



SPREP
Secretariat of the Pacific Regional
Environment Programme



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.**

Federated States of Micronesia National Waste Audit Analysis Report

August 2023



This Waste data collation, analysis and reporting for the FSM 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).

© Secretariat of the Pacific Regional Environment Programme (SPREP) 2023

Reproduction for educational or other non-commercial purposes is authorised without prior written permission from the copyright holder and provided that SPREP and the source document are properly acknowledged. Reproduction of this publication for resale or other commercial purposes is prohibited without prior written consent of the copyright owner.

SPREP Library Cataloguing-in-publication data

Federated States of Micronesia national waste
audit analysis report (August 2023). Apia, Samoa :
SPREP, 2023.
63 p. 29 cm.

ISBN: 978-982-04-1253-8 (print)
978-982-04-1254-5 (ecopy)

1. Recycling (Waste, etc.) – Technical reports
– Federated States of Micronesia. 2. Waste
management – Refuse and refuse disposal –
Federated States of Micronesia. 3. Hazardous
wastes – Auditing – Federated States of Micronesia.
I. Pacific Regional Environment Programme
(SPREP). II. Title.
363.7280966

Disclaimer: This publication was produced with the financial support of the European Union. Its contents are the sole responsibility of SPREP and do not necessarily reflect the views of the European Union. This document has been compiled in good faith, exercising all due care and attention. SPREP does not accept responsibility for inaccurate or incomplete information.



Acknowledgment: The PacWaste Plus programme acknowledges the MRA Consulting Group for their contributions towards the development of National Waste Audit analysis report.

Cover Photo Credit: Darren James Photography



PO Box 240
Apia, Samoa
T: +685 21929
E: sprep@sprep.org
W: www.sprep.org

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



www.pacwasteplus.org

Table of Contents

Map of The Federated States of Micronesia (FSM)	5
Glossary	6
Executive Summary	7
1 Introduction	9
1.1 Background	9
1.2 Purpose and aim	9
1.3 Scope	9
1.4 Country overview	10
2 Methodology	11
2.1 Data sources	11
2.2 Data analysis	12
2.3 Key performance indicators	13
3 Audit analysis results	14
3.1 Summary of data availability	14
3.2 KPI reporting results	15



Map of The Federated States of Micronesia (FSM)



Source: World Atlas, 2020

Glossary

Acronym	Definition
C&D	Construction and Demolition (Waste)
C&I	Commercial and Industrial (Waste)
DCMR	Data Strategy & Collection, Monitoring, and Reporting (Framework)
FSM	Federated States of Micronesia (The)
KPI	Key Performance Indicator
KTG	Kolonia Town Government
MEA	Multilateral Environmental Agreement
MSW	Municipal Solid Waste (i.e., waste originating from the general public that is typically managed by local government entities, excludes commercial / business waste)
NGO	Non-Governmental Organisation
PICT	Pacific Island Countries & Territories
SPREP	Secretariat of The Pacific Regional Environment Programme

Terminology	Definition
Capacity	The total maximum waste storage and processing that can take place at a facility (as capped by license conditions).
Capture rate	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)
Coverage	The proportion of total households that have access to a regular waste collection service.
Modern	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, and have access to equipment and machinery such as a bulldozer. A landfill or dumpsite must employ a leachate management system and a daily cover routine. A recovery facility should have fire prevention and control measures in place, and appropriate stormwater runoff controls. Facilities must not be exceeding their maximum storage capacity.
Per capita	Units measured on a per person basis (i.e., to allow for extrapolation over a national population).
Recovery	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.
Unregulated	Typically, unlicensed waste facilities which do not follow international frameworks, rules, and guidelines to protect the health of the environment and community.
Waste facility	'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 / recovery facilities for dry recyclables (and e-waste), 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 FSM 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 FSM

Core KPIs	Result	Supplementary KPIs	Result
1. Count / capacity of modern waste facilities	0 / 0	1. Cost of disposal to landfill (\$/tonne)	US \$16.47
2. Count / capacity of unregulated waste facilities	5 / Chuuk State landfill at capacity, rest unknown	2. Weight of waste disposed (tpa)	12,772
3. National recovery rate (%)	No data	3. Weight of waste recovered (tpa)	No data
4. Per capita waste generation rate (kg/capita/year)	85.6	4. Volume and type of stockpiled hazardous waste (m ³)	See Section 3.2
5. Municipal Solid Waste (MSW) composition (%)	Figure (a)	5. Marine plastic pollution potential (tpa)	980
6. Household waste capture rate (%)	35.51%	6. Awareness and support of waste management services (%)	No data
7. Household collection service coverage (%)	46.69%	7. Proportion of strategic waste management initiatives implemented (%)	91.30%
8. Fulfillment of MEA reporting requirements (%)	25.56%	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.

