



SPREP
Secretariat of the Pacific Regional
Environment Programme



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Kiribati National Waste Audit Analysis Report

August 2023



This Waste data collation, analysis and reporting for the Kiribati 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



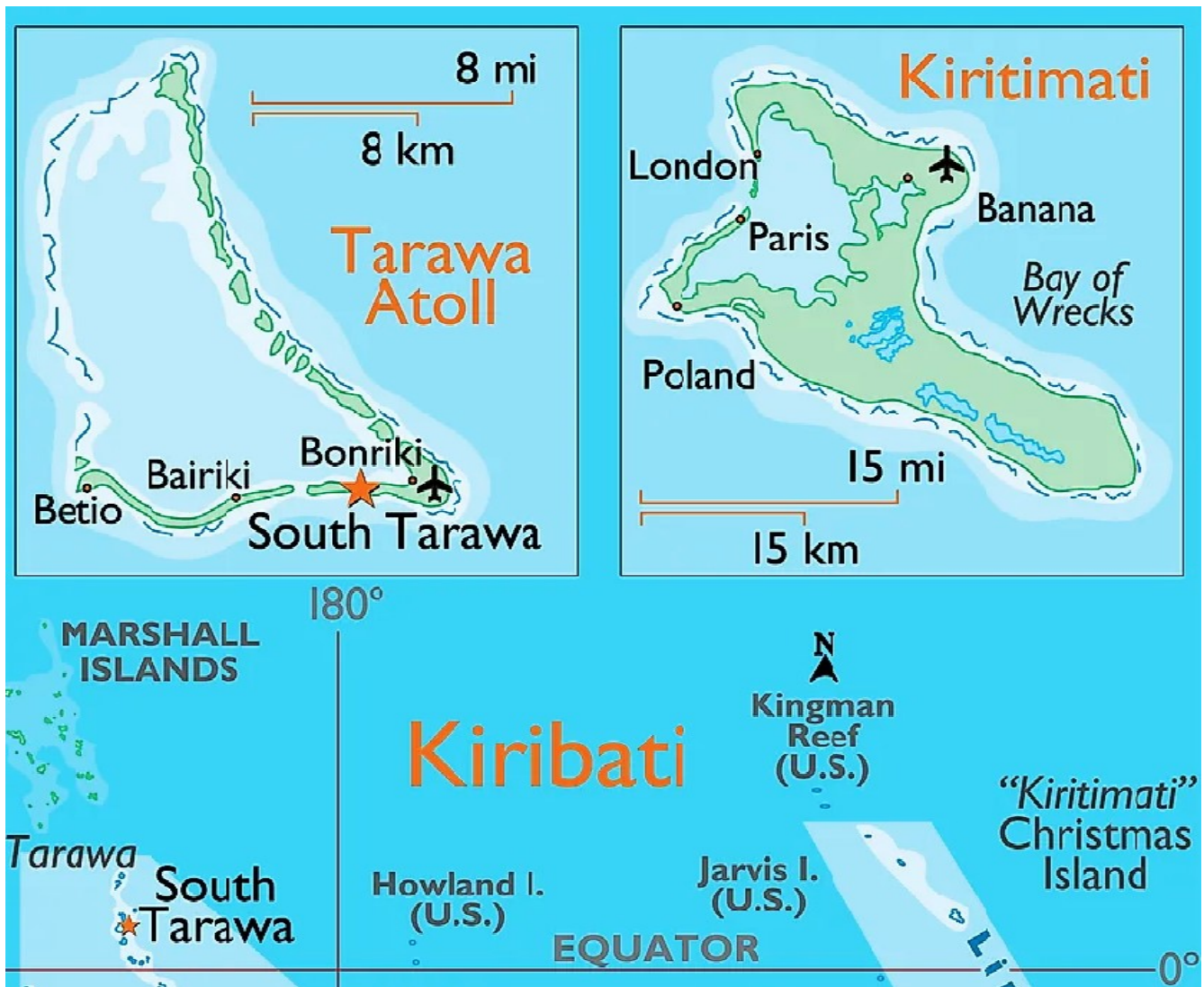
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Map of Kiribati



