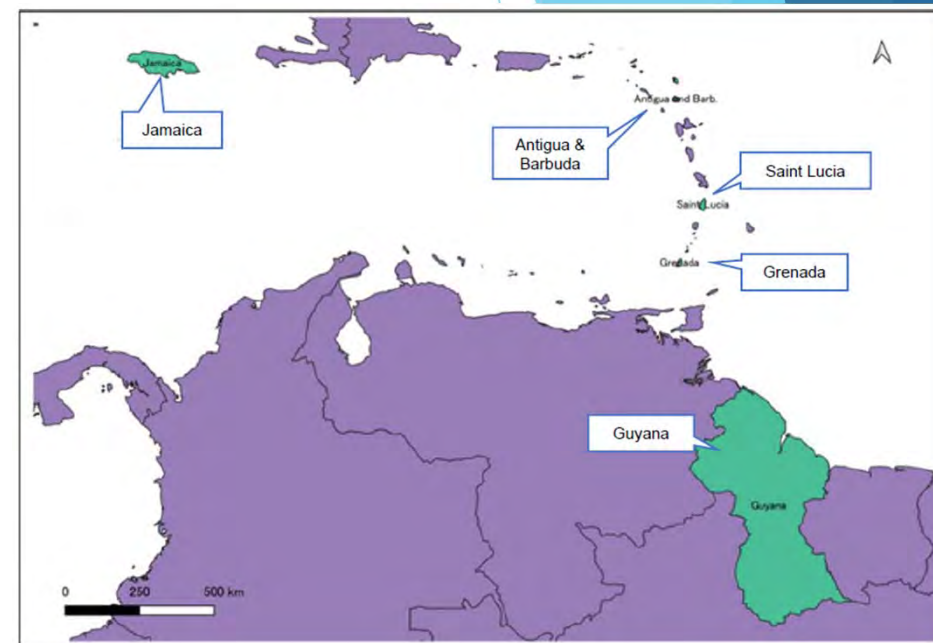
December 2021 - January 2024 (approximately 2 years)

## iv. Overall goal

Efforts to improve waste management and information sharing to prevent plastic litter from entering the ocean are promoted in the Caribbean region.

## v. Project objective

The capacity of the target countries to address waste management priorities to prevent plastic waste leakage into the ocean is strengthened, and results and lessons learned from national initiatives are shared across the Caribbean region.





# Common challenges (1)

## Increasing amount of waste

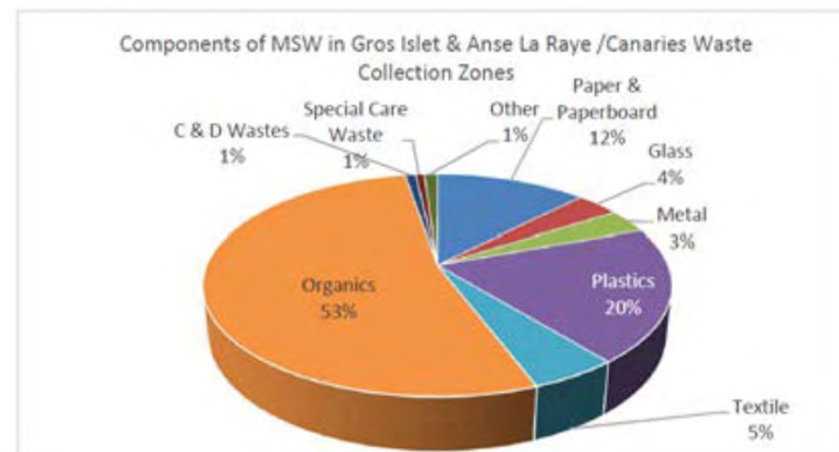
- ▶ Countries in the Caribbean region generate a large amount of waste per capita and a significant proportion of plastic, probably due to a certain level of economic development and the influence of the USA's lifestyle and culture.
- ▶ Island countries are less likely to secure new land for disposal sites due to their small land area. On the other hand, the increase in the amount of waste, especially bulky waste such as plastics, is causing serious problems in terms of decreasing the lifetime of landfills.
- ▶ In recent years, the problem of difficult-to-dispose-of materials such as waste home appliances, waste vehicles and waste tyres has also become more serious.

Figure: Waste Generation Amount per Capita



Source: Basics of Municipal Solid Waste Management in Africa, p.9 (<https://unhabitat.org/african-clean-cities-publications>) and waste generation rate reported by each country.

