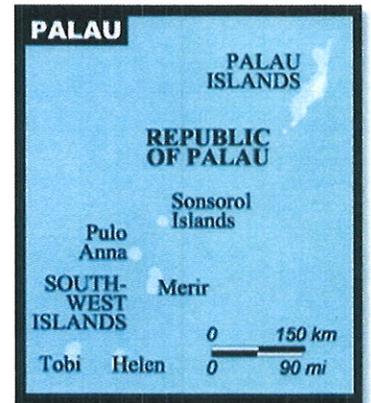
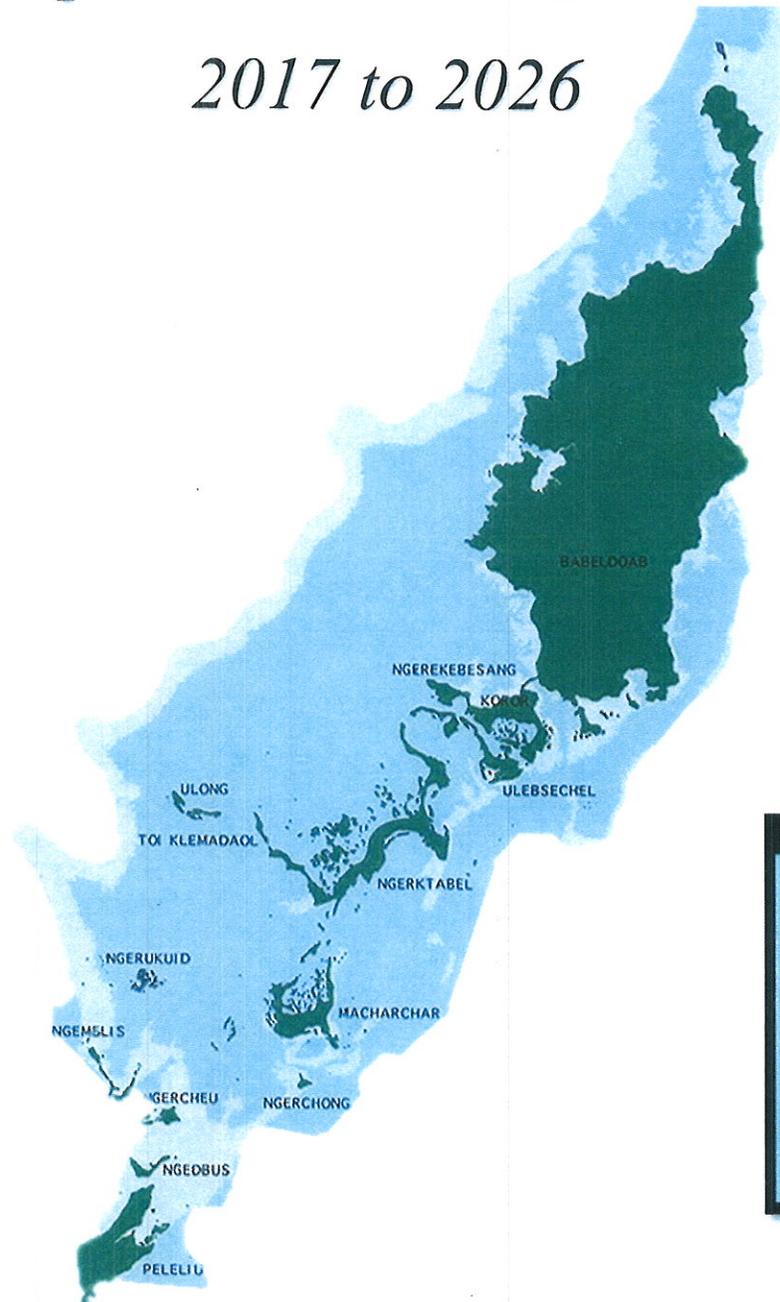


# NATIONAL SOLID WASTE MANAGEMENT STRATEGY:

*The Roadmap towards a Clean and Safe Palau*

*2017 to 2026*



# National Solid Waste Management Strategy:

The Roadmap towards a Clean and Safe Palau

2017 to 2026

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## ACRONYMS

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CEM	Continuous Emission Monitoring
EIS	Environmental Impact Statement
EIA	Environmental Impact Assessment
GDP	Gross Domestic Products
ISWMP	Integrated Solid Waste Management Plan
NGO	Non-Governmental Organization
NSWMP	National Solid Waste Management Plan
PEE	Public Education and Enhancement
PNC	Palau National Code
SSWMAP	State Solid Waste Management Action plan
SWM	Solid Waste Management
ULAB	Used Lead Acid Battery
NSWMS	National Solid Waste Management Strategy
PPP	Public Private Partnership
CDL	Container Deposit Levy
PPE	Personal Protective Equipment
WMMC	Waste Management Monitoring Committee
ARF	Advance Recycling Fund
uPoPs	Unintended Persistent Organic Pollutants
KPIs	Key Performance Indicators
MOU	Memorandum of Understanding
ODS	Ozone Depleting Substance
WCP	Waste, Chemicals and Pollutants
BTA	Belau Tourism Association
GEF	Global Environment Facility

Organization	
BPH	Bureau of Public Health
BPW	Bureau of Public Works
DSWM	Division of Solid Waste Management
CNMI	Commonwealth of the Northern Mariana Islands
DEH	Division of Environmental Health
DMR	Division of Marine Resources
EQPB	Environmental Quality Protection Board
JICA	Japan International Cooperation Agency
KSG	Koror State Government
MoF	Ministry of Finance
MoH	Ministry of Health
MPIIC	Ministry of Public Infrastructure, Industries and Commerce
NEPC	National Environmental Protection Council
OEK	Olbiil Era Kelulau
OERC	Office of Environmental Response and Coordination
PALARIS	Palau Automated Land And Resource Information System
PAN	Protected Area Network
PEEC	Public Education and Enhancement Committee
PIRRIC	Pacific Islands Regional Recycling Initiative Counsel
PPUC	Palau Public Utilities Corporation
ROP	The Republic of Palau
SPREP	Secretariat of the Pacific Regional Environment Programme
NEMO	National Emergency Management Office
PCoC	Palau Chamber of Commerce
MIF	Micronesian Islands Forum
PCC-CRE	Palau Community College-Research Extension
SPC	Secretariat of the Pacific Community
FAO	Food and Agriculture Organization

## EXECUTIVE SUMMARY

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The proximity of Palau to Asia and other productive yet consumerist societies has attributed to the country's significant change in the nature of wastes and consumption pattern in the last 10 years. The country is now confronted with substantial waste management issues that need to be addressed in the immediate to short-term period. This is further exacerbated by constraints such as limited land space, resources, institutional and human capacity, as well as vulnerability to climate change, among others. It is, therefore, inevitable for the government of Palau to explore strategies that will allow reduction and proper management of wastes so as not to compromise the public health, amenity of the environment and the social being of its communities.

Because of its demonstrated good governance as manifested in the designation of dedicated offices for waste management, the successful legislation of a container deposit system, investments on waste infrastructure and equipment, among others, the Palau government is also receiving extensive support from development partners such as the Government of Japan. The government's commitment drives major changes in the waste sector.

This National Waste Management Strategy is intended to serve as a roadmap that will define actions to assist policy makers and program implementers make more informed decisions in addressing changing and emerging issues in the waste sector. Its endorsement by the government leadership can also result in optimum resource allocation and attract increased donor funding and assistance for the waste sector.

The Strategy covers the period from 2017 to 2026 and responds to solid wastes which pose imminent risks to public health and the receiving environment. It was developed through intensive stakeholder engagements in order to encourage a shared responsibility between the government and the stakeholders in ensuring that the journey leads to a clean and safe Palau through to 2026.

The Strategy and Action Plan also seeks to build strong pillars that will enable strengthened institutional and human capacities to implement waste management activities. It is also expected to complement actions that will provide best practices that will minimize risks and achieve optimum and resource-efficient benefits. These are all well aligned with the aspirations in the Cleaner Pacific 2025<sup>1</sup>.

Six strategic goals were established via wide stakeholder consultations:

Goal #1: Relevant waste data is generated and waste initiatives are properly documented for more informed decisions.

Goal #2: There is strengthened institutional capacity on waste management based on economic and social benefits.

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<sup>1</sup> *Cleaner Pacific 2025 is the regional SWM strategy which is formulated by SPREP and JICA. Refer to <http://www.sprep.org>*

Goal #3: The stakeholders understand the merits (economic, environmental and health) of proper waste management and co-sharing of responsibilities.

Goal #4: Waste management follows best practice approaches with provisions for continuous improvement.

Goal #5: Waste practitioners are provided with training opportunities.

Goal #6: Waste activity outcomes are reported and disseminated to relevant stakeholders.

In order to achieve these strategic goals, the following strategic actions are identified:

1. The responsible agencies shall undertake regular data collection and analysis.
2. The government shall develop, amend and enforce national policies, strategies, plans and legislation and strengthen institutional arrangements to support and promote best practice waste management.
3. The responsible agencies shall undertake cost-benefit analysis of waste management.
4. The responsible agencies shall undertake effective awareness campaigns to gain support on waste management initiatives.
5. The responsible agencies shall strengthen existing and develop new public-private partnerships.
6. The responsible agencies shall implement waste reduction and resource recovery programs.
7. The responsible agencies shall manage hazardous wastes according to best practices.
8. The responsible agencies shall ensure that wastes are collected when required.
9. The responsible agencies shall improve infrastructure, operation and monitoring of waste management facilities.
10. The responsible agencies shall explore and conduct human capacity development programs for all stakeholders.
11. The responsible agencies shall implement monitoring and reporting programs.
12. The government shall initiate the establishment of a multi-stakeholders monitoring committee and act as the Secretariat.

The National Solid Waste Management Strategy will be implemented collectively by relevant sectors, led by the Bureau of Public Works (Division of Solid Waste Management), Environmental Quality Protection Board and the State Governments. This will constitute the long-term agenda for these agencies to fulfil its mandate of addressing waste issues. An action plan to cover the first half of the strategy is designed to propel its implementation.

The financial requirements to undertake the action plan will be drawn from the Recycling Fund, government allocation and potential assistance from development partners..

The progress of the National Solid Waste Management Strategy will be measured against certain established key performance indicators. A monitoring and evaluation framework will be designed by a

multi-stakeholder monitoring committee and would be disseminated through an agreed reporting process to coincide with the periodic review of the Strategy.

# 1 BACKGROUND

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The National Solid Waste Management Strategy is presented in two parts:

The first part provides the context for the updating of the Palau National Solid Waste Management Plan which was drafted in 2008 which stakeholders think is no longer reflective of the current situation considering new challenges faced in the waste sector. The government also adheres to the fact that the National Strategy needs to be aligned with the Pacific Regional Waste and Pollution Management Strategy (Cleaner Pacific 2025) endorsed by most of the SPREP member countries from which most donor projects are based.

The second part presents the National Solid Waste Management Strategy. The Strategy sets out the purpose, scope, principles, expected outcomes, and strategies for action. These actions which are detailed will define the direction Palau should take to address the key issues presented in Part One.

## 2 VISION AND MISSION STATEMENTS

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The following stakeholder-driven vision and mission statements are meant to provide guidance and inspiration to what Palau deems to achieve in the next 10 years. These also define the optimal desired future state of the country with regards to managing wastes.

**Vision:** A clean and safe Palau through solid waste management

**Mission:** To develop and implement a comprehensive waste management system with the 3R+Return Policy, by employing sustainable solutions consistent with traditional and cultural values.

## 3 PART ONE—CONTEXT

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### 3.1 INTRODUCTION

The changing consumption pattern in most Pacific Island countries resulted in the proliferation of increased wasteful imported products. This resulted in substantial increases in the amount of wastes generated in the country. Consequently, the government is faced with the challenge of dealing with mounting waste issues. Palau is no exception considering its proximity to Asia and other productive yet highly consumerist societies, including constraints such as land space for disposal, limited resources and inadequate institutional and human capacity, among others.

Palau has received extensive support from development partners owing to its demonstrated good governance in waste management. In particular for the waste sector, the government established a designated office to oversee the delivery of waste services working closely with the local authorities. The successful implementation of the Beverage

Container Recycling Program is a manifestation of the commitment of the government to address waste issues in the country. This commitment is seen to drive changes in the waste sector.

In order to sustain these initiatives and funding commitments, it will be helpful to have a roadmap that will define strategies and actions to assist policy makers and program implementers make more informed decisions. The existence of an endorsed Waste Strategy will also optimise resource allocation by the government and attract increased donor funding and assistance for the waste sector.

### 3.2 PALAU COUNTRY PROFILE

The Republic of Palau sits in the western most part of the Pacific region with a landmass of 458 km<sup>2</sup>. It consists of 340 individual islands with a distance of 700 km from the northeast (Ngeruangel) to the southwest (Helen Reef).

The islands are predominantly volcanic, high limestone, low platform, and coral atoll. The northern portion of Palau Islands include Babeldaob, Ngerkebesang, Malakal, and the urban center of Koror. The small elevated limestone islets constitute the world renowned Rock Islands which was recognized as a World Heritage site in 2012. The map of Palau is shown below.

