Pacific Island Countries (Region)

Data Collection Survey on promotion of recycling plastics and other materials in Pacific Island Countries

Final Report

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Japan International Cooperation Agency(JICA)

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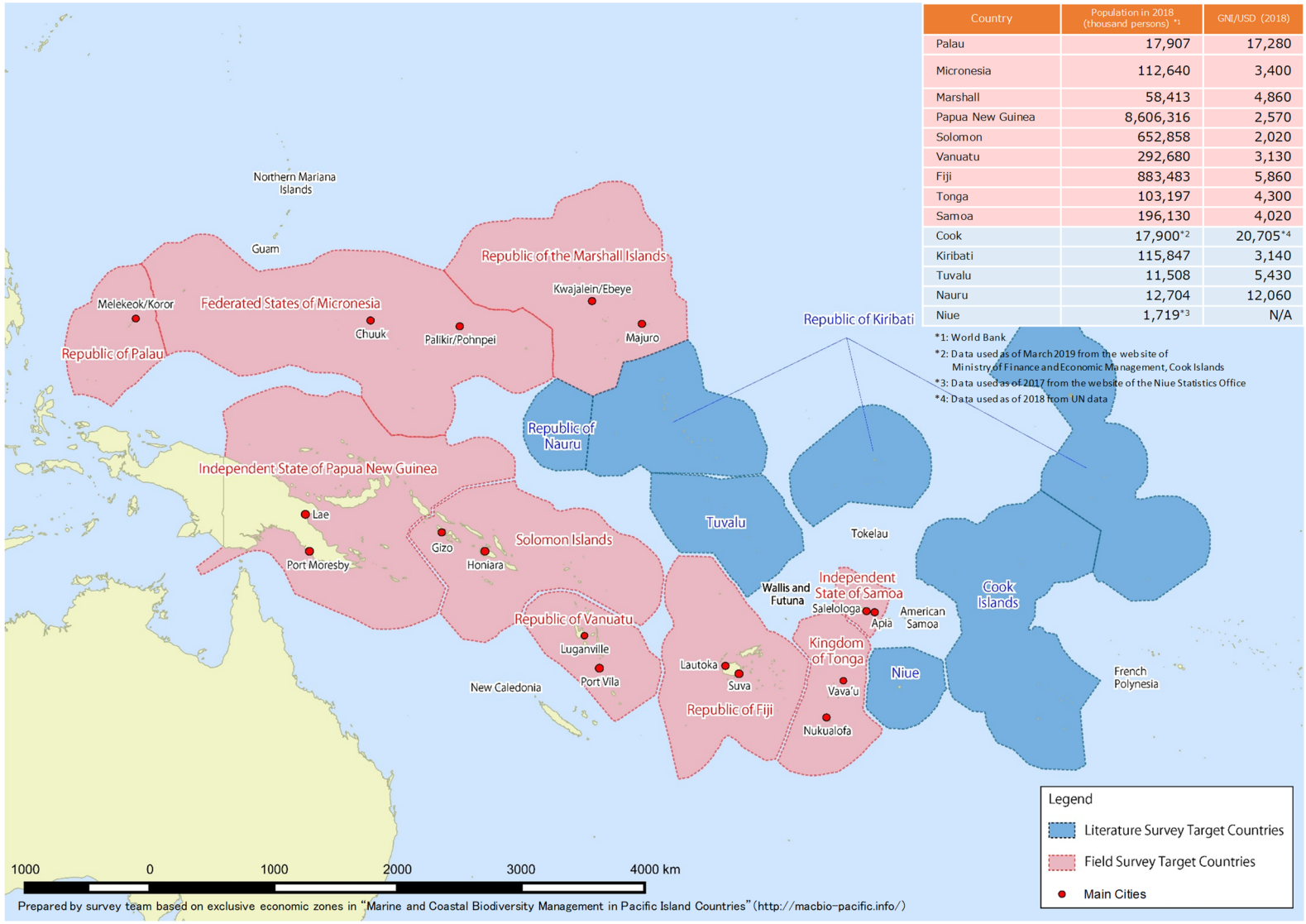
Target Countries



Prepared by survey team based on exclusive economic zones in "Marine and Coastal Biodiversity Management in Pacific Island Countries" (http://macbio-pacific.info/)

Country	Population in 2018 (thousand persons) *1	GNI/USD (2018)
Palau	17,907	17,280
Micronesia	112,640	3,400
Marshall	58,413	4,860
Papua New Guinea	8,606,316	2,570
Solomon	652,858	2,020
Vanuatu	292,680	3,130
Fiji	883,483	5,860
Tonga	103,197	4,300
Samoa	196,130	4,020
Cook	17,900*2	20,705*4
Kiribati	115,847	3,140
Tuvalu	11,508	5,430
Nauru	12,704	12,060
Niue	1,719*3	N/A

*1: World Bank
*2: Data used as of March 2019 from the web site of Ministry of Finance and Economic Management, Cook Islands
*3: Data used as of 2017 from the website of the Niue Statistics Office
*4: Data used as of 2018 from UN data

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List of Target Countries

Abbreviation	English
Palau	Republic of Palau
Micronesia	Federated States of Micronesia
Marshall	Republic of the Marshall Islands
Papua New Guinea	Independent State of Papua New Guinea
Solomon	Solomon Islands
Vanuatu	Republic of Vanuatu
Fiji	Republic of Fiji
Tonga	Kingdom of Tonga
Samoa	Independent State of Samoa
Cook	Cook Islands
Kiribati	Republic of Kiribati
Nauru	Republic of Nauru
Niue	Niue
Tuvalu	Tuvalu

List of Attachment

1 Set of Questionnaires
2 Detail Tables of Import and Export Statistical Data
3 Calculation Sheets of Material Flow

1 Background and Objective of the Survey

1.1 Background and Objective of the Survey

1.1.1 Background

In the Pacific island countries, the geographical conditions of remoteness, isolation and narrowness of their lands, as well as the social background of their traditional land ownership systems, make it difficult to manage waste appropriately. Furthermore, the rapid modernization of life style has led to the diversification and increase in the amount of waste, which is one of the common issues in the region.