Figure: Waste Composition in Saint Lucia



Source: Waste Characterization Study Report by SLSWMA (2018)

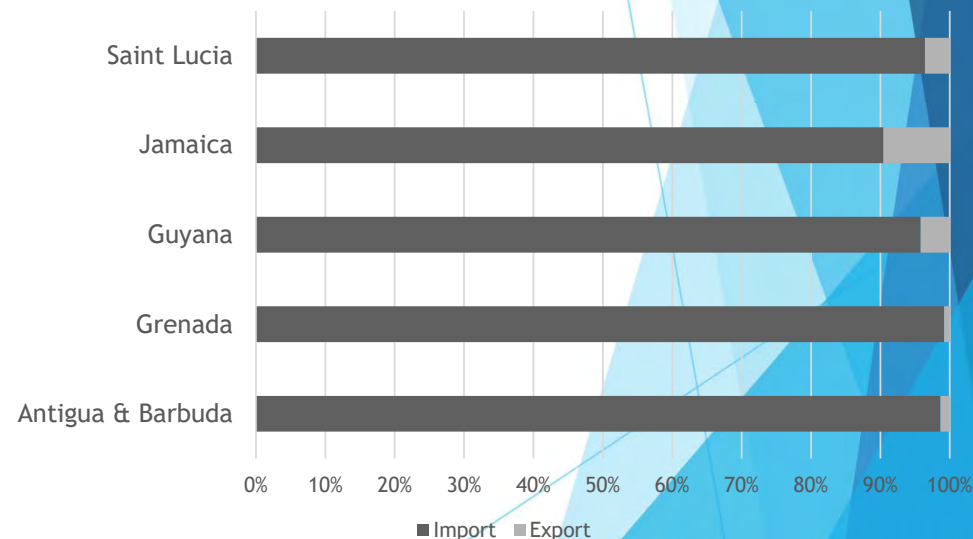
## Common challenges (2)

### One-way flow of goods

- ▶ The creation of a resource-recycling society and the promotion of a circular economy are essential for the sustainable development of a region or country.
- ▶ However, in island countries in the Caribbean region, the market is small and industries that receive recycling cannot grow. In addition, because they are far from countries with industry, transport costs are high and cannot be sent back.
- ▶ As a result, the flow of goods is a one-way from industrialized countries to the islands, and post-consumer goods accumulate on the islands as waste or flow into the environment.
- ▶ In other words, the problems of SIDS are strongly reflected in waste management.

### Import vs Export

Trade (ton)	Antigua & Barbuda	Grenada	Guyana	Jamaica	Saint Lucia
Import	18,807	21,198	153,315	370,919	27,176
Export	259	174	6,741	39,181	1,009
Total	19,066	21,372	160,056	410,101	28,185



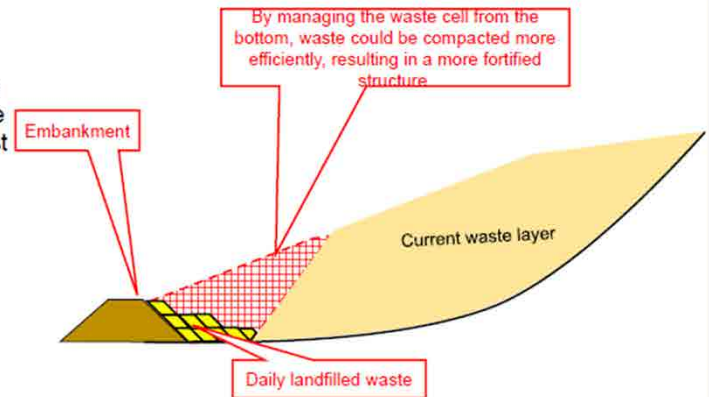
Source: UN-comtrade (<https://comtradeplus.un.org/>)

# Approaches, in Saint Lucia

- ▶ Improving landfill operations
  - ▶ Adequate compaction on slopes
  - ▶ Gas ventilation to prevent fire and accelerate waste decomposition
  - ▶ Monitoring leachate quality
- ▶ Extending the life of the landfill
  - ▶ The life of the landfill is expected to be extended by 10 years through the following measures:
    - ▶ Construction of the embankment at the bottom of the waste slope,
    - ▶ Compaction from bottom to top,
    - ▶ Modification of the access road, etc.
  - ▶ Composting is being implemented on a trial basis, and if the scale of composting is increased in the future, it is expected to further extend the life of the landfill.

## Slope Collapse mitigation and landfill operation improvements

An embankment was constructed under the slope at the southeast end to demonstrate the method of waste management and compaction from a bottom to the top perspective.



Cross Section of the embankment and demonstrated waste cell.