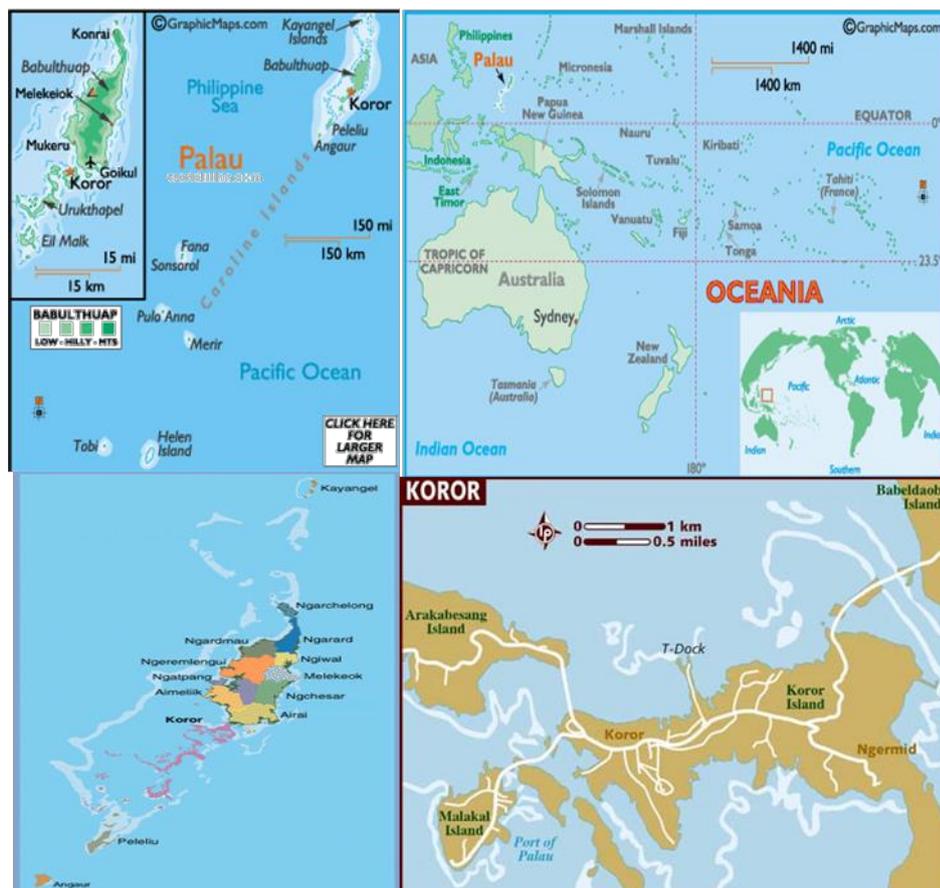


Figure 3-1 : Map of the Republic of Palau

### 3.2.1 Climate:

The warm tropical climate consists of two seasons: dry season (December to April) and rainy season (April to December) with an average temperature range of 26 – 32 °C. The average rainfall is 150 inches or 3810 mm per year. The wettest months are June to August.

### 3.2.2 Population:

The population of Palau are shown below.

Table 3-1: The population of Palau

		2015	2012	Change	State
1	Koror	11,754	11,665	89	Koror
2	Airai	2,455	2,537	-82	Babeldaob
3	Peleliu	484	489	-5	Peleliu
4	Ngaraard	413	453	-40	Babeldaob
5	Ngeremmegui	350	309	41	Babeldaob
6	Aimeliik	334	281	53	Babeldaob
7	Ngarachelong	316	316	0	Babeldaob
8	Ngchesar	291	287	4	Babeldaob
9	Ngatpang	282	282	0	Babeldaob
10	Ngiwal	282	257	25	Babeldaob
11	Melekeok	277	299	-22	Babeldaob
12	Ngardmau	185	195	-10	Babeldaob
13	Angaur	119	130	-11	Angaur
14	Kayangel	54	76	-22	Kayangel
15	Sonsorol	40	6	34	Sonsorol
16	Hatohobei	25	10	15	Hatohobei
	Total	17,661	17,501	160	
	Urban area	13,899	78.7%		
	Rural area	3,762	21.3%		

Source: “2016 statistical year book” Bureau of Budget and Planning, MOF

### 3.2.3 Economy:

The government employs 30% of the work force. The major sectors contributing to economic growth are tourism, fishing, and agriculture. The gross domestic product per capita is \$17,308.00

### 3.2.4 Drinking Water Resources:

The Palau Water System distributes drinking water to the states of Koror and Airai and most of Babeldaob. There are areas in Babeldaob relying on surface water. The states of Peleliu, Angaur, Kayangel, and Ngiwal receives drinking water from groundwater. Most households in these states also have rainwater tanks.

### 3.3 OVERVIEW OF PALAU'S WASTE SECTOR

#### 3.3.1 Laws on Solid Waste Management

Followings are the Laws and Regulations relating to the Solid Waste Management.

- Environment Quality Protection Act (1981)
- Environment Quality Protection Board Regulations
- Recycling Law
- Littering Law
- Plastic Bag Ban Act (November 08, 2017)

#### 3.3.2 Solid Waste Management Plan/Strategy

Followings are the plan and/or strategy relating to the Solid Waste Management.

- National Solid Waste Management Plan (NSWMP) 2012 – 2017  
This plan was submitted and approved by Minister of MPIIC on 2012
- National Solid Waste Management Strategy (NSWMS) 2017-2026  
NSWMS which cover from 2017 to 2026 is developed and pending for review and approval by the Minister of MPIIC.

#### 3.3.3 Roles and Responsibilities relevant to the Waste Sector

##### 3.3.3.1 National Government

The management of solid wastes in Palau is undertaken by the Bureau of Public Works (BPW) under the Ministry of Public Infrastructure, Industries and Commerce and the State Governments while the management of hazardous wastes falls under the mandate of the Environmental Quality Protection Board (EQPB) which is operating as a semi government agency.

The Division of Solid Waste Management is established as the designated office to oversee management of solid wastes in a Cabinet Resolution in 2014 (personal communication with Calvin Ikesil, 2017). Previously, the office sits under the Division of Road and Equipment as the Solid Waste Agency. The Division has the following general functions:

- Ensure that the disposal of solid wastes in the whole country is cost-effective and compliant with regulatory provisions minimizing environmental and public health risks;
- Coordinate and collaborate with State governments, other relevant line agencies and other countries in the region on solid waste matters of mutual interest;
- Promote solid waste management initiatives geared towards prevention and reduction of wastes through education and outreach programs;
- Mobilize resources to ensure the optimal utilization of investments from the government and assistance from donors;
- Provide strategic direction and legislative agenda to strengthen institutional capacity in delivering solid waste services; and
- Raise the profile of solid waste management to gain sustained support to the sector.
- Operate and maintenance of M-Dock final disposal site which is located in Koror State.

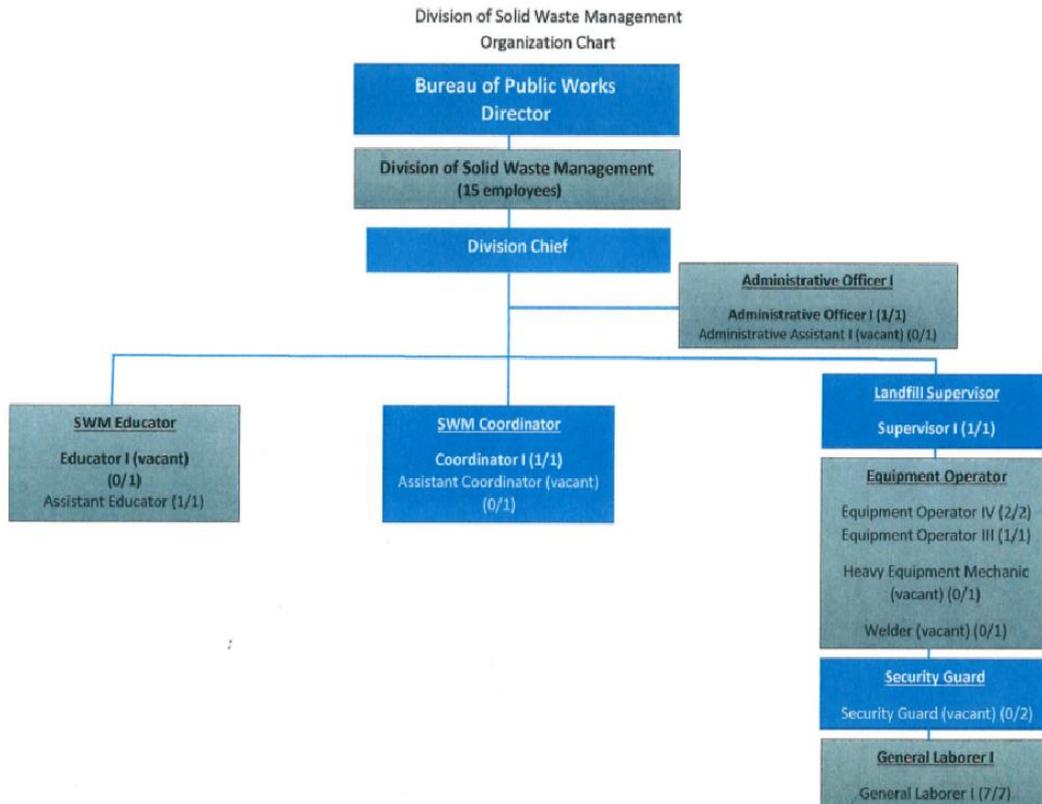


Figure 3-2 : Organizational structure of the Division of Solid Waste Management, BPW-MPIIC

The EQPB functions as the regulatory agency in charge of monitoring waste management activities ensuring that such activities do not, in any way, cause pollution of the environment. It also acts as regulator of hazardous wastes in the country and primarily assumes the function of its management in the absence of a designated office to deal with hazardous wastes.

### 3.3.3.2 Koror State

Koror State is responsible for waste collection of house hold wastes which generated in Koror State. Furthermore, various recycling facilities which located next to M-Dock disposal site were constructed and operated by Koror state Government-Solid Waste Management Office whose organization is shown below.

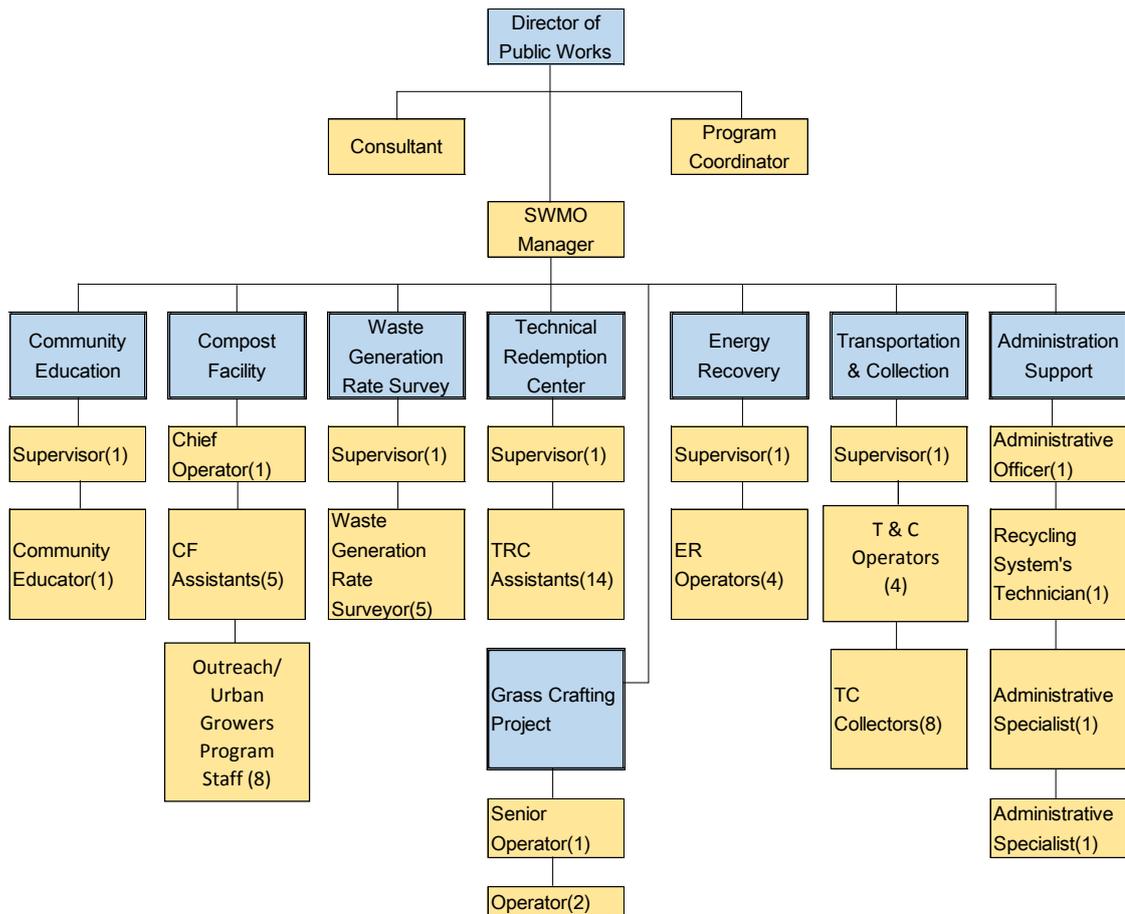


Figure 3-3 : Organizational structure of the Solid Waste Management Office in Koror State Government

### 3.3.3.3 10 states in Babeldaob Island

There are 10 states in Babeldaob Island and each state government is responsible for waste collection and waste disposal. There is no specific organization responsible for solid waste management. Department of public works or public health are conducting waste collection works as part of their responsibilities. Normally one trucks with an operator and waste collection workers are collecting wastes just once in a week.

### 3.3.4 Current State of Waste Management

#### 3.3.4.1 Waste Generation and Characterization

Several waste amount and composition surveys (WACS) were conducted through JICA technical cooperation projects. The most recent are the Surveys conducted during JPRISM II in July 2017 and results were presented below.

