



**SPREP**  
Secretariat of the Pacific Regional  
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This initiative is supported by **PacWastePlus**-a 72 month project funded by the European Union (EU) and implemented by the Secretariat of the Pacific Regional Environment Programme (SPREP) to **sustainably and cost effectively improve regional management of waste and pollution.**

# Vanuatu National Waste Audit Analysis Report

August 2023



This Waste data collation, analysis and reporting for the Vanuatu National Waste Audit Analysis Report was guided by the overarching Regional Waste Data Collection, Monitoring, and Reporting (DCMR) Framework for the Pacific Island Countries and Territories (PICT).

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Our vision: A resilient Pacific environment sustaining our livelihoods and natural heritage in harmony with our cultures.

# PacWaste Plus Programme

The Pacific – European Union (EU) Waste Management Programme, PacWaste Plus, is a 72-month programme funded by the EU and implemented by the Secretariat of the Pacific Regional Environment Programme (SPREP) to improve regional management of waste and pollution sustainably and cost-effectively.

## About PacWaste Plus

The impact of waste and pollution is taking its toll on the health of communities, degrading natural ecosystems, threatening food security, impeding resilience to climate change, and adversely impacting social and economic development of countries in the region.

The PacWaste Plus programme is generating improved economic, social, health, and environmental benefits by enhancing existing activities and building capacity and sustainability into waste management practices for all participating countries.

Countries participating in the PacWaste Plus programme are: *Cook Islands, Democratic Republic of Timor-Leste, Federated States of Micronesia, Fiji, Kiribati, Nauru, Niue, Palau, Papua New Guinea, Republic of Marshall Islands, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu.*

## Key Objectives

### Outcomes & Key Result Areas

The overall objective of PacWastePlus is *“to generate improved economic, social, health and environmental benefits arising from stronger regional economic integration and the sustainable management of natural resources and the environment”*.

The specific objective is *“to ensure the safe and sustainable management of waste with due regard for the conservation of biodiversity, health and wellbeing of Pacific Island communities and climate change mitigation and adaptation requirements”*.

### Key Result Areas

- **Improved** data collection, information sharing, and education awareness
- **Policy & Regulation** - Policies and regulatory frameworks developed and implemented.
- **Best Practices** - Enhanced private sector engagement and infrastructure development implemented
- **Human Capacity** - Enhanced human capacity

Learn more about the PacWaste Plus programme by visiting



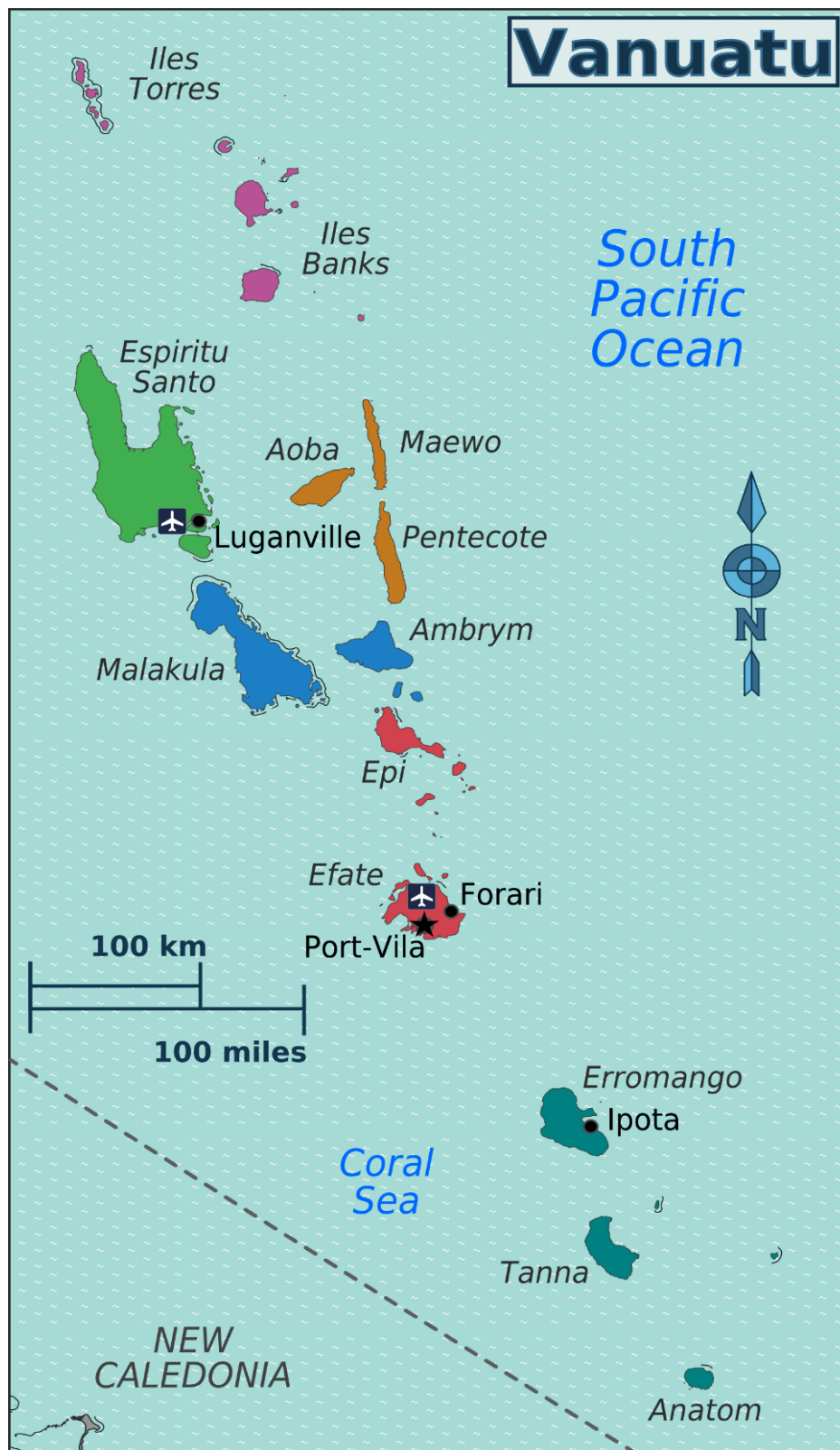
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# Map of Vanuatu



Province Legend	
	Torba
	Sanma (Luganville)
	Penama
	Malampa
	Shefa (Port-Vila)
	Tafea

Source: [wikimedia.org/wiki/commons/3/36/Vanuatu\\_Regions\\_map.png](https://commons.wikimedia.org/wiki/File:Vanuatu_Regions_map.png)