Source: World Atlas, 2020

Glossary

Acronym	Definition
C&D	Construction and Demolition (Waste)
C&I	Commercial and Industrial (Waste)
CDS	Container Deposit Scheme
DCMR	Data Strategy & Collection, Monitoring, and Reporting (Framework)
KPI	Key Performance Indicator
KWMRR Strategy	Kiribati Waste Management and Resource Recovery Strategy
MEA	Multilateral Environmental Agreement
MELAD	Ministry of Environment, Lands and Agriculture Development
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)
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.
Coverage	The proportion of total households that have access to a regular waste collection service.
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 Kiribati 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 Kiribati

Core KPIs	Result	Supplementary KPIs	Result
1. Count / capacity of modern waste facilities	1 / 0	1. Cost of disposal to landfill (\$/annum)	AUD \$34.47 (US \$22.98)
2. Count / capacity of unregulated waste facilities	5 / Capacity unknown	2. Weight of waste disposed (tpa)	8,752
3. National recovery rate (%)	(CDS 49.69%) See Section 3.2	3. Weight of waste recovered (tpa)	95.9
4. Per capita waste generation rate (kg/capita/year)	112	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)	359
6. Household waste capture rate (%)	53.07%	6. Awareness and support of waste management services (%)	No data
7. Household collection service coverage (%)	40.09%	7. Proportion of strategic waste management initiatives implemented (%)	68.75%
8. Fulfillment of MEA reporting requirements (%)	44.55%	8. Commercial waste capture rate (%)	See Section 3.2
		9. Commercial collection service coverage (%)	62.00%
		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
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Kiribati MSW Composition

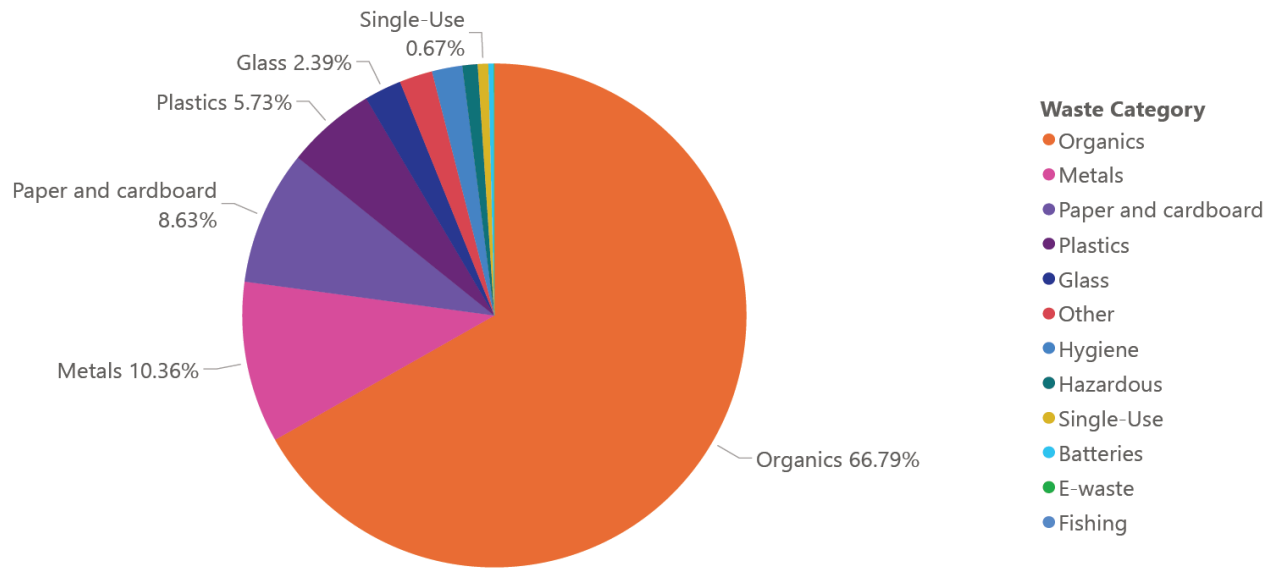


Figure (a) Kiribati Municipal Solid Waste (MSW) composition (% by weight)



1 Introduction

1.1 Background

Kiribati 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.