In this context, JICA has been supporting improvement of solid waste management in the Pacific region, starting with the dispatch of individual experts to SPREP (Secretariat of the Pacific Regional Environment Programme) in 2000, through wide-area cooperation based in Samoa and bilateral technical cooperation projects in Palau, Vanuatu and Fiji. Since 2011, cooperation focused on regional cooperation has been promoted through “Japanese Technical Cooperation Project for Promotion of Regional Initiative on Solid Waste Management in Pacific Island Countries (J-PRISM)”, and Phase 2 (2017-2022) is currently underway.

J-PRISM Phase 2 has made some progress in promoting recycling in countries through the introduction of container deposit Legislation (CDL) and support for the establishment of recycling associations in each country. For example, in the Marshall, the CDL was launched in August 2018 with the support of J-PRISM Phase 2, and the amount of glass, cans and PET[1] bottles collected has increased significantly. Support for the introduction of CDL is also underway in Vanuatu, Micronesia (e.g. the state of Yap, Kosrae, and Pohnpei), and other countries, with the expectation of lateral deployment to other Pacific countries.

J-PRISM phase 2 has also supported the establishment of recycling associations in Samoa, Vanuatu, and Solomon Islands by private recycling companies in each country, and is working to develop a system to promote recycling in which governments and the private sector work together.

However, in the Pacific region, recycling-related industries are not fully developed, and the region is in a situation where imported goods are the source of waste, and it is difficult to complete the materials circulation in the country due to the restrictions of the market and economic scale. Therefore, in order to further promote recycling in the region in the future, it is necessary to establish a system that embodies the concept of "3R+Return", which is to promote proper recycling and treatment of recyclable materials by exporting, or in other words, "return", valuable and difficult-to-treat materials to other countries where they can be recycled, in addition to the results achieved in the above-mentioned countries.

In J-PRISM Phase 2, in addition to the establishment of recycling promotion systems in each country, it will plan to promote initiatives at the regional level to realize the "3R+Return", and plan to study feasible and concrete future scenarios through consultations with SPREP and governments in each country.

The first step of this survey is to (1) summarize information on the current status of material recycling in each country and (2) estimate material flows in the current and future, and to narrow down the target items (recyclable materials) that should be collected, stored, treated and exported as a priority in the future. The next step is to collect information that will

[1] Poly Ethylene Terephthalate

contribute to a scenario study on the promotion of recycling in a wide area during J-PRISM Phase 2, as well as to formulate future support plans and policies in the waste sector that will contribute to the marine plastic waste problem, etc., looking ahead to after the completion of J-PRISM Phase 2.

1.1.2 Survey objectives

The objectives are to summarize the current status of material recycling in each country through analysis of existing data and field interviews with relevant organizations, and to collect and analyze information towards promotion of regional recycling in the pacific region by developing current and future material flow and so on.

1.2 Survey Team

1.2.1 List of members of the survey team

Table 1-1 List of members of the survey team

Field of Expertise	Name	In Charge Sub region
Team Leader/Waste Management Policy・Recycle Survey 1	Shinnosuke Oda	-
Deputy Team Leader/Waste Management Policy/ Recycle Survey 4	Junji Anai	Polynesia
Trade Statistics・Retail Distribution Survey/Material Flow Analysis 1	Yoshinosuke Hamada	Melanesia
Waste Management Policy・Recycle Survey 2	Kozo Nagahira	Melanesia
Trade Statistics・Retail Distribution Survey/Material Flow Analysis 2	Misa Oishi	Micronesia
Waste Management Policy・Recycle Survey 3	Richard Leney	Micronesia
Trade Statistics・Retail Distribution Survey/Material Flow Analysis 3	Hiroshi Tsuruta	Polynesia
Marine Plastic Measures	Yume Mori	-

1.2.2 Management structure of the survey team

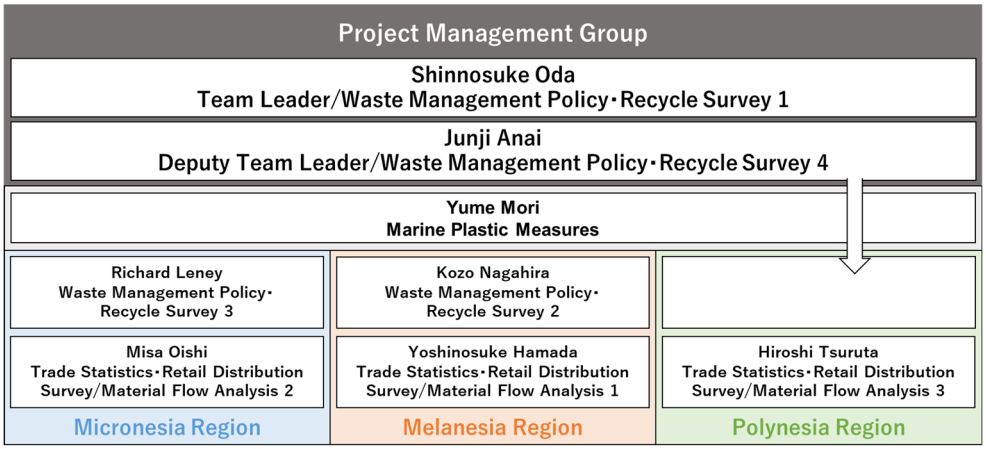


Figure 1-1 Management structure of the survey team

1.3 Schedule of the Survey

The survey was conducted as the schedule shown in the following chart. The survey was initially planned to conduct field work in 9 field survey target countries. However, duw to COVID-19, all field work except for field work in Fiji was switched to domestci work and remotly condutced.