## Glossary

Acronym	Definition
<b>C&amp;D</b>	Construction and Demolition (Waste)
<b>C&amp;I</b>	Commercial and Industrial (Waste)
<b>DCMR</b>	Data Strategy & Collection, Monitoring, and Reporting (Framework)
<b>DEPC</b>	Department of Environment Protection and Conservation (Vanuatu)
<b>KPI</b>	Key Performance Indicator
<b>MEA</b>	Multilateral Environmental Agreement
<b>MSW</b>	Municipal Solid Waste (i.e., waste originating from the general public that is typically managed by local government entities, excludes commercial / business waste)
<b>NGO</b>	Non-Governmental Organisation
<b>PICT</b>	Pacific Island Countries & Territories
<b>PRIF</b>	Pacific Regional Infrastructure Facility
<b>SPREP</b>	Secretariat of The Pacific Regional Environment Programme

Terminology	Definition
<b>Capacity</b>	The total maximum waste storage and processing that can take place at a facility (as capped by license conditions).
<b>Capture rate</b>	The proportion of total waste generated that is successfully captured and disposed or recovered in an environmentally responsible manner (e.g., by a formal collection service or self-hauled to a licensed facility)
<b>Coverage</b>	The proportion of total households that have access to a regular waste collection service.
<b>Modern</b>	A 'modern' facility employs 'sound waste management practices' (as defined by the UNEP) and results in minimal adverse impacts on the environment. A 'modern' facility must be licensed, staffed, have access to equipment and machinery such as a bulldozer, employ a leachate management system and implement a daily cover routine at a landfill, and must not be exceeding their maximum storage capacity.
<b>Per capita</b>	Units measured on a per person basis (i.e., to allow for extrapolation over a national population).
<b>Recovery</b>	Any activity that diverts waste material from landfill, including processing of dry recyclables (such as paper, cardboard, metal and plastics such as PET and HDPE), organics recovery, and energy recovery.
<b>Unregulated</b>	Typically, unlicensed waste facilities which do not follow international frameworks, rules, and guidelines to protect the health of the environment and community.
<b>Waste facility</b>	'Waste facilities' involved in the handling, disposal, or recovery of waste streams above a minimum processing threshold determined on country basis (i.e., tonnes of waste received per year). Can include landfills or dumpsites (that primarily rely on burying waste in a controlled manner), recycling facilities for dry recyclables, organics recovery facilities, and waste-to-energy facilities. Incinerators are not included in this analysis.

## Executive Summary

Waste data collation, analysis and reporting for the Vanuatu National Waste Audit Analysis Report was guided by the overarching Regional Waste Data Collection, Monitoring, and Reporting (DCMR) Framework for the Pacific Island Countries and Territories (PICT).

The implementation of the DCMR Framework ensures that waste data is collected, analysed, and reported in a consistent and reliable way across the Pacific.

*Table (a) Summary of Key Performance Indicators (KPIs) for Vanuatu*

Core KPIs	Result	Supplementary KPIs	Result
1. Count / capacity of modern waste facilities	0 / 0	1. Cost of disposal to landfill (\$/annum)	No data
2. Count / capacity of unregulated waste facilities	4 / Capacity unknown	2. Weight of waste disposed (tpa)	19,463
3. National recovery rate (%)	(11.66%) See Section 3.2	3. Weight of waste recovered (tpa)	656
4. Per capita waste generation rate (kg/capita/year)	89.1	4. Volume of stockpiled hazardous waste (m <sup>3</sup> )	See Section 3.2
5. MSW Composition (%)	Figure (a)	5. Marine plastic pollution potential (tpa)	1,480
6. Household waste capture rate (%)	41.89%	6. Awareness and support of waste management services (%)	No data
7. Household collection service coverage (%)	41.89%	7. Proportion of strategic waste management initiatives implemented (%)	73.68%
8. Fulfillment of MEA reporting requirements (%)	41.67%	8. Commercial waste capture rate (%)	See Section 3.2
		9. Commercial collection service coverage (%)	See Section 3.2
		10. Total weight of disaster waste disposed (tpa)	No data

*Note: 'No data' indicates that the audit did not capture the parameters / measurements necessary to calculate the KPI.*

## Vanuatu MSW Composition

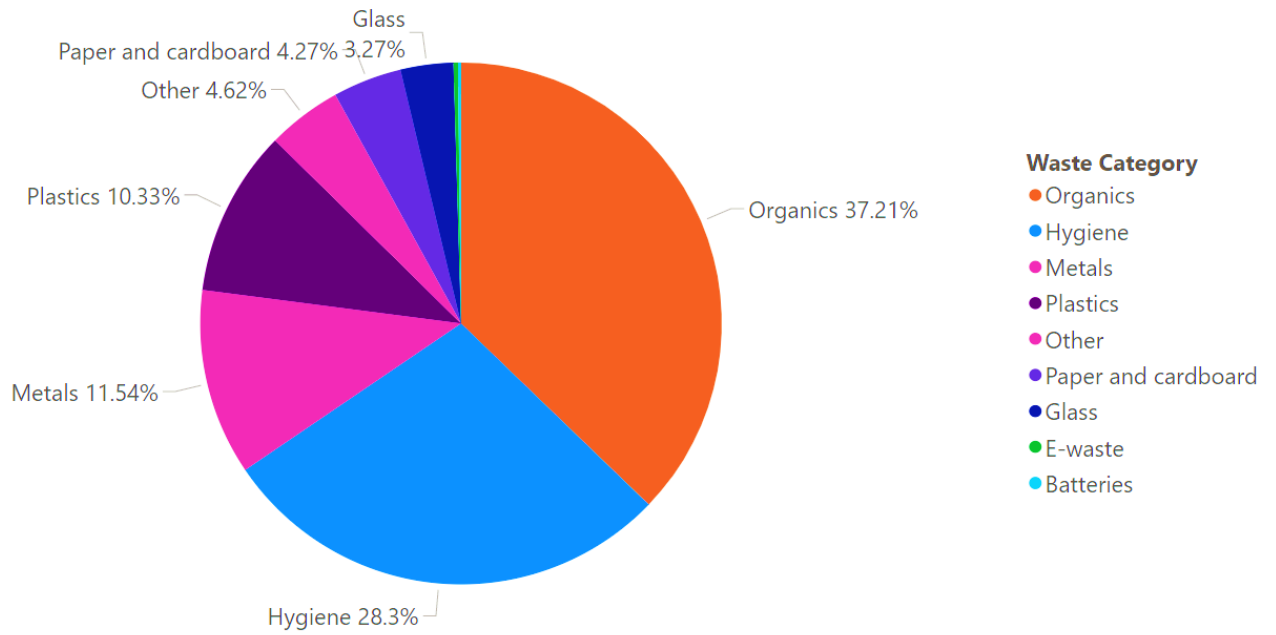


Figure (a) Municipal Solid Waste (MSW) Com position (% by weight)





# 1 Introduction

## 1.1 Background

Vanuatu is one of fifteen Pacific Island Nations which took part in the PacWastePlus Programme implemented through SPREP and funded by the European Union Delegation of the Pacific. PacWastePlus aims to improve waste management activities across the islands and strengthen the capacity of Governments, industries, and communities to manage wastes to protect human health and the environment.

