

Solid Waste Management Country Profile

Palau

BACKGROUND

Palau has a population of 17,661¹ according to the 2015 census, of which about 65% reside in Koror State and 30% in the 10 states of nearby Babeldaob Island, which is located adjacent to Koror across the sea. The land area is about 458 square kilometers, most of which is occupied by the island of Babeldaob. Palauans make up 73% of the population; the rest are foreign residents in Palau. The GNI per capita is USD 17,280² and the main industries are construction, tourism, and commerce based on the import of food and consumer goods³.

INSTITUTIONAL ASPECTS

Laws and regulations on waste management in Palau are as follows.

- Environment Quality Protection Act 1981 - RPPL No. 1-58
- Solid Waste Management Regulations (2013)
- Recycling Act 2006 - RPPL No. 7-24
- Beverage Container Recycling Regulation 2009
- Plastic Bag Use Reduction Act 2017 - RPPL No. 10-14

A National Solid Waste Management Strategy (NSWMS) has been developed as follows:

- National Solid Waste Management Strategy: The Roadmap towards a Clean and Safe Palau 2017 to 2026

At the national level, the Bureau of Public Works (BPW) under the Ministry of Public Infrastructure and Industries (MPII) is responsible for the overall management of municipal waste and the Environmental Quality Protection Board (EQPB) is the agency responsible for hazardous waste. The waste management operations in each of the 18 states in Palau are the duty of the state governments. Operations and management of the final disposal site located in Koror State, the largest state in the country, and the supervision of the Container Deposit Scheme (CDS) for beverage containers are carried out by BPW.

TECHNICAL ASPECTS

Waste Generation and Composition

According to the NSWMS 2017-2026, the amount of waste generated per day in Koror and the 10 states in Babeldaob, categorized by source, is as shown in the table below. Approximately one-third of the waste is household waste and the remaining two-thirds is other waste.

Waste generated in Palau (tons/day)

Source of Waste	Waste Generated (tons/day)
Household	11
Other sources	23
Municipal waste total	34

Source: National Solid Waste Management Strategy (NSWMS) 2017-2026

In addition, as shown in the NSWMS 2017-2026, a waste flow was created based on an SWM baseline survey, and the waste flow revealed not only the amount of waste generated, but also the amount discharged, and the final disposal amount. In Palau, recycling activities, such as the CDS for beverage containers and composting of organic waste, have been working effectively, which contributes to reducing the final disposal amount.

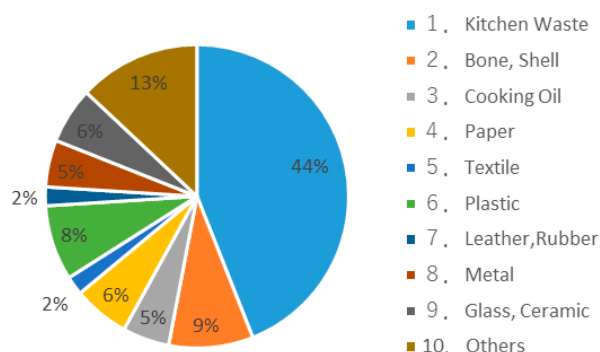
Volume of waste managed by waste management services in Palau (tons/day)

Amount Generated	Amount Discharged	Final Disposal Amount
34	29	29

Source: National Solid Waste Management Strategy (NSWMS) 2017-2026

With regard to the composition of household waste, it was found from surveys conducted in 2014 and 2015⁴ that kitchen waste accounted for the largest proportion at 44%, as shown in the figure. However, most kitchen waste is efficiently utilized as livestock feed and composting material.

Waste Composition of Household Wastes in Koror (Weight %)



Source: National Solid Waste Management Strategy (NSWMS) 2017-2026

Waste Collection

Household waste in Koror is collected by the waste management division of the state government using four compactor trucks and open-top trucks, working five days a week, and each household is provided with a weekly collection service. Residents discharge waste in drums placed on the roadside in front of their houses, where it is collected by collection vehicles driving along the road. This system works on a door-to-door basis and the collection rate is estimated to be 100%.

For the 10 states of Babeldaob, previously each state government provided a collection service and transported waste to small-scale dump sites located in the states. With the use of the new national landfill site in Aimeliik, BPW started the inter-state collection to serve 10 states of Babeldaob since February 2021.



Waste collection using a compactor truck in Babeldaob (2019)

Waste Disposal

Until February 2021, Koror State and some of the states in Babeldaob had transported their waste to M-Dock landfill site located in Koror State. It had been in use for more than 50 years, utilizing a low-lying area along the coast.