1.3.1 Schedule

Item / Period	2020					2021								
	8	9	10	11	12	1	2	3	4	5	6	7	8	9
Domestic Work	□	▭	▭			▭			▭	▭	□	▭	▭	□
Field Work				▭			▭	■	■	■	□			
Submission of Reports	△	IR				△	PR							FR △

Figure 1-2 Schedule chart

Items \ Period	2020					2021								
	8	9	10	11	12	1	2	3	4	5	6	7	8	9
A Domestic Work														
A.1 Preparation of the Inception Report and consultation	□													
A.2 Collection and review of relevant documents		▭												
A.3 Determination of survey methodology and format		▭												
A.4 Survey on the current legal system for waste management (literature survey)			▭											
A.5 Survey on marine plastic litter control, including regulation of single-use plastics (literature survey)			▭											
A.6 Preparation of the Progress Report						▭								
A.7 Development of material flows												▭		
A.8 Challenges and Recommendations for the Promotion of Wide-Area Recycling in the Pacific region													▭	
A.9 Preparation of the Final Report and reporting														□
Basic information on Shipping Routes and Port Facilities and etc. (Field survey target countries except for Fiji)									▭	▭	□			
B. Field Work														
B.1 Survey on consumers' behavior in dealing with recyclable waste				▭			▭	■	■	■	□			
B.2 Survey on distribution and retail industries				▭			▭	■	■	■	□			
B.3 Survey on recycling activities by the private sector (private recycling companies)				▭			▭	■	■	■	□			
B.4 Survey on recycling activities by the public sector (central and local governments)				▭			▭	■	■	■	□			
B.5 Survey on the current legal system for waste management				▭			▭	■	■	■	□			
B.6 Survey on marine plastic litter control, including regulation of single-use plastics				▭			▭	■	■	■	□			
B.7 Basic information survey on import and export of recyclable materials				▭			▭	■	■	■	□			
B.8 Survey on import / export statistical data and census data				▭			▭	■	■	■	□			
B.9 Report on survey results to local stakeholders														□
Basic information on Shipping Routes and Port Facilities and etc. (Fiji)									■	■	□			

Regend: ■ Field Work ▭ Domestic Work

Figure 1-3 Work schedule

1.3.2 Flow chart

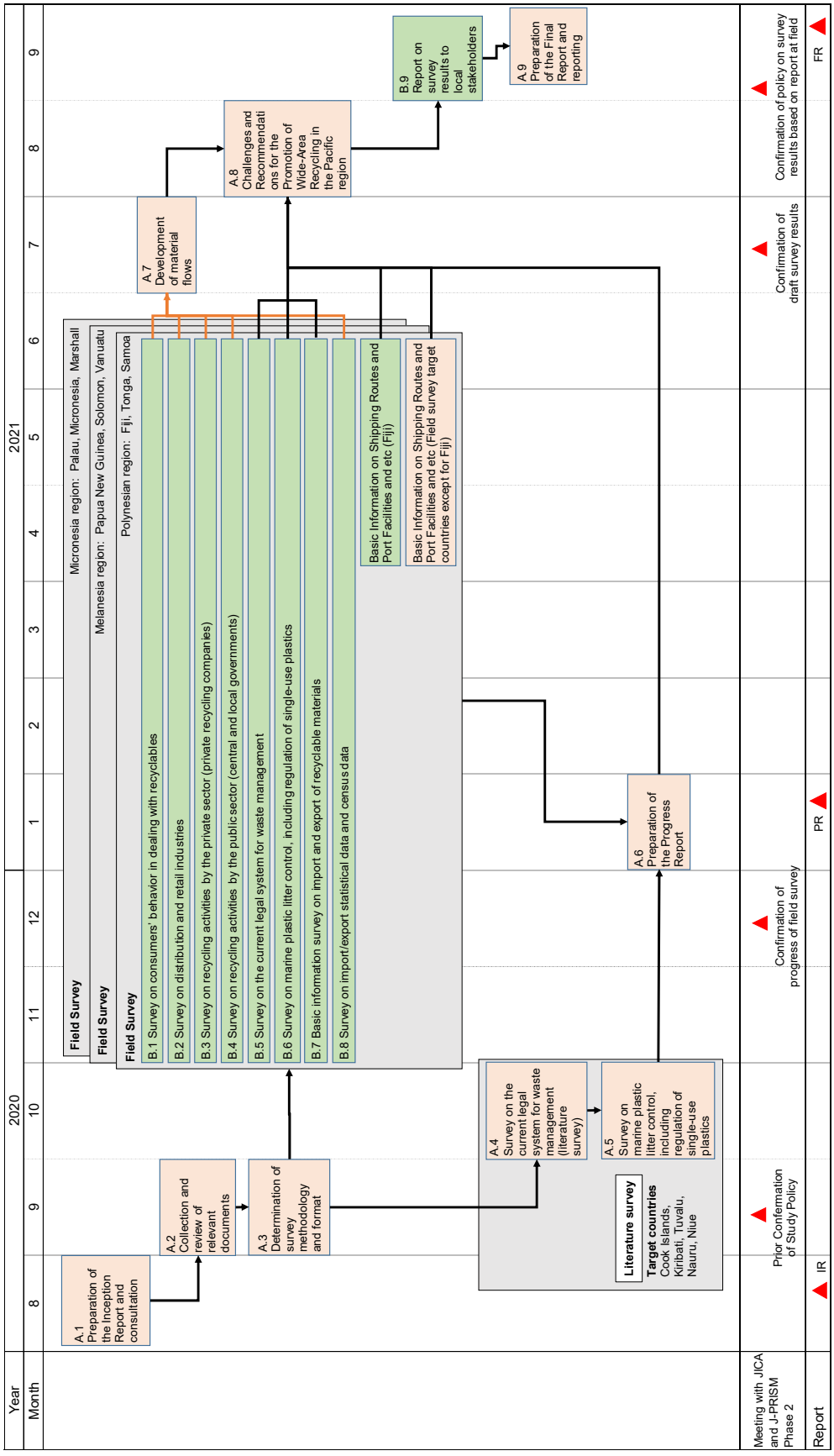


Figure 1-4 Flow chart

1.4 Target Countries

The 14 Pacific countries (Fiji, Papua New Guinea, Samoa, Tonga, Solomon, Vanuatu, Micronesia, Palau, Marshall, Cook, Kiribati, Tuvalu, Nauru, and Niue) are the target countries.