##### 3.3.4.1.1 Generation Rate of Household Wastes

Generation rate of household wastes are obtained by waste amount and composition survey conducted through JICA study as below.

Table 3-2: Generation Rate of Household Waste in Koror and Babeldaob

Recyclable (g/person/day)		Non-recyclable (g/person/day)		Generation Rate of Household Waste (g/person/day)
On-site recycling <sup>2</sup>	Recyclable for CDL <sup>3</sup>	Self-disposal <sup>4</sup>	Discharged Waste <sup>5</sup>	
98	41	77	457	673
14.6%	6.1%	11.4%	67.9%	100%

#### 3.3.4.1.2 Generation Rate of Municipal Solid Waste

Municipal solid waste includes waste other than household such as commercial, business, schools, government offices and so on. Generation Rate of Municipal Solid Waste is 2,008 g/person/day as shown below.

Table 3-3: Generation Rate of Municipal Solid Waste in Koror and Babeldaob

Generation Rate of Household waste	Generation Rate of Other than household waste	Generation Rate of Municipal solid waste
673 g/person/day	1,335 g/person/day	2,008 g/person/day

#### 3.3.4.1.3 Waste Generation Amount

Waste generation amount is calculated from generation rate and population. Waste generation amount other than household such as commercial, business, entities are calculated based on the waste amount survey at disposal site. Waste generation amount from household is 11.4 ton/day and other than household is 22.6 ton/day. Overall MSW generation amount is 34.0 ton/day as shown below.

Table 3-4: Waste Generation Amount in Koror and Babeldaob

Generation Source	Generation Rate (g/person/day)	Population	Waste Generation Amount (ton/day)
Household Waste	673 g/person/day	16,953 persons	11.4 ton/day
Other than household	1,335 g/person/day	16,953 persons	22.6 ton/day
Total MSW	2,008 g/person/day		34.0 ton/day

#### 3.3.4.1.4 Waste Composition

The household waste stream of Palau as reflected in waste audit and characterization studies undertaken in the highly urbanized state of Koror and the bigger Babeldaob area is dominated

<sup>2</sup> On-site recycling: composting of green waste and kitchen waste, kitchen waste feeding for livestock or pet.

<sup>3</sup> Recyclable for CDL is the containers which collected through container deposit legislation system such as aluminium cans, PET bottles and glass bottles.

<sup>4</sup> Self-disposal is the waste which dispose within his/her premises by burning and burying and not discharged to outside.

<sup>5</sup> Waste amount and composition survey conducted in 2015 through JPRISM I

by vegetable/putrescible/kitchen wastes - 44% in Koror (AMITA, 2014) and 41% in Babeldaob (J-PRISM, 2015).

Around 30% of Koror’s wastes are potentially recyclable, i.e. paper, plastic, metal, glass, and green waste (leaves, grass, wood) as shown following figure. Because of the successful beverage container redemption program, these containers are no longer found in the normal household wastes. The low amount of yard wastes (2%) also reflects the successful diversion of green wastes from the landfill.

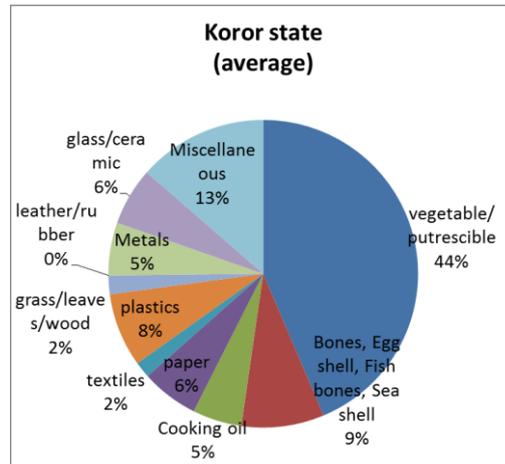


Figure 3-4 : Household waste composition in Koror (Source: AMITA, 2014)

In Babeldaob, around 42% of generated wastes are potentially recyclable including green waste with a greater percentage of green wastes (14%) found in the waste stream compared to Koror and a little bit of beverage container (1%) still mixed with the regular household waste. These can be attributed to the absence of green waste collection program in this area and the less proximity to the National Redemption center. Following figure illustrates the waste composition in Babeldaob.

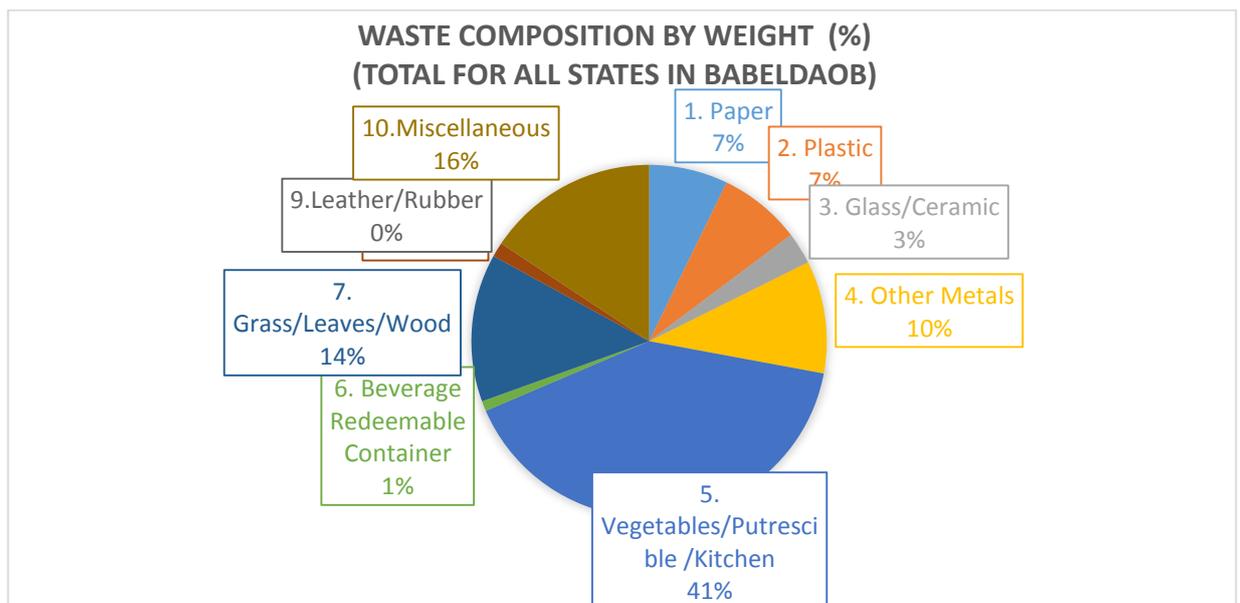


Figure 3-5 : Household waste composition in Babeldaob (Source: J-PRISM, 2015)

#### 3.3.4.1.5 Final Disposal Amount

All the wastes generated in Koror are collected and transported to M-Dock disposal site which is located in Koror state and operated by Division of SWM, BPW. Waste amount survey was conducted on Jun 2017 and the results are summarized as follows:

Table 3-5: Daily Final Disposal Amount in Koror M-Dock<sup>6</sup>

Description	Amount	Data Source
Transported by Koror State Government (KSG)	6.10 ton/day	JPRISM II average of 10 to 15 Jun 2017
Direct Transportation by business, shop, private etc.	20.95 ton/day	Ditto
Total	27.05 ton/day	

#### 3.3.4.2 Current Waste Services

##### Waste Collection:

The State Governments are responsible for the collection of wastes in their respective areas. Koror, being the most urbanized center, has the biggest investment that allows for 100% coverage of residential areas. The current collection system is based on a time and motion study with the most recent one conducted in 2015.

Residents of Koror are entitled to a once a week collection of residual wastes with four vehicles running daily from Monday to Friday in two shifts – 7:30am to 4:30pm and 4pm to midnight. All residual wastes are disposed at the M-Dock Landfill.

Collection in the 42 segregation facilities located in 7 out of 12 hamlets are done daily including weekends. These segregation facilities were established in 2007 with bins set up to store paper, plastics, Al cans, glass, green wastes and kitchen wastes separately. The system was changed in 2012 when the segregation classification was reduced to mixed recyclables and residual wastes. The cages in the newly established segregation facility (2016) located at the BPW Building are emptied every Wednesday.

Collection of green waste is upon request and scheduled on Tuesdays and Thursdays.

Because of the large volume of food waste in Palau's waste stream, about 40 participating households are provided with composting bins and wood chips by Koror State Government for sandwich piling of food wastes. These are collected every Friday. Food waste is also collected from a pilot hotel (Palau Pacific Resort) on request. As an incentive, these willing households are provided with free compost every month. Food waste from most schools and other hotels go to piggery farms.

There is a special collection of all types of plastics every Wednesday in 45 participating households and 25 participating private companies (mostly auto shops generating big plastic

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<sup>6</sup> Waste amount survey was conducted from 10 Jun to 15 Jun 2017 and the amount is daily average.

scraps like bumpers, etc.). Commercial wastes are collected and disposed by either private companies or by the business owners themselves.

A summary of the schedule of collection service provided by Koror State Government is as follows:

Table 3-6: Waste Collection Schedule in Koror State

Day	Items Collected	Source
<b>Monday</b>	Residual wastes	Household
	Segregated wastes	Hamlets
<b>Tuesday</b>	Residual wastes	Household
	Segregated wastes	Hamlets
	Green waste (by request)	Household
<b>Wednesday</b>	Residual wastes	Household
	Segregated wastes	Hamlets
	Segregated wastes	BPW Building
	Plastics (special collection)	Participating households and private companies
<b>Thursday</b>	Residual wastes	Household
	Segregated wastes	Hamlets
	Green waste (by request)	Household
<b>Friday</b>	Residual wastes	Household
	Segregated wastes	Hamlets
	Food waste	Participating households
<b>Saturday/ Sunday</b>	Segregated wastes	Hamlets

#### Waste Treatment and Processing:

Koror State Government operates the Koror State Recycling Center. The center houses the following facilities: a) National Redemption Center where recovered cans, glass and bottles are received and processed, b) Energy Recovery Facility where selected plastic types are converted to oil which is used as input to generate energy, c) Composting Facility which processes green waste to produce compost (sold as Grade A - \$5 and Grade B - \$2.50), and d) Glass Blowing Facility where glass is crafted to other ornamental products such as vases, etc.

As mentioned earlier, 7 out of 12 hamlets have segregation facilities which started operating in 2007. The Koror state government is planning to expand the facility to the rest of the hamlets. BPW and EQPB have also initiated a segregation facility in the building for four types of wastes: beverage container, paper/cardboard boxes, plastic (caps, PET, HDPE, LDPE and PP) and miscellaneous/residual wastes. The recyclables are brought and processed at the Koror State Recycling Center and residual wastes are brought to the landfill.

The glass bottles brought to the National Redemption Center are either crafted as described above or crushed and used for concrete work on pavements.

Collection, processing and disposal (exportation) of scrap metal including end of life vehicle is privatized to the Palau Waste Company. Koror State Government also collects scrap metal on request and they brought to a designated area at M-Dock Landfill where the Palau Waste Company is based.

Tires are shredded at the M-Dock Landfill and used for construction work. Cooking oil and used motor oil are filtered and used as an additive to the oil produced from the Plastic – To - Oil facility at the Recycling Center for generation of energy. ULAB<sup>7</sup>s are stored at a facility operated by EQPB at the M-Dock Landfill.

Successful Recycling Activities:

a. **Composting** (since 2009)

Koror State Recycling Center is receiving green waste, cardboard and kitchen waste from hotel for producing compost. Following table indicate the amount of wastes which used for composting. 0.48 ton/day of wastes are used for Composting which is 2 % of Waste Generation which contribute to reduce the wastes in Disposal Site.

Table 3-7: Wastes amount used for Composting

Year	Volume (m3)			Weight (ton)			Total
	Green Waste	Cardboard	Kitchen Waste	Green Waste	Cardboard	Kitchen Waste	
2013	280.8	28.2	103.4	56.2	2.8	103.4	162.4
2014	267.0	40.0	126.0	53.4	4	126	183.4
2015	291.6	29.4	122.3	58.7	2.9	122.3	183.9
2016	252.8	78.2	109.9	47.3	7.8	109.9	165.0
Average				53.9	4.4	115.4	173.7
Daily amount				0.15	0.01	0.32	0.48

Source: Solid Waste Management Office of Koror State Government

b. **Beverage Container Recycling** (since 2011)

Out of 88,369,379 imported beverage containers, about 77,159,060 have been redeemed, compressed and either shipped out off-island for recycling or recycled on the island. This reflects an 87.3% success rate of redemption. Of these redeemed, about 56 million Al and steel cans and 20 million plastic bottles have been shipped to Taiwan for recycling. Glass bottles (about 2 million) have been recycled on the island.

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<sup>7</sup> ULAB:Used Lead Acid Battery

Table 3-8: Number of Deposited and Redeemed at Recycling Center<sup>8</sup>

Year	Number of Deposited	Number of Redeemed	Redemption Rate
2011	6,663,590	0	
2012	14,386,027	18,925,157	131.6%
2013	15,459,266	15,369,174	99.4%
2014	15,618,616	14,678,332	94.0%
2015	17,687,328	13,694,907	77.4%
2016	18,554,552	14,491,490	78.1%
Total	88,369,379	77,159,060	87.3%

The following table indicates the number of beverage containers redeemed at recycling center from 2012 to 2016. Around 1.7 ton of beverage containers are diverted from landfill which is 5% of waste generation which contribute to reduce final disposal amount in M-Dock Landfill.