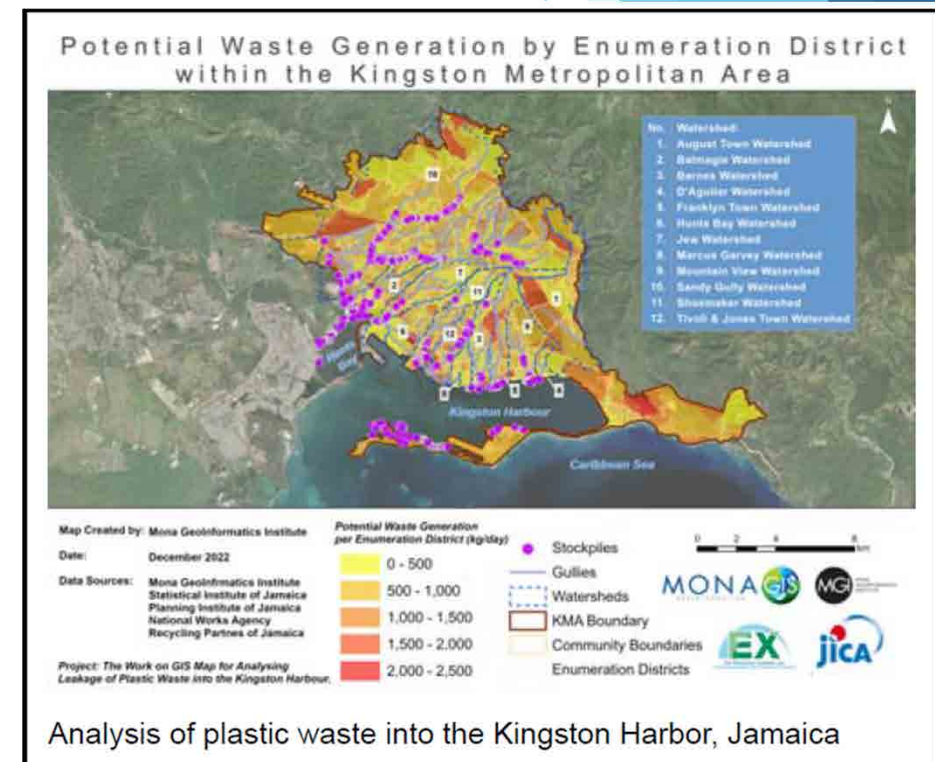
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# Approaches, in Jamaica

- ▶ Plastic waste regulations
  - ▶ Jamaica has already enforced a law against single-use plastics from January 2019.
  - ▶ The government is working to expand the items covered by the single-use plastic law, and to introduce a deposit return system for plastic containers.
- ▶ GIS map for analysing plastic waste leakage into Kingston Harbour
  - ▶ In Kingston, the dumping of waste into waterways and its inflow into Kingston Harbour has become a social problem with negative impacts on mangrove forests and fisheries.
  - ▶ The project used GIS to analyse the causal relationship between terrestrial collection services and community conditions and the discharge of plastic waste into Kingston Harbour.



# Approaches, in Guyana

## ► Solid Waste Management Plan

- Assisting the government in developing waste management plans.
- As a part of this pilot project, basic surveys, such as a waste amount and composition survey and time and motion survey, are conducted
- It is expected that after the project, officials of the government will develop waste management plans for other regions by themselves.





# Approaches, Information sharing

- ▶ Workshop and Seminar
  - ▶ 1<sup>st</sup> workshop in Saint Lucia, March 2022
  - ▶ 2<sup>nd</sup> workshop in Jamaica, August 2022
  - ▶ 3<sup>rd</sup> workshop in Saint Lucia, March 2023
  - ▶ Final seminar in Guyana, October 2023
- ▶ Monthly Technical Online Meeting
  - ▶ 17 times from May 2022 to September 2023
- ▶ Best practices
  - ▶ Shared 35 times via SharePoint (website for members only)





# Collaboration with regional institutions and private sectors

- ▶ Caribbean Community, CARICOM
- ▶ Organisation of Eastern Caribbean States, OECS
- ▶ United Nations Environment Programme, UNEP
- ▶ Mona Geoinformatics Institute (MGI) at the University of the West Indies, Jamaica
- ▶ GraceKennedy Foundation, Jamaica
- ▶ Recycling Partners of Jamaica
- ▶ Puran Brothers, Guyana
- ▶ Cevons Waste Management, Guyana

# Recommendations

- ▶ It is hoped that the pilot projects will be continued and further developed in Guyana, St Lucia and Jamaica. It is recommended that the plans and technical notes developed during this project to be fully used. These technical notes will be published on the websites of several counterpart organisations.
- ▶ Since counterpart organisations in each country have a wealth of knowledge and experience in solid waste management, sharing this with other Caribbean countries with similar environments and challenges is recognised as important for ease of understanding and applicability. It is therefore recommended that information sharing to be continued and expanded, with CWWA, CARICOM and OECS at the centre, with support from donors such as JICA, EU, UN agencies and others.
- ▶ It is also recommended that information to be shared with SIDS in other regions, such as the Pacific SIDS, which face and have addressed challenges similar to those of the Caribbean SIDS.

Thank you very much for your  
attention.