The nine countries (Fiji, Micronesia, Palau, Papua New Guinea, Marshall, Samoa, Solomon, Tonga, and Vanuatu) are the field survey target countries, and the other five countries (Cook, Kiribati, Tuvalu, Nauru, and Niue) are the target countries for the literature survey only.

Table 1-2 Overall information on target countries

Country	Area (km^2)	Population as of 2019 (thousands)*	Capital	GDP as of 2019 *
Palau	488	18	Melekeok	268 million USD
Micronesia	700	114	Palikir	402 million USD**
Marshall	180	59	Majuro	221 million USD**
Papua New Guinea	460,000	8,780	Port Moresby	24,800 million USD
Solomon	28,900	670	Honiara	1,590 million USD
Vanuatu	12,190	300	Port Vila	934 million USD
Fiji	18,270	890	Suva	5,496 million USD
Tonga	720	104	Nuku'alofa	510 million USD
Samoa	2,830	200	Apia	850 million USD
Cook	237	20	Avarua	575 million NZD
Kiribati	730	118	Tarawa	190 million USD
Nauru	21	13	Yaren	120 million USD
Niue	259	2	Alofi	47 million NZD
Tuvalu	26	116	Funafuti	50 million USD

*Approximate figures are shown as rounded from original data (Source: Web site of Ministry of Foreign Affairs of Japan)
**GDP as of 2018 is applied for Micronesia and Marshall

1.5 Main Relevant Organizations

- Fiji : Department of Environment
- Papua New Guinea : Conservation and Environment Protection Agency
- Samoa : Division of Environment and Conservation, Ministry of Natural Resources and Environment
- Tonga : Waste Authority Limited, Ministry of Meteorology, Information, Disaster Management, Environment, Climate Change and Communications
- Solomon : Ministry of Environment, Climate Change, Disaster Management and Meteorology
- Vanuatu : Department of Environmental Protection and Conservation
- Micronesia : Office of Environment & Emergency Management
- Palau : Bureau of Public Works, Ministry of Public Infrastructure, Industries and Commerce
- Marshall : Ministry of Public Works

1.6 Scope

The following items are assumed to be the scope of this survey. Comprehensive information on the following items, for which recycling is expected to be promoted, mainly plastics such as PET bottles will be collected.

- Disposable (Single use) plastic
- PET bottle
- Aluminum can
- Glass
- Paper and cardboard
- Scrap metal (ferrous and non-ferrous scraps)
- End of life vehicle (automobile, used lead acid battery, Used tyre)
- Waste Home appliance (white goods, etc.)
- Waste lubricant oil

2 Survey on the Current Status of Material Recycling in the Pacific Island Countries

2.1 Survey on Consumers' Behavior in Dealing with Recyclables

2.1.1 Outline of the survey

The survey on consumers' behavior in dealing with recyclables was initially targeted the nine field survey target countries. However, travelling to those nine countries had been restricted since April, 2020 due to global pandemic of COVID-19. Since this survey was designed to be implemented by local contractor, it was judged that it would be difficult to remotely procure, contract and supervise local contractor. Consequently, the survey was implemented only in Fiji which the survey team enabled to travel.

a. Objective of the survey

The objective of the survey is to reveal disposal methods of recyclables by identifying the consumer's behavior, disposal methods of recyclables (e.g. disposal, sell or handover), and the reasons.

b. Survey method

b.1 Target area

The city of Suva and the second largest city, Lautoka, were selected according to the survey specifications that the survey should be conducted in a total of two cities, one from the capital and the other from major municipalities.

Table 2-1 Outline of the target area of the survey on consumer's behavior in dealing with recyclables

Item	Suva City	Lautoka City
Population	76,823	44,840
Land Area	26.24 km^2	16.07 km^2
City Summary	Suva is the largest metropolitan city in Fiji and the centre of politics and economy. The city is located on the southeast coast of the island of Viti Levu. In 1877, the city was decided to be the capital. Combined with the town of Lami, Nasinu, and Nausori, the city holds more than one third of the national population. Most of the financial, political and non-political organizations are based in Suva. The Kings Wharf in the Port Suva plays a pivotal role in international shipping. The city has also large industrial zones holding warehouses and factories.	Lautoka is the second largest city in Fiji, where the municipal administration system was commenced in 1977. The city is located on the west coast of the island of Viti Levu, and holds the second largest international airport, following to Suva. Being the centre of the sugar cane growing areas, Lautoka is known as the Sugar City. Apart from sugar production, the city has various industries such as timber milling, blending, steelworks, paints, fishing, hatchery, etc.

*Source: 2017 Census

b.2 Target of survey

Target: Households discharging the recyclables

b.3 Sampling

The number of samples were 150 each in the Suva area and the Lautoka area (300 in total). The survey was conducted by interviewing the target households directly or by telephone.

The survey was initiated in Lautoka on 9th April, 2021 by conducting face to face interviews with target households. However, the interview in Suva was suspended in the midst of the survey due to the lockdown caused by the Covid-19 pandemic. As an alternative, telephone interviews were conducted for the remaining households. The survey ended on 29th May, 2021. The following table shows the outline of the survey.

Table 2-2 Outline of the survey on consumer's behavior in dealing with recyclables

Area	Zone	Type of Survey	Date of Survey	No. of samples	Total No. of samples
Suva	Kinoya & Tacirua	Face to Face	19/04/2021	30	150
	Tamavua & Cunningham	Face to Face	19/04/2021	27	
	Samabula & Nabua	Face to Face	19/04/2021	3	
	Raiwaqa & Vatuwaqa & Nasese & Nasinu to Suva City	Phone Call & Video Call (Due to COVID-19 restrictions)	11/05/2021 to 29/05/2021	90	
Lautoka	Field 40 & Balawa	Face to Face	09/04/2021 & 12/04/2021	30	150
	Banaras & Rifle Range	Face to Face	12/04/2021 & 13/04/2021	30	
	Kashmir & Tavakubu	Face to Face	13/04/2021	30	
	Waiyavi & Tomuka	Face to Face	13/04/2021 & 16/04/2021	30	
	Simla	Face to Face	16/04/2021	30	

2.1.2 Result of the survey

a. Generation and disposal of recyclables

The following table summarizes the items generated by the households per week based on the interview with 300 households. It was revealed that recyclables generated the most is single use plastics at 91 %, followed by PET bottles and paper at 73% respectively.