Table 3-9: Breakdown of Beverage Containers Redeemed and Daily Weight

	Year	Aluminum Can	Steel Can	PET Bottle	Glass Bottle
Number of Bottle	2012	12,321,127	370,680	4,360,757	391,062
	2013	8,679,141	652,739	3,638,431	452,352
	2014	9,358,251	304,751	4,243,758	509,018
	2015	8,744,413	272,899	4,062,098	466,919
	2016	9,101,697	242,228	4,482,043	508,554
	Total	48,204,629	1,843,297	20,787,087	2,327,905
	Yearly Average	9,640,926	368,659	4,157,417	465,581
	Daily Average	26,413	1,010	11,390	1,276
Daily Weight (ton/day)	0.42	0.03	0.23	1.02	
Daily Weight Total (ton/day):					1.70

**c. Plastic Recycling (since 2013)**

Plastic recycling allows the reverse processing of plastic back to its original form (oil) which can be used for energy generation. Since the start of the program, about 3 tons of plastic waste has been collected and processed monthly or 100kg per day. Since this plant is still at experiment phases and careful examination of outcome will be required.

<sup>8</sup> Beverage Container Recycling Program Annual Report FY 2011 to 2016 by Division of Solid Waste Management, BPW, MPIIC

On 1<sup>st</sup> of June 2017 there was fire incident at the plant which destroyed 80% of the facility. As of October 2017, it has been repaired and has resumed operation.

The combined recycling activities account for 12% recycling rate of the generated waste in Koror and Babeldaob in 2017.

Waste Disposal:

The M-Dock Landfill is the national landfill in Palau located in Koror State. It has been in operation for more than 50 years but was rehabilitated to an engineered landfill in 2007 using a semi-aerobic system patterned after the Fukuoka method which gave it an extended life of another 5-6 years until 2012. However, the 13 acre landfill situated on a flat reef is still currently in use (2017). Further expansion is in the pipeline through to 2020 while the government is preparing for a new landfill site in Aimeliik State. A photograph of the M-dock Landfill is shown in following figure.



Figure 3-6 : Photograph of M-dock Landfill as of March 2016

Waste disposal amount survey was conducted at M-Dock disposal site from 10 Jun to 15 Jun 2017 continuously. Survey was conducted using portable weighbridge to measure weight of wastes incoming to disposal site. Results are summarized below.

Table 3-10 : Waste Disposal Amount Survey Results

Description	June 2017						Average
	10	11	12	13	14	15	
	Sat	Sun	Mon	Tue	Wed	Thu	
Incoming Waste Amount (ton/day)	20.94	8.43	39.71	30.69	29.4	33.12	27.05
Incoming Vehicle Numbers (nos/day)	91	39	85	93	84	66	76

Following table shows the breakdown of the amount of daily wastes disposed at the landfill from different sources. Following figure illustrates the corresponding percentages of wastes going to the landfill by origin. As shown below, household wastes are merely one quarter and three quarters are from business, hotels, and commercials and so on.

Table 3-11 : Source of wastes disposed at M-Dock Landfill<sup>9</sup>

	Source of Waste	% of Disposal Amount
1	Hotel	11.8 %
2	Retail store	13.2 %
3	Restaurant	7.0 %
4	Government	4.3 %
5	Business/ School	20.6 %
6	Household	27.2 %
7	Construction/ Waste Tire	12.7 %
8	Marine debris from the Rock Island	3.2 %
TOTAL		100 %

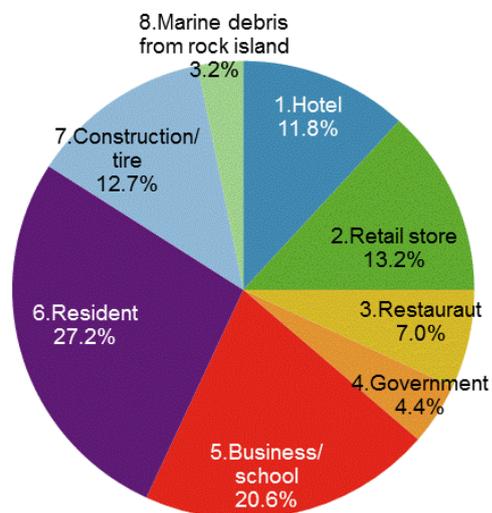


Figure 3-7 : Source of Wastes at M-Dock Landfill Site

As of Oct 2017, there are seven (7) community dumpsites operated by other states in Babeldaob Island. With the proposed new national landfill in Aimeliik State, it is expected that the M-dock Landfill and these open dumpsites will be closed.

The new national landfill with funding support from JICA is expected to be ready for operation in year 2020. An Environmental Impact Assessment (EIA) is currently being prepared by a local consultant as required by EQPB. A JICA consultant team will also undertake preliminary investigation and basic design in the 2<sup>nd</sup> quarter of 2017.

### 3.3.4.3 Waste Flow in Koror and Babeldaob

As a result, waste flow in Koror and Babeldaob is illustrated as shown below.

<sup>9</sup> Source: Waste amount survey conducted by AMITA Institute for Sustainable Economies Co.,Ltd through JICA Project in 2015

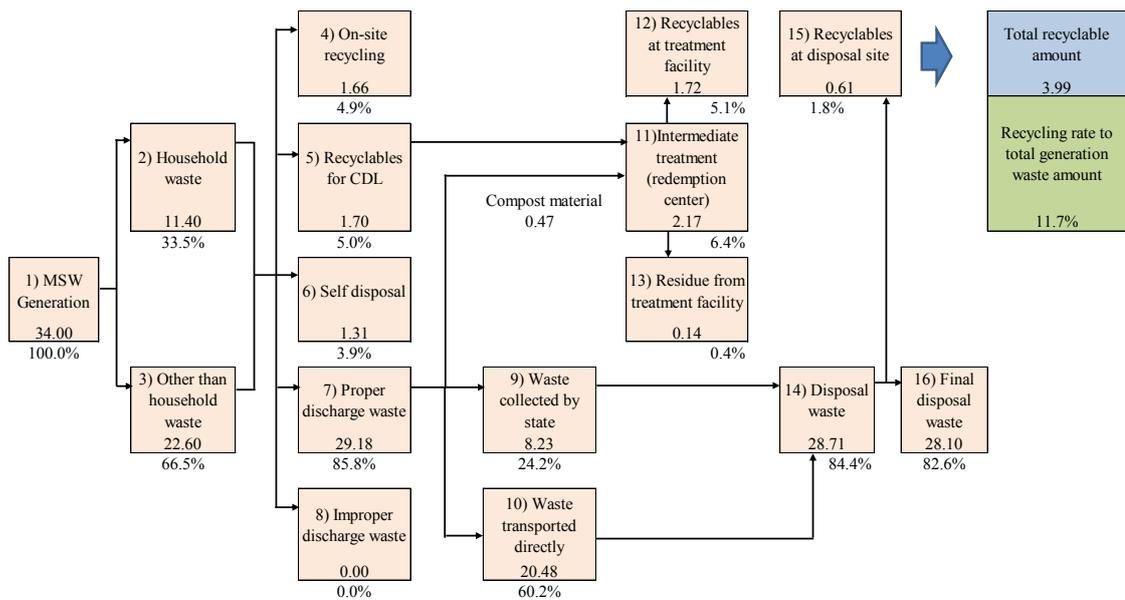


Figure 3-8 : Combined Waste Flow in Koror and Babeldaob in 2017

### 3.3.4.4 Other Waste Management Activities

#### Awareness Programs:

Following activities are initiated by BPW Division of Solid Waste Management together with Koror State Government as awareness programs.

Table 3-12 : Awareness Activities by National Government

Awareness Activities	Contents
School Presentation	Visiting elementary schools and high schools to present about 3R with activity games and quizzes to students. Presentation of waste segregation station.
Promotion of 3Rs	Practice event booth at the events (Earth day, Independence day, PCC career Expo) and promote 3R to the community. Install 3R billboard on road side. Talk show about 3R and CDL.
Installation of recycling bins	Install recycling bins at the airport to promote 3R campaign not only to citizens but also to the tourism industries.
Promotion of flower pots made by recycling tires	Install flower pots (used tires) in MOH, MOE and schools.
Site Visit Tour	Invite students to see the current situation of M-Dock landfill and recycling center to explain the importance of waste reduction.

### 3.3.4.5 Resources

#### Budget Allocation for Waste Management:

The Recycling Fund generated from the Beverage Container Deposit Legislation is able to support all the expenditures associated with the functions of the Division of Solid Waste

Management BPW as specified in Section 3.3.1, including personnel. The office no longer receives extra budget allocation from the national government.

For the Koror State Government which is running the National Recycling Center and the collection service for the state, the Compensation Fund is enough to cover the operation of the National Redemption Center including all facilities. The National Redemption Center operation is evidently a self-liquidating system. About 30% of the state’s expenditure to deliver waste services are derived from the Compensation Fund with the remaining 70% from the State allocation to cover personnel and overhead costs associated with its functions. .

Capital Assets:

The Division of Solid Waste Management, BPW operates the M-dock Landfill. The Koror State Government operates the Koror State Recycling Center which houses the National Redemption Center, the Energy Recovery Center, the Composting Facility and the Glass Crafting Facility. The state government also runs 42 segregation stations around the state. The existing capital assets used for waste service delivery are listed below.

Table 3-13 : Assets located or used at the M-Dock Landfill

Asset Description	Location/Condition
SHANTUI Bulldozer SD16R	LANDFILL AREA, bought in 2017
KOMATSU PC-120-8 EXCAVATOR	LANDFILL AREA, Bought in 2016
MITSUBISHI 5 ton Dump truck	LANDFILL AREA, Bought in 2017
CANON IMAGE RUNNER COPIER MACHINE	LANDFILL CONTAINER/POOR
CAT BULLDOZER DGH SERIES II	LANDFILL AREA/GOOD
NISSAN VANETTE FLATBED TRUCK	LANDFILL AREA/GOOD
SUZUKI ESCUDO S.U.V	LANDFILL AREA/POOR
TOYOTA ALPHARD 4DR FS VAN	SWM OFFICE/NEW
NISSAN X-TRAIL VEHICLE	SWM CHIEF/POOR
TIRE MACHINE	LANDFILL AREA/GOOD
POWER WASHER 220V 2500PSI	LANDFILL AREA/GOOD
HUSQUAUNA CHAINSAW	LANDFILL AREA/GOOD
MAKITA BUSH CUTTER	LANDFILL AREA/POOR
MITSUBISHI BUSH CUTTER	LANDFILL AREA/POOR
MITSUBISHI BUSH CUTTER	LANDFILL AREA/GOOD
MITSUBISHI BUSH CUTTER	LANDFILL AREA/GOOD
MITSUBISHI BUSH CUTTER	LANDFILL AREA/NEED PARTS
MAKITA GRINDER	LANDFILL AREA/NEW
MAKITA CIRCULAR SAW	LANDFILL AREA/NEW
MAKITA POWER DRILL	LANDFILL AREA/NEW
SUBMERGEABLE WATER PUMPS (3)	LANDFILL POND/GOOD

**Table 3-14 : Assets of Koror State Government used for waste service delivery**

Asset Description	Number of units	Location/Condition
Garbage Trucks	4	Koror State Recycling Centre
Dump trucks (2 ton) – for special collection	3	Koror State Recycling Centre
Single Chamber Compactors	4	National Redemption Centre
Multi-Chamber Compactors	3	National Redemption Centre
Glass Crushers	1 big & 1 small	National Redemption Centre
Electric Forklift	1	National Redemption Centre
Counting Machines	2	National Redemption Centre
Plastic Recycling Machines		Energy Recovery Centre <sup>10</sup>
- NVG 1000 - Big (Stationary)	1	
- NVG 100 - Small (Stationary)	1	
- BeH model - Table top (Portable)	4	
Oil Tanks	6	Energy Recovery Centre
Batch Type, Waste Oil treatment system	1	Energy Recovery Centre
Hybrid Generators	4	Energy Recovery Centre
Plastic Shredders	2	Energy Recovery Centre
Pelletizer	1	Energy Recovery Centre
Fuel Trucks	2	Energy Recovery Centre
Wood Chippers	2	Composting Facility
Paper Shredder (industrial size)	1	Composting Facility
Pay Loaders	2	Composting Facility
Bulldozer	1	Composting Facility
Excavator	1	Composting Facility
Turner Machine in Compost Tunnel	1	Composting Facility
Trommel Screen & Conveyor	1	Composting Facility
2 ton Dump Truck	1	Composting Facility
Air Blowers	3	Composting Facility
Oil Tank	1	Composting Facility
Glass Melting Furnace	1	Glass Crafting Facility
Glory Hole	1	Glass Crafting Facility
Annhealing Oven	1	Glass Crafting Facility

#### 3.3.4.6 Development Assistance

The following is a summary of development assistance received by a donor country.