In Vanuatu, waste recovery is conducted by RecycleCorp, a private company that collects various recyclable materials, including aluminium cans, glass, scrap metal, batteries, and e-waste. Operating in both Port Vila and Luganville, RecycleCorp actively collaborates with waste pickers at landfills and provides 240-litre mobile garbage bins to commercial premises for a fee. RecycleCorp consolidates and exports recyclable waste, maintaining stockpiles in both the Port Vila and Luganville facilities.

In addition, private companies such as Azure Pure Water and Vanuatu Brew encourage bottle returns by offering a 5-10 VUV redemption. The recycling sector in Vanuatu is expanding following contributions from the PacWaste Plus programme and the contributions of industry bodies like the Vanuatu Recyclers and Waste Management Association.

Vanuatu's overall waste management practices are limited and primarily rely on burying, burning, dumping, and landfilling. There is limited access to proper waste collection and disposal facilities, leading to environmental degradation and health hazards. The country requires investment in infrastructure, implementation of data-guided decision making, and increased general waste management education to improve the current situation.

## 1.2 Purpose and Aim

The purpose of this audit analysis and report is to establish a baseline position for Vanuatu's waste data and waste management systems.

The aim of this audit analysis report is to:

- Validate pre-existing national waste audit data; and
- Build national waste insights based on new key performance indicators (KPIs) to understand waste management trends.

The results of this report, and the other fourteen SPREP country audit analysis reports, will be collated together to inform a broader Pacific Regional Data and Audit Analysis Report.

## 1.3 Scope

The scope of this report is limited to the following waste data collected in Vanuatu:

- **Vanuatu waste audit report 2018:** The audit provided an evaluation of household and business waste generated in Vanuatu. Audit data and information was obtained via interviews and waste collections from 205 households and 45 businesses.
- **Vanuatu waste audit report 2020:** The audit provided an assessment of the state of Vanuatu's landfills including landfill audits and stockpile assessments.

This national report examines the MSW, commercial and industrial (C&I), disaster waste and landfill waste streams. Landfills may receive a broad array of waste types, including construction and demolition (C&D) waste, hazardous waste, and other types of waste in addition to MSW and C&I waste, and as such are considered separate waste stream.

The potential for marine plastic pollution is considered for macroscopic plastic waste (i.e., plastics that can be identified through compositional audits) originating from household sources. Accurate data on the amount and management of macroscopic plastic waste in the region is limited.

## 1.4 Country Overview

The Republic of Vanuatu is a group of more than 80 islands located in the Pacific Ocean's Melanesia region (see map on Page 4 of this report). It spans a total area of 12,189 square kilometres and has a total coastline length of 2,530 kilometres. The country is home to over 300,000 people, with 22% residing in urban areas and 78% in rural areas.

Vanuatu's total population is growing at a rate of about 2.4% annually. Most of the urban population is concentrated in the capital city of Port Vila on the island of Efate, and in the city of Luganville on the larger island of Espiritu Santo.

Vanuatu's Department of Environment Protection and Conservation (DEPC) developed the *National Environment Policy and Implementation Plan 2016-30* which aligns with the country's *National Sustainable Development Plan*. This plan, along with the regional *Cleaner Pacific 2025* strategy (*Cleaner Pacific 2025: Pacific Regional Waste and Pollution Management Strategy 2016-2025*), include specific actions aimed at improving solid waste management.

The responsibility for managing solid waste is divided among various institutions in Vanuatu, which include:

- National government: The national government is responsible for creating national legislation, strategies, and policy frameworks for waste management, as well as fulfilling obligations under international conventions, primarily through the Department of Environment Protection and Conservation (DEPC).
- Provincial government: The provincial government establishes the local regulatory framework for waste management.
- Local/municipal government: The local/municipal government is responsible for providing household waste collection, recycling services, managing and operating landfill sites, and educating and raising awareness among local communities. This includes the Port Vila Municipal Council (PVMC), Luganville Municipal Council (LMC), and Lenakel Town Municipal Council (LTMC).

Non-governmental organisations (NGOs) and donor partners, as well as businesses such as waste collection contractors and private recyclers, also play a role in the waste management and resource recovery sector.

Management of hazardous wastes such as medical waste or used oil are typically regulated by the corresponding government department or ministry.



## 2 Methodology

Waste data collation, analysis and reporting was guided by the overarching Regional Waste Data Collection, Monitoring, and Reporting (DCMR) Framework for the Pacific Island Countries and Territories (PICT). The implementation of the DCMR Framework ensures that waste data is collected, analysed, and reported in a consistent and reliable way across the Pacific.

### 2.1 Data sources

Data collated and examined in this audit analysis report was sourced from the data sources listed in **Table 1**.

*Table 1 Data sources examined and available data*

Data Source	Methods for data collation	Reported data
<b>Vanuatu waste audit 2018</b>	<ul style="list-style-type: none"> <li>Household waste audits</li> <li>Business waste audits</li> <li>Household interviews</li> </ul>	<ul style="list-style-type: none"> <li>Access to general waste collection service</li> <li>Household waste separation methods</li> <li>Waste disposal methods</li> <li>Willingness to pay for, and collection service satisfaction</li> <li>Household waste disposal rates</li> <li>Commercial disposal rates</li> <li>Household waste composition</li> </ul>
<b>Vanuatu waste audit 2020</b>	<ul style="list-style-type: none"> <li>Landfill audits (visual assessment)</li> <li>Visual stockpile audits</li> <li>Customs data</li> </ul>	<ul style="list-style-type: none"> <li>Landfilled waste (weight per year)</li> <li>Landfill waste composition</li> <li>Import and export material flow</li> </ul>
<b>2020 Vanuatu National Census</b>	<ul style="list-style-type: none"> <li>National census</li> </ul>	<ul style="list-style-type: none"> <li>Populations</li> <li>Household data</li> <li>Waste collection services</li> <li>Waste collection service coverage</li> </ul>

The 2018 and 2020 audits were performed with separate methodologies, scopes and objectives and were completed by different organisations.

#### 2.1.1 Vanuatu Waste Audit 2018

The methodology used in the 2018 audit predates the publication of the Pacific Regional Infrastructure Facility (PRIF) waste audit guidelines (completed in 2020), leading to some differences in waste material sorting categories (used to group similar waste types) and audit methodology compared to more recent audits undertaken for the region.