Table 2-3 Proportion of recyclables generated per week for 300 households

Items	Number of Households	
1. Single use plastic	272	(91%)
2. PET bottle	220	(73%)
3. Aluminum can	185	(62%)
4. Tin	112	(37%)
5. Glass bottle	151	(50%)
6. Paper	219	(73%)
7. Cardboard	146	(49%)
8. Others	160	(53%)

Regarding the method of discharging recyclables, multiple answers were obtained to the following options as below.

a. Discharge it together with general waste (without sorting) when municipal waste is being collected.
b. Separate and discharge it when municipal waste is being collected.
c. Sell or give it to the collectors.
d. Take it to a recycling station / center and sell it.
e. Burn it in the yard
f. Others (Kitchen waste, Diapers etc.)

For all items, "a. Discharge it together with general waste (without sorting) when municipal waste is being collected." was the most common. For glass bottles, 46% answered "c. Sell or give it to the collectors."

Table 2-4 Disposal methods of recyclables per week (multiple answers)

Items	Quantity	Unit	Respondents	a	b	c	d	e	f
1. Single use plastic	1,629	GB/No.*1	272	97%	0%	0%	0%	2%	3%
2. PET bottle									
2.1 Less than 500ml	163	No.	39	87%	0%	1%	1%	1%	11%
2.2 Less than 2 liters	950	No.	172	83%	0%	1%	2%	2%	13%
2.3 Over 2 liters	403	No.	87	95%	0%	0%	2%	1%	3%
3. Aluminum can	915	No.	185	95%	0%	0%	2%	1%	3%
4. Tin	700	No.	112	96%	0%	0%	0%	0%	4%
5. Glass bottle	1,081	No.	151	51%	0%	46%	1%	1%	4%
6. Paper	2,901	Pages	219	88%	0%	0%	1%	9%	3%
7. Cardboard	566	No.	146	79%	0%	1%	2%	13%	8%
8. Others	244	GB/No.	160	71%	1%	0%	1%	2%	27%

*1: means Number of Garbage Bags

Regarding the reasons for selection of the method of discharging recyclables, multiple answers were obtained to the following options as below.

1. Because it was too much trouble to sort the waste
2. Because I followed the waste sorting guide given by the municipal council
3. Because I thought it would be recycled properly
4. Because I thought it would help the environment and resources
5. Because someone came to my house to pick up my recyclable waste or there was a place nearby to drop it off
6. Because I can exchange it for money
7. Because there is no government collection service
8. Because I don't want to leave my waste at home
9. Because I did not know where to put it
10. Others

According to the results in the previous section, the reasons for choosing each discharge method were summarized in the table below focusing on the discharge methods of "a. Discharge it together with general waste (without sorting) when municipal waste is being collected" and "c. Sell or give it to the collectors".

The main reasons for selecting "a. Discharge it together with general waste (without sorting) when municipal waste is being collected" as the discharge method were "2. Because I followed the waste sorting guide given by the municipal council", "8. Because I don't want to leave my waste at home "," 5. Because someone came to my house to pick up my recyclable waste or there was a place nearby to drop it off" and "1. Because it was too much trouble to sort the waste".

Table 2-5 Reasons for choosing the disposal method a (multiple answers)

Items	Number of Respondents	Reasons (%)									
		1	2	3	4	5	6	7	8	9	10
1. Single use plastic	255	9	56	1	0	25	0	0	31	0	1
2. PET bottle											
2.1 Less than 500ml	40	30	38	3	0	13	0	0	48	0	3
2.2 Less than 2 liters	139	11	56	1	0	24	0	0	32	0	0
2.3 Over 2 liters	72	14	42	4	0	31	0	1	38	1	3
3. Aluminum can	169	9	53	1	0	26	0	1	33	0	1
4. Tin	110	10	45	1	0	42	0	0	19	0	0
5. Glass bottle	83	11	78	1	0	4	2	0	34	1	1
6. Paper	188	9	57	1	0	28	0	1	30	1	1
7. Cardboard	116	7	61	0	0	31	0	0	17	0	2
8. Others	111	2	79	2	0	13	0	1	33	1	4

On the other hand, 75% of the respondents who chose "c. Sell or give it to the collectors." cited "6. Because they can be exchanged for money" as the reason for selecting the glass bottle discharge method.

Table 2-6 Reason for selecting disposal method c (multiple answers)

Items	Respondents	Reason for choosing the discharge method (%)									
		1	2	3	4	5	6	7	8	9	10
1. Single use plastic	0	-	-	-	-	-	-	-	-	-	-
2. PET bottle											
2.1 Less than 500ml	1	0	0	0	0	100	0	0	0	0	0
2.2 Less than 2 liters	2	0	0	0	0	50	50	0	0	0	0
2.3 Over 2 liters	1	0	0	0	0	0	0	0	0	0	100
3. Aluminum can	0	-	-	-	-	-	-	-	-	-	-
4. Tin	0	-	-	-	-	-	-	-	-	-	-
5. Glass bottle	61	3	0	5	0	5	75	0	15	0	0
6. Paper	2	-	-	-	-	-	-	-	-	-	-
7. Cardboard	1	0	0	0	0	0	100	0	0	0	0
8. Others	0	-	-	-	-	-	-	-	-	-	-

b. Generation of waste home appliance

b.1 Ownership of home appliance

Looking at the ownership rate, which is the ratio of the total number of home appliance owned to the number of surveyed households (300 households), TVs and refrigerators were about 100%, washing machines were about 90%, and microwave ovens were 54%. Of these home appliances, 84%-90% of items are new at the time of purchase; whereas 10-15% of items are purchased as used products. Regarding the smart phone, the average units owned by the households is 9 units, of which 75% is purchased as used product.