Kiribati's solid waste management has progressed substantially over the past three decades. Kiribati has a well-developed legislative framework for waste management and recycling, including an established container deposit scheme (CDS). The CDS is part of the Kaoki Maange (Keep Kiribati Beautiful) Program, a successful recycling initiative in the country. At the time of the audit report, the CDS was available in South Tarawa, where a material recycling facility near the Betio Landfill handles the collection of CDS-eligible items, electronic waste, and white goods. Betio Landfill has a shredder for chipping green waste and the woodchip is sold to the community.

However, landfilling is Kiribati's primary waste management method. With two of the three managed landfills in Kiribati reaching capacity, the threat of overflowing landfills and unmanaged waste is increasing. Waste collection services to the outer islands are limited, so residents rely on burying and burning of wastes or disposal of waste into the sea.

1.2 Purpose and Aim

The purpose of this audit analysis and report is to establish a baseline position for Kiribati 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 Kiribati:

- **Kiribati waste audit report 2021:** The audit was undertaken March to April 2021 and provided an evaluation of household and business waste generated in Kiribati. Audit data and information was obtained via interviews and waste collection from 208 households and 53 businesses, followed by sorting and weighing. The audit report also provided an assessment of the state of Kiribati's landfills including landfill audits and stockpiles 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 Republic of Kiribati is an independent, low-lying island nation located in the central Pacific Ocean. It is less than 100 kilometres from the equator and one of the most remote countries in Micronesia. Its 21 inhabited islands (of a total of 33 islands) are on average 6 metres above sea level.

The three island groups are the Gilbert Islands, the Line Islands, and the Phoenix Islands. Approximately 45% of Kiribati's population of 119,438 people live on urban South Tarawa, an island with a narrow reef on one side and a shallow lagoon reaching kilometres out to sea, with one road in the middle. The remaining 55% of Kiribati's population live on the rural outer islands. Although Kiritimati Island is part of Kiribati, it is 2,000 kilometres from the capital in Tarawa and there are no direct flights between them.

Kiribati has developed significant environmental legislation, policy, and strategies for solid waste management, such as the *Environment Amendment Act 2007* and the *Kiribati Waste Management and Resource Recovery Strategy 2020–2030 (KWMRR Strategy)*. In addition, Kiribati has ratified numerous international and regional commitments related to the environment, most notably the Basel and Waigani Conventions.

The responsibility for managing solid waste is divided among national and municipal institutions in Kiribati, which include:

- **National Government:** Largely responsible for policy and planning solid waste management nationally via Kiribati's Ministry of Environment, Lands and Agriculture Development (MELAD). MELAD oversees solid waste management by regulating and funding waste management services. The Government also has a Bureau of Public Works, which includes infrastructure planning, and raising public awareness about solid waste management issues. Additionally, the national government coordinates with local governments to address solid waste issues and implement the KWMRR Strategy.
- **Local/municipal government:** For those with access to collection services, the municipal governments of Kiribati are responsible for household and commercial waste collection, the management of landfills, and recycling facilities and projects.

Beyond this, private recycling companies have a contractual arrangement with public entities to provide waste management and pollution control services.



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
Kiribati waste audit 2021	<ul style="list-style-type: none"> • Sample collection from households and businesses • Sort and weigh of household/business waste. • Household and business interviews • Landfill audit • Stockpile assessment 	<ul style="list-style-type: none"> • Household and business waste generation • Household and business waste composition • Waste disposal at landfills and dumpsites • Stockpile types and quantities • Landfilled waste composition and weight • Landfill life
2020 Kiribati National census	<ul style="list-style-type: none"> • National census 	<ul style="list-style-type: none"> • Population data • Household data (size, number)

2.1.1 Kiribati Waste Audit 2021

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

The audits were carried out to cover one week's waste from selected areas and two weeks' waste at the landfill. The data was then extrapolated out to obtain the waste disposal and generation rates for the whole of the country.