The 2018 audits took place over three weeks, across multiple urban and rural locations. It was assumed that the minimum number of required samples should be 140 and the maximum should be 200. The sampling was divided based on the distribution of population among different islands in Vanuatu to obtain a representative sample of all waste generated in the country.

Samples were collected from households and businesses. Sampling methodologies differed by the type of collection service available to the sampled area; places with a formal collection system, places with a formal waste drop off point, or places with no collection system in place at all. Household interviews were also conducted for premises where waste was collected during the audits. Once collected, all household and commercial samples were sorted into 49 reporting categories.

### 2.1.2 Vanuatu Waste Audit 2020

The 2020 audit utilised the Waste Audit Methodology produced by PRIF and utilised the results of the 2018 audit to categorise different waste types as unique proportions of the entire waste stream.

The audit consisted of landfill and material stockpile audits. Landfill audits were completed via visual audits of truck loads arriving at the audited disposal locations. The audit was carried out over 14 days, and composition results from the 2018 audit were applied to observations made in 2020. Waste stockpile audits were conducted on Efate and Espiritu Santo. The method used during the audits incorporated some recommendations from the PRIF guidelines, but a consistent method for estimating the number of stockpiled materials was not consistently employed from site to site.

Table 2 Sample locations for audits

Sample Location	Population (2020)	Classification (based on National Census 2020)
Port Vila (city)	49,034	Urban
Luganville (city)	17,719	Urban
Ifira	1,281	Rural
Lelepa	500	Rural

## 2.2 Data Analysis

Each country's audit reports, audit data, and other relevant data sources were inspected for relevant information which was subsequently collated into country specific databases. The extracted audit data was then used to calculate the DCMR Framework KPIs. KPI reporting followed the calculation methodologies as detailed in the DCMR Framework.

The main assumptions made during the analysis are discussed below.

Where it was necessary to modify calculation methodologies or assumptions (e.g., in cases of missing data or when certain parameters had to be calculated using assumptions derived from external data sources like census data), details of the changes are provided under their corresponding KPI in **Section 3.2**.

### 2.2.1 Main Assumptions

- Audit data provided for 'urban' areas (Port Vila, Luganville) and 'rural' areas (Ifira, Lelepa) (see **Table 2**) is assumed to be representative of the rest of the country. The areas immediately surrounding Port Vila and Luganville, which could be considered 'semi-urban', have been categorised as 'rural' given limited data available.
- All population estimates used to calculate performance indicators are based on national census data from 2020, which predates the initial waste audit (completed in 2018).
- All waste plastics which are not managed in an environmentally sound manner are assumed to have the potential risk of polluting oceans and estuarine waterways.
- Commercial waste service coverage reporting has relied primarily on survey information conducted during audits of commercial business waste.

## 2.3 Key Performance Indicators

The DCMR Framework introduces a series of KPIs (see

**Table 3**). The KPIs were developed to guide data analysis with the aim of improving the efficiency of data collection activities by building on pre-existing data collection practices across the region.

Each of the KPIs were designed to be reported to using corresponding data collection methodologies.

These comprise of:

- a waste facility register
- household waste audits and community surveys
- business waste audits and surveys
- a policy survey
- landfill and stockpile audits

**Table 3** Key Performance Indicators (KPIs) from the DCMR Framework

Core KPIs	Supplementary KPIs
1. Count / capacity of modern waste facilities	1. Cost of disposal to landfill
2. Count / capacity of unregulated waste facilities	2. Weight of waste disposed
3. National recovery rate	3. Weight of waste recovered
4. Per capita waste generation rate	4. Volume and type of stockpiled hazardous waste
5. Municipal Solid Waste (MSW) composition	5. Marine plastic pollution potential
6. Household waste capture rate	6. Awareness and support of waste management services
7. Household collection service coverage	7. Proportion of strategic waste management initiatives implemented
8. Fulfillment of Multilateral Environmental Agreement (MEA) reporting requirements	8. Commercial waste capture rate
	9. Commercial collection service coverage
	10. Total weight of disaster waste disposed

## 3 Audit Analysis Results

### 3.1 Summary of Data Availability

The waste audits provided varying levels of data and information for the purposes of calculating performance via the indicators introduced in the DCMR Framework. The extent to which there was adequate data and information to calculate the KPIs is represented below in **Table 4**.

*Table 4 - Summary of data availability for reporting against DCMR Framework KPIs*

Core KPIs	Supplementary KPIs
1. Count / capacity of modern waste facilities	1. Cost of disposal to landfill
2. Count / capacity of unregulated waste facilities	2. Weight of waste disposed
3. National recovery rate	3. Weight of waste recovered
4. Per capita waste generation rate	4. Volume and type of stockpiled hazardous waste
5. Municipal Solid Waste (MSW) Composition	5. Marine plastic pollution potential
6. Household waste capture rate	6. Awareness and support of waste management services
7. Household collection service coverage	7. Proportion of strategic waste management initiatives implemented
8. Fulfillment of MEA reporting requirements	8. Commercial waste capture rate
	9. Commercial collection service coverage
	10. Total weight of disaster waste disposed

*Note: 'No data' indicates that the audit did not capture the parameters/measurements necessary to calculate the KPI.*

In summary:

- There was adequate data provided within the audit reports to sufficiently calculate Core KPIs 4 to 8, and Supplementary KPIs 3, 5, and 7.
- There was limited data to calculate Core KPIs 1 to 3, and Supplementary KPIs 2, 4, 8, and 9.
  - Relevant data for 2 out of 4 waste facilities (Bouffa Landfill and Luganville dumpsite) was presented. This included information as to the equipment, staffing, and leachate management controls present on site, but no information pertaining the implementation of a cover system.
  - There were some measurements of volume for e-waste, but no mention of measurements for all other hazardous waste categories suggested in the DCMR framework.
  - There was some information pertaining to the collection service coverage and waste capture rate for commercials presented in the audit report, however it is difficult to confidently extrapolate the results of the indicator to the national level due to data insufficiency. See **Section 3.2**.
- No data was available in the report to calculate to inform Core KPI 3, and Supplementary KPIs 1, 6 and 10. No information was identified in the 2018 and 2020 audit reports for:

In the future, improved data capture and data quality will benefit performance assessment by reducing the extent to which assumptions and substitutions are necessary. In turn, the KPIs will reflect a more accurate depiction of the status of waste management in Vanuatu.

### 3.2 KPI Reporting Results

The following sections present the results of the collated and analysed waste audit data for each of the eight core and ten supplementary KPIs introduced in the DCMR Framework. The results of the analysis will serve as a baseline position for Vanuatu to compare future data to, and to guide subsequent waste management or waste data related activities.



