

Good Practices in the FSM on Solid Waste
Management

State EPAs/KIRMA & Public Works and
Transportation and Infrastructure

Outcomes of the 1st PHASE: Issue 2



Yap State Environmental Protection
Agency

Yap State Public Works and
Transportation

Chuuk State Environmental Protection
Agency

Chuuk State Public Works

Pohnpei State Environmental Protection
Agency

Pohnpei State Transportation &
Infrastructure

Kosrae Island Resource Management
Authority

Kosrae State Transportation and
Infrastructure

Good Practices on Solid Waste Management in the FSM -2016

(supported by FSM OEEM and JICA)



CONTENTS

	Page
Director's Message	3
Introduction	4
EPAs/KIRMA	5
Brief Summary of Policy on waste <i>-National Government and State Government</i>	8
Awareness <i>-Yap, Chuuk, Pohnpei, and Kosrae</i>	9
<u>WASTE COMPOSITION Survey Results</u> <u>(2015)</u>	11
Landfill Management <i>-Yap, Chuuk, Pohnpei and Kosrae</i>	13
Collection and Disposal <i>-Yap, Chuuk, Pohnpei, and Kosrae</i>	19
Recycling <i>-Yap, Pohnpei, Kosrae</i>	25
Conclusion	30

DIRECTOR'S MESSAGE



Director Andrew R. Yatilman
Office of Environment and Emergency Management
FSM National Government

This second edition of the "Good Practices booklet" focuses on the progress and challenges demonstrated by each of the four states in relation to the five components of the J-PRISM project. These five components are a) Policy, b) Awareness, c) Landfill Management, d) Collection and Disposal, and e) Recycling.

Because Waste Management activities are primarily implemented by the four states, we commit to assist in their efforts to address waste management in the FSM.

INTRODUCTION

In this second edition of the Good Practices in the FSM on Solid Waste Management, the emphasis is on the recent progress of the states' efforts in managing waste through five components: a) Policy; b) Awareness; c) Landfill Management; d) Collection and Disposal; and e) Recycling. The first edition of the Good Practices Booklet was published in May, 2015 and good practices of the states' 2014-2015 activities through the J-PRISM project were highlighted. Kamagar, Kinisou Chapur, Kalahngan, and Kulo Mulolap.

The vision, as stated in the National Solid Waste Management Strategy, remains to be "The Federated States of Micronesia generate waste and consider the waste that is produced as a valuable resource to be managed sustainably (1)."

WASTE as a VALUABLE RESOURCE



(Yap State Plastic bag Regulations)

EPAs/KIRMA



(Above) The Waste Committee during the final Joint Coordinating Committee Meeting during December, 2015



**EPA Director Christina Fillmed and T&PW
Director Jonathon Marmar -YAP STATE**



**EPA Director Ismael Mikel and T&I/PW Director
Tosiwo Nakayama Jr. - CHUUK STATE**



**EPA Director Henry Susaia -POHNPEI STATE
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**KIRMA Director Robert Jackson T&I/PW Director Weston Luckymis=
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The specialists and coordinators are assisted by Public Works and Transportation and Infrastructure staff. In addition, J-PRISM experts visited the states every three months and provided technical assistance in solid waste management work. Furthermore, the Division of Environment and Sustainable Development of the FSM National Government Office of Environment and Emergency Management facilitates and coordinates state EPAs/KIRMA efforts on solid waste management.



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(RMI, Kosrae, and Pohnpei)



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SDP, FSM OEEM

COMPONENT 1 -POLICY



STATEMENT ON MANAGING SOLID WASTE MANAGEMENT

Vision: The Federated States of Micronesia generate waste and consider the waste that is produced as a valuable resource to be managed sustainably.

Mission: The mission of the island states is to reduce solid waste generation and manage residual waste materials in a way which maximizes opportunities for resource recovery, while protecting their public health and environment through partnership with all its citizens.

CURRENT POLICY RELATED DOCUMENTS ON WASTE

- A. National Solid Waste Management Strategy
- B. Good Practices Booklet; Issue 1
- C. Leachate Monitoring Guidelines

Currently, the National Government and the State Governments of the Federated States of Micronesia have developed and endorsed their 5-year Solid Waste Management Strategy and Action Plans:

Government	Year of Endorsement
Yap State Government	2015
Chuuk State Government	2012
Pohnpei State Government	2014
Kosrae State Government	2009 and revisited in 2015
National Government	2015

The Five year strategies include an Action Plan which entails activities to be implemented in a timeframe. Activities are implemented through the various components:

- Sustainable Financing
- Planning
- Awareness
- Medical Waste
- Capacity Building

Additionally, it is essential to share good practices of solid waste management among each other in order to promote sound management and improve the current system. A Good Practices Booklet was published last year for that purpose.

Furthermore, a Leachate Monitoring Guidelines document was developed to provide guidance on monitoring leachate at the various dumpsite/landfill points.

COMPONENT 2: AWARENESS



The management of Solid Waste cannot be complete without the collaboration of stakeholders through an awareness campaign. Solid Waste Management Awareness Campaigns in the FSM have promoted the application of the 3 R's: Reduce, Reuse, and Recycle in the communities and schools, through a Prepaid Bag, Waste Bins, School presentations, and Radio Spots.