Table 2-7 Breakdown of home appliance owned by households

Items	Total number of units owned (Ownership rate*)	Bland new (At the time of purchase)	Used (At the time of purchase)
(1) Television set	292 (97%)	85%	15%
(2) Refrigerator	311 (104%)	88%	12%
(3) Washing machine	265 (88%)	92%	8%
(4) Microwave oven	162 (54%)	86%	14%
(5) Air conditioner	62 (21%)	84%	16%
(6) Computer			
6.1 Desktop	37 (12%)	73%	27%
6.2 Laptop	239 (80%)	89%	11%
(7) Cell phone			
7.1 Smartphone	2713 (904%)	25%	75%
7.2 Flip phone	19 (6%)	89%	11%
(8) Others (Kettle, Rice Cooker, Toaster etc.)	204 (68%)	99%	1%

*The ownership rate shows the ratio of the total number of owned vehicles to the number of surveyed households (300) as a percentage.

b.2 Years of use of home appliance

The survey results on the years of use of home appliance is summarized as shown in the table below by calculating the average years of all responses for each product. Although the average years of use for each item cannot be unconditionally compared, the average years of use of smartphones, which were mostly second-hand goods at the time of purchase, were relatively short compared to other items.

Table 2-8 Years of use of home appliance

Item	Years
1. Television set	5.6
2. Refrigerator	5.9
3. Washing machine	5.5
4. Microwave oven	5.6
5. Air conditioner	5.9
6. Personal computer	
6-1. Desktop	5.0
6-2. Laptop	4.6
7. Cell phone	
7-1. Smartphone	3.7
7-2. Flip phone	5.2

b.3 Disposal methods of waste home appliance

Regarding the reasons for selection of the disposal methods of home appliance, multiple answers were obtained to the following options as below.

a. Discard together with the other wastes for municipal waste collection
b. Give / Sell to the collectors or other peoples (if sell, please indicate the selling price)
c. Pay to the collector for disposal (please indicate the disposal price)
d. Bring to the recycling station / centre etc.
e. Keep at home
f. Dumping it in open spaces
g. Others

Regarding the disposal method of waste home appliance, the number of respondents to the question and the disposal methods are shown below. More than 50% of the respondents for about white goods such as TVs, refrigerators and washing machines and microwave ovens, and about half of the respondents for about desktop PCs and flip phones answered "a. Discard together with the other wastes for municipal waste collection" as a disposal method. Regarding air conditioners and flip phones, 40% of respondents answered that they would "f. Dumping it in open spaces". Compared to relatively small home appliances such as laptop computers and mobile phones, the ratio of answer of "e. Keep at home" for refrigerators and washing machines seems to be low. Also, around 10% of the respondents for all items answered, "b. Give / Sell to the collectors or other peoples", while, the answers of "c. Pay to the collector for disposal" were few.

Table 2-9 Disposal methods of waste home Appliance (multiple answers)

Type of appliance	Total No of Answers	Disposal Method						
		a	b	c	d	e	f	g
1. Television set	269	51%	13%	1%	1%	6%	14%	21%
2. Refrigerator	288	52%	13%	1%	1%	2%	14%	20%
3. Washing machine	266	53%	10%	1%	1%	2%	16%	22%
4. Microwave oven	158	51%	9%	1%	1%	1%	16%	23%
5. Air conditioner	48	38%	10%	0%	2%	2%	44%	25%
6. Personal computer								
6-1. Desktop	36	47%	25%	3%	0%	0%	8%	17%
6-2. Laptop	166	42%	16%	1%	1%	11%	10%	22%
7. Cell phone								
7-1. Smartphone	283	49%	13%	1%	1%	10%	10%	18%
7-2. Flip phone	15	27%	13%	0%	0%	13%	40%	13%

With regard to the households selecting “b. Give / Sell to the collectors or other peoples” in the table mentioned above, the waste home appliance are sold at following price on average.

Table 2-10 Selling price of waste home appliance

Type of appliance	No. of Answers	Average (FJD/unit)
1. Television set	15	208
2. Refrigerator	15	197
3. Washing machine	12	221
4. Microwave oven	9	206
5. Air conditioner	4	325
6. Personal computer		
6-1. Desktop	2	100

Type of appliance	No. of Answers	Average (FJD/unit)
6-2. Laptop	12	175
7. Cell phone		
7-1. Smartphone	15	173
7-2. Flip phone	0	-

b.4 Reasons for selecting the disposal method for waste home appliance

Regarding the reasons for the disposal method of waste home appliances, "a. Discard together with the other wastes for municipal waste collection" and "f. Dumping it in open spaces" were the main disposal methods. The number of people and the reasons of choosing those main disposal methods are shown below.

1. Because it was too much trouble to sort the waste
2. Because I followed the waste sorting guide given by the municipal council
3. Because I thought it would be recycled properly
4. Because I thought it would help the environment and resources
5. Because someone came to my house to pick up my recyclable waste or there was a place nearby to drop it off
6. Because I can exchange it for money
7. Because there is no government collection service
8. Because I don't want to leave my waste at home
9. Because I did not know where to put it
10. Others

First, the table below summarizes the reasons for choosing "a. Discard together with the other wastes for municipal waste collection" as the disposal method for waste home appliances. Regarding TVs, refrigerators, washing machines, microwave ovens, etc., nearly half of the respondents answered, "a. Discard together with the other wastes for municipal waste collection", however, it was found that about 70% of the respondents said that they followed the waste sorting guide given by the municipal council as its reason. Regarding large appliances such as TVs, refrigerators, washing machines, and air conditioners, and smartphones, more than 30% of the respondents cited the reason that they do not want to leave waste at home.