Legend

Sufficient data	Limited data	No data
-----------------	--------------	---------

FSM MSW Composition

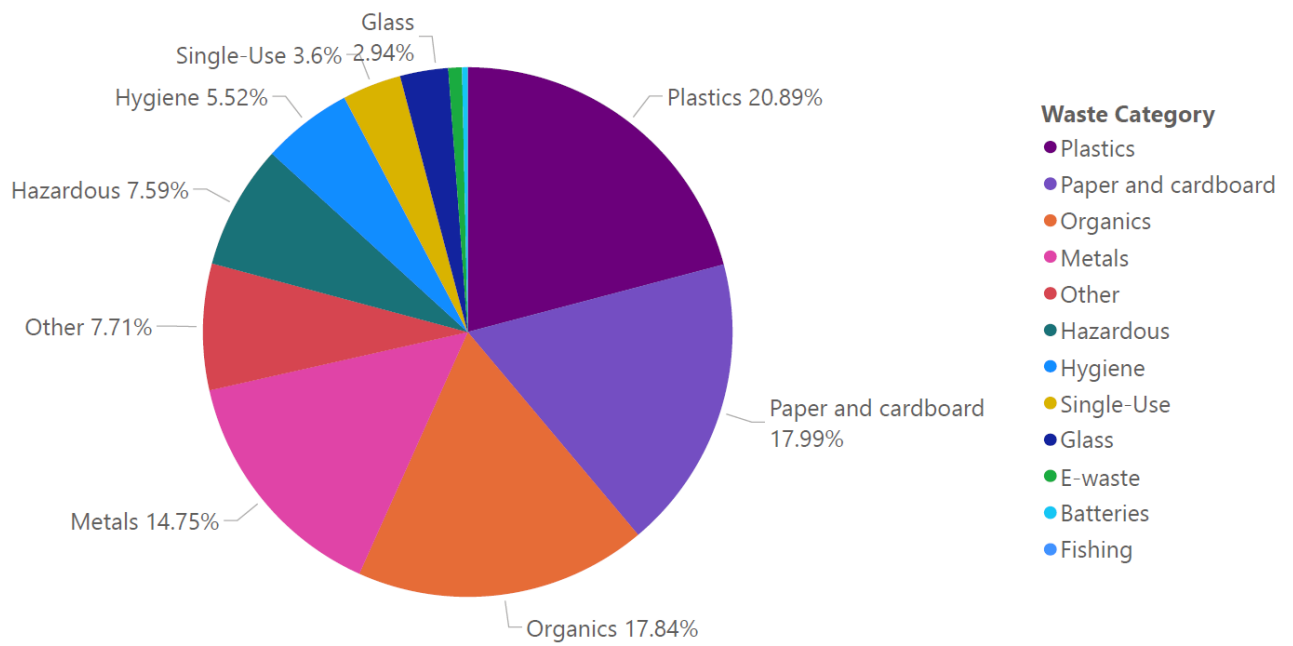


Figure (a) FSM Municipal Solid Waste (MSW) Composition (% by weight)



1 Introduction

1.1 Background

The Federated States of Micronesia is one of fifteen Pacific Island Nations which took part in the PacWaste Plus Programme implemented through SPREP and funded by the European Union Delegation of the Pacific. The PacWaste Plus Programme 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.

FSM's waste management practices are limited, and households in communities without garbage collection services either self-haul to the landfill, burn or bury waste. An aluminium beverage container recycling scheme (CDS) operates in Pohnpei State in the town of Kolonia. Households must register to drop off aluminium cans and receive a refund of five cents per can. There is some reuse of household food organics as feed to livestock and coconut fibre and husk is reused as firewood.