Yap's Green Promo Bag Campaign



Chuuk's Waste Bin



Pohnpei's Pre-paid Bag



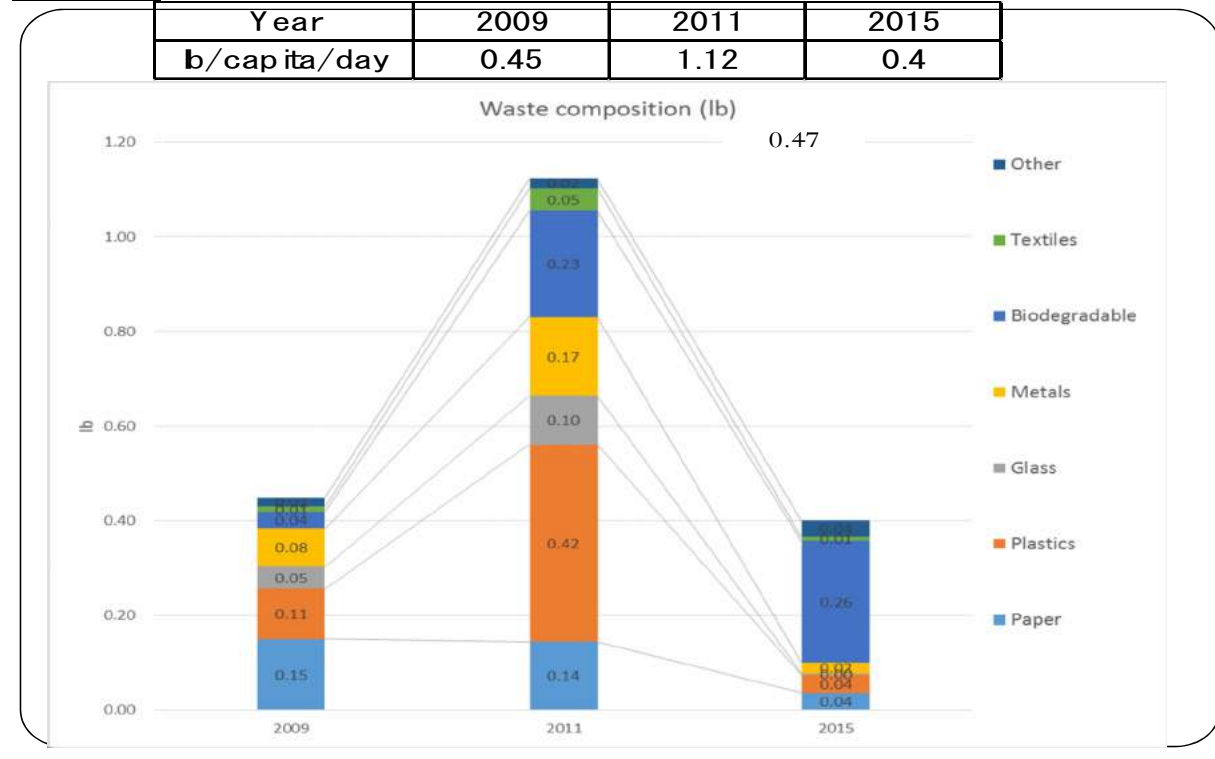
Kosrae's Recycling Campaign



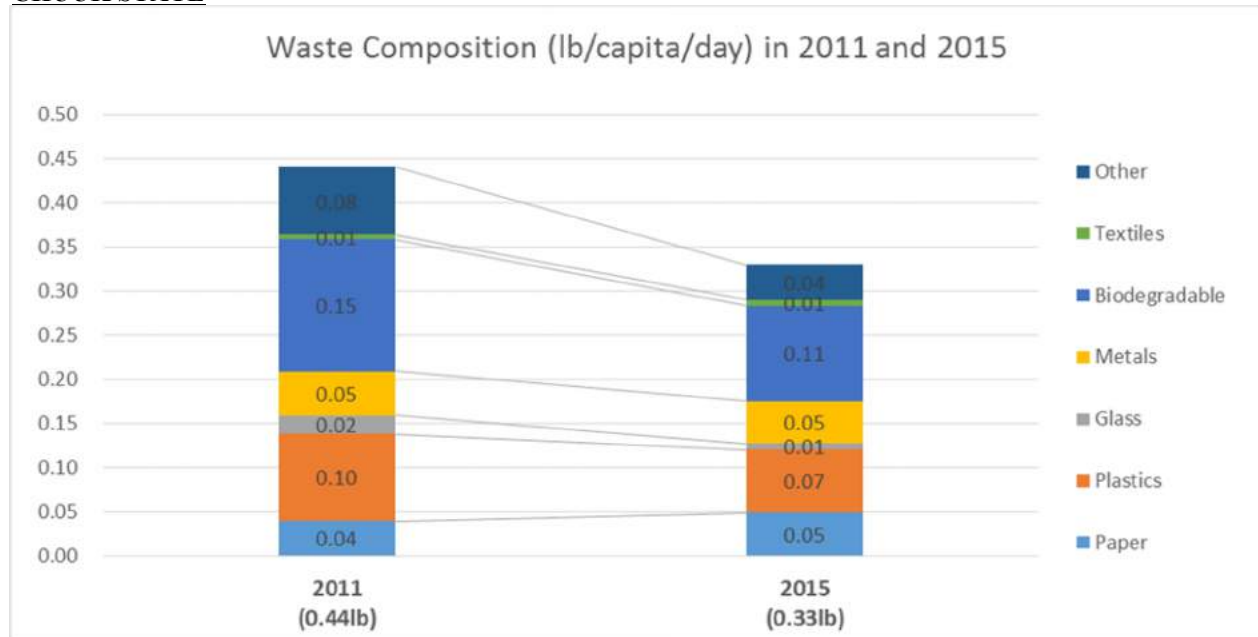
WHAT KINDS OF WASTE ARE WE DEALING WITH?

Waste is accelerating at a rapid pace in the FSM. Each state has completed surveys to assist in the determination of types of waste, their weight, and volume.