<sup>10</sup> Energy recovery center was caught on fire on 1<sup>st</sup> June 2017 and has resumed operation

Table 3-15 : Development Assistance from a donor country

Development Partner	Assistance Provided
1. Government of Japan (JICA)	<ul style="list-style-type: none"> <li>• 40% of capital costs for Koror State waste operation</li> <li>• Grant Aid for the new landfill facility in Aimeliik State</li> <li>• Technical assistance and trainings through the J-PRISM Project</li> <li>• Improvement of segregation through the International Centre for Environmental Technology Transfer (ICETT)</li> </ul>
2. Government of Japan (Grass Roots Project)	<ul style="list-style-type: none"> <li>• Equipments for Koror State Government-SWM</li> </ul>
3. Government of Taiwan	<ul style="list-style-type: none"> <li>• Equipments for other States</li> </ul>
4. SPREP	<ul style="list-style-type: none"> <li>• Equipments for Koror State Government-SWM</li> </ul>

#### 3.3.4.7 Potential Linkages

- Collaboration between Division of Solid Waste Management (DSWM) and Koror State Government is forged through the J-PRISM Project – resulted in the successful implementation of recycling activities in the country
- Coordination between DSWM and Division of Environmental Health of the Ministry of Health in the prevention of vector diseases and management of medical wastes
- Incorporation of disaster wastes into the Disaster Management Plan of the National Emergency Management Office (NEMO)
- Active participation in the Micronesia Islands Forum (MIF) to explore opportunities for sub-regional recycling network, e.g. scrap metal, batteries, etc.
- Support to the Urban Growers Program (extension of the Koror State Solid Waste Management Office) by the Bureau of Agriculture of the Ministry of Natural Resources, Environment and Tourism and the Palau Community College (Cooperative Research Extension) - research, training and extension on composting towards food security
- Climate Change Policy
- Ridge to Reef Program - EQPB

#### 3.3.4.8 Review of the National Solid Waste Management Plan 2008 – 2015

The National Solid Waste Management Plan (NSWMP, 2008) was produced through the “Project for Improvement of Solid Waste Management in the Republic of Palau” funded through JICA. However, it was during the subsequent JICA Project (J-PRISM Phase 1) when the plan was officially approved by the government and later on reviewed and updated by SPREP and J-PRISM in 2012.

The review indicated that the NSWMP only provided general guidance with no specific direction, thus the development of more concrete activities in the form of an Action Plan.

Through a review undertaken by J-PRISM (Muranaka, 2015) of the Action Plan, successful and on-going activities were noted, as follows:

- Monitoring was undertaken around the M-dock Landfill at regular intervals through the Division of Solid Waste Management, Bureau of Public Works (DSWM-BPW) and the Koror State Government (KSG), after a monitoring plan was developed identifying a number of parameters to be considered.
- Awareness activities were conducted through PEEC.
- KSG successfully installed segregation stations in 7 out of 12 hamlets.
- KSG, PEEC and DSWM-BPW continuously promoted composting in the community using the designed pamphlets.
- DSWM-BPW extended the lifespan of the M-Dock Landfill to a further 5 years (until 2012)
- DSWM-BPW procured heavy equipment for the M-Dock Landfill which contributed to the further extension of the lifespan of the landfill which is still currently in use.
- DSWM-BPW successfully selected a new landfill site in Babeldaob and finalized the closure plan of the M-Dock Landfill.
- KSG undertook asset review and prepared a procurement plan for collection vehicles.
- DSWM-BPW established a drop off station for hazardous waste (Mottainai Yard).

The same review by Muranaka in 2015 also noted the low-progress activities, as follows:

- Development of State SWM plans
- Annual monitoring of the progress of the NSWMP
- Conduct of survey of recycling activities, e.g. vehicles, e-wastes, batteries as a requirement for the Recycling Law
- Review of the relevant permit for waste facility operators to submit monitoring data
- Amendment of the Beverage Container Legislation with the intent of considering those larger than 32 ounces and dairy containers.
- Exploring overseas market for batteries and e-waste
- Development of a Rehabilitation Plan for the state dumpsites
- Preparation of basic plan, Environmental Impact Statement, detailed landfill design and commencement of construction of the new landfill
- Closure of state dumpsites
- Planning for inter-state collection service
- Planning and commencement of collection service for Angaur, Peleliu and Kayangel states
- Evaluation and assessment of existing incinerators for medical wastes
- Preparation of technical guidance for operation of incinerators
- Strengthening of the hazardous waste regulation
- Implementation of hazardous waste collection
- Preparation and implementation of hazardous waste management plan
- Establishment of temporary storage for hazardous waste
- Strengthening of enforcement of the Dumping Regulation

- Strengthening of partnership of PEEC with the private sectors such as the Chamber of Commerce
- Development and implementation of a sustainable financial plan
- Introduction of the user-pay system
- Development of the Terms of Reference and Action Plan for the partnership with PEEC

There are a number of gaps identified in the previous plan:

- With the dismissal of the PEEC, the DSWM-BPW and state governments should intensify their awareness campaigns further.
- The responsibility of environmental monitoring needs to be clarified.
- There has to be clear, shared responsibilities in the collection, storage and disposal of hazardous wastes among the State government, DSWM-BPW and EQPB.
- The waste services delivered by KSG which highlight successful initiatives are not indicated in the plan.
- The presentation of the NSWMP cannot be easily understood by the stakeholders – too technical in some respects.

The outcome of the review of the NSWMP along with the current waste issues identified during intensive stakeholder engagements, across all sectors, are all taken on board in the development of the updated National Solid Waste Strategy and Action Plan.

#### *3.3.4.9 Challenges and Opportunities*

The delivery of proper waste services can be a daunting task which can likely be hampered by the following challenges:

- The cost impact of providing wider waste services to all the states and expanding recycling programs to include more items;
- The low volume of potential recyclable wastes in relation to the economy of scale;
- The lack of return of many recyclable wastes currently being experienced globally (e.g. no demand for scrap metal, plastics)
- The approaching full capacity of M-Dock Landfill and the limitation of expanding the same site – planning for waste disposal beyond the current 1-year lifespan of the site;
- The cost liabilities and commitment to improving waste service sites to best practice to achieve maximum diversion of waste from the landfill given the constrained resources available;
- The sustained active commitment of stakeholders (government and non-government) to co-share the responsibility of managing wastes; initiation of community-based programs which are more affordable and financially sustainable, low-technology solutions to waste issues but involving greater community and stakeholder participation
- The regulation of imported goods through imposition of waste levies;
- The vulnerability to disaster and climate change impacts which has the potential to increase green waste and disaster debris and damage to core public infrastructure assets, such as landfills and equipment.
- Major infrastructure projects being carried out or in the pipeline which will generate large volumes of construction waste

Opportunities which exist that can be beneficial in the delivery of waste services include:

- The existence of designated departments in the government to specifically oversee the management of wastes indicate the government's focus on waste management as a priority environmental health issue; prioritization of waste management in the government's agenda;
- The resulting strategy and action plan will attract increased level of program support and funding in country and from donor agencies;
- The endorsed Pacific Regional Waste and Pollution Management Strategy (Cleaner Pacific 2025) defines certain elements of countries' commitments from which the National Solid Waste Management Strategy and Action Plan can be aligned;
- Through the Cleaner Pacific 2025, there may be opportunities for regional collaborative arrangements. Having clear, concise strategic actions in the National Solid Waste Management Strategy and Action Plan which would give Palau a significant head start;
- The willingness of the different sectorial representatives in getting involved to address waste issues will enable the establishment of a multi-stakeholder monitoring program. This will ensure that outcomes on the delivery of the plan reach out to the wider public and will provide an audit mechanism on the delivery and performance of waste services;

## 4 PART TWO – THE STRATEGY (THE ROADMAP TOWARDS A CLEAN AND SAFE PALAU)

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### 4.1 PURPOSE

The previous National Solid Waste Management Plan of 2008 defined certain strategic elements of managing wastes with due consideration on the issues at that time. While there were a number of initiatives picked up and challenges overcome during the implementation of this Plan, the path has to be re-directed to allow for changing and emerging issues currently faced in the waste sector.

The nature of wastes and the consumption pattern of the community has significantly changed in the last 10 years and this resulted in some emerging waste issues which need to be addressed in the immediate to short-term period. The National Solid Waste Management Strategy and Action Plan builds on earlier commitments and responds to the new waste environment covering Solid Wastes which pose imminent risks to public health and the receiving environment.

This updated National Solid Waste Management Strategy and Action Plan builds on the strategic actions of the previous plan based on a review done during the development process through stakeholder engagements. This Strategy seeks to provide direction on where the government and stakeholders should currently gear their effort to ensure that the journey leads to a clean and safe Palau. Managing waste as a resource will be the core approach to deliver socio-economic, health and environmental benefits through to 2026.

The Strategy and Action Plan also seeks to build strong pillars that will enable strengthened institutional and human capacities to implement waste management activities. It is also expected to complement actions that will provide best practices which will minimize risks and achieve optimum and resource-efficient benefits. These are all well aligned with the aspirations in the Cleaner Pacific 2025.

This document also recognizes the paramount role of community and stakeholders in the achievement of successful initiatives. It intends to build relationships among stakeholders and encourage co-sharing of responsibilities in managing wastes through wider community involvement and public-private partnerships (PPP).

In summary, the Strategy articulates the vision, aims and principles to guide actions, sets key directions and priority approaches for solid waste management and resource recovery to 2026 with provisions for measuring progress and response to changes in the waste sector.

## 4.2 SCOPE

This National Solid Waste Management Strategy and Action Plan covers the 10-year period from 2017 to 2026 with an action plan designed to be implemented for the first half of the period 2017 to 2021. A general review of the Strategy will be undertaken in 2020 to update its relevance to the current needs and plan for the next activities for the remaining period of the Strategy.

The Strategy considers solid wastes generated in the household, institutional and commercial waste streams of the main island. The specific types of wastes covered in the strategy are illustrated below.

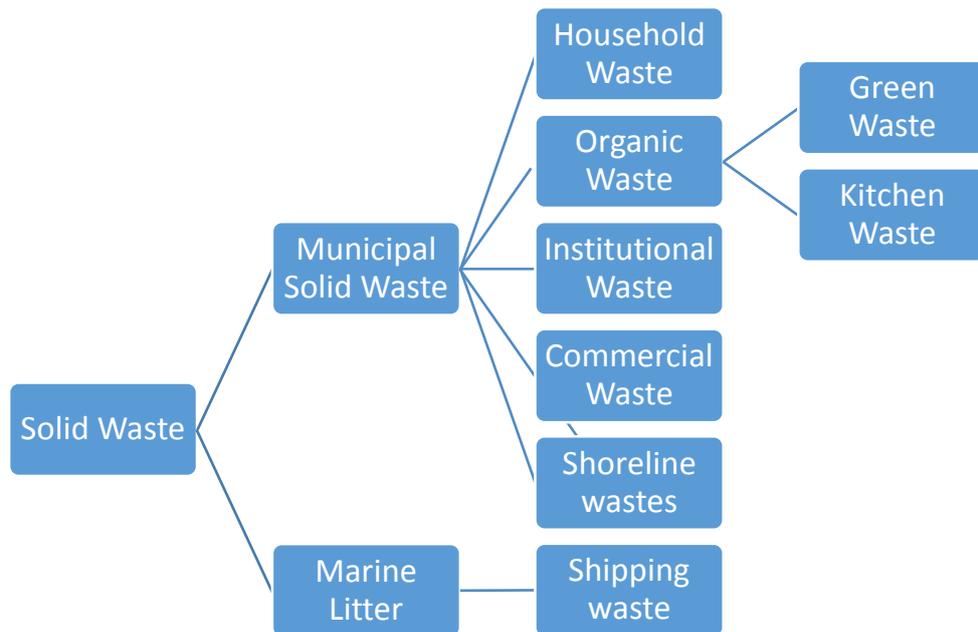


Figure 4-1 : Type of Wastes

The National Strategy does not cover liquid and gaseous wastes although greenhouse gas (GHG) emissions resulting from waste activities will be assessed.

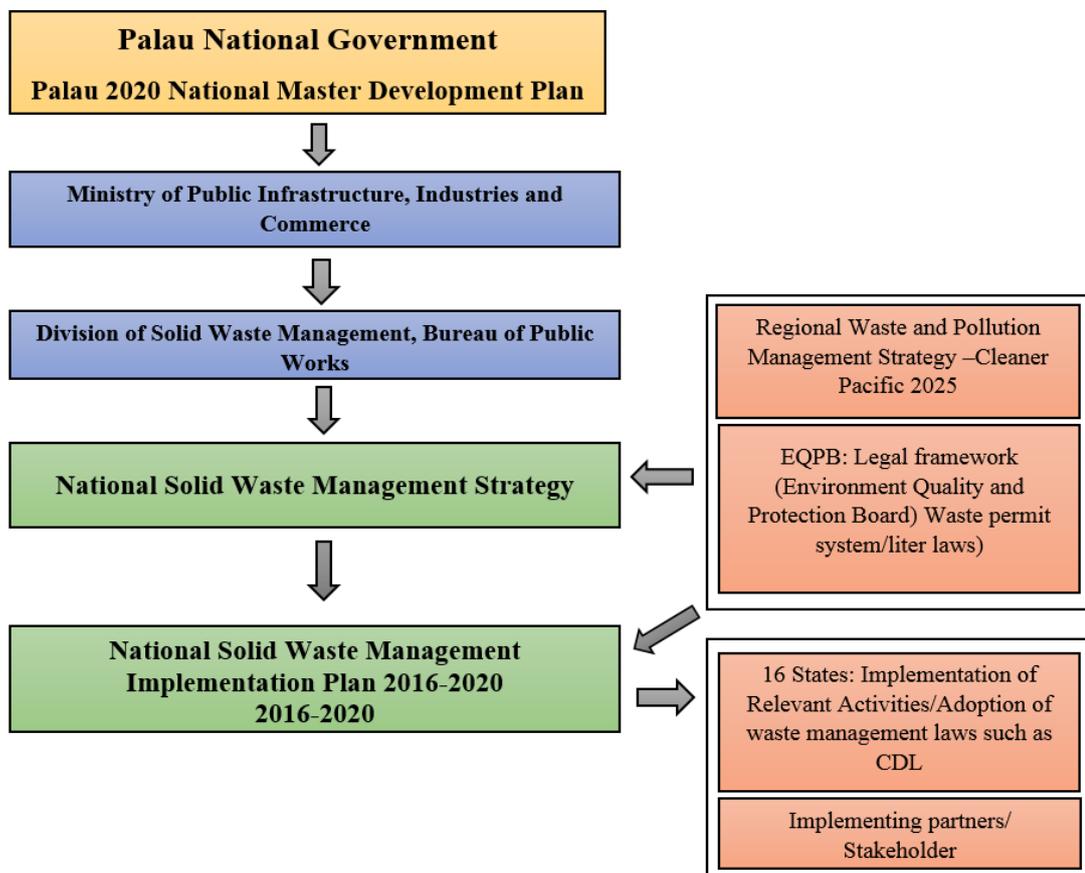
An Action Plan developed in line with the National Strategy articulates the vision for a clean and safe Palau through solid waste management. This plan details agreed activities covering the first 5 years of implementing the Strategy through to 2021. The intent is to have these activities reviewed (monitored and evaluated) and updated after 5 years commencing implementation in 2017. The goals and strategic actions are established to achieve this 10-year vision.