Table 2-11 Reasons for disposing of waste home appliance together with general waste when municipal waste is collected (multiple answers)

Items	Number of Respondents	Reason for selecting the disposal method (%)									
		1	2	3	4	5	6	7	8	9	10
1. Television set	141	6	73	1	1	12	2	0	33	1	3
2. Refrigerator	155	5	74	1	1	12	2	0	32	1	4
3. Washing machine	144	5	76	1	1	11	1	0	33	1	2
4. Microwave oven	80	5	66	1	0	18	3	0	31	0	3
5. Air conditioner	20	0	65	0	0	25	5	0	30	5	0
6. Personal computer											
6.1. Desktop	18	6	83	0	0	6	0	0	22	0	6
6.2. Laptop	73	4	74	1	0	12	3	0	23	1	4
7. Cell phone											
7.1. Smartphone	143	6	75	1	0	12	1	0	35	1	3
7.2 Flip phone	4	0	25	25	0	50	0	0	25	0	0

Next, the reasons for choosing "f. Dumping it in open spaces" as the disposal method for waste home appliances are summarized in the table below. Regarding air conditioners and flip phones, 40% of the respondents answered "f. Dumping it in open spaces". The percentage of respondents who answered that they did not want to leave the these waste at home as a reason for dumping such waste including other items in open spaces was the highest compared to other

reasons. In addition, about 20 to 30% of the respondents answered that it was troublesome to separate garbage.

Table 2-12 Reasons for dumping waste home appliance in open spaces

Items	Number of Respondents	Reason for selecting the disposal method (%)									
		1	2	3	4	5	6	7	8	9	10
1. Television set	36	25	6	0	0	0	0	3	83	6	0
2. Refrigerator	40	28	5	0	0	0	0	3	85	5	0
3. Washing machine	42	33	5	0	0	0	0	2	88	2	0
	42	33	5	0	0	0	0	2	88	2	0
4. Microwave oven	25	24	8	0	0	0	0	0	88	4	0
5. Air conditioner	11	27	9	0	0	0	0	0	82	9	0
6. Personal computer											
6.1. Desktop	3	0	0	0	0	0	0	0	100	0	0
6.2. Laptop	16	25	0	0	0	0	0	13	81	0	0
7. Cell phone											
7.1. Smartphone	29	31	0	0	0	0	0	3	86	0	3
7.2 Flip phone	4	25	0	0	0	0	0	0	100	0	0

Both respondents who answered "a. Discard together with the other wastes for municipal waste collection" and "f. Dumping it in open spaces" indicated not to want leave the waste at home as a reason. But differences in perception were also confirmed, such as following the waste separation guide of the local government and thinking that waste separation is troublesome.

c. End of life vehicle

c.1 Ownership of vehicles

The survey revealed that 52% of the households own vehicles.

Table 2-13 Status of the households that own vehicles

Question	Households	
Yes, My family has vehicle(s)	155	(52%)
No, my family does not	145	(48%)
Total	300	(100%)

In total, total 209 units of vehicles are owned by 155 households. The survey revealed that 66% of automobiles are purchased as used products. The percentage is much higher in truck since 71% of item is purchased as used products. On the contrary, all of the 4 motorcycles owned by the households are purchased as brand new products.

Table 2-14 Breakdown of vehicles owned by households

Type of vehicle	Total No. of Units	New as of purchased	Used as of purchased
1. Passenger car	198	34%	66%
2. Truck	7	29%	71%
3. Motorcycle	4	100%	0%
4. Others	0	0%	0%

Regarding the years of using vehicles on average, it is found that new cars are expected to be used for 7.2 years, while the duration of period is shortened to 5.8 years for used cars. Similarly, the duration of period is expected for 9 years in new trucks, whereas it remains 3.7 years in used trucks. The motorcycles owned by 2 households are all new products, of which 3 units are owned by 1 household, while 1 unit is owned by the other household. The duration of period for the motorcycle is expected for 3 years.

Table 2-15 Years of using vehicles

Type of vehicle	New or Used as of purchased	Years (average)
1. Passenger car	New	7.2
	Used	5.8
2. Truck	New	9.0
	Used	3.7
3. Motorcycle	New	3.0
	Used	-
Average years of use		6.1

c.2 Units and reasons for leaving end of life vehicle in household premises

Multiple answers were obtained to the following options regarding the number of end of life vehicle stored on the premises and the reasons for them.

1. Because the procedure and preparation for disposal is troublesome
2. Because it is too much trouble to take it to the place of delivery
3. Because I think it is expensive to dispose of it
4. Because there is no opportunity to dispose of it
5. Because I don't know if it will be recycled properly
6. Because I want to keep it
7. Because I don't know how to dispose of it
8. Because I keep it as a spare part and do not intend to dispose of it
9. Others

The survey revealed that 14 households keep end of life vehicle in their premises, namely 17 passenger cars and 1 motorcycle. Neither trucks nor other vehicles are kept in the premises.

The most common reason for storing on the premises is "8. Because I keep it as a spare part and do not intend to dispose of it" except for "9. Others", which means that the respondents are keeping a spare for themselves to use. In addition, there was also an answer that the spare parts were to be sold to acquaintances.

Table 2-16 Units and reasons for leaving end of life vehicle in household premises

Type of vehicle	Number of unit	No. of respondents	Reasons for leaving end of life vehicle in your premises								
			1	2	3	4	5	6	7	8	9
Passenger car	17	13	0%	8%	0%	0%	0%	0%	8%	38%	54%
Truck	0	0	-	-	-	-	-	-	-	-	-
Motorcycle	1	1	0%	0%	0%	0%	0%	100%	0%	0%	0%
Others	0	0	-	-	-	-	-	-	-	-	-

c.3 Maintenance of automobiles owned by the households

The survey also asked about the replacement regarding tires, batteries, and lubricants. The questions asked for tires and batteries is about frequency of replacement, while the question asked for lubricants is about annual consumption amount by liter.

The result shows that almost 50% of the respondents replace tires every year, and subsequently 30% of the respondents have replacement every 2 years. As for batteries, 39% of the respondents replace the batteries every 2 years, followed by the answer “every year” at 28%, and “every 3 years” at 17%.