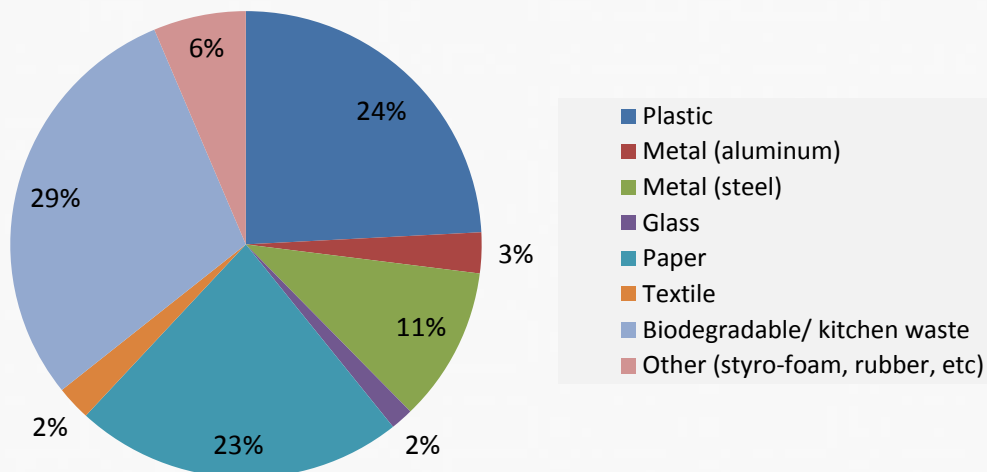
YAP STATE



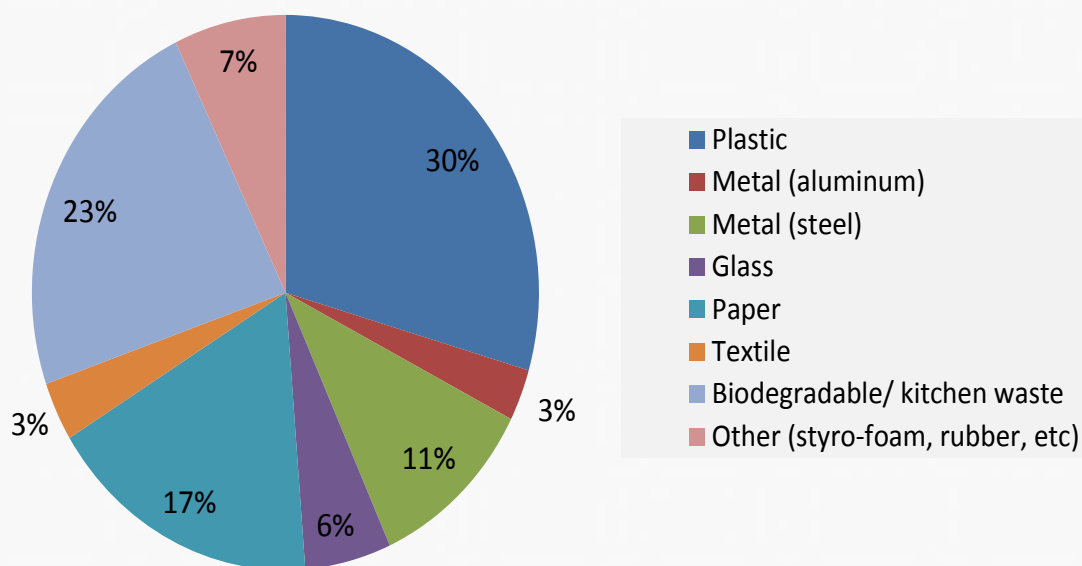
CHUUK STATE



All Pohnpei State



All Kosrae State



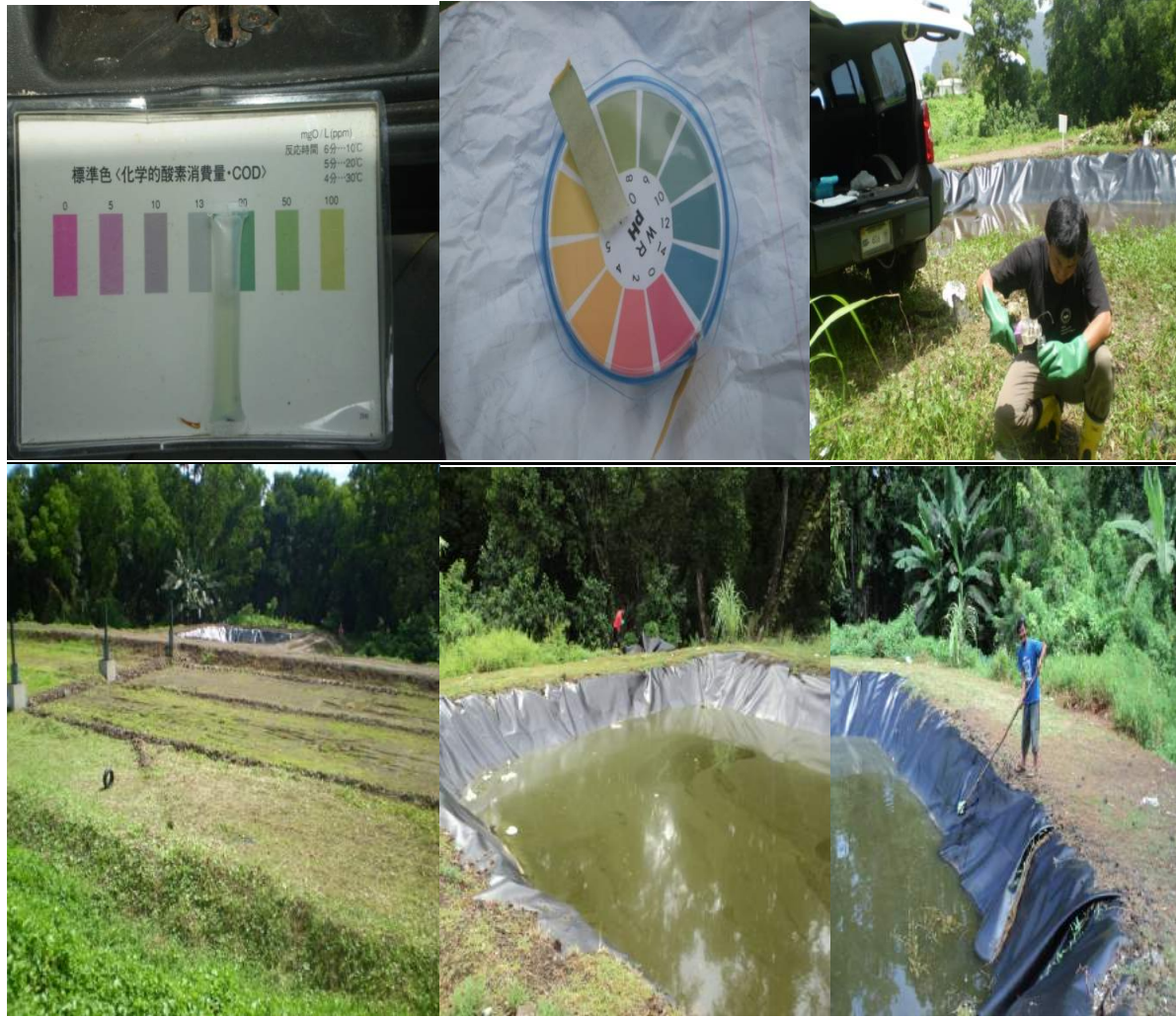
In the early 2000, it was estimated that 17-19 percent of the waste stream was plastic. Today, that has doubled in all the states since everything people use is made out of plastic. Biodegradable waste is second in highest of percentage next to plastic.

CHALLENGES:

Waste is accelerating at a rapid pace and the need to manage the rise and use of plastics is an issue to be dealt with.

COMPONENT 3: LANDFILL MANAGEMENT





KOSRAE STATE

A landfill survey was conducted on December 2, 2015 with the objective of estimating its life span. The calculation method used for the Field survey on the elevation of the current wastewater was based on the distances between the standard elevation point and the fourteen points on the site. An estimate of the volume of remaining capacity in the site was also calculated.

Calculation:

Remaining Capacity: $(A + B) \times C/2 \times D$ D:186ft length
 $=249,919$ cubic feet $= 7,078$ cubic meter (m^3)

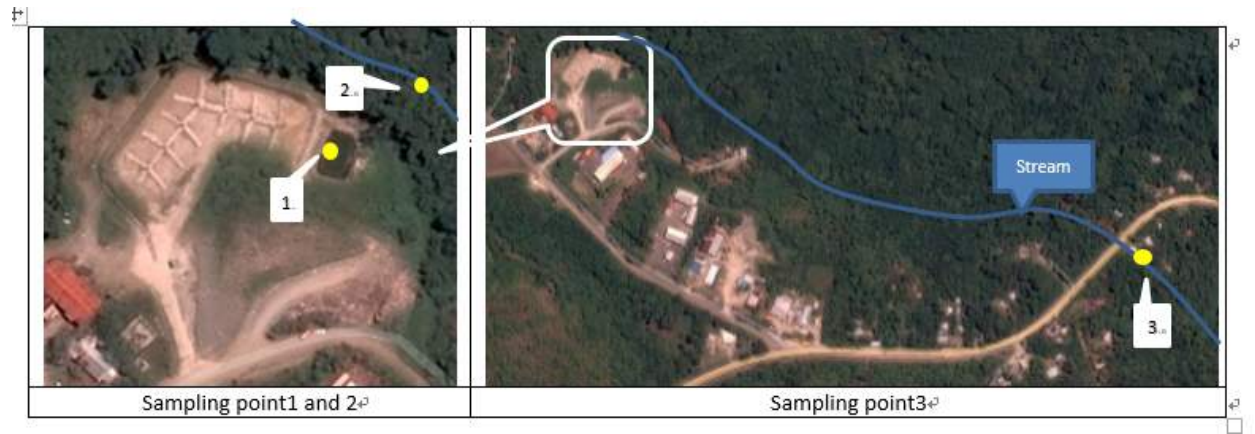
Estimated life span (The case study)