### 4.3 AIMS

The National Solid Waste Management Strategy and Action Plan aims to:

- Synergize efforts in waste management among different line agencies of the government and the wider community;
- Improve the environment, health and socio-economic conditions of the people of Palau by managing wastes properly through 3R+return programs and provision of safe and environmentally sound collection, storage, treatment and disposal systems; and
- Sustain the initiatives on waste management through the commitments of the government and the stakeholders adopting this Strategy.

### 4.4 STRATEGY CONTEXT



### 4.5 STRATEGY DEVELOPMENT PROCESS

The development of the Strategy and Action Plan Involved review of relevant documents, observation of current delivery of waste services, review of the existing National Solid Waste Management Plan 2008 and conduct of a series of workshops to gain insights on current and emerging waste issues and gain full understanding of the waste sector in Palau.

The multi-sectoral consultations were undertaken in three workshops, i.e. 1) review of existing plan, identification of issues, setting up strategic approaches and updating of the Plan, 2) revision of Action Plan by key government staff based on further stakeholder comments, and c) presentation of the revised Action Plan to the stakeholders.

These consultations provided some degree of confidence that the delivery of waste programs and activities align with community expectations and within institutional capacity. The output of the workshops also provided valuable feedback information to assist in improving and refocusing the delivery of waste services in the country.

The consultation process (Figure 4-2) involves the review of the current Palau National Solid Waste Management Plan 2008 and identification of issues besetting the waste sector from a stakeholder and institutional point of view. From the identified issues, the stakeholders also provided inputs as to how these issues can be addressed. The outputs from these consultations form the significant basis for establishing strategic goals, actions and specific activities contained in the Strategy and Action Plan.

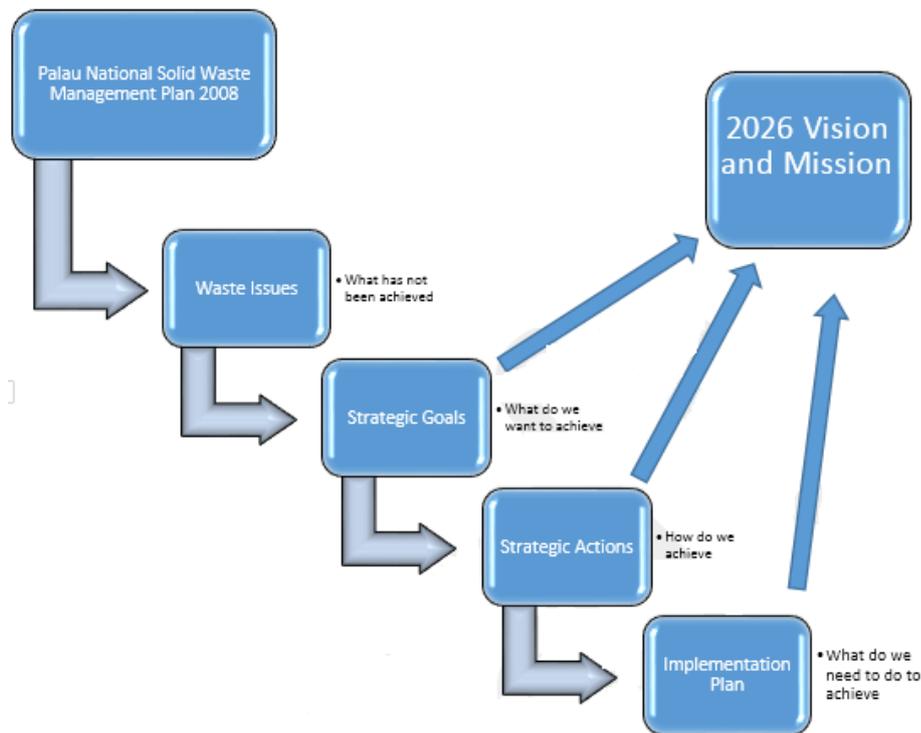


Figure 4-2 : Consultation Process for the Development of Strategy

## 4.6 GUIDING PRINCIPLES

Similar relevant guiding principles as the Cleaner Pacific 2025 will be adhered to in the implementation of this Strategy as follows:

- PRINCIPLE 1      Reduce, Reuse, Recycle, Return (3R + Return)**  
In prescribing waste management interventions, the preference shall be to reduce the generation of waste and pollutants; to reuse if appropriate and safe to do so; to recycle domestically when technically and economically feasible; and to return waste resources to appropriate recycling facilities in other countries. Residual waste that cannot be reused, recycled, or returned for recycling shall be disposed of in an environmentally sound manner.
- PRINCIPLE 2      Product stewardship**  
Those involved in producing, importing, selling, using and disposing of products have a shared responsibility to ensure that those products or materials are managed throughout their lifecycle in a way that reduces their impact on the environment and on human health and safety.
- PRINCIPLE 3      Polluter pays principle**  
Waste producers and polluters should pay the cost of managing their waste or cleaning up the pollution and remediating associated environmental damage.
- PRINCIPLE 4      Proximity principle**  
The treatment and disposal of waste and pollutants should take place at the closest possible location to the source, in order to minimize the risks involved in its transport.
- PRINCIPLE 5      Transparency**  
All waste management activities shall be conducted in an open and transparent manner.
- PRINCIPLE 6      Public consultation and participation**  
Public consultation shall be integrated into the planning of national and regional waste management and pollution control activities, and participants shall be given the opportunity to provide informed input, which shall be considered as advice by relevant decision-makers. Participants shall also be informed of the results of the consultation process.
- PRINCIPLE 7      Multi-sectoral approach**  
Waste management and pollution control approaches shall involve multiple sectors (such as climate change, biodiversity conservation, health, tourism and agriculture) in order to improve the success and effectiveness of interventions.
- PRINCIPLE 8      Regionalism**  
Regional cooperation and collaboration through genuine partnerships shall be undertaken where appropriate to complement national efforts, overcome common constraints, share resources and harness shared strengths.
- PRINCIPLE 9      Sound decision-making**

Decision-making shall be based on scientific information and risk-analysis from national, regional and/or international sources and shall promote the optimum utilization of resources.

**PRINCIPLE 10    Precautionary approach**

When an activity may lead to unacceptable but scientifically uncertain harm to human health or the environment, actions shall be taken to avoid or diminish that harm without having to await the completion of further scientific research.

**PRINCIPLE 11    Proactive approach**

All WCP activities shall be undertaken using a planned rather than reactive approach to ensure limited resource allocations are optimized.

**PRINCIPLE 12    Adherence to regional and international conventions**

Pacific island countries and territories shall abide by their obligations to regional and international treaties related to waste, chemicals, hazardous waste and marine pollution.

**PRINCIPLE 13    Public-private partnership**

The comparative and competitive advantages of the private sector shall be harnessed to improve the delivery of waste management and pollution control services through a contractual relationship between private and public entities.

**PRINCIPLE 14    Selection of appropriate and affordable technology**

Selection (development and/or transfer) of environmentally sound technologies for waste management and pollution control shall fully consider the prevailing socio-economic conditions and capacity of the country and, where deemed necessary, shall be part of an overall management strategy that prioritizes public health and environmental protection, sustainability and compliance with international and regional treaties (such as reduction in greenhouse gas and ODS emissions and uPOPs generation).

## 4.7 KEY STRATEGIC GOALS, ACTIONS AND TARGETS

As an outcome of the consultations, Palau stakeholders believed that the following goals and actions would help them achieve the vision for a clean and safe Palau in 2026.

The strategy sets the roadmap from which the actions emanate resulting into more clarity and certainty for the government, community and the other stakeholders. These actions will offer more benefits from coordinated approach focusing on the work across all relevant sectors. These also complement current programs and activities in the waste sector of Palau. These strategies will be delivered under the leadership of Bureau of Public Works (BPW) and Environmental Quality and Protection Board (EQPB), both of which are mandated to oversee and implement waste-related activities of the government.

#### 4.7.1 DATA MANAGEMENT AND ANALYSIS

##### **Goal #1: Relevant waste data is generated and waste initiatives are properly documented for better informed decisions.**

The proper collection and analysis of data is essential for determination of appropriate management actions. This is based on the principle that whatever cannot be measured cannot be managed. The outcomes of waste management initiatives can easily be determined through certain indicators which can be measured discretely.

##### **Current Driver:**

While Palau national and state governments ensure that the delivery of required waste services is provided, waste collection remains a current issue in some areas with full coverage and reasonable frequency not yet achieved. This could have been anticipated if there is proper recording and analysis of data from the daily operations.

The stakeholders believe that there is still a dearth of information relevant to the different waste types such as hazardous waste stockpiles, e-wastes and potentially recyclable items which could have been used to design appropriate management systems to address specific issues for the different waste items. This include expanding the number of items in the recycling program, i.e. revising the Container Deposit Legislation. The availability of data will provide evidential information to make better informed decisions.

##### **Strategic Action:**

1.1. The responsible agencies shall undertake regular data collection and analysis.

The following key performance indicators (KPIs) are expected to measure the achievement of this goal:

- 1 national database developed
- 1 guideline for standard operating procedures for data collection established

#### 4.7.2 INSTITUTIONAL DEVELOPMENT

##### **Goal #2: There is strengthened institutional capacity on waste management based on economic and social benefits.**

This goal hopes to reform and strengthen institutions and governance to effectively drive the successful achievement of outcomes of waste management and resource recovery actions. These relate to policies and legislation, institutional arrangements including organizational structure, and resource allocation. The increased capacity of the government to make informed decisions will raise the profile of the waste sector.

##### **Current Driver:**

Palau has already demonstrated good governance and commitment to the protection of the environment. In particular for waste management, it is one of the first Pacific Island countries to legislate a Container Deposit Levy (CDL) system which allowed recovery and diversion of beverage containers away from the M-Dock Landfill and other state landfills. The success of this legislation has been one of the key driving factors to further progress resource recovery including other items like other beverage containers, vehicles, ULABs, used oil, etc. which stakeholders think should be considered in a new legislation. The proposed new legislation can also cover regulation of imported goods through a review of import taxation. The transboundary movement of e-wastes is seen as an unresolved issue which can likewise be included in the legislation.

While the Recycling Fund from the CDL is enough to undertake national mandates such as landfill operation and awareness campaigns, the Koror State allocation is not enough to cover the operation of the Koror State Recycling Center and the collection services. There is a need to augment this fund with user pay systems for collection and disposal of both solid and hazardous wastes and other related waste management activities as recommended during the stakeholder engagements.

Currently, there is no tax incentive for private companies dealing with wastes. The government should develop a mechanism to encourage private sector involvement in waste management. In addition, the system should also direct the producers and suppliers to have corporate responsibility over potential wastes generated out of their businesses.

Through legislation, the coordination among the different implementing and enforcement agencies can be improved. Particular attention was given to unclear responsibility of managing healthcare wastes specifically in private clinics. Other issues such as open burning of wastes was noted in the discussions which drive the need to update existing outdated legislation focused on waste management.

### **Strategic Actions:**

- 2.1 The government shall develop, amend and enforce national policies, strategies, plans and legislation and strengthen institutional arrangements to support and promote best practice waste management.
- 2.2 The responsible agencies shall undertake cost-benefit analysis of waste management.

The following key performance indicators (KPIs) are expected to measure the achievement of this goal:

- 2 legislations amended
- 1 legislation developed

#### 4.7.3 STAKEHOLDER AWARENESS AND PUBLIC-PRIVATE PARTNERSHIPS

##### **Goal #3: The stakeholders understand the merits (economic, environmental and health) of proper waste management and co-sharing of responsibilities.**

The success of any waste management initiative relies heavily on behavioral changes of the people generating wastes. The community needs to be fully aware of the adverse environmental and health impacts of improperly managed wastes. By being fully aware, the community will view wastes in a different perspective and develop and demonstrate a willing behavior to co-share the responsibility of managing wastes.

One objective of this goal is to provide business opportunities out of wastes, improve markets for wastes and ensure that sustainable financing is achieved. Through this goal, there will be some degree of assurance that waste management can be continuously improved because of well-resourced systems in place. The goal also seeks to optimise the economic value of waste as a resource.

##### **Current Driver:**

As indicated earlier, stakeholders think that the success of the CDL drives the inclusion of other potentially recyclable items imported to the country. This will further motivate the community to segregate wastes into several items. The involvement of the private sector can, likewise, be enhanced through certain mechanisms that will provide economic opportunities such as tax incentives and boost the sense of corporate responsibility of producers and suppliers, e.g. on end-of-life vehicles. Currently, there is no clear financial benefits from wastes aside from the redemption of beverage containers.