There is otherwise limited access to proper waste collection and disposal facilities, leading to environmental degradation and health hazards. The country lacks a comprehensive waste management system and 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 FSM waste data and waste management systems.

The aim of this 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 FSM:

- **FSM waste audit report 2021:** The audit was undertaken January to April 2021 and provided an evaluation of household and business waste generated in the FSM. Audit data and information was obtained via interviews and collections from each of the four states of the FSM, following by sorting and weighing. Sampling conducted consisted of a total of 337 household waste audits and 79 business waste audits across the four states. The audit report also provided an assessment of the FSM'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. As such, landfill waste is considered a 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 Federated States of Micronesia (FSM) is a country located in the western Pacific Ocean. The country is comprised of over 600 islands, and is made up of four states: Yap, Chuuk, Pohnpei, and Kosrae.

The country covers an area of approximately 700 square kilometres and has a population of over 100,000 people, approximately 23% of the population of the FSM lives in urban areas, while the remaining 77% lives in rural areas. The majority of urban residents in FSM live in the capital city of Palikir, which is located on the island of Pohnpei. Other urban areas include the towns of Colonia in Yap, and Weno in Chuuk.

The FSM has developed a National Solid Waste Management Strategy to address the challenges of managing solid waste in the country. The strategy was developed in collaboration with the four state governments and other stakeholders, with the aim of improving waste management practices across the country.

The strategy seeks to develop and implement policies, plans, legislations, regulations, and institutional arrangements that encourage sustainable solid waste management.

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

- **National government:** The Department of Environment, Climate Change and Emergency Management oversees intrastate coordination and provides support on issues of environment, sustainable development and climate change, including waste management.
- **State government:** Each of the four state governments has implemented their own unique waste management strategies. State Departments of Public Works and Transportation (DPW&T) are responsible for collection and transportation of waste and operation and management of disposal sites in Kosrae, Chuuk and Yap. Each state has an Environmental Protection Agency (EPA) serving as the state's main regulatory body for the management of waste. They perform inspections at landfills to ensure environmental standards are met, organise recycling, promote recycling, and environmental education. In Chuuk and Yap specifically, the EPA has broad overseen recycling via a CDL scheme.
- **Local/municipal government:** Some legislative function for waste management at the local government level is performed by municipal governments.



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
FSM waste audit 2021	<ul style="list-style-type: none"> • Landfill audits • Household waste audits • Interviews (household & commercial) • Stockpile assessments 	<ul style="list-style-type: none"> • Landfilled waste (weight per year) • Landfill waste composition • Access to general waste collection service • Household waste separation methods • Waste disposal methods • Willingness to pay for, and collection service satisfaction • Household waste disposal rates • Commercial disposal rates • Household waste composition
2010 FSM National census	<ul style="list-style-type: none"> • National census 	<ul style="list-style-type: none"> • Population Data • Household Data

2.1.1 FSM Waste Audit 2021

The audit was undertaken between January to April 2021 and utilised the Waste Audit Methodology produced by Pacific Regional Infrastructure Facility (PRIF).

The waste audit was managed remotely due to impacts of the global pandemic and country border closures. In-country focal point personnel within several environment and resource management departments managed the waste audit activities on the ground. The country focal points were responsible for coordinating the audit teams. The audit coordinator prepared audit plans for use in each of the four states in FSM.

The audits were carried out at different times for each state:

- January to February in Pohnpei: 76 household samples and 74 household interviews, 25 commercial samples and interviews.
- January in Chuuk: 120 household samples and 97 household interviews, 27 commercial samples and 25 interviews.
- March to April in Kosrae: 92 household samples and 90 household interviews, 24 commercial samples and interviews.
- Late March to May in Yap: 49 household samples, 71 household interviews, 3 commercial samples and 7 interviews.