Planned weekly waste volume: $12 m^3 =$ daily $1.714 m^3$
 $(2m^3 \text{ capacity compactor} \times 6 \text{ loads / week})$

$7,078m^3 / 1.714 m^3/\text{day} = 4,129 \text{ days} = 11.3 \text{ year}$

Chemical Oxygen Demand (COD) and Potential Hydrogen (pH) are used to test water quality at the leachate ponds and mangrove forest on a monthly basis. **COD** is a measurement of the

oxygen required to oxidize soluble and particulate organic matter in water, while **PH** measures the degree of acid and/or basic water of a substance.



YAP STATE

The Water Quality Program under the Yap State EPA monitors leachate at the various sampling points of the landfill site and the existing dumpsite on a monthly basis. Chemical Oxygen Demand, Potential Hydrogen, Gas Temperature, and Color are monitored using Pack Test COD, pH Strip, and a Thermometer. Data acquired from the testing reveal the conditions of the existing dumpsite, and the discharge from the Leachate Pond at the Landfill Site.



POHNPEI STATE

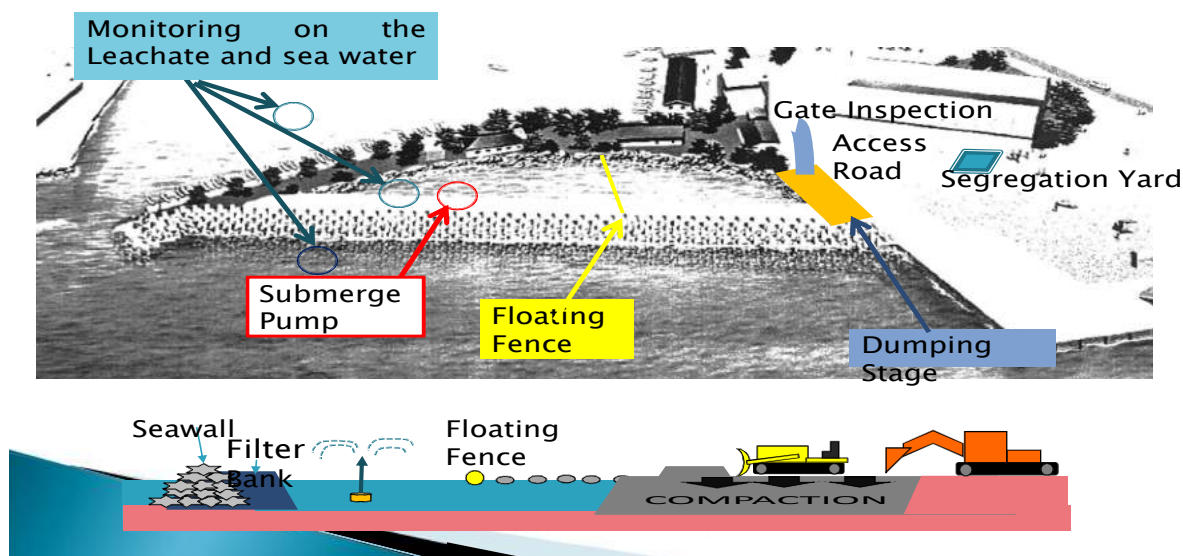
Since the rehabilitation of the Dekehtik dumpsite, improvements have been made to accommodate waste in its small scale cell. The improvements include the development of leachate testing points, leachate flow system; installation of a filtering and an aeration system. The development of a second cell is in progress.

CHALLENGES:

The challenge surrounding the dumpsite is limited space. The pile of waste seems to be surmounting each day in the current cell, leaving no room for incoming waste. Although the second cell has been cleared, the amount of incoming waste is accelerating at a rapid pace. Additionally, compactors used to press against the waste sometimes break down, hindering daily compaction of the mountain of waste.



The marina Dumpsite



CHUUK STATE

The Marina dumpsite is an interim dumpsite for Chuuk State. The existing dumpsite at Neauo will be closing in the near future which has prompted the current Administration to locate a suitable land for a new landfill with Fukuoka Method applications. Currently, the Marina dumpsite is designed to temporarily accommodate Chuuk's incoming waste.

In the meantime, securing a new location for the new landfill has been made. The proposed new landfill is located in Nepukos with an area of 7,000 square meters.

CHALLENGES:

The current dumpsite is expected to close down in 2017, and a new landfill location has been identified. However, EIA assistance on the new landfill site is still pending.

YSWMC Operation Manual

1. General provision

This manual was made in accordance with solid waste management regulations (Regulation number 2015-03) known as SWMR, (Solid Waste Management Regulations), and is only applied to the new landfill known as YSWMC (Yap State Solid Waste Management Center) that PW&T manages. In case there is no reference in this manual, refer to the SWMR.

2. Gate Control policy/Inspection

2-1. Schedule

The Landfill Business day is Monday thru Sunday. Business hours are from 7:00 am to 7:00 pm.

2-2. Inspection

YSWMC only accepts wastes in accordance with section 2.2 of the SWMR: (Disposal Requirements). In case there are any signs installed in YSWMC, the security must lead vehicles to the designated area. Signage must be installed in YSWMC indicating areas to separate specific wastes and general wastes.

2-3. Exceptions

YSWMC may accept the following other wastes for storage only. These wastes shall be brought to the recycling company (Island Paradise recycle center) first, only when the recycling company does not have any space to store the waste, they can be stored in YSWMC.

- | | |
|------------------------|-------------------|
| a. Electric Appliances | b. Cars and Bikes |
| b. Ice Box | d. Metals |

Weekly Check List								
Date: _____		Prepared by: _____				Signature: _____		
Action Items and checked by Supervisors	Conditions							Comment
	M o	T u	W e	T h	F r	S a	S u	
1. Cleaning & Hauling Vegetation around the Center should be neat and not overgrown. Any waste around the Center that is not in its designated place should be moved.								
2. Dike It should be free from any damage and in solid condition.								
3. Slope Formation It should be solid and secure.								
4. Rain Drainage It should not have any blockages or clogging. Drains should be free from debris and vegetation.								
5. Leachate Pond Check for damage to the lining. Check level of leachate in relation to the over flow level.								
6. Access Road Ensure no pot holes or debris. Check that it is sufficiently compacted and not muddy.								
7. Gas Venting Pipe Air should be releasing freely from venting pipe, and should not be hotter than 100F. Pipes should not be damaged or cracked. Materials for extension should be prepared and ready to be installed. Gas vent should be installed vertically and secure.								