#### Core KPI 1: Count / capacity of modern waste facilities

Core KPI 1: Count / capacity of modern waste facilities	
<b>Result</b>	<p><b>Count of modern waste facilities: 0</b></p> <ul style="list-style-type: none"> <li>• None of the four documented waste disposal facilities in Vanuatu meet the requirements of being a ‘modern’ facility. The four disposal sites documented in the audit reports reflect the following information: <ul style="list-style-type: none"> <li>– Bouffa landfill: Staffed and has a dedicated bulldozer. However, the leachate management system in place is non-functional. The landfill does not practice a daily cover routine. No information on landfill capacity.</li> <li>– Luganville dumpsite: Staffed and has access to a bulldozer. No leachate management or use of daily cover. No information on landfill capacity.</li> <li>– Lenakel dumpsite: No relevant information found in audit reports.</li> <li>– Lakatoro dumpsite: No relevant information found in audit reports.</li> </ul> </li> </ul> <p><b>Capacity of modern waste facilities (tonnes per annum): 0</b></p> <ul style="list-style-type: none"> <li>• Since none of the disposal facilities in Vanuatu meet ‘modern’ requirements, the capacity of modern facilities is 0.</li> </ul>
	<ul style="list-style-type: none"> <li>• None</li> </ul>
	<ul style="list-style-type: none"> <li>• No estimates or parameters were used to calculate the maximum annual processing capacity (tpa) of any of the four Vanuatu disposal sites.</li> <li>• No information available for Lenakel or Lakatoro dumpsites. <ul style="list-style-type: none"> <li>– Staffing, equipment access, leachate management, daily cover use</li> <li>– Disposal tonnages</li> </ul> </li> </ul>
	<ul style="list-style-type: none"> <li>• There are no landfills or dumpsites in Vanuatu which are up to ‘modern’ standards.</li> <li>• Relevant data for 2 out of 4 facilities (Bouffa and Luganville) was reported.</li> <li>• Lack of leachate management at these facilities means that both the environment and community are at risk of hazards due to contamination and material flow.</li> <li>• No daily cover usage at the landfill sites means that these sites are very susceptible to material flow during climate-related weather events such as cyclones.</li> <li>• Investment to upgrade existing landfills in Vanuatu to meet with modern standards / best practice will lead to better outcomes for the local environment and community health.</li> </ul>



## Core KPI 2: Count / capacity of unregulated waste facilities

Core KPI 2: Count / capacity of unregulated waste facilities	
<b>Result</b>	<p><b>Count of unregulated waste facilities: 4</b></p> <ul style="list-style-type: none"> <li>• None of the four disposal facilities reported on meet the requirements of a ‘modern’ facility and as such are classified as ‘unregulated’.               <ul style="list-style-type: none"> <li>– Inadequate leachate management</li> <li>– No use of daily cover</li> </ul> </li> <li>• There is dedicated equipment at Bouffa Landfill and external equipment is accessible for use at the Luganville dumpsite.</li> </ul> <p><b>Capacity of unregulated waste facilities (tonnes per annum): No data</b></p> <ul style="list-style-type: none"> <li>• None</li> </ul>
	<ul style="list-style-type: none"> <li>• No estimates or parameters were used to calculate the maximum annual processing capacity (tpa) of any of the four Vanuatu disposal sites.</li> <li>• No information available for Lenakel or Lakatoro dumpsites.               <ul style="list-style-type: none"> <li>– Staffing, equipment access, leachate management, daily cover</li> <li>– Disposal tonnages</li> </ul> </li> </ul>
	<ul style="list-style-type: none"> <li>• All facilities are ‘unregulated’.</li> <li>• Relevant data for 2 out of 4 facilities (Bouffa and Luganville) was reported.</li> <li>• Lack of leachate management at these facilities means that both the environment and community are at risk of hazards due to contamination and material flow.</li> <li>• No daily cover usage at the landfill sites means that these sites are very susceptible to material flow during climate-related weather events such as cyclones.</li> <li>• The identified unregulated facilities present investment opportunities to upgrade existing sites to align with best practice. Reducing the number of these facilities will lead to better outcomes for the local environmental and community health.</li> </ul>





### Core KPI 3: National recovery rate

Results	
<b>Results</b>	<p><b>National recovery rate (%): Insufficient data (Port Vila and Luganville: 11.66%)</b></p> <ul style="list-style-type: none"> <li>• RecycleCorp, a private company, is the only major party responsible for recycling in Vanuatu. Their efforts focus on collecting aluminium cans, glass, scrap metal, batteries, and electronic waste. They operate in both Port Vila and Luganville. RecycleCorp purchases waste from pickers at landfills and offer 240-litre mobile garbage bins to commercial customers in Port Vila for a fee. There are no other recycling services available in other provinces.</li> <li>• Targeted materials include:             <ul style="list-style-type: none"> <li>– Aluminium</li> <li>– Copper</li> <li>– Nonferrous metals</li> <li>– Glass</li> <li>– E-waste</li> <li>– Used lead acid batteries</li> </ul> </li> </ul>
	<ul style="list-style-type: none"> <li>• Uses the summation of disposal estimates from Bouffa and Lenakel dumpsite as the estimated total amount of waste disposed of at landfill per annum.</li> </ul>
	<ul style="list-style-type: none"> <li>• Lacking information on the total quantity of waste disposed by all facilities (tpa) in Vanuatu.             <ul style="list-style-type: none"> <li>– The audit report only presented information for Bouffa Landfill and Lenakel dumpsite, not Lakatoro and Lenakel dumpsites</li> </ul> </li> </ul>
	<ul style="list-style-type: none"> <li>• Due to the lack of information as to the total amount of waste disposed at landfill across Vanuatu, and the fact that RecycleCorp only operates in Luganville and Port Vila, there is insufficient data to present a recovery rate at the national level.</li> <li>• Approximately 12% of targeted materials disposed of in Port Vila and Luganville is diverted from landfill by RecycleCorp.</li> <li>• The audit report highlighted that high export costs for consolidated recycled material posed a barrier to expanding current recycling operations. Further investigation of these barriers to recovery is recommended.</li> </ul>