Table 2 Sample locations for audits

Sample Location	Population (2010)	Classification
Pohnpei	36,196	Rural
Chuuk	48,654	Urban
Kosrae	6,616	Rural
Yap	11,377	Rural

2.2 Data Analysis

Each country’s audit reports, audit data, and other data sources were inspected for relevant information which was subsequently collated into country-specific databases. These databases were 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

- The audit data provided for ‘urban’ areas (Chuuk) and ‘rural’ areas (Pohnpei, Kosrae, Yap) (see Table 2) is assumed to be representative of the rest of the country.
- All population estimates used to calculate performance indicators are based on national census data from 2010, which predates the audit (completed in 2021).
- 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; and,
- 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	

Legend		
Sufficient data	Limited data	No data

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 report to sufficiently calculate Core KPIs 4 to 8, and Supplementary KPIs 1, 2, 5 and 7.
- Limited data was provided within the audit report to calculate Core KPIs 1 and 2, and supplementary KPIs 4, 8 and 9.
 - No information as to the maximum processing capacities of the waste facilities (tonnes per annum) was provided.
 - Stockpile volume estimates were not given for all suggested hazardous waste categories.
 - 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.
- No data was available in the report to calculate Core KPI 3, and Supplementary KPIs 3, 6, and 10.

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 across the FSM.

4.1 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 the FSM 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

Result	<p>Count of modern waste facilities: 0</p> <ul style="list-style-type: none"> • None of the four documented waste disposal facilities in FSM 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"> – Dekehtik landfill (Pohnpei): Owned by state government, operated by private entity. Staffed and have landfill management equipment. Leachate management adopted. No information as to the application of daily cover. – Chuuk State landfill: Owned by state government. Temporary dumpsite and at capacity at the time of the audit. Staffed and have landfill management equipment. No leachate management. No information as to the application of daily cover. – Tofol landfill: Owned by state government. Staffed, and has access to landfill management equipment. Leachate management adopted. No information as to the application of daily cover. – Yap State landfill: Owned by state government. Staffed and have landfill management equipment. Leachate management adopted. No information as to the application of daily cover. • The Kolonia Town Government (KTG) recycling centre (and the Madolenih Redemption Centre) receives aluminium cans as a part of Pohnpei’s CDS. Aluminium cans are counted into baskets of 500 and pressed / compacted at the KTG recycling centre. No further data was available on this recycling facility in the audit report. <p>Capacity of modern waste facilities (tonnes per annum): 0</p> <ul style="list-style-type: none"> • Since none of the disposal facilities in FSM meet ‘modern’ requirements, or there is insufficient data to determine a classification, the capacity of modern facilities is 0.
Assumptions	<ul style="list-style-type: none"> • None
Data gaps	<ul style="list-style-type: none"> • No estimates or parameters were used to calculate the maximum annual processing capacity (tpa) of any of the four FSM disposal sites. • No mention of daily/weekly cover systems at any of the landfills. • No information on the total storage capacity of the sites, and if they are exceeding storage capacity.
Key considerations	<ul style="list-style-type: none"> • Given there is no information on cover systems for any of the landfills, it is assumed that there are no landfills or dumpsites in FSM that meet with modern standards. • Lack of leachate management at Chuuk State landfill means that both the environment and community are at risk of hazards due to contamination and material flow. • No daily cover usage at the landfill sites means that these sites are very susceptible to climate-related weather events such as cyclones.



Core KPI 2: Count / capacity of unregulated waste facilities

Result	<p>Count of unregulated waste facilities: 5</p> <ul style="list-style-type: none"> • None of the four presented disposal facilities meet the requirements of a ‘modern’ facility and as such are classified as ‘unregulated’. <ul style="list-style-type: none"> – Inadequate leachate management in Chuuk State landfill – No use of daily cover • Majority are lined, staffed, and have access to equipment. • There is insufficient data on the KTG recycling facility to determine if it meets with modern requirements and as such it is classified as ‘unregulated’. <p>Capacity of unregulated waste facilities (tonnes per annum): No data</p> <ul style="list-style-type: none"> • Chuuk State landfill was at full capacity at the time of the audit.
Assumptions	<ul style="list-style-type: none"> • None
Data gaps	<ul style="list-style-type: none"> • No estimates or parameters were used to calculate the maximum annual processing capacity (tpa) of any of the five facilities. • No mention of daily/weekly cover systems at any of the landfills. • No information on the total storage capacity of the sites, and if they are exceeding storage capacity.
Key considerations	<ul style="list-style-type: none"> • All facilities are ‘unregulated’. • Lack of leachate management at Chuuk State landfill means that both the environment and community are at risk of hazards due to contamination and material flow. • No daily cover usage at the landfill sites means that these sites are very susceptible to climate-related weather events such as cyclones.