While there have been continuous awareness campaigns undertaken by the national and some state governments, the stakeholders believe that the social marketing of waste initiatives is still inadequate and needs to be taken to the next level with due consideration on the environmental and health impacts of improperly managed wastes, e.g. toxicity issues associated with e-wastes.

Awareness campaigns are limited and not undertaken across all states. It is noteworthy, though, that some leading actors in the private sector such as hotels are promoting recycling.

##### **Strategic Actions:**

- 3.1 The responsible agencies shall undertake effective awareness campaigns to gain support on waste management initiatives.

3.2 The responsible agencies shall strengthen existing and develop new public-private partnerships.

The following key performance indicators (KPIs) are expected to measure the achievement of this goal:

- 2 awareness campaigns in a month undertaken
- 4 PPP programs implemented

#### 4.7.4 BEST PRACTICE AND COST EFFECTIVE APPROACHES

##### **Goal #4: Waste management follows best practice approaches with provisions for continuous improvement.**

The best practice approach to waste management can significantly reduce the impacts of environmental and public health risks which also have social and economic implications. By following best approaches, the safety and health of the waste operators and community served will not be jeopardized. Apart from this, an efficient, reliable and sustainable waste service can be assured if delivered with due regard for specific local conditions. This includes the need to adopt climate proofing measures to increase resilience of waste related infrastructure to climate change events as well as traditional knowledge which is still being espoused by culturally sensitive communities.

There will be greater likelihood that equitable and accessible services can be provided to a wider scale of the community.

##### **Current Driver:**

The segregation of wastes is only happening in certain areas with recycling initiatives mostly done at Koror State. Limited items are either processed at the Koror State Recycling Center (few beverage container types, green waste, selected types of plastic, glass) or stored at the M-Dock Landfill (baled cans and PET bottles, scrap metal, and tires). Some beverage containers are processed at Belau Garbage and Scrap Company.

Full coverage of normal collection service including special events has not yet been achieved due to insufficient funding. It is recommended for the government to explore options of user pay system for both collection and disposal to augment subsidy received from the Recycling Fund.

The M-Dock Landfill in Koror is now reaching its capacity with very little option for expansion. The limited disposal space needs to be optimized and operation should be well supervised with workers provided with proper guidance to address operational inefficiencies and occupational health and safety risks.

The presence of 12 other open dumpsites across the country with no proper safeguards for environmental and health risks is a great challenge faced by the government. The stakeholders believe that there should only be one well-maintained

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and properly operated national landfill with transfer stations established in strategic areas.

The intensity of typhoons hitting the country warrants the need for better planning rather than ad hoc approaches to managing disaster wastes. These approaches should be translated into a plan and properly communicated to stakeholders who are likely to offer voluntary services of collecting and disposing debris during post-event recovery operations.

### **Strategic Actions:**

- 4.1 The responsible agencies shall implement waste reduction and resource recovery programs.
- 4.2 The responsible agencies shall ensure that wastes are collected when required.
- 4.3 The responsible agencies shall improve infrastructure, operation and monitoring of waste management facilities.

The following key performance indicators (KPIs) are expected to measure the achievement of this goal:

- 60% waste diversion from the landfill
- At least 2 additional staff assigned to the Division of Solid Waste Management specifically for the waste facility sites.
- At least 2 dedicated staff in each State to oversee management of wastes
- Palau becomes a party to the Waigani Convention
- 1 national landfill established
- 8 transfer stations established

#### **4.7.5 HUMAN CAPACITY DEVELOPMENT**

##### **Goal #5: Waste practitioners are provided with training opportunities.**

It is highly essential to increase the capacity of waste service providers so that the agency in charge can demonstrate good waste management practices to the community. This will offer greater degree of confidence in discharging functions and the capability to tailor solutions according to prevailing local conditions.

### **Current Driver:**

Further enhancement of human capacity for waste practitioners in Palau is regarded as necessary to address knowledge gaps on waste management. Most trainings are management level rather than technical or operational level.

Short-term trainings have been provided by JICA and SPREP whereby trainees are engaged to the holistic approach to waste management. However, the staff require focused trainings on certain aspects of waste management, e.g. specialized training on hazardous waste handling and disposal, landfill operations, waste strategic planning, monitoring, etc.

### **Strategic Action:**

5.1 The responsible agencies shall explore and conduct human capacity development programs for all stakeholders.

The following key performance indicators (KPIs) are expected to measure the achievement of this goal:

- At least 1 Waste Summit conducted back to back with a certified “train - the – trainers” program, conducted in a year.
- At least 10 staff trained as waste practitioners in a year.

#### 4.7.6 DISSEMINATION OF OUTCOMES AND EXPERIENCES

### **Goal #6: Waste activity outcomes are reported and disseminated to relevant stakeholders.**

The decision-makers and the community should be given access to meaningful, accurate and up-to-date national waste data and information which reflects progress and challenges on managing wastes. Through this goal, the behavior and preferences of the community can be captured. By providing evidential outcomes through this reporting process, more informed decisions can likely be generated.

### **Current Driver:**

Currently, DSWM-BPW is very effective in reporting progress of waste activity outcomes to the Executive Management through the Ministry of Public Infrastructure, Industries and Commerce. These efforts need to be enhanced and sustained to regularly update policy makers. The efforts also need to be extended to relevant stakeholders including the community and the private sector as well as counterparts in the region. More evidential information should be disseminated to relevant stakeholders especially when new programs or activities are proposed.

### **Strategic Actions:**

- 6.1 The responsible agencies shall implement monitoring and reporting programs.
- 6.2 The government shall initiate the establishment of a multi-stakeholders monitoring committee and act as the Secretariat.

The following key performance indicators (KPIs) are expected to measure the achievement of this goal:

- At least 1 annual report generated based on national, regional and international templates
- The committee is established with a corresponding budget.
- Integrate multifunctional committee with other committees
- Quarterly meetings conducted with agenda/minutes produced

The strategic goals, actions and key performance indicators are summarised in Table 4-1.

Table 4-1 : Summary of Strategic Goals and Actions

Thematic Area	Strategic Goals	Strategic Actions	KPIs and Targets
<b>DATA MANAGEMENT AND ANALYSIS</b>	1. Relevant waste data is generated and waste initiatives are properly documented for better informed decisions.	1.1 The responsible agencies shall undertake regular data collection and analysis.	<ul style="list-style-type: none"> <li>• 1 national database developed</li> <li>• 1 guideline for standard operating procedures for data collection established</li> </ul>
<b>INSTITUTIONAL DEVELOPMENT</b>	2. There is strengthened institutional capacity on waste management based on economic and social benefits.	2.1 The government shall develop, amend and enforce national policies, strategies, plans and legislation and strengthen institutional arrangements to support and promote best practice waste management. 2.2 The responsible agencies shall undertake cost-benefit analysis of waste management.	<ul style="list-style-type: none"> <li>• 2 legislations amended</li> <li>• 1 legislation developed               <ul style="list-style-type: none"> <li>- Plastic Bag Ban Act</li> </ul> </li> </ul>
<b>STAKEHOLDER AWARENESS AND PUBLIC-PRIVATE PARTNERSHIPS</b>	3. The stakeholders understand the merits (economic, environmental and health) of proper waste management and co-sharing of responsibilities.	3.1 The responsible agencies shall undertake effective awareness campaigns to gain support on waste management initiatives. 3.2 The responsible agencies shall strengthen existing and develop new public-private partnerships.	<ul style="list-style-type: none"> <li>• 2 awareness campaigns in a month undertaken</li> <li>• 4 PPP programs implemented</li> </ul>
<b>BEST PRACTICE AND COST EFFECTIVE APPROACHES</b>	4. Waste management follows best practice approaches with provisions for continuous improvement.	4.1 The responsible agencies shall implement waste reduction and resource recovery programs. 4.2 The responsible agencies shall manage hazardous wastes according to best practices. 4.3 The responsible agencies shall ensure that wastes are collected when required.	<ul style="list-style-type: none"> <li>• 60% waste diversion from the landfill</li> <li>• At least 2 additional staff assigned to the Division of Solid Waste Management specifically for the waste facility sites.</li> <li>• At least 2 dedicated staff in each State to oversee management of wastes</li> </ul>

Thematic Area	Strategic Goals	Strategic Actions	KPIs and Targets
		4.4 The responsible agencies shall improve infrastructure, operation and monitoring of waste management facilities.	<ul style="list-style-type: none"> <li>Palau becomes a signatory to Waigani Convention</li> <li>1 national landfill established</li> <li>8 transfer stations established</li> </ul>
<b>HUMAN CAPACITY DEVELOPMENT</b>	5. Waste practitioners are provided with training opportunities.	5.1 The responsible agencies shall explore and conduct human capacity development programs for all stakeholders.	<ul style="list-style-type: none"> <li>At least 1 waste summit back to back with a certified train - the - trainers program conducted in a year</li> <li>At least 10 staff trained waste practitioners in a year</li> </ul>
<b>DISSEMINATION OF OUTCOMES AND EXPERIENCES</b>	6. Waste activity outcomes are reported and disseminated to relevant stakeholders.	<p>6.1 The responsible agencies shall implement monitoring and reporting programs.</p> <p>6.2 The government shall initiate the establishment of a multi-stakeholders monitoring committee and act as the Secretariat.</p>	<ul style="list-style-type: none"> <li>At least 1 annual report generated based on national, regional and international templates</li> <li>The committee is established with a corresponding budget.</li> <li>Integrate multifunctional committee with other committees</li> <li>Quarterly meetings conducted with agenda/minutes produced</li> </ul>

## 4.8 IMPLEMENTATION

### 4.8.1 Risks

The likelihood of the following risks to occur during the course of implementation of this Strategy is considered.

Table 4-2 : Risks and mitigation measures likely to occur

Risks	Level	Mitigating Measure
<b>a. Donors withdraw support to the implementation of selected activities</b>	Low	Ensure that donors' expectations are met; maintain good relationship with donors
<b>b. The Advanced Recycling Fund (ARF) will be channelled to other sectors.</b>	Low	Consider user pay systems to deliver waste services
<b>c. Change in government policies reducing financial commitment to waste services</b>	Low	Develop a waste policy that will seal government's commitment to the waste sector over a period of time.
<b>d. Failure to gain expected community and stakeholders' involvement.</b>	Medium	Sustained awareness programs and provide incentives and livelihood opportunities in the waste sector.
<b>e. Natural calamities damaging waste infrastructure and interrupting delivery of waste services</b>	Medium	Climate proofing of waste infrastructure; develop disaster waste management plan and business continuity plan during disasters.
<b>f. Failure to maintain standard of waste delivery services including OH&amp;S</b>	Medium	Provide operational guidelines to workers and proper PPEs
<b>g. Low uptake of training opportunities and inability to translate learning outcomes into relevant actions</b>	Low	Provide flexible learning opportunities (short term) and develop national expertise program that will mandate provision of technical advice to waste workers.
<b>h. Failure of waste monitoring committee to discharge its functions</b>	High	Prepare MOU based on agreed terms of references and provide incentives for involvement of stakeholders; provide learning opportunities to members.

#### 4.8.2 Assumptions

- Economic growth will be maintained regardless of changes to global economy.
- The current political system remains stable and will continue to provide commitment to the waste sector in adherence to the sustainable development goals.
- The implementing agencies will remain compliant to its mandate of improving waste management in the country; the Solid Waste Division will continue to be a dedicated office for solid waste management.
- Measurement of waste data will be a priority for more informed decisions and translated to management actions.
- The principle of waste hierarchy will be the prevailing guide for resolving waste issues geared more towards 3R + Return with global market prices favouring recycling.
- Traditional and cultural values are highly regarded in providing sustainable solutions, e.g. composting to assist in food security.
- Positive results of waste management initiatives will not be negated by natural disasters.
- There will still be assistance from development partners during the course of the Strategy.

#### 4.8.3 Action Plan

The specific activities to support the implementation of this strategy have been articulated and presented in the appended Annex 1. This action plan will define the priorities in the next 5 years translated into the annual work program of the implementing agencies, i.e. Solid Waste Division of the Bureau of Public Works and the Environmental Quality Protection Board (EQPB) for funding consideration. There will be annual review of progressive actions for each key service areas through the established mandate of a multi-sectoral monitoring committee and monitoring and evaluation matrix developed by the committee.

### 4.9 MONITORING AND EVALUATION

#### 4.9.1 Measuring Progress

The likelihood of success in implementing the National Solid Waste Management Strategy and Action Plan will depend on an established mechanism to regularly monitor and periodically evaluate progress of the planned activities. The monitoring and evaluation mechanism will take into account feedback on findings through a Waste Monitoring System and lessons learned to enhance performance and results. The existence of baseline data is very critical as reference points to establish targets for the achievement of the set goals for the duration of the plan. The following framework will be developed in consultation with the constituted multi-sectoral monitoring committee to guide in measuring progress of the strategy and the plan. This framework can be established once baseline information has been gathered in a separate exercise.