#### Core KPI 4: Per capita waste generation rate

Results	
<b>Results</b>	<p><b>Per capita waste generation rate (kg/capita/year): 89.1</b></p> <ul style="list-style-type: none"> <li>– kg/capita/day: 0.244</li> <li>– kg/household/day: 1.15</li> </ul>
	<ul style="list-style-type: none"> <li>• Household waste audit data was converted from a per household basis to a per capita basis, then grouped and averaged based on geographic position (i.e., rural, semi-urban or urban), and extrapolated using census data of the national population.</li> <li>• Population data used to calculate per capita information was based on 2020 census results.</li> <li>• Where provinces had no data (i.e., Torba, Sanma, Penama and Malampa), an assumed ‘rural’ average waste generation rate was used based on household audit data from Shefa (including Ifira and Black Sands, excluding Port Vila).</li> <li>• Areas around Port Vila which could be considered semi-urban due to access to Port Vila but being located geographically outside the municipality, were assigned ‘rural’ average waste generation rates.</li> <li>• Outer islands were sampled as rural representative samples. No census data was available for these islands. Population estimates were derived from other publicly available data sources.</li> </ul>
	<ul style="list-style-type: none"> <li>• No information recorded in the provinces of Torba, Sanma, Penama and Malampa.</li> <li>• Not all regions, islands or towns/villages represented in audits have corresponding data represented in the 2020 census.</li> <li>• No information for waste generation rates in semi-urban areas.</li> </ul>
	<ul style="list-style-type: none"> <li>• There needs to be some exploration of a semi-urban category, due to populations living near Port Vila and Luganville having access to the cities while also living outside their limits. It is recommended that future data audits consider the addition of these areas to obtain a more representative sample of ‘semi-rural’/‘peri-urban’ waste generation in Vanuatu.</li> <li>• Future per capita waste generation rates will provide insight into waste management trends and changes for Vanuatu.</li> </ul>



## Core KPI 5: Municipal Solid Waste (MSW) Composition

### Results

Organics is the most prevalent waste type for household waste in Vanuatu. This is followed by hygiene product waste and then plastics.

- Organics: 37.21%
- Hygiene: 28.30%
- Metals: 11.54%

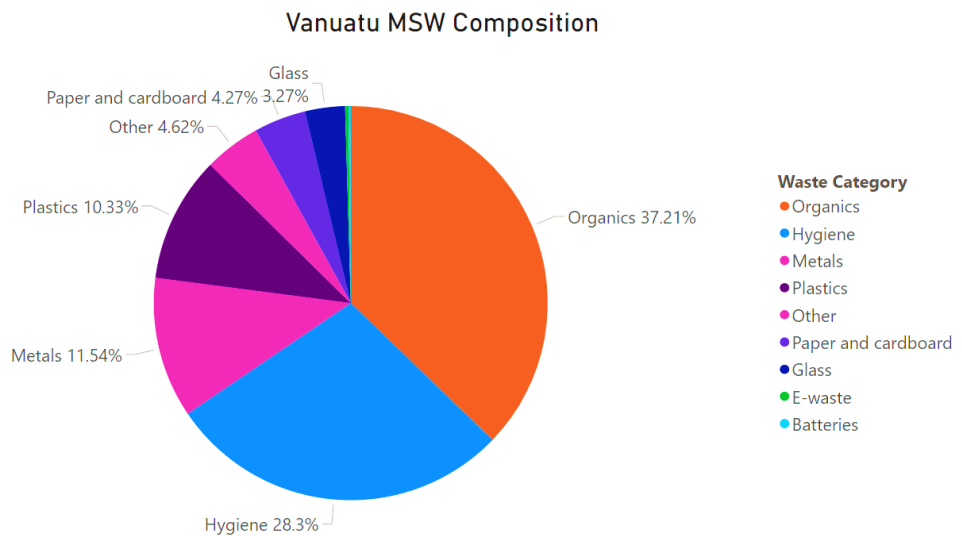


Figure 1 Vanuatu Municipal Solid Waste (MSW) composition (% by weight)

- None

• Categories reported in the audit are based on the 2018 waste audit, which predates the PRIF waste audit guidelines. These categories were converted to the PRIF audit guideline categories to report to this performance indicator.

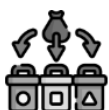
• No samples taken in the provinces of Torba, Sanma, Penama and Malampa.

• The prevalence of organics in the household waste stream is likely due to reliance on local subsistence agriculture, as rural communities often have fewer options for food and goods, which can result in a greater reliance on locally grown or produced items.

• Organics recovery systems, such as a local or national composting service could help support local farmers and reduce the amount of organic waste destined for landfill.

• It is recommended that compositional data is updated data on a regular basis. Impacts of the pandemic and climate change or weather events will have changed the proportions of waste types sourced from households.

• Household waste compositions provide an insight into the types of waste contained inside the MSW stream. Knowledge of the waste types and proportion of these wastes present within the household waste stream allows for targeted decision making and prioritisation of problem waste types.



## Core KPI 6: Household waste capture rate

<b>Results</b>	<p><b>Household waste capture rate (%): 41.89</b></p> <ul style="list-style-type: none"> <li>– Total weight of household waste generated = 26,738 tpa</li> <li>– Total weight of household waste captured responsibly = 11,195 tpa</li> </ul>
<b>Assumptions</b>	<ul style="list-style-type: none"> <li>• The survey and audits did not capture each household’s disposal method, or the weight of waste captured by management services, so census data was used and extrapolated across household audit results.</li> </ul> $\text{Household waste capture rate (\%)} = \frac{\text{weight of managed waste (tpa)}}{\text{total household waste generated (tpa)}}$ <p>Total weight of managed waste is calculated as the product of:</p> $\text{weight of managed waste (tpa)} = \frac{\text{household collection coverage (\%)}}{\text{total household waste generated (tpa)}}$ <p>Collection service coverage (%) is the product of:</p> $\text{household collection coverage (\%)} = \frac{\text{number of households with some form of collection service}}{\text{total number of households}}$ <p>Total household waste generated is the summation of waste generation tonnages for all sampling locations. Waste generation rates for individual sampling locations are calculated by:</p> $\begin{aligned} \text{total household waste generated (tpa)} &= \text{average waste generation rate of location} \left( \frac{\text{kg}}{\text{capita}} \right) \\ &\quad \times \text{location population} \end{aligned}$
<b>Data gaps</b>	<ul style="list-style-type: none"> <li>• No information available to quantify each household’s disposal method.</li> <li>• No information on the weight of waste captured by waste management services.</li> </ul>
<b>Key considerations</b>	<ul style="list-style-type: none"> <li>• Less than half of the waste generated in Vanuatu is captured by formal collection services (i.e., successfully captured and disposed of or recovered in an environmentally responsible manner).</li> <li>• The remaining proportion of waste generated which is not captured via waste management services is at risk of being burned, littered, buried, or dumped, and uncaptured waste poses a risk to both environmental and community health.</li> </ul>



### Core KPI 7: Household collection service coverage

Results		Household collection service coverage (%): 41.89
<b>Assumptions</b>	<ul style="list-style-type: none"> <li>• Calculated based on information from 2020 census data:               <ul style="list-style-type: none"> <li>– Number of households</li> <li>– Number of households with access to a collection service per area / location</li> <li>– Number of households with access to central disposal site</li> <li>– Number of households with access to composting service</li> </ul> </li> </ul>	
<b>Data gaps</b>	<ul style="list-style-type: none"> <li>• No relevant survey responses recorded in audit reports:               <ul style="list-style-type: none"> <li>– Requires number of respondents confirming access to some form of collection service.</li> </ul> </li> <li>• Total number of survey participants not available in audit reports.</li> </ul>	
<b>Key considerations</b>	<ul style="list-style-type: none"> <li>• Less than half of the population of Vanuatu has access to some reliable form of waste collection service.</li> <li>• A more representative result for this KPI can be achieved through use of the DCMR Framework's suggested community survey.</li> </ul>	