Core KPI 3: National recovery rate

Results	<p>National recovery rate (%): No data</p> <ul style="list-style-type: none"> The audit reports did not include any estimates or calculable parameters to determine the number of materials diverted from landfill for recovery. The FSM does have a waste recovery facility, namely the Kolonia Town Government (KTG) recycling centre. There is also the Madolenih Redemption Centre. Both provide aluminium can recycling services to Pohnpei. Households are required to pre-register to drop off the aluminium cans in recycling centres. A refund of six cents per can is paid, with an operational cost of one cent per can (consumers receive five cents per can redeemed). The press treatment for the aluminium cans is located at the KTG recycling centre only. There are no other recycling services or facilities available in other states.
Assumptions	<ul style="list-style-type: none"> None
Data gaps	<ul style="list-style-type: none"> No information on the total quantity of waste received by all facilities (tpa) No information on the total mass of material diverted from landfill (tpa). No information on the estimated mass of material recovered per annum (tpa) at any facility.
Key considerations	<ul style="list-style-type: none"> The national recovery rate was not able to be calculated given the lack of data. The audit highlighted that potentially recyclable materials are present in the waste stream in proportions suitable for recycling efforts should markets be present.



Core KPI 4: Per capita waste generation rate

Results	<p>Per capita waste generation rate (kg/capita/year): 85.6</p> <ul style="list-style-type: none"> kg/capita/day: 0.235 kg/household/day: 1.10
Assumptions	<ul style="list-style-type: none"> 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 or urban), and then extrapolated using census data of the national population. Per capita information based on 2010 census results. Chuuk State was considered as an 'urban' area in waste audits, while Pohnpei, Kosrae and Yap were considered as an 'rural' area.
Data gaps	<ul style="list-style-type: none"> None
Key considerations	<ul style="list-style-type: none"> Future per capita waste generation rates will provide insight into waste management trends and changes for the FSM. It is recommended that this performance indicator result is updated when more recent census data becomes available.



Core KPI 5: Municipal Solid Waste (MSW) Composition

Results

Plastics is the most prevalent waste type for household waste in FSM. This is followed by Paper and cardboard waste and then Organics.

- Plastics: 20.89%
- Paper and cardboard: 17.99%
- Organics: 17.84%

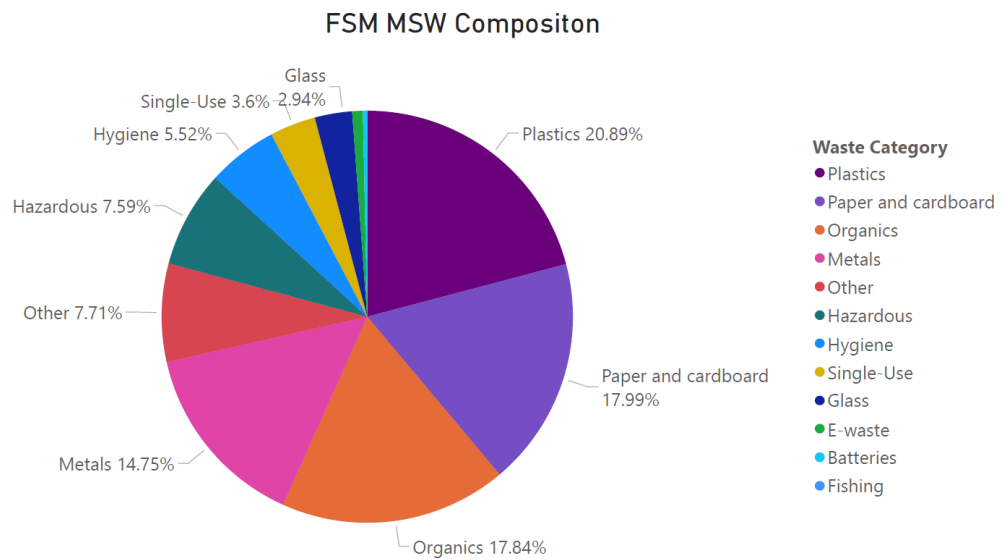


Figure 1 FSM Municipal Solid Waste (MSW) composition (% by weight)