Yap State's Operation Manual which was developed in accordance with the Solid Waste Management Regulations is applied to the new landfill.

COMPONENT 4: COLLECTION AND DISPOSAL





Compactors
donated in
2012



Waste Bins
installed

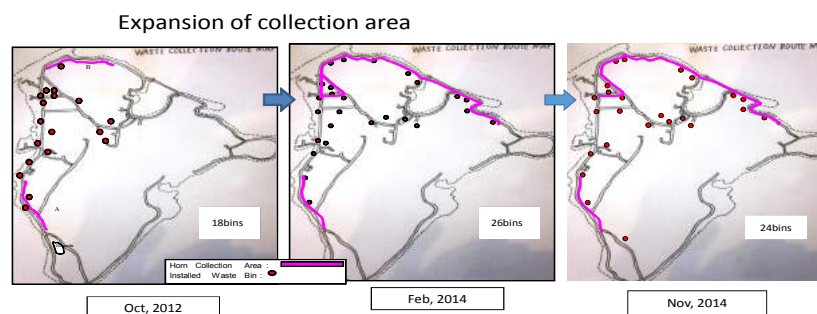


Time & Motion Study in
2013



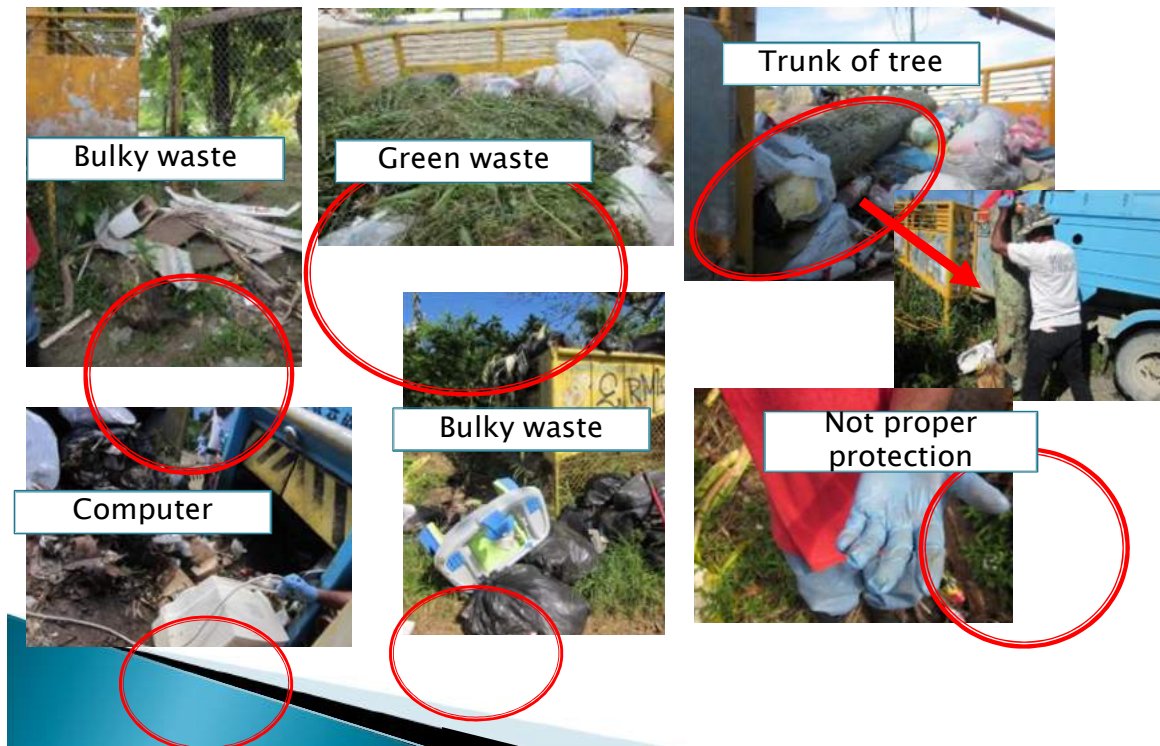
Disussion on collection
service in 2013

In 2012, the Japan Government donated two compactor trucks to Chuuk State, followed by a Maintenance training, and the establishment of the Horn Collection Method. The Horn Collection Method was established through the "Sia Nimeti Chuuk Project" which was developed and implemented through collaborative efforts of Chuuk State EPA and the Chuuk Women's Council (CWC). The objective of the project was to increase the amount of Weno households' access to a waste collection system. A total of 458 bags were collected during its first trial in 2012 over a period of seven months from June to December. Additionally, preliminary waste composition surveys were implemented by the waste team at Chuuk EPA which concluded that biodegradable waste remains to be the dominant type of waste found in most households.



Chuuk's Horn Collection System has expanded to most of the villages on Weno, the capital. In 2011, the collection services began with three villages. Five additional villages were added to the pick-up list in 2012, and in 2015 three more villages were added.

Challenges of the collection service



There are challenges of the Horn Collection as well. With the advent of modernization, there has been an increase in electrical and electronic waste, hence the issue of what to do with them and where to store them remain a challenge. Some of the items that have been disposed are not properly dismantled, and they remain hazardous to the public. Additionally, those who handle them do not wear the proper protection gears.

OTHER STATES

Each municipality in Pohnpei State manages a collection system and charges residents with pick-up fees. Some municipalities were granted compactor trucks from Japan, while other municipalities use the more traditional flat bed trucks to collect and dispose trash. There is one private company that provides collection service as well. This private company, PWMS, is also contracted by the Pohnpei State Government to manage the dumpsite.

In Yap State, a private company collects residential, business, and government trash for a fee, while in Kosrae, the four municipal governments collaborate with KIRMA to collect trash from residential, business, and government areas free of charge.

What happens when you litter in Chuuk State? A person will be fined for littering. According to Chuuk State's Littering law, individuals will be fined \$500.00. Yap, Pohnpei, and Kosrae also have littering laws.



Met ewe annukun piingaw?

—Ei annuk a pinei me apeti om kopwe pii fetan non neni ese nifinifin nukun chok ekkewe nenien kapich.

Tetten 1.

Pingaw. Mei atai annuk an emon aramas, ewneni ika ew kompeni epwe koturuno, oturano, aparasa ika nikiti p1, nimengaw, kapich ika ese nifinifin sakkun pi non ese nifinifin napangapan won ewe anenap, ewe anen chitosan, fonuwen emon ika neset ika non konik nukun chok ewe nenien koturuno pi ne kapich ika nimengaw minne a nom fan tumunuwen ewe Muun Chuuk ika ew kewe municipalities ika ew kinikinin.