A total of 203 household samples and 53 commercial samples were gathered in this audit. The landfill audit was completed over the course of 14 days at Naanikai and seven days at Betio.

Table 2 Sample locations for audits

Sample Location	Population (2020)	Classification
South Tarawa	63,072	Urban
Abaiang	20,735	Rural
Maiana	8,344	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 (South Tarawa) and 'rural' areas (Abaiang and Maiana) (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 2020, 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:

- The audit reports provided adequate information for Core KPIs 3 to 8, and Supplementary KPIs 2, 3, 5, and 7.
- There was limited data available to calculate Core KPIs 1 to 3, and Supplementary KPIs 1, 4, and 8.
 - Storage and processing capacities for waste facilities were not identified in the audit report.
 - There were some measurements of volume for e-waste, but no mention of measurements for all other hazardous waste categories.
 - No specific operational costs were presented for the landfills in Kiribati.
 - There was some information pertaining to the 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.
 - There was insufficient data available in the audit report to allow for a recovery rate to be calculated at the national level.
- No data was available to inform Supplementary KPIs 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 in Kiribati. 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 Kiribati to compare future data to, and to guide subsequent waste management or waste data related activities.



Core KPI 1: Count / capacity modern waste facilities

Result	<p>Count of modern waste facilities: 1</p> <ul style="list-style-type: none"> The audit report provided information on six facilities: Betio, Nanikaai, Bikenibeu landfills, Abaiang (Tabwakea) and Maiana (hazardous) dumpsites, and the Betio MRF which also houses the Kaoki Maange Waste Recycling Facility on the same site. Analysis deemed that 5 of these could not be classified as ‘modern’ facilities under the definitions set out in the DCMR framework: <ul style="list-style-type: none"> Of the six facilities identified within the report, Betio, Nanikaai, and Bikenibeu landfills, and the Betio MRF / Kaoki Maange Waste Recycling Facility are staffed and have equipment access. The two dumpsites on Kiritimati (Abaiang and Maiana) are not controlled and unmanaged. Landfill facilities in Kiribati are lacking in leachate management infrastructure and daily cover systems on site. The Betio MRF houses end of life vehicles, e-waste and white goods. The Kaoki Maange Waste Recycling Facility is situated within the Betio MRF site. It stockpiles recyclables such as PET bottles, aluminium cans and lead acid batteries for export and recycling overseas, and has a PET baler and aluminium can-crushing machine. Stockpiles of recyclables appear well organised. This facility has been classified as a ‘modern’ facility. <ul style="list-style-type: none"> A 10 by 8 metre hanger facility provides cover for the baler and the processing of recyclables. The 2021 waste audit noted that stockpiling space at the MRF is becoming insufficient due to PET bottle export challenges. Operates a CDS under contract to a private-sector business. <p>Capacity of modern waste facilities (tonnes per annum): 0 / No data</p> <ul style="list-style-type: none"> The disposal facilities in Kiribati do not meet with modern requirements, so the capacity of these ‘modern’ facilities is 0. There is insufficient data to determine the capacity of the Kaoki Maange recovery facility (or the Betio MRF).
Assumptions	<ul style="list-style-type: none"> None
Data gaps	<ul style="list-style-type: none"> No estimates or parameters were identified in the audit report pertaining to the maximum annual processing capacity (tpa) of any of the Kiribati disposal sites or recovery facility.
Key considerations	<ul style="list-style-type: none"> There are no landfills or dumpsites in Kiribati which are up to ‘modern’ standards. The Kaoki Maange recovery facility has been classified as ‘modern’. The Kaoki Maange recovery facility stockpiles lead acid batteries. Best practice requires that recovery facilities implement fire prevention and control measures, and suitable drainage to capture pollution runoff. Lack of leachate management at the landfills / dumpsites 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 material flow during climate-related weather events such as cyclones. Investment to upgrade existing landfills in Kiribati to meet with modern standards/best practice will lead to better outcomes for the local environment and community health.