Assumptions

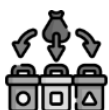
- None

Data gaps

- None

Key considerations

- 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

Results	<p>Household waste capture rate (%): 35.51%</p> <ul style="list-style-type: none"> – Total weight of household waste generated = 8,800 tpa – Total weight of household waste captured responsibly = 4,109 tpa
Assumptions	<ul style="list-style-type: none"> • The survey and audits did not capture each household’s disposal method, nor the weight of waste captured by management services, so census data was used and extrapolated across household audit results. <p style="text-align: center;"><i>Household waste capture rate (%) = $\frac{\text{weight of managed waste (tpa)}}{\text{total household waste generated (tpa)}}$</i></p> <p>Total weight of managed waste is calculated as the product of:</p> <p style="text-align: center;"><i>weight of managed waste (tpa) = $\frac{\text{household collection coverage (%)}}{\text{total household waste generated (tpa)}}$</i></p> <p>Collection service coverage (%) is the product of:</p> <p style="text-align: center;"><i>household collection coverage (%) = $\frac{\text{number of households with some form of collection service}}{\text{total number of households}}$</i></p> <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> <p style="text-align: center;"><i>total household waste generated (tpa) = average waste generation rate of location $\left(\frac{\text{kg}}{\text{capita}}\right)$ × location population</i></p>
Data gaps	<ul style="list-style-type: none"> • The 2021 audit and conducted survey did not capture: <ul style="list-style-type: none"> – Information to quantify each household’s disposal method. – The weight of waste captured by management services. – The household data are based on the 2010 census report, which predates the waste audits report. The household waste capture rate would benefit from updated census data becoming available.
Key considerations	<ul style="list-style-type: none"> • Less than half of the waste generated in FSM is captured by formal collection services. (i.e. successfully captured and disposed or recovered in an environmentally responsible manner). • 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. • This KPI is expected to change significantly in the future as relevant data is collected to calculate the household waste capture rate more accurately.



Core KPI 7: Household collection service coverage

Results	<p>Household collection service coverage (%): 46.69%</p> <ul style="list-style-type: none"> • On Pohnpei, collection services are regarded as being unreliable, and are infrequent (monthly for households). Coverage: 18.92%. • On Chuuk, there is a low frequency of collection service (one day a week). Coverage: 51.55%. • On Kosrae, public opinion of the collection service was generally positive. However, transportation of waste was highlighted as an issue, households appear to be aware of a need for more waste collection trucks to increase transport capacity, and more bins need to be provided as storing of waste for collection is becoming an issue. Coverage: 74.44%. This is the highest coverage of the four states of the FSM. • On Yap, the waste collection service is inconsistent, and the service coverage of households is limited. Coverage: 12.68%
Assumptions	<ul style="list-style-type: none"> • Calculated based on information from 2010 census data: <ul style="list-style-type: none"> – Number of households – Proportion of populations by state – Coverage percentages for each state were derived from survey responses indicating access to some form of collections. This was extrapolated across the rest of the population per each state according to their rural or urban zonings.
Data gaps	<ul style="list-style-type: none"> • None
Key considerations	<ul style="list-style-type: none"> • There is significant variation in the coverage across each of the FSM’s four states. • Two thirds of households in the FSM do not have access to a household waste collection service. Even for serviced areas, the infrequency of waste collections limits the service’s effectiveness. • It should be noted that collection service coverage is a significant challenge for the FSM due to the remote, isolated, and dispersed nature of the islands.



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

Results		Fulfillment of MEA reporting requirements (%): 25.56%			
		Convention	Status	Reporting requirements	Reports delivered
		Basel Convention	Accession	Annual reports (27)	3
		Stockholm Convention	Accession	5 reporting cycles (5)	2
Assumptions	<ul style="list-style-type: none"> None 				
Data gaps	<ul style="list-style-type: none"> Only MEA's with mandatory reporting requirements were included in the calculation of this KPI. For conventions like the Waigani convention of which the FSM is a member, strict reporting requirements are not enforced and so are not included in the calculation. 				
Key considerations	<ul style="list-style-type: none"> The FSM are significantly behind on the required MEA reports for the agreements of which it is party to. FSM is one of the only PICTs to have submitted to the Stockholm and Basel Conventions in the last five years. 				