Table 4-3 : Suggested evaluation matrix of the Strategy and Action Plan of Palau

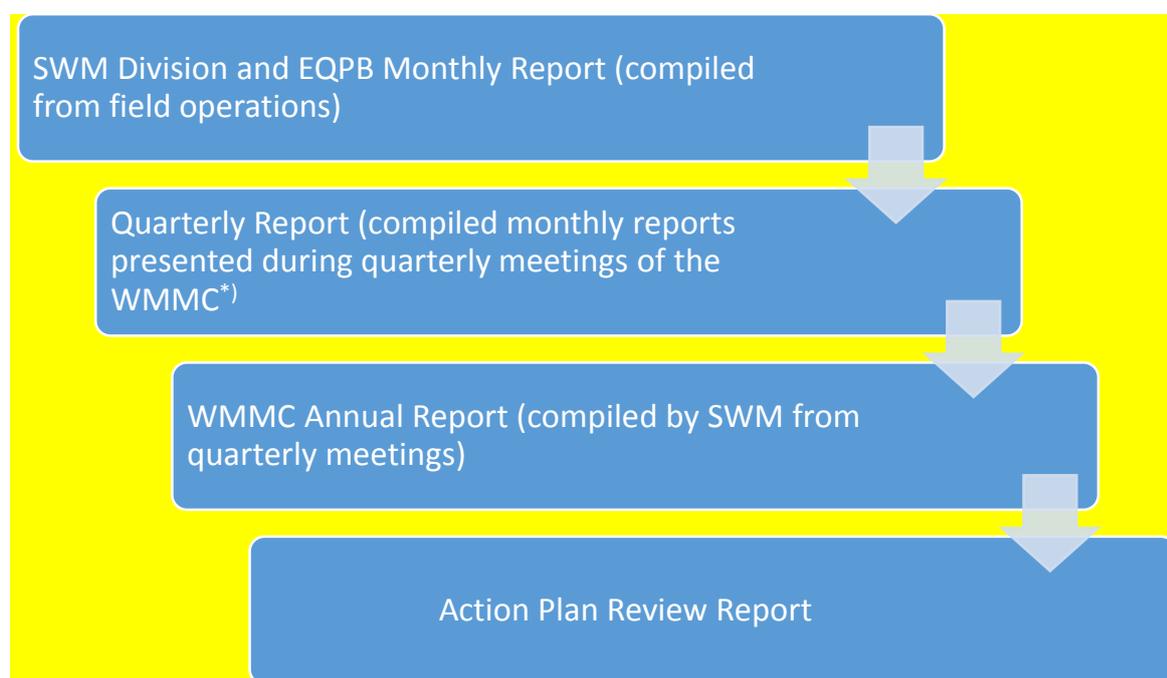
Goals/Outcomes & Activity Outputs	INDICATOR	DEFINITION	BASELINE	TARGET	DATA SOURCE	FREQUENCY	RESPONSIBLE	REPORTING
		How is it calculated?	What is the current value?	What is the target value?	How will it be measured?	How often will it be measured?	Who will measure it?	Where will it be reported?
Goal								
Outcomes								
Outputs								

#### 4.9.2 Periodic Review of the Action Plan

The participative review of the strategy and the plan will be undertaken annually through steering committee meetings. The outcomes and outputs reported during the periodic committee meetings will be compiled into an annual reporting matrix or template based on the monitoring and evaluation framework described in the previous section. This will be presented during the annual steering committee meetings and during the planned annual Waste Summit.

At the end of the 5-year duration of the action plan (2021), there will be a wider review of the strategy to identify corrective actions and recommendations for the remaining half period of the strategy. The review is also expected to sustain and further improve uptake of the strategy.

The following outlines the review process.



\* Waste Management Monitoring Committee

Figure 4-3 : Process of reviewing the implementation of the strategy

#### 4.10 FINANCIAL CONSIDERATIONS

The implementation of the strategy requires substantial financial and technical resources. Through the action plan developed to support the strategy implementation for the first half of the period, potential funding can be sourced through national and local budget allocation and development partners' assistance such as JICA.

Specifically, the Recycling Fund will continuously be mobilized to subsidise the delivery of waste services. The proposed expansion of the CDL Programme is expected to significantly increase investments for waste management and sustain delivery of proper waste services.

The following recommended strategies can also be considered:

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- a. establishing user-pay and polluter-pay systems to cover costs for waste service delivery,
- b. mainstreaming waste management with other priority development areas such as climate change, economic development (agriculture and tourism), and biodiversity conservation, among others, allowing for cross-sectoral issues to be addressed and multi-sectoral engagement enhanced,
- c. continuously raising the profile of waste management among politicians, decision-makers, communities and development partners to invite more funding to the sector; and
- d. Ensuring that project outcomes and outputs are significantly achieved to encourage more investment into the waste sector from both the government and development partners.

# Annex 1: Action Plan

<b>Goal #1: Relevant waste data is generated and waste initiatives are properly documented for better informed decisions.</b>									
Implementation Activity	Who is responsible	Timing					Potential Source of Funding	Estimated Budget (\$)	KPI
		Year 1	Year 2	Year 3	Year 4	Year 5			
A. Design a database to report outcomes including standard methodology to collect, manage and analyse and report data.	BPW (MPIIC), EQPB, and PALARIS, SPREP						SWD budget	5,000	
B. Manage the waste management database	BPW (MPIIC), EQPB, Statistics Office, SPREP to assist						National budget appropriation	25,000	
C. Prepare the inventory of HW (adopt World Customs Organisation Harmonized system codes)	Private companies that import (will be a requirement by EQPB regs.)							6,000	Improve the inventory and monitoring
D. Monitor the inventory of HW	EQPB							0	
E. Update the country waste profile	BPW (MPIIC), EQPB, SPREP								

<b>Goal #1: Relevant waste data is generated and waste initiatives are properly documented for better informed decisions.</b>									
Implementation Activity	Who is responsible	Timing					Potential Source of Funding	Estimated Budget (\$)	KPI
		Year 1	Year 2	Year 3	Year 4	Year 5			
F. Assess GHG footprint of waste management activities	BPW (MPIIC), EQPB								

**Goal #2: There is strengthened institutional capacity on waste management based on economic and social benefits.**

Implementation Activity	Who is responsible	Timing					Potential Source of Funding	Estimated Budget	KPI
		Year 1	Year 2	Year 3	Year 4	Year 5			
A. Amend the existing Beverage Recycling Law	Senate and House Committees responsible for the sector, MPIIC Minister						OEK	1,500	
B. Develop a legislation banning importation of certain items (e.g. plastic water bottles and pellets)	Senate and House Committees responsible for the sector, MPIIC Minister						EQPB/OEK	1,500	
C. Undertake cost-benefit analysis of proposed legislation.	BPW (MPIIC), SPREP to assist						Donor/SPREP	10,000	
D. Develop and implement a detailed sustainable financing plan. - to cover collection, haulage, treatment disposal - include procurement and maintenance plan for equipment - consider current revenue streams	MPIIC, EQPB, MOF, state governments, private sector								

<b>Goal #2: There is strengthened institutional capacity on waste management based on economic and social benefits.</b>									
Implementation Activity	Who is responsible	Timing					Potential Source of Funding	Estimated Budget	KPI
		Year 1	Year 2	Year 3	Year 4	Year 5			
E. Introduce user-pay system for collection and disposal									
E.1. Feasibility study to decide the price and system of tipping fee and collection fee	BPW (MPIIC)/ JICA, state governments, MOF							0	To implement tipping (private company) fee at the landfill in Babeldaob To implement collection fee with in Babeldaob states
E.2 Develop the regulation on the collection and tipping fee	BPW (MPIIC), state governments							0	
F. Develop the guidelines on waste disposal	BPW (MPIIC)								
G. Revise the existing SWM regulation - including segregation (both private sector and	EQPB							0	Updated SWM regulation

<b>Goal #2: There is strengthened institutional capacity on waste management based on economic and social benefits.</b>									
Implementation Activity	Who is responsible	Timing					Potential Source of Funding	Estimated Budget	KPI
		Year 1	Year 2	Year 3	Year 4	Year 5			
segregation stations) - final disposal - etc									
H. Review relevant permits to require waste treatment/ disposal facility operators to submit plans and monitoring data to EQPB (e.g. healthcare wastes)									
I. Propose the tax incentive program such as low tax on biodegradable items	BPW (MPIIC) (commnets from KSG, PCOC, EQPB, etc)							0	Development of the proposal
J. Revise the hazardous waste regulation to include: - inventory and monitoring - Management and disposal based on requirements under	EQPB SPREP						SPREP	0	Revised reg. of HW

<b>Goal #2: There is strengthened institutional capacity on waste management based on economic and social benefits.</b>									
Implementation Activity	Who is responsible	Timing					Potential Source of Funding	Estimated Budget	KPI
		Year 1	Year 2	Year 3	Year 4	Year 5			
international conventions to which Palau is a party (e.g. Basel Convention).									
K. Develop a plan to privatize collection	BPW (MPIIC), KSG						BPW (MPIIC)	200,000 /year	Privatize the collection service in Babeldaob state

**Goal #3: The stakeholders understand the merits (economic, environmental and health) of proper waste management and co-sharing of responsibilities.**

Implementation Activity	Who is responsible	Timing					Potential Source of Funding	Estimated Budget	KPI
		Year 1	Year 2	Year 3	Year 4	Year 5			
<p>A. Develop and implement a more coordinated awareness campaign plan</p> <ul style="list-style-type: none"> <li>- Expand the existing 3R awareness campaign</li> <li>- Utilize toolkits</li> <li>- Implement a Clean Schools or Clean Campus Program</li> </ul>	National and state governments, communities. Bureau of Tourism, Fisherman’s Association, BELAU Tourism Association, PVA						National and State budget, private sector, GEF small grant programs	50,000	
<p>B. Develop Public-Private Partnership (PPP) programs</p> <ul style="list-style-type: none"> <li>- e.g. household battery disposal bins, eco-bags, reusable beverage containers (with company logos),</li> </ul>	National (EQPB, BPW (MPIIC), Ministry of Finance, DEH, BOA, PCC/CRE, etc), private sector, NGOs, SPREP, COC, Bureau of Tourism, Fisherman’s Association, BELAU Tourism Association, PVA						National government , private		

**Goal #3: The stakeholders understand the merits (economic, environmental and health) of proper waste management and co-sharing of responsibilities.**

Implementation Activity	Who is responsible	Timing					Potential Source of Funding	Estimated Budget	KPI
		Year 1	Year 2	Year 3	Year 4	Year 5			
compost production, handling difficult and hazardous wastes, car batteries, scrap metal, tires, etc. - consider extended producer/importer responsibility scheme									

**Goal #4: Waste management follows best practice approaches with provisions for continuous improvement.**

Implementation Activity	Who is responsible	Timing					Potential Source of Funding	Estimated Budget	KPI
		Year 1	Year 2	Year 3	Year 4	Year 5			
A. Expand the Koror State 3R + return program across all states	Association of governors, KSG, communities						National and state budget	150,000	
B. Establish additional redemption centers	BPW (MPIIC), Koror, Airai						Donors, Recycling fund	150,000	
C. Expand composting program (community and home composting)	KSG, other state governments, private sector								
D. Manage hazardous wastes properly									
D.1 Establish hazardous waste drop off and storage facilities and healthcare waste treatment facility	EQPB, state, BPW (MPIIC), DEH						SPREP, donors, national government	300,000	
E. Establish a centralized national landfill	National, state						Donor, national government	5,000,000	
E.1 Designate and construct the location of the segregation/	BPW (MPIIC) States						-Grassroots fund of Japan	\$175,000 \$35,000/each	Set sufficient segregation/compost/ disaster waste

<b>Goal #4: Waste management follows best practice approaches with provisions for continuous improvement.</b>									
Implementation Activity	Who is responsible	Timing					Potential Source of Funding	Estimated Budget	KPI
		Year 1	Year 2	Year 3	Year 4	Year 5			
compost/disaster waste stations.							-PAN fund	(size:20x40) 5 stations	station for all state to assess
E.2 Design the collection system from the segregation stations	BPW (MPIIC) State						Recycling fund	200,000/year	
F. Develop a plan and secure funding for the closure of the Babeldaob state dumpsites	BPW (MPIIC)/JICA, OEK						Tourist fee	0	All dumpsites in Babeldaob are closed and converted to transfer stations
G. Undertake environmental monitoring and reporting	EQPB, BPW (MPIIC), state						National budget	1,000,000	
H. Coordinate between stakeholders to develop a disaster waste management plan	States BPW (MPIIC) EQPB NEC DEH Climate Change Energy Recycling companies							0	Output: Disaster waste management plan

**Goal #5: Waste practitioners are provided with training opportunities.**

Implementation Activity	Who is responsible	Timing					Potential Source of Funding	Estimated Budget	KPI
		Year 1	Year 2	Year 3	Year 4	Year 5			
Implement training programs on OH & S, landfill operation, waste management techniques, specialized hazardous waste management, etc.	EQPB, BPW (MPIIC), DEH, MOE, PCC/CRE, private sector						SPREP, FAO, SPC, JICA, other donors	125,000	

**Goal # 6: Waste activity outcomes are reported and disseminated to relevant stakeholders.**

Implementation Activity	Who is responsible	Timing					Potential Source of Funding	Estimated Budget	KPI
		Year 1	Year 2	Year 3	Year 4	Year 5			
A. Undertake monitoring and reporting of KPIs of waste management implementation plan	EQPB, BPW (MPIIC), multi-stakeholders						National budget	10,000	
B. Establish the committee/working group on SWM including NGOs, climate change office and PAN Office with MOU	All stakeholders listed in the NSWMP							6,000	
C. Conduct meetings of multi-stakeholder committee/working group to monitor progress and resolve issues	National government, Stakeholders						National budget	50,000	
D. Develop a communication plan to report outcomes; e.g. annual reports, annual briefing notes to the Minister, a	Multi-stakeholder committee/working group								

<b>Goal # 6: Waste activity outcomes are reported and disseminated to relevant stakeholders.</b>									
Implementation Activity	Who is responsible	Timing					Potential Source of Funding	Estimated Budget	KPI
		Year 1	Year 2	Year 3	Year 4	Year 5			
national summit to report outcomes to stakeholders etc.									
E. Attend the Clean Pacific Roundtable	Designated representative								