Core KPI 2: Count / capacity of unregulated waste facilities

Result	<p>Count of unregulated waste facilities: 5</p> <ul style="list-style-type: none"> • All landfills/dumpsites identified in the audit report meet the requirements of a ‘modern’ facility and as such are classified as ‘unregulated’. <ul style="list-style-type: none"> – Inadequate leachate management; and – No use of daily cover. • Abaiang dumpsite (recognised by local government) and Maiana dumpsite (unapproved) have no staff, regular equipment access, leachate control or daily cover system. <ul style="list-style-type: none"> – Maiana dumpsite is of particular concern as it is used as a hazardous waste dumpsite. <p>Capacity of unregulated waste facilities (tonnes per annum): No data</p> <ul style="list-style-type: none"> • The audit report did not provide measurements to calculate the total processing or storage capacities of wastes facilities in Kiribati (tonnes per annum). At the time of the audit, however it was noted that: <ul style="list-style-type: none"> – Betio Landfill has 10% or three years of storage capacity remaining. – Nanikaai Landfill has 30% or 10 years of storage capacity remaining. – Bikenibeu Landfill has 71% or 30 to 35 years of storage capacity remaining.
Assumptions	<ul style="list-style-type: none"> • None
Data gaps	<ul style="list-style-type: none"> • No estimates for the maximum annual processing capacity (tpa) of any of the Kiribati landfills and disposal sites presented in the audit report.
Key considerations	<ul style="list-style-type: none"> • All landfill/dumpsites are ‘unregulated’. This includes: <ul style="list-style-type: none"> – Betio Landfill; – Nanikaai Landfill; – Bikenibeu Landfill; – Abaiang dumpsite; and, – Maiana (hazardous waste) dumpsite. • No measurements are available on the total processing capacity of the sites per annum, however Betio and Nanikaai landfills are nearing maximum capacity. It is likely that at the time of writing this report, Betio has reached or is exceeding capacity. • It is recommended that maximum capacities for all facilities are investigated and reported on. • 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. • No daily cover usage at the landfill sites means that these sites are very susceptible to climate-related weather events such as cyclones. In the case of Kiribati, sea level rise and related inundation and reduction in available usable land are of particular concern, raising the risk of harm to environmental and community health. • 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.



Core KPI 3: National recovery rate

Results	<p>National recovery rate (%): Insufficient data (South Tarawa CDS: 49.69%)</p> <ul style="list-style-type: none"> • According to information available in the audit report, recovery efforts in Kiribati consist of South Tarawa’s CDS, and the Kaoki Maange recovery facility. The audit report did not identify any other dedicated recovery operations. • As such, there is insufficient data to calculate a recovery rate to the national level, but it is worth highlighting that around half of the materials targeted by the Kaoki Maange program on South Tarawa are successfully diverted from landfill. • Annually, South Tarawa diverts from landfill approximately: <ul style="list-style-type: none"> – 11 tonnes of PET plastics; – 23 tonnes of aluminium cans; and – 62 tonnes of used lead-acid batteries. – This results in an annual 96 tonnes diverted from landfill. <p>According to the audit report, this material is stockpiled until quantities are ready for export. At the time of the audit report, approximately 550 tonnes of these waste materials have been exported since the program was introduced in 2003.</p>
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"> • Kiribati is one of the few Pacific Island Nations with a dedicated waste recovery system and infrastructure. • A national recovery rate was not able to be calculated. Recovery efforts at the time of the audit were restricted to South Tarawa. Though successful in diverting targeted materials from landfill, the scale of recovery operations in Kiribati as a whole is still small. • Recycling on Kiribati relies on export to other countries. The lack of markets for Kiribati to export recyclable waste to limits the recovery of waste in the country. The audit report noted that no PET bottles have been exported since 2018 due to lack of markets and that about 200 tonnes of PET bottles were stockpiled at Kaoki Maange.