Since this area was adjacent to a boat slip which had a lot of tourist traffic, the structure was designed with consideration for the surrounding environment: the landfill waste had been hidden within an embankment so that no waste was visible from the surrounding area. A leachate treatment pond had also been installed, and was designed to circulate back to the disposal site as needed, thereby avoiding discharge in the vicinity. The embankment was built up higher in 2007 and 2017, and as of 2020, waste was being deposited in the third tier. Approximately 27 tons of waste had been delivered every day to the M-Dock landfill site, of which about 30% was from households and the rest was from businesses such as hotels and restaurants, or was construction waste. While no fees had been charged for disposal of the waste, BPW, a national agency, was responsible for the landfill operation at M-Dock landfill site.



An aerial view of the M-Dock landfill site (2019)

With grant assistance from Japan, a new landfill site was constructed in Aimeliik on the island of Babeldaob, and has been in use since February 2021. At present, waste from the state of Koror, where 65% of the population lives, and waste from the 10 states of Babeldaob, is being disposed of at this new national landfill site in Aimeliik.



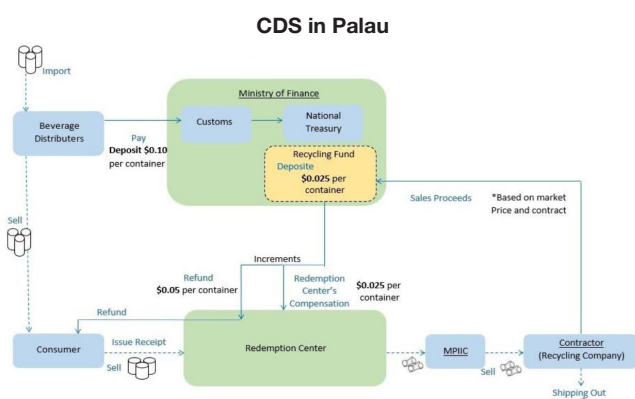
The new landfill site in Aimeliik (2022)

Recycling

When it comes to recycling in Palau, the success of the CDS has been noteworthy; however, many other recycling activities are also conducted under the leadership of the recycling center. Major recycling activities are outlined below.

1) Container Deposit Scheme (DS)

The CDS, in place since 2011, charges a deposit of 10 cents per beverage (in aluminum cans, steel cans, plastic bottles, or glass bottles) upon import of the beverages and refunds 5 cents per empty container brought to designated redemption centers, as seen in the diagram below.



Source: Beverage Container Recycling Program Annual Report FY-2020

Since the introduction of this system, the collection rate for eligible containers has remained high, with an average collection rate of 87.3% from 2011 to 2016.

Number of containers and redemption rate under CDS

Year	No. of Containers Subject to Deposits	No. of Containers 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%

Source: Annual report on CDS (2018) issued by waste management section of BPW

Of the 5-cent difference between the deposit and the refund, 2.5 cents is paid to the contractor for the operating costs of the redemption center. The remaining 2.5 cents is used by BPW to cover costs for waste management, such

as operating the disposal facility.



Collected aluminum cans and compression equipment in the recycling center in Koror (2018)

2) Composting

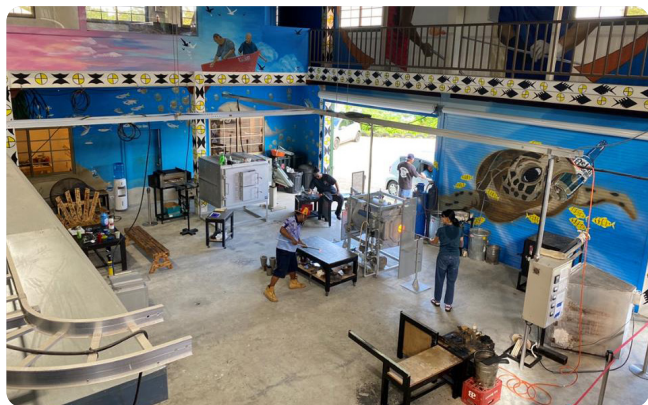
Since 2009, the recycling center operated by Koror state government has been composting waste such as green waste, cardboard, and kitchen waste discharged from hotels and other businesses. About 500 kg of waste per day is converted into compost, which contributes to a 2% reduction in the amount of generated waste. The compost produced in the facility is offered for sale to those who wish to purchase it.