Met epwe fis ngonuk ika ka atai ei annuk?

—Ika ka atai me puratiw ei annuk kopwe paking ren esap kukkun seni \$50.00 me nap seni \$500.00 chana.

Tetten 5.

1. Ion aramas, neni ika kompeni a atai Tetten 1 me non ei annuk epwe tipis, ren tipis kukkun, iwe nupwen a tipis epwe pakkin (\$50.00), iwe nge ika pwe a pwan atai ei annuk me murin, iwe epwe pakking esap nap seni nimepuku chana \$500.00; iwe nge ika pwe a pwan atai ei Annuk me murin, iwe epwe pakking esap nap seni nimepuku chana \$500.00.

You can read the full text of this law at FSM Supreme court webpage. See http://fsm.supremecourt.org/WebSite/chuuk/code/title22/T22_Ch03.htm#1301



RULES ON CHUUK'S WASTE BIN

1. RESIDENTS ARE ALLOWED TO THROW THEIR TRASH IN THE BINS
2. THE PRIVATE SECTORS ARE NOT ALLOWED TO THROW THEIR TRASH IN THE BINS
3. BULKY AND GREEN WASTES ARE NOT ALLOWED IN THE BIN

Yap State's Fire Permit System prohibits burning of inorganic waste especially tires. Additionally, its Regulations for Environmental Requirements for Transport Vessel prohibits disposal of inorganic waste at sea or at any outer island.


Yap State Environmental Protection Agency


Yap State Fire Permit System

Do not burn any non-biodegradable materials such as tires and plastic.

When you do burn, please ensure that you do so in a safe and responsible way.

Depending on the prevailing weather conditions, the Fire Permit Committee will make determinations and notify the public regarding whether it is a:

Burning inorganic material releases dioxins and other hazardous substances that are harmful to human health and the environment.

Clear over hanging vegetation, make a border around the burn area, and stay at the burn site to ensure safety until completely extinguished.

On the main island and Fais, starting any fire other than a cooking fire is only permitted during a safe burning period or during a fire permit period with a fire permit from the Fire Section or Fais Officer.



SAFE BURNING PERIOD during which time you may safely and responsibly burn without a permit;

FIRE PERMIT PERIOD during which you must obtain a free fire permit from the Fire Section (or Fais Officer) before undertaking any burning other than for cooking fires; or

UNSAFE BURNING PERIOD during which time no person is permitted to undertake any burning.

The Fire Permit System operates all year, and helps to minimize the risk of fires becoming uncontrolled and causing harm to people, homes, and the environment.

Please check the Fire Period before burning.

Wildfires in Yap result in the loss of crops, forests, top soil, timber, wildlife habitat, fruit bats, biodiversity, and mangroves. Please help the Fire Permit Committee to keep our islands safe from wildfires.



For further information, please contact the Yap State Environmental Protection Agency at Tel (691) 350-2113/2317 or Email at epayap@mail.fm.


Yap State Environmental Protection Agency


Regulations for Environmental Requirements for Transport Vessels

From 31 March 2015, it will be illegal to transport any of the following animals, dead or alive, in whole or part on passenger or government vessels operating between Yap's islands without a Government permit.

PROTECTED SPECIES BELOW & ANY OTHER PROTECTED BY YAP STATE LAW

IMPROVED WASTE MANAGEMENT

All inorganic and non-biodegradable trash must be kept onboard planes and boats travelling between Yap's islands, and returned to Yap Main Island for recycling through the Yap State Recycling Program or disposal at the Yap Public Landfill.



3Rs

REDUCING.
REUSING.
RECYCLING.



Compliance with these requirements is required by the Environmental Requirements for Transport Vessel Regulations. Offenders will be prosecuted and are liable for fines. For further information please contact the Yap State Environmental Protection Agency at Tel No (691) 350-2113 or Email at epayap@mail.fm.

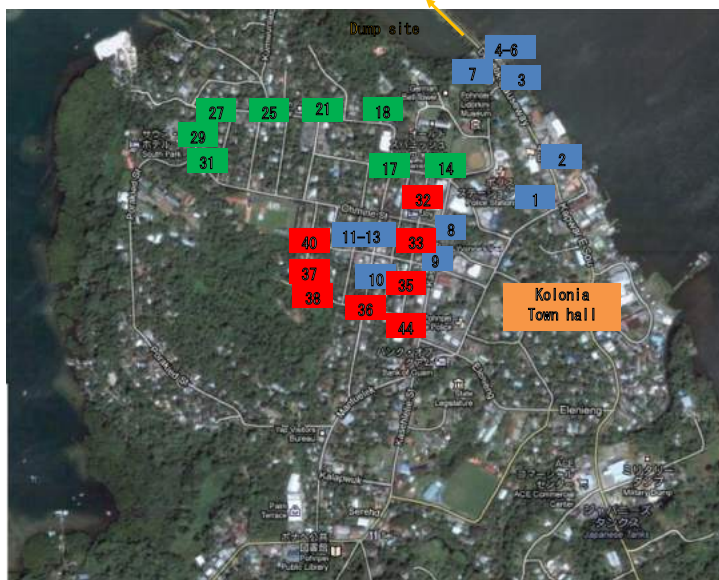
CHALLENGES:

Although laws and regulations are in place, enforcement remains to be weak.

What is Time and Motion Study? A Time and Motion study focuses on the time it takes for a collection truck to travel from one collection point to another. The sample below shows how many trips the collection truck made in one day over a week period.

Example of Time & motion study(2012)

1 - 13 1st round trip 14 - 31 2nd round trip
32 - 40 3rd round trip



9

CHALLENGES:

Sometimes, the garbage truck breaks down hence hindering the scheduled trash pick-ups times. Additionally, the parts for the garbage truck are not always readily available as they have to be imported from a foreign country.

COMPONENT 5- RECYCLING



Yap State's Recycling System has been thriving since 2009 when it was established by legislation. The system targets containers and attaches to it a handling and operating fee through the process of import, and recycling. There are four entities that oversee the operation of the system with the Yap State Environmental Protection Agency as its managing agency. There is flexibility in changes to the regulations in regards to categories and fee schedules. Containers are counted using pre-sized bins.

Yap State Recycling Program Regulations

Purpose and Scope. These regulations implement the Yap State Recycling Act (Y.S.L. 7-18) and establish guidelines, procedures, requirements and standards for the operation of the Recycling Program, including fiscal control and accountability over all monies collected pursuant to the Act and these regulations. These regulations shall be known and may be cited as the "Recycling Program Regulations." These regulations and any amendments hereto shall have the force and effect of law.