Core KPI 4: Per capita waste generation rate

Results	Per capita waste generation rate (kg/capita/year): 112 <ul style="list-style-type: none">– kg/capita/day: 0.306– kg/household/day: 1.60
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 extrapolated using census data of the national population.• Where divisions had no data (Southern Division, Line Islands & Phoenix Division), an assumed 'rural' average waste generation rate was used based on data from household audits from the Northern and Central Divisions.• The South Tarawa Division is considered the only urban population in Kiribati.• Per capita information was sourced from 2020 census results.
Data gaps	<ul style="list-style-type: none">• No information recorded in Southern Division, and the Line Islands & Phoenix Divisions.• Not all regions, islands or towns/villages represented in the audit report have corresponding data represented in the 2020 census.
Key considerations	<ul style="list-style-type: none">• It is recommended that future audits provide greater data coverage across all the divisions in Kiribati.





Core KPI 5: Municipal Solid Waste (MSW) Composition

Results

Organic waste is the most prevalent waste type found in household waste in Kiribati. This is followed by metals and paper & cardboard.

- Organics: 66.79%
- Metals: 10.36%
- Paper & Cardboard: 8.63%

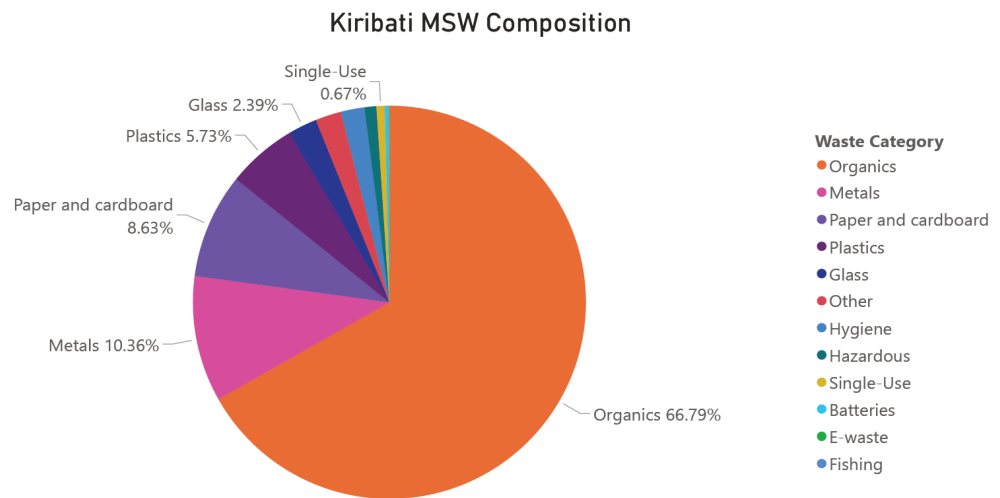


Figure 1 Kiribati Municipal Solid Waste (MSW) composition (% by weight)

Assumptions

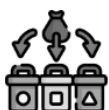
- None

Data gaps

- No samples taken in the Southern Division, Line Islands & Phoenix Division.

Key considerations

- 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.
- According to the audit report, following a ban on plastic bags and nappies in 2020 it is likely that organic or compostable alternatives will enter the waste stream and increase the overall proportion of organic waste generated by households.
- 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 (%): 53.07%</p> <ul style="list-style-type: none"> – Total weight of household waste generated = 13,348 tpa – Total weight of household waste captured responsibly = 7,084 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. $\text{Household waste capture rate (\%)} = \frac{\text{weight of managed waste (tpa)}}{\text{total household waste generated (tpa)}}$ <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> $\text{total household waste generated (tpa)} = \text{average waste generation rate of location} \left(\frac{\text{kg}}{\text{capita}} \right) \times \text{location population}$
Data gaps	<ul style="list-style-type: none"> • The audit did not quantify household disposal methods. • No data was collected in the Southern Division and Line Islands & Phoenix Division.
Key considerations	<ul style="list-style-type: none"> • Just over half of the waste generated in Kiribati is captured by formal collection services (i.e. successfully captured and disposed or recovered in an environmentally responsible manner). • There are no collection services available to the rest of the outer islands of Kiribati. On these islands, all waste is dumped, buried, or burned. • This KPI is expected to change in the future as relevant data is collected and used to calculate a more accurate household waste capture rate.