### Core KPI 8: Fulfillment of Multilateral Environmental Agreement (MEA) reporting requirements

Results		Fulfillment of MEA reporting requirements (%): 41.67%		
	<b>Convention</b>	<b>Status</b>	<b>Reporting requirements</b>	<b>Reports delivered</b>
	<b>Basel Convention</b>	Accession	Annual reports (4)	0
	<b>Minamata Convention</b>	Accession	1 report	1
	<b>Stockholm Convention</b>	Ratified	5 reporting cycles (5)	1
<b>Data gaps</b>	<ul style="list-style-type: none"> <li>• None</li> </ul>			
<b>Assumptions</b>	<ul style="list-style-type: none"> <li>• Only MEA's with mandatory reporting requirements were included in the calculation of this KPI.</li> <li>• For conventions like the Waigani convention of which Vanuatu is a member, strict reporting requirements are not enforced and so are not included in the calculation.</li> </ul>			
<b>Key considerations</b>	<ul style="list-style-type: none"> <li>• Vanuatu has satisfied the reporting requirements for the Minamata convention on Mercury.</li> <li>• Vanuatu is behind on national reports for the Basel and Stockholm conventions.</li> </ul>			



### Supplementary KPI 1: Cost of disposal to landfill

Results	Cost of disposal to landfill (\$/tonne): No data
<b>Assumptions</b>	<ul style="list-style-type: none"> <li>• None</li> </ul>
<b>Data gaps</b>	<ul style="list-style-type: none"> <li>• No information available in audit reports on the annual facility operating cost for any facilities.</li> <li>• Lacking information to calculate the annual quantity of waste disposed (tpa):               <ul style="list-style-type: none"> <li>– Estimates only present for Bouffa Landfill and Luganville dumpsite, no information present for Lenakel and Lakatoro dumpsites</li> </ul> </li> </ul>
<b>Key considerations</b>	<ul style="list-style-type: none"> <li>• Completion of the waste facility register suggested by the DCMR Framework will provide sufficient data to accurately calculate this indicator and a benchmark for comparing disposal costs against previous periods, other countries, and the region.</li> <li>• Governments and private industry would also be more able to accurately budget for estimated future costs.</li> </ul>



### Supplementary KPI 2: Total weight of waste disposed

Results	Total weight of waste disposed (tonnes per annum): 19,463
	<ul style="list-style-type: none"> <li>• None</li> </ul>
	<ul style="list-style-type: none"> <li>• Lacking information to calculate the annual quantity of waste disposed (tpa):               <ul style="list-style-type: none"> <li>– Disposal estimates only present for Bouffa Landfill and Luganville dumpsite, no information present for Lenakel and Lakatoro dumpsites.</li> <li>– No information as to the existence of landfills/dumpsites besides the four identified in audit report</li> </ul> </li> </ul>
	<ul style="list-style-type: none"> <li>• Current weight of waste disposed is not representative of all waste sent to landfill in Vanuatu, due to data gaps for Lenakel and Lakatoro dumpsites.</li> <li>• For Bouffa and Luganville landfills, 19,463 tonnes of material are disposed per annum based on audit results.</li> <li>• This KPI is expected to increase considerably once data is collected from other facilities in the future using the waste facility register suggested in the DCMR Framework.</li> </ul>



### Supplementary KPI 3: Total weight of waste recovered

<b>Results</b>	<p><b>Total weight of waste recovered (tonnes per annum): 656</b></p> <p>Waste is recovered via RecycleCorp, a private recycler operating in both Port Vila and Luganville,</p> <ul style="list-style-type: none"><li>• Targeted Materials include:<ul style="list-style-type: none"><li>– Aluminium</li><li>– Copper</li><li>– Nonferrous metals</li><li>– Glass</li><li>– E-waste</li><li>– Used lead acid batteries</li></ul></li></ul>
<b>Assumptions</b>	<ul style="list-style-type: none"><li>• None</li></ul>
<b>Data gaps</b>	<ul style="list-style-type: none"><li>• Lack of dedicated recovery facilities in Vanuatu mentioned in audit report.</li></ul>
<b>Key considerations</b>	<ul style="list-style-type: none"><li>• RecycleCorp, Vanuatu’s only dedicated recycling operation at the time of the audit report, recovers approximately 656 tonnes of waste from landfill per annum.</li><li>• Calculation of this KPI requires the completion of the waste facility register with the inclusion of data for any recovery facilities operating in the Solomon Islands. This will indicate the effectiveness of a country’s waste management systems, recovery systems &amp; infrastructure, and a comparative data point for other countries and time periods.</li></ul>



#### Supplementary KPI 4: Volumes of stockpiled hazardous waste

<b>Results</b>	<b>Volumes of stockpiled hazardous wastes (m<sup>3</sup>):</b> <ul style="list-style-type: none"> <li>– Asbestos: No data</li> <li>– E-waste: 6.7</li> <li>– Healthcare and pharmaceutical waste: No data</li> <li>– Used oil: No data</li> <li>– Used tyres: No data</li> <li>– Obsolete chemicals: No data</li> </ul>
<b>Assumptions</b>	<ul style="list-style-type: none"> <li>• None</li> </ul>
<b>Data gaps</b>	<ul style="list-style-type: none"> <li>• E-waste stockpiles volumes reported for Bouffa Landfill and Luganville dumpsites. No data for Lenakel and Lakatoro dumpsites.</li> <li>• No stockpile volume measurements recorded in audit data for any other hazardous waste categories.</li> </ul>
<b>Key considerations</b>	<ul style="list-style-type: none"> <li>• The volume of other hazardous waste stockpiles in Vanuatu remains unknown.</li> <li>• Landfill audits, stockpile assessments, and the completion of the waste facility register as proposed by the DCMR Framework will provide the necessary information to make calculate this indicator.</li> </ul>



#### Supplementary KPI 5: Marine plastic pollution potential

<b>Results</b>	<b>Marine plastic pollution potential (tonnes per annum): 1,480</b>
<b>Assumptions</b>	<ul style="list-style-type: none"> <li>• Assumes a national weight of mismanaged waste, based on household audit samples. <ul style="list-style-type: none"> <li>– This calculation uses the total weight of waste generated, subtracted by the weight of waste captured by collection services. The difference is the estimate for mismanaged waste used in this calculation.</li> <li>– Mismanaged waste is defined as all waste which is not captured in collection services, and ends up buried/burned/littered etc.</li> </ul> </li> <li>• Uses proportion of plastics captured in MSW composition.</li> </ul>
<b>Data gaps</b>	<ul style="list-style-type: none"> <li>• Requires a more reliable metric for mismanaged waste.</li> </ul>
<b>Key considerations</b>	<ul style="list-style-type: none"> <li>• Waste plastics which are not managed in an environmentally sound manner are assumed to pose a significant risk of polluting oceans and estuarine waterways.</li> </ul>