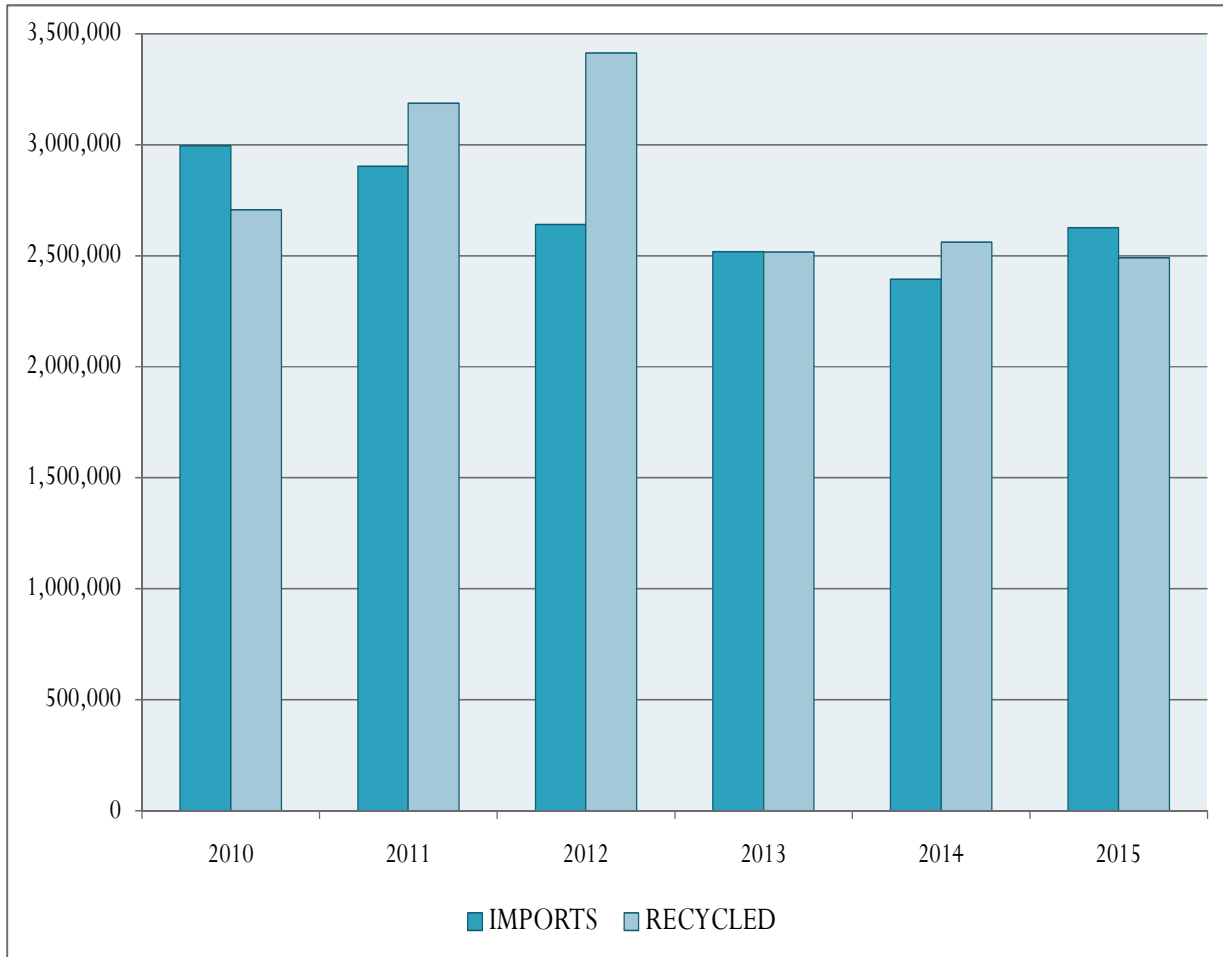
SCHEDULE A

RECYCLING MATERIAL	AMOUNT OF FEE
Any beverage container made of aluminum	\$0.06 per container
Any glass beverage container	\$0.06 per container
Any beverage container made from PET	\$0.06 per container
Any cooking oil container made from PET	\$0.06 per container

SCHEDULE B

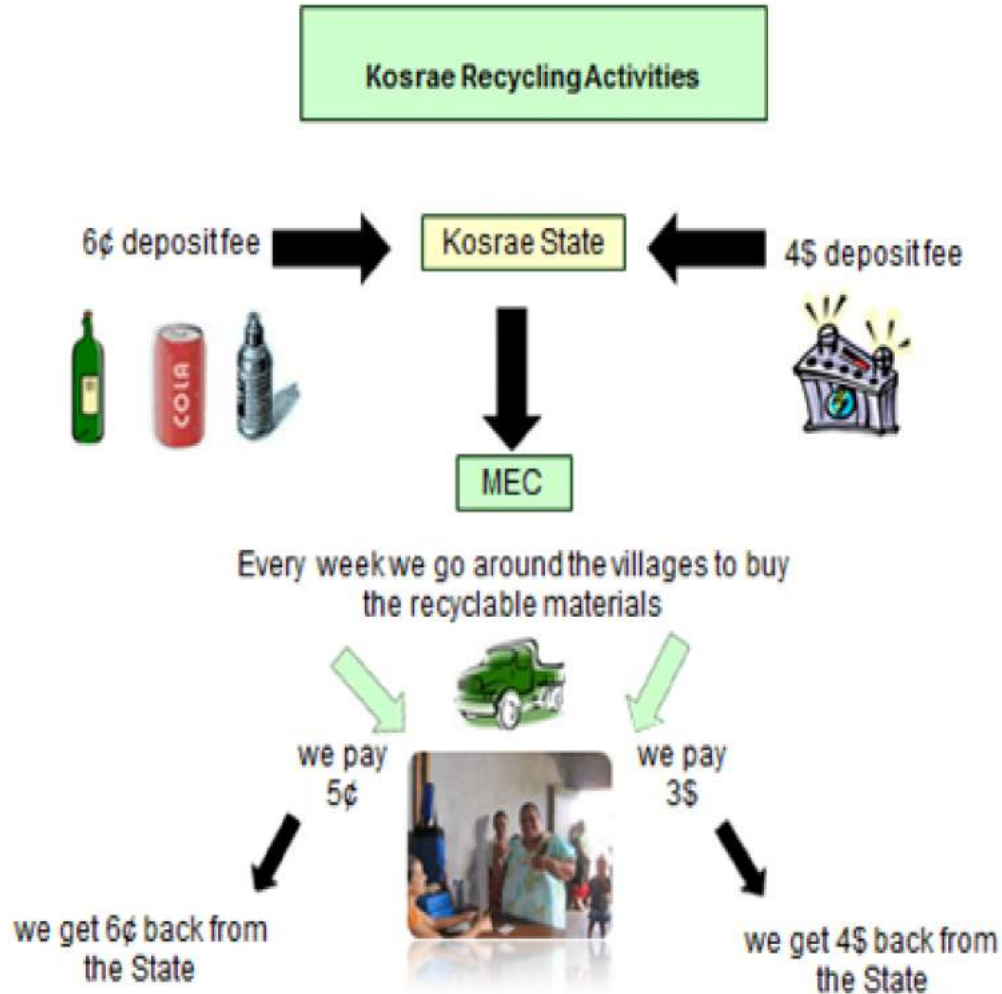
RECYCLING MATERIAL	RECYCLING REFUND	MINIMUM NO. OF CONTAINERS
Any beverage container made of aluminum	\$0.05 per container	5
Any glass beverage container	\$0.05 per container	5
Any beverage container made from PET	\$0.05 per container	5
Any cooking oil container made from PET	\$0.05 per container	5

FY10 to FY 15 Recycling Quantities Combined Total



27

In 2012, there were more recycled items, and in 2010, the number of imported recycled items reached 3,000,000. Since then, the quantities of recycled and imported items have stabilized.