Core KPI 7: Household collection service coverage

Results	<p>Household collection service coverage (%): 40.09%</p> <ul style="list-style-type: none"> Household collection services are only offered on South Tarawa, Kirimati, and Betio islet. None of the islands with access to collections have full coverage.
Assumptions	<ul style="list-style-type: none"> This performance indicator has been calculated based on information from 2020 census data: <ul style="list-style-type: none"> Number of households; and Proportion of populations by division. Coverage percentages for each division were derived from figures provided in the audit report for South Tarawa, Betio, and Kirimati. These were averaged for each island, used representatively for their corresponding divisions, and then extrapolated to the national level based on rural and urban zonings of the divisions.
Data gaps	<ul style="list-style-type: none"> None
Key considerations	<ul style="list-style-type: none"> Establishing a waste collection service throughout all of Kiribati remains a significant challenge. Some households in South Tarawa, Betio and Kirimati are not receiving collections. There are no collection services available to the remaining islands of Kiribati. On these islands, all waste is dumped, buried, or burned. Expanding coverage on Kiribati's other islands would increase the waste capture rate and reduce the quantity of waste that is mismanaged. A more representative result for this KPI can be achieved through use of the DCMR Framework's suggested community survey.



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

Fulfillment of MEA reporting requirements (%): 44.55%			
Convention	Status	Reporting requirements	Reports delivered
Basel Convention	Accession	Annual reports (22)	3
Minamata Convention	Accession	1 report	1
Stockholm Convention	Ratified	5 reporting cycles (5)	1
<ul style="list-style-type: none"> None Only MEA's with mandatory reporting requirements were included in the calculation of this KPI. For conventions like the Waigani Convention, strict reporting requirements are not enforced and so are not included in the calculation. Kiribati has satisfied the reporting requirements for the Minamata Convention on Mercury. Kiribati is significantly behind on national reports for the Basel and Stockholm Conventions. 			



Supplementary KPI 1: Cost of disposal to landfill

Results	<p>Cost of disposal to landfill (\$/tonne): AUD \$34.47</p> <ul style="list-style-type: none"> This calculation is based on local government expenditures for waste management: <ul style="list-style-type: none"> Teinainano Urban Council: AUD \$102,660 Betio Town Council: AUD \$160,441 No specific operating costs for landfills was provided in the report.
Assumptions	<ul style="list-style-type: none"> Local government waste management expenditure was assumed to be representative for the cost of operating landfills within each council's jurisdiction. The calculation assumed: <ul style="list-style-type: none"> Betio landfill: AUD \$160,441 Nanikaai landfill: AUD \$51,330 Bikenibeu landfill: AUD \$51,330 These costs were divided by each facility's estimated mass of material disposed per annum. The presented figure is not a true representation of the cost of disposing waste to landfill in Kiribati.
Data gaps	<ul style="list-style-type: none"> No information presented in audit reports on the annual facility operating cost for any facilities.
Key considerations	<ul style="list-style-type: none"> 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): 8,752
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 KPI 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	<p>Total weight of waste recovered (tonnes per annum): 95.9</p> <ul style="list-style-type: none"> All recovered waste identified in the audit report was recycled via South Tarawa’s CDS. Annually, South Tarawa diverts from landfill approximately: <ul style="list-style-type: none"> 11 tonnes of PET plastics; 23 tonnes of aluminium cans; and 62 tonnes of used lead-acid batteries. This results in an annual 96 tonnes diverted from landfill. According to the Kiribati waste audit (2021), waste is stockpiled until quantities are ready for export. Since 2018, no PET has been exported.
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"> Recycling on Kiribati relies on export to other countries. The lack of markets for Kiribati to export recyclable waste to limits the recovery of waste in the country.