### Supplementary KPI 6: Awareness of waste management services

<b>Results</b>	<b>Awareness of waste services (%): No data</b>
<b>Assumptions</b>	<ul style="list-style-type: none"> <li>• None</li> </ul>
<b>Data gaps</b>	<ul style="list-style-type: none"> <li>• Unable to calculate based on information made available in audit reports as this performance indicator requires completion of community survey, specifically gathering responses on:             <ul style="list-style-type: none"> <li>– Number of positive responses indicating awareness</li> <li>– Number of available services</li> <li>– Number of survey participants</li> </ul> </li> </ul>
<b>Key considerations</b>	<ul style="list-style-type: none"> <li>• Completion of the community survey in the future is required to report to this KPI. Monitoring the community's awareness provides an indication of the success of education initiatives and effective use of existing waste management services.</li> </ul>



### Supplementary KPI 7: Proportion of strategic waste management initiatives implemented

<b>Results</b>	<p><b>Proportion of waste management initiatives implemented (%): 73.68%</b></p> <ul style="list-style-type: none"> <li>– Number of successfully implemented waste initiatives = 14 out of 19</li> <li>– Number of planned/pipeline initiatives = 5</li> <li>• Implemented initiatives include:             <ul style="list-style-type: none"> <li>– Vanuatu National Environment Policy and Implementation Plan 2016 – 2030</li> <li>– Waste Management Act 2014</li> <li>– National Waste Management, Pollution Control Strategy and Implementation Plan 2016-2020</li> </ul> </li> <li>Pipeline initiatives include:             <ul style="list-style-type: none"> <li>– Container deposit scheme</li> <li>– National Disaster Waste Management Action Plan</li> <li>– Second Phase of Plastics Ban</li> </ul> </li> </ul>
<b>Assumptions</b>	<ul style="list-style-type: none"> <li>• None</li> </ul>
<b>Data gaps</b>	<ul style="list-style-type: none"> <li>• None</li> </ul>
<b>Key considerations</b>	<ul style="list-style-type: none"> <li>• Vanuatu's primary waste legislation is the Waste Management Act 2014. Before this there was no official waste legislation in the country.</li> <li>• Vanuatu introduced the National Waste Management and Pollution Control Strategy and Implementation Plan 2016-2020, but this is now due for review.</li> <li>• Waste management in Vanuatu is overseen by the national and provincial governments, with the primary responsibility for waste management lying with the provincial governments.</li> </ul>



### Supplementary KPI 8: Commercial waste capture rate

<b>Results</b>	<p><b>Commercial waste capture rate (%): Insufficient data</b></p> <ul style="list-style-type: none"> <li>Measured as the fraction of the total waste captured through formal waste management services over the total waste generated by businesses.</li> <li>Without estimates of commercial waste generation rates and the number of businesses, this indicator cannot be calculated.</li> </ul>
<b>Assumptions</b>	<ul style="list-style-type: none"> <li>None</li> </ul>
<b>Data gaps</b>	<ul style="list-style-type: none"> <li>No estimate for the total amount of commercial waste successfully captured by management services identified.</li> <li>No information on the number of businesses in Vanuatu provided in the audit report.</li> <li>No information on waste generation rates or the total amount of waste generated by businesses except for samples in Luganville and Port Vila.</li> </ul>
<b>Key considerations</b>	<ul style="list-style-type: none"> <li>Accurate calculation relies on an estimate of total numbers of businesses in the country categorised by business type, and an estimate of the commercial waste generation rates for each business type.</li> <li>Completion of business surveys suggested in the DCMR Framework will provide an indication of how many businesses are using collection services, and other forms of waste management, and to what extent these businesses access the service.</li> </ul>



### Supplementary KPI 9: Commercial collection service coverage

<b>Results</b>	<p><b>Commercial collection service coverage (%): Insufficient data</b></p> <ul style="list-style-type: none"> <li>Port Vila and Luganville have implemented a user-pays system for commercial solid municipal waste collection. Collection is also carried out by private contractors in the Port Villa area. No quantification of collection service coverages for businesses was provided in the audit reports.</li> </ul>
<b>Assumptions</b>	<ul style="list-style-type: none"> <li>None</li> </ul>
<b>Data gaps</b>	<ul style="list-style-type: none"> <li>No information on the total number of businesses participating in collection services nationally.</li> <li>No information on the specific commercial collection service coverages by region.</li> <li>No information provided on the access that businesses have to alternative collection services (e.g., waste disposal-points or self-haul).</li> </ul>
<b>Key considerations</b>	<ul style="list-style-type: none"> <li>Accurate calculation relies on understanding the total number of businesses participating nationally, and specific collection service coverages for businesses.</li> <li>Completion of business surveys suggested in the DCMR Framework, would provide an indication of how regular, accessible, and affordable collection services are for businesses.</li> </ul>



## Supplementary KPI 10: Weight of disaster waste disposed

<b>Results</b>	<p><b>Weight of disaster waste disposed (tpa): No data</b></p> <ul style="list-style-type: none"><li>• Measured as a sum of the recorded weight of disaster waste disposed to landfill or received and stockpiled at waste facility following a disaster event.</li><li>• No disaster waste data was recorded during the examined audits.</li></ul>
<b>Assumptions</b>	<ul style="list-style-type: none"><li>• Only captures disaster waste which ends up disposed of or stored at waste facilities, including landfills, disposal sites and recovery facilities.</li><li>• Assumes that the waste facility register has been completed to capture disaster waste information separately of other waste loads received post-event (i.e., information on disaster waste categorised separately to other waste types/streams).</li></ul>
<b>Data gaps</b>	<ul style="list-style-type: none"><li>• The calculation of this performance indicator relies on estimations of the weight of disaster waste (tonnes) landfilled or received at a waste disposal facility following disaster events.</li></ul>
<b>Key considerations</b>	<ul style="list-style-type: none"><li>• Calculation of this performance indicator provides an estimate of the amount of disaster waste being effectively managed and the total amount of disaster waste generated in a year.</li><li>• Calculating this KPI can be undertaken by regularly updating the waste facility register. Tracking the vehicle capacity and percentage fullness of the load for any 'disaster waste' carrying vehicles entering the facility will help reconcile waste amounts disposed if these wastes are not managed separately.</li></ul>





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