Supplementary KPI 1: Cost of disposal to landfill

Results		Cost of disposal to landfill (\$/tonne): US \$16.47	
		– Pohnpei: US \$15.93	
		– Chuuk: US \$8.97	
		– Kosrae: US \$3.16	
		– Yap: US \$40.08	
		<ul style="list-style-type: none"> The audit reported on operating costs for each of the major landfills in the four states, providing official \$/annum figures. 	
Assumptions	<ul style="list-style-type: none"> None 		
Data gaps	<ul style="list-style-type: none"> None 		
Key considerations	<ul style="list-style-type: none"> The audit provided all necessary data to calculate this figure using direct tonnage estimates and operational costs. Completion of the waste facility register suggested by the DCMR Framework will provide sufficient data to accurately calculate this indicator to work as a benchmark for comparing disposal costs against previous periods, other countries, and the region. 		



Supplementary KPI 2: Total weight of waste disposed

Results	Total weight of waste disposed (tonnes per annum): 12,800
Assumptions	<ul style="list-style-type: none"> • None
Data gaps	<ul style="list-style-type: none"> • None
Key considerations	<ul style="list-style-type: none"> • This performance indicator provides an indication of the effectiveness of a country's waste management system in diverting waste from the environment via landfill. This result can be used to evaluate the need for additional investment into waste disposal infrastructure and identify opportunities for improved recycling.



Supplementary KPI 3: Total weight of waste recovered

Results	Total weight of waste recovered (tonnes per annum): No data
Assumptions	<ul style="list-style-type: none"> • None
Data gaps	<ul style="list-style-type: none"> • No weight data for recovered waste was recorded during the audit. • Data on the mentioned recovery facilities did not go beyond mention of name and function.
Key considerations	<ul style="list-style-type: none"> • It is recommended that future audits follow the suggested methodologies presented in the DCMR framework to collate data for calculation of this performance indicator. • While recycling infrastructure does exist in the FSM, the amount of waste which this infrastructure recovers from the country's total generated is not able to be calculated with currently available data.



Supplementary KPI 4: Volume and type of stockpiled hazardous waste

Results	Volume and type of stockpiled hazardous wastes (m³): <ul style="list-style-type: none"> – Asbestos: No data – E-waste: 6,042 m³ – Healthcare and pharmaceutical waste: No data – Used oil: 1,027 m³ – Used tyres: Insufficient data – Obsolete chemicals: No data
Assumptions	<ul style="list-style-type: none"> • None
Data gaps	<ul style="list-style-type: none"> • There were no recorded volumes for asbestos, healthcare and pharmaceutical, and obsolete chemical waste stockpiles. • Used tyre stockpile data was recorded in tonnes, not cubic metres.
Key considerations	<ul style="list-style-type: none"> • The volume of other hazardous waste stockpiles in the FSM remains unknown. • Landfill audits, stockpile assessments, and the completion of the waste facility register proposed by the DCMR Framework will provide the information required to calculate this performance indicator.



Supplementary KPI 5: Marine plastic pollution potential

Results	
Results	Marine plastic pollution potential (tonnes per annum): 980
Assumptions	<ul style="list-style-type: none"> • Assumes a national weight of mismanaged waste, based on household audit samples. <ul style="list-style-type: none"> – 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. – Mismanaged waste is defined as all waste which is not captured in collection services, and ends up buried / burned / littered etc. • Uses proportion of plastics captured in MSW composition.
Data gaps	<ul style="list-style-type: none"> • Requires a more reliable metric for mismanaged waste.
Key considerations	<ul style="list-style-type: none"> • Waste plastics made up the highest proportion of the MSW in the FSM, at about 21% percent of the total waste generated. • Waste plastics which are not managed in an environmentally sound manner are assumed to pose a significant risk of polluting oceans and estuarine waterways.



Supplementary KPI 6: Awareness of waste management services

Results	
Results	Awareness of waste services (%): No data
Assumptions	<ul style="list-style-type: none"> • None
Data gaps	<ul style="list-style-type: none"> • Unable to calculate based on audit reports as this performance indicator requires completion of community survey, specifically gathering responses on: <ul style="list-style-type: none"> – Number of positive responses indicating awareness – Number of available services
Key considerations	<ul style="list-style-type: none"> • Completion of 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.