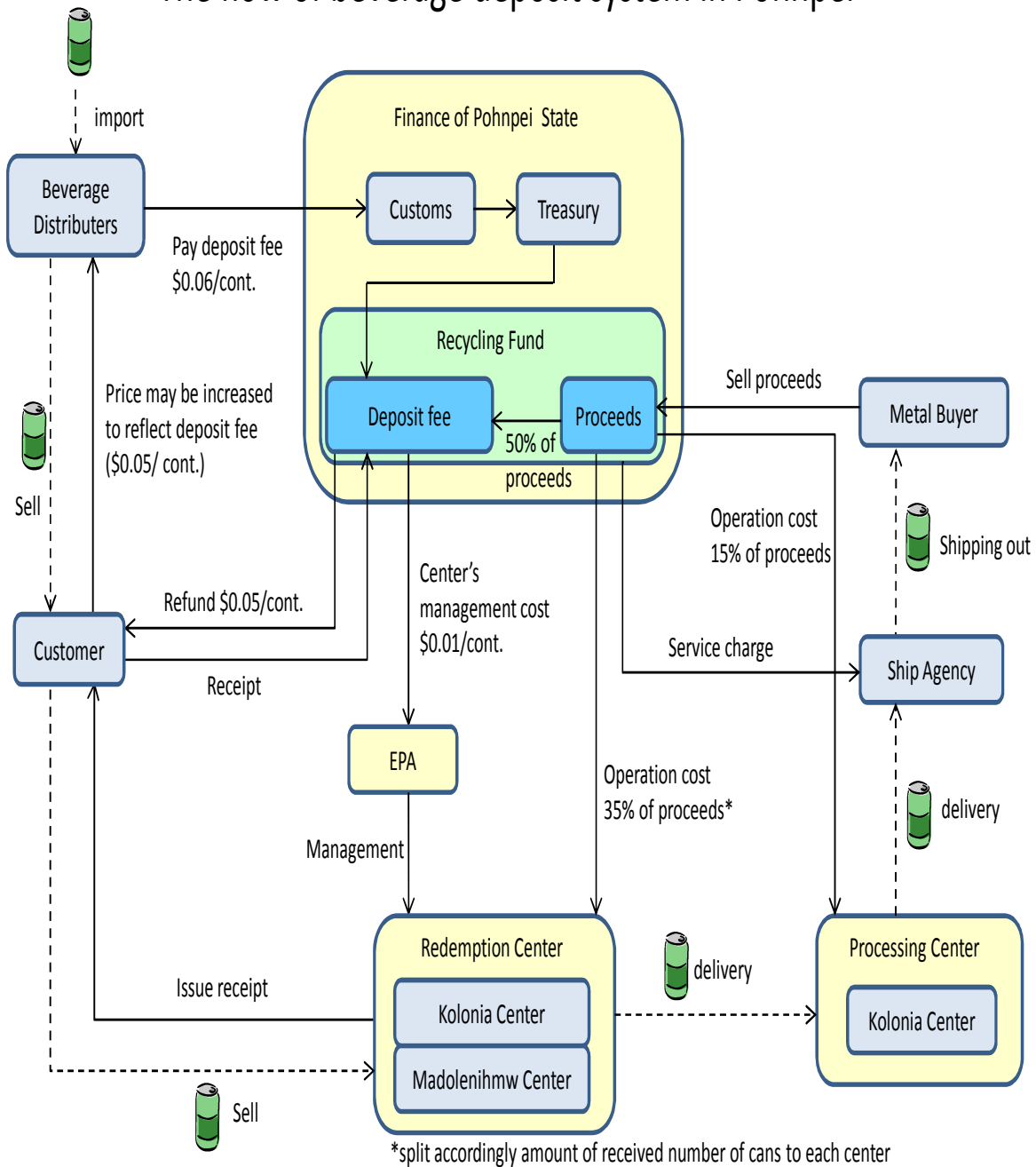


Kosrae's Recycling system has been in existence since 2009 when it began through the support of UNDP. There is a six cent deposit fee for every can, pet bottle and glass collected. There is also a four dollar deposit fee for every car battery collected. Every week, the public is invited to bring recyclable materials to the center points.

In addition to the recycling center program, there is an on-going recycling campaign in the elementary schools which includes teacher training and student learning regarding recycling activities.

Pohnpei's Recycling System was established by legislation in 2013. There is a 6 cent deposit on every can. The recycled items only include aluminum cans. An amendment to add more collectibles is currently under review at Legislature.

The flow of beverage deposit system in Pohnpei



August, 2013 Present

Acknowledgements and Appreciation to the following organization that has unrelentingly supported FSM's efforts in Solid Waste Management:

- ✓ Japan International Cooperative Agency (JICA): *Special Thanks to the former Resident Representative, Mr. Kaoru Iwasaki, and the former Formulation Project Advisor, Takahisa Watanabe*
- ✓ J-PRISM Project: *Special Thanks to J-PRISM experts: Ms. Lisa Muranaka and Mr. Akira Haseyama*
- ✓ WELCOME to the New JICA Resident Representative, Mr. Shinji Shibata and Formulated Project Advisor, Ms. Ayako Yoshida

KAMAGAR, KINISOU CHAPUR, KALAHNGAN, AND KULO

Acknowledgements to the following departments and offices that have unrelentingly combated Solid Waste Management issues in the FSM:

- ✓ Yap State Environmental Protection Agency (EPA)
- ✓ Yap State Department of Public Works and Transportation (DPWT)
- ✓ Chuuk State Environmental Protection Agency (EPA)
- ✓ Chuuk State Department of Public Works (PW)
- ✓ Pohnpei State Environmental Protection Agency (EPA)
- ✓ Pohnpei State Office of Transportation and Infrastructure (T&I)
- ✓ Kosre Island Resources Management Authority (KIRMA)
- ✓ Kosrae State Department of Transportation and Infrastructure (DT&I)