Supplementary KPI 4: Volume and type of stockpiled hazardous waste

Results	<p>Volume and type of stockpiled hazardous wastes (m³):</p> <ul style="list-style-type: none"> Asbestos: No data E-waste: 11 m³ Healthcare and pharmaceutical waste: No data Used oil: No data Used tyres: No data Obsolete chemicals: No data
Assumptions	<ul style="list-style-type: none"> None
Data gaps	<ul style="list-style-type: none"> No volumetric data was provided for any hazardous material stockpiles aside from e-waste. No data was found relating to stockpiles for these materials. Further information is required to confirm how these wastes are managed.
Key considerations	<ul style="list-style-type: none"> Further information as to the presence, waste type and volume of hazardous waste stockpiles in Kiribati is required to effectively manage these stockpiles/waste materials. Landfill audits, stockpile assessments, and the completion of the waste facility register as proposed by the DCMR Framework will provide the necessary information to calculate this performance indicator.



Supplementary KPI 5: Marine plastic pollution potential

Results	
Results	Marine plastic pollution potential (tonnes per annum): 359
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 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; and – Number of survey participants.
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 (%): 68.75%</p> <ul style="list-style-type: none"> – Number of successfully implemented waste initiatives = 11 out of 16 – Number of planned/pipeline initiatives = 5 • Implemented waste initiatives include: <ul style="list-style-type: none"> – Kiribati National Implementation Plan for Persistent Organic Pollutants 2019 – Kiribati Integrated Environment Policy 2013 – Kiribati Waste Management and Resource Recovery Strategy 2020–2030 (KWMRR Strategy) • Pipeline initiatives include: <ul style="list-style-type: none"> – Review of Kiribati’s integrated environment policy – Revised National Waste Management Strategy – Review of the Environment Act (as amended in 2007)
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"> • Solid waste management in Kiribati relies on existing laws related to the environment, public health, customs, and disaster management which include waste management measures. • The dominant waste management initiative is the KWMRR Strategy. • While Kiribati has no specific waste management legislation, initiatives and measures implemented in other laws reflect the country’s growing commitment to proper waste management. These include, for example: <ul style="list-style-type: none"> – Banning the import of single use plastic bags in 2020, via the <i>Kiribati Customs Act 2019</i>. – <i>The Public Highways Protection Act 2018</i>, which empowers the Kiribati Land Transport Authority to prohibit littering on any public highway.



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 information on the total amount of waste generated by businesses. No estimate for the number of businesses in Kiribati provided in the audit report. No information on the waste generation rates 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 (%): 62.00%</p> <ul style="list-style-type: none"> Commercial waste collection services are only available in South Tarawa. A total of 53 businesses on South Tarawa were interviewed during conducted interviews. Businesses either pay the local council a fee for waste collection or self-haul their waste to landfill. Apart from Betio islet and Kiritimati, all waste is dumped, buried, or burned on other islands. <ul style="list-style-type: none"> Collected: 59.00% Self-hauled: 3.00%
Assumptions	<ul style="list-style-type: none"> Sample coverages assumed to be representative of all businesses with access to collection services in Kiribati, as commercial collections are only available on South Tarawa. No information as to service coverages or number of participating businesses beyond the conducted surveys were identified.
Data gaps	<ul style="list-style-type: none"> While Kiritimati does offer collection services, it was not identified in the audit report if these services are made available to businesses.
Key considerations	<ul style="list-style-type: none"> This result does not reflect the collections coverage for all businesses across Kiribati as collection services are only available to businesses on South Tarawa. Based on the interviews conducted across South Tarawa, around 62% of applicable businesses have access to some form of collection service. This result is restricted by currently available data. 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.





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