Supplementary KPI 7: Proportion of strategic waste management initiatives implemented

Results	<p>Proportion of waste management initiatives implemented (%): 91.11%</p> <ul style="list-style-type: none"> – Number of successfully implemented waste initiatives = 41 out of 45 – Number of planned/pipeline initiatives = 4 <ul style="list-style-type: none"> • At the time of reporting, the FSM does not have any dedicated waste management legislation. Instead, waste management is regulated by a combination of national and state-level regulations relevant to waste management. • Implemented waste initiatives (at the national level) include: <ul style="list-style-type: none"> – Environmental Protection Act (2014) – Act for the prohibition on the importation, sale or distribution of one time use disposable Styrofoam and plastic food service items and plastic shopping bags (2020) – State Waste Management Strategies • Pipeline initiatives include: <ul style="list-style-type: none"> – National waste policy – New state legislative initiatives for solid waste under the Clean Environment Act – Container deposit schemes for Chuuk, expansion in Yap – Chemical management system
Assumptions	<ul style="list-style-type: none"> • None
Data gaps	<ul style="list-style-type: none"> • None
Key considerations	<ul style="list-style-type: none"> • Each of the four states in FSM - Yap, Chuuk, Pohnpei, and Kosrae - has developed a Solid Waste Management Strategy that provides guidance on waste management practices in the respective states. • The decentralised nature of waste management in FSM makes it difficult to develop a cohesive and effective waste management system across the country. Therefore, the Solid Waste Management Strategies developed by each state play an essential role in addressing the specific needs and challenges of waste management. • However, the lack of dedicated waste management legislation in FSM presents a challenge to ensuring efficient and effective waste management practices across the country.



Supplementary KPI 8: Commercial waste capture rate

Results	<p>Commercial waste capture rate (%): Insufficient data</p> <ul style="list-style-type: none"> Measured as the fraction of the total waste captured through formal waste management services over the total waste generated by businesses. Without estimates of commercial waste generation rates and the number of businesses, this indicator cannot be calculated.
Assumptions	<ul style="list-style-type: none"> None
Data gaps	<ul style="list-style-type: none"> No estimate for the number of businesses in FSM in the audit report. No information on the total amount of waste generated by businesses. No information on the waste generation of businesses in the audit report.
Key considerations	<ul style="list-style-type: none"> 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. 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.



Supplementary KPI 9: Commercial collection service coverage

Results	<p>Commercial collection service coverage (%): 25.43%</p> <ul style="list-style-type: none"> 25 businesses were interviewed in Pohnpei and Chuuk, 24 in Kosrae, 7 in Yap. <ul style="list-style-type: none"> Pohnpei coverage: 40.00% Chuuk coverage: 24.00% Kosrae coverage: 79.10% Yap coverage: 14.30%
Assumptions	<ul style="list-style-type: none"> Sample coverages are assumed to be representative of the whole of FSM. No information on service coverages or the number of participating businesses beyond the conducted surveys were identified.
Data gaps	<ul style="list-style-type: none"> The audit report did not quantify access to alternative collection services used by businesses (e.g., waste disposal-points or self-haul), however the different disposal methods indicated by respondents was listed. No information on the total number of businesses participating nationally.
Key considerations	<ul style="list-style-type: none"> Accurate calculation relies on understanding the total number of businesses participating nationally, and specific collection service coverages for businesses. Completion of business surveys suggested in the DCMR Framework, would provide an indication of how regular, accessible, and affordable collection services are for businesses.



Supplementary KPI 10: Weight of disaster waste disposed

Results	Weight of disaster waste disposed (tpa): No data <ul style="list-style-type: none">• 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.• No disaster waste data was recorded during the examined audits.
Assumptions	<ul style="list-style-type: none">• Only captures disaster waste which ends up disposed of or stored at waste facilities, including landfills, disposal sites and recovery facilities.• 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).
Data gaps	<ul style="list-style-type: none">• 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.
Key considerations	<ul style="list-style-type: none">• 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.• Calculating this KPI can be undertaken by regularly updating the waste facility register. Tracking the vehicle capacity and percentage fullness of the load of any 'disaster waste' carrying vehicles entering the facility will help reconcile waste amounts disposed if these wastes are not managed separately.





EUROPEAN UNION



ISBN 978-982-04-1240-8



9 789820 412408