Compost yard, and green waste for use as a raw material (2018)

3) Glass Bottle Recycling

Glass bottles are not reused in Palau, where no beverage manufacturing industry exists. Instead, glass bottles collected via the CDS are crushed into small pieces to be used as construction materials, or melted as raw materials for glass crafts so that tourists and others can experience the glass craft manufacturing process.



Glass factory in Koror (2022)

4) Others

At the both of the M-Dock landfill site and the national landfill site in Aimeliik, scrap vehicles are dismantled and sorted into different materials, such as scrap metal, copper, and aluminum, which are exported by a private contractor.

FINANCIAL ASPECTS

Waste management in Palau is implemented without charging households and businesses fees for waste collection and disposal, as of June 2022. The operational costs of the waste management section of BPW, which manages the disposal site and educates residents on recycling activities, are entirely covered by 25% of the CDS deposit, thereby avoiding any reliance on the national budget.

The Koror government covers about 70% of the necessary expenses from the state budget and the remaining 30% from the operating revenue of the CDS redemption center.

LOCAL AREAS

Palau has 16 states in total, and 95% of its population resides in Koror and the 10 states of Babeldaob. The remaining 5% live in the other five states on remote islands, the most populous of which is Peleliu Island, with 484 people. The state government in Peleliu provides a waste collection service using vehicles that include collection vehicles donated by the Japanese government through Grant Assistance for Grassroots Human Security Projects. However, the situation at the landfill is far from ideal, as landfill compaction is rarely undertaken due to a lack of heavy machinery.

As Peleliu's landfill situation indicates, waste management on the remote islands of PICs is extremely difficult. However, at the same time, Peleliu offers a valuable exam-

ple of cooperation with a national CDS program to introduce recycling activities on a remote island, reducing beverage container disposal and littering.

CONCLUSIONS

In general, waste management has been properly implemented in Palau, making effective use of abundant financial resources and foreign assistance. Thus, it is important to maintain such proper waste management continuously.

Construction of a new disposal site and smooth transition

In November 2020, a new final landfill site was constructed in Aimeliik on the island of Babeldaob using Japanese grant aid. Since its operation in February 2021, all the waste from Koror, which used to be disposed of at the M-Dock landfill site, and the waste from the 10 states in Babeldaob, which used to be disposed of at several small-scale disposal sites in Babeldaob, is being transported to this site for sanitary disposal. The existing small disposal sites operated by state governments are slated to be closed due to improper operation and management, which is expected to contribute to improving sanitary conditions on Babeldaob Island.

Inter-state collection on Babeldaob island

On Babeldaob Island, where the new landfill site was constructed, a unified collection and disposal system was successfully introduced by transitioning from individual waste collection and disposal by each state government to inter-state collection by a private contractor under the responsibility of BPW. Although the distances waste is transported will become longer, the new system is expected to improve collection efficiency and make the most of a private company.

Proper closure of the M-Dock landfill site

The M-Dock landfill site, used for 50 years, is to remain as a disposal site for residual waste from recycling activities in Koror. Once the third embankment currently in use is fully filled, the site is scheduled to be properly closed and utilized as an asset of the Koror state government. As it is adjacent to the tourist boat slip in Koror, effective use of the site as a park with an observation deck is being considered.

Securing financial resources

As mentioned above, Palau has maintained its beauty as a tourist destination without imposing a disposal fee on those who generate waste, using the abundant



revenue from tourism and the CDS. However, in order to properly manage the new landfill site as well as implement sound waste management, it is important to secure sustainable financial resources. From this perspective, therefore, the necessity of charging disposal fees at the new landfill site has been discussed in line with the polluter-pays principle.

<https://www.sprep.org/publications/national-solid-waste-management-strategy-the-roadmap-towards-a-clean-and-safe-palau-2017-2026>

^{*1} 2015 Census of Population, Housing and Agriculture for the Republic of Palau

^{*2} World Bank, 2018

^{*3} Basic Data for Palau, Ministry of Foreign Affairs of Japan

^{*4} Feasibility study on comprehensive resource circulation system for low carbon society in Republic of Palau by AMITA Institute for Sustainable Economies Co., Ltd. under "Feasibility Studies on Joint Crediting Mechanism (JCM) Projects towards Environmentally Sustainable Cities" of Ministry of Environment, Japan.

REFERENCE

1. National Solid Waste Management Strategy: The Roadmap towards a Clean and Safe Palau 2017 to 2026

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