Table 2-17 Frequency of replacement of tires and batteries

Items	Number of respondents	Frequency of replacement (once every n years)				
		1	2	3	4	5
1. Tires	150	54%	30%	9%	5%	3%
2. Car battery	150	28%	39%	17%	7%	11%

As the result of asking 148 households, the annual consumption amount of lubricants is 14.5 liters per unit on average.

Table 2-18 Annual consumption amount of lubricants

Items	Number of respondents	Total lubricant replaced	Amount of waste lubricant generated per unit
3. Lubricant	148	2,143 liters	14.5 liters/unit

Regarding the disposal method of used tires, used lead acid batteries, and waste lubricant oil generated by maintenance, multiple answers were obtained to the following options.

a. The dealer's workshop takes it back free of charge.
b. Sell it to a recycler (please write the sale price)
c. Have it taken to a recycling company (if you pay a disposal fee, please state the amount)
d. Others (Pls. specify)

Most respondents answered that the dealer's workshop collect these wastes free of charge.

Table 2-19 Disposal methods after the replacement of tires, batteries, and lubricants

Items	Number. of respondents	a	b	c	d
1. Tires	146	90%	1%	0%	9%
2. Car battery	144	95%	2%	0%	3%
3. Lubricant	144	97%	1%	0%	2%

c.4 Disposal methods of end of life vehicle

Regarding questions about how to dispose of end of life vehicle, multiple answers were obtained to the following options.

a. Trade in my car to a dealer.
b. Sell to a recycler (for reuse of used parts)
c. Sell to a scrap buyer
d. Leave it on the premises.
e. Leave it in an open space other than my premises.
f. Others (Repair and sell or re-use)

With regard to the disposal methods of end of life vehicles, almost half of respondents answered “a. Trade in my car to a dealer.”, and 14% of respondents answered “b. Sell to a recycler (for re-use of used parts)”. The percentage of respondents who answered that they would place it on the premises or in open spaces other than their own premises was relatively low compared to other answers.

Table 2-20 Disposal methods of end of life vehicles

Items	Number of respondents	a	b	c	d	e	f
1. Car body	154	49%	14%	8%	4%	1%	30%
2. Tires	152	47%	14%	5%	5%	1%	31%
3. Car battery	150	49%	14%	5%	5%	1%	30%

c.5 Selling price of car body, tires, and car batteries generated from end of life vehicle

The average selling price of car body, tires, and car batteries to the dealers or recyclers is as shown in the table below. Although only one respondent selected “d. Leave it on the premises”, in fact, this respondent seems engaging in business by selling the parts related to end of life vehicle.

Table 2-21 Selling price of car body, tires, and lead acid battery generated from end of life vehicle (Unit: FJD/unit)

Disposal methods	1. Car body	2. Tires	3. Car battery
a. Trade in my car to a dealer	16,356	1,304	368
b. Sell to a Recyclers (for reuse of used parts)	10,000	363	300
c. Sell to a scrap buyer	2,679	340	204
d. Leave it on the premises	4,000	80	500
e. Leave it in an open space	0	0	0
f. Others (Repair and sell or re-use)	8,650	5,667	3,000

c.6 Disposal methods of end of life vehicle and the reasons

Multiple answers were obtained to the following options regarding the reasons for how to dispose of end of life vehicle.

1. Because I thought it would be easy to arrange and easy to hand over
2. Because they come to my house to take it out or there is a delivery address nearby
3. Because I thought it would be cheaper or less costly to pay
4. Because I was informed about the replacement
5. Because I thought it would be properly recycled at an approved delivery site
6. Because I did not know where to send it
7. Others

Regarding the most common disposal methods trade-in to dealers, and reasons for selling to recyclers are summarized as below. Regarding trade-in to dealers, more than 60% of the respondents cited the convenience of "because procedures and pick-up are easy" as the reason for the car body, tires, and lead acid batteries.

Table 2-22 Reasons for trade-in car body, tires, and lead acid battery to dealers

Items	Number of respondents	Reasons for selecting a disposal method (multiple answers)						
		1	2	3	4	5	6	7
1. Car body	75	63%	3%	5%	0%	4%	0%	36%
2. Tires	74	61%	3%	5%	1%	4%	0%	36%
3. Car battery	76	61%	3%	5%	1%	5%	0%	36%

Similarly, as for the reason for selling to recyclers, more than 50% of respondents cited the convenience of "because the procedure and collection are easy".

Table 2-23 Reasons for selling car body, tires, and lead acid battery to recyclers

Items	Number of respondents	Reasons for selecting a disposal method (multiple answers)						
		1	2	3	4	5	6	7
1. Car body	19	58%	0%	0%	0%	0%	0%	42%
2. Tires	19	53%	0%	0%	0%	5%	0%	42%
3. Car battery	19	58%	0%	0%	0%	0%	0%	42%

Regarding end of life vehicle, it seems that many residents recognize the convenience of trade-in to dealers, sales procedures and handing to recyclers.

2.2 Survey on Distribution and Retail Industries

2.2.1 Outline of the survey

In this survey, 7 types of questionnaires have been formulated as follows.

Table 2-24 List of questionnaires for the survey

Questionnaire	Type of Business
1. Questionnaire B.2-1-1 (automobile)	Automobile retailers and importers
2. Questionnaire B.2-1-2 (tyre and lead acid battery)	
3. Questionnaire B.2-2 (home appliance)	Home appliance retailers and importers
4. Questionnaire B.2-3 (lubricant oil)	Manufacturers and importers of lubricants
5. Questionnaire B.2-4 (single use plastic)	Manufacturers, retailers and importers of plastic products
6. Questionnaire B.2-5-1 (Import of beverage (PET bottle, aluminum can and glass))	Beverage manufacturers, retailers and importers
7. Questionnaire B.2-5-2 (Manufacture of beverage (PET bottle, aluminum can and glass))	

The questionnaires listed above are available in the attachment for further details. Those questionnaires were used for nine field survey target countries in common, and distributed to more or less 5 companies in each country. Number of answers received from each type of business for each countries are summarized in the table below. As for country or type of business which were not provided answers, basic information based on the knowledge of the survey team and existing documents were summarized.

Table 2-25 Number of answers received for each type of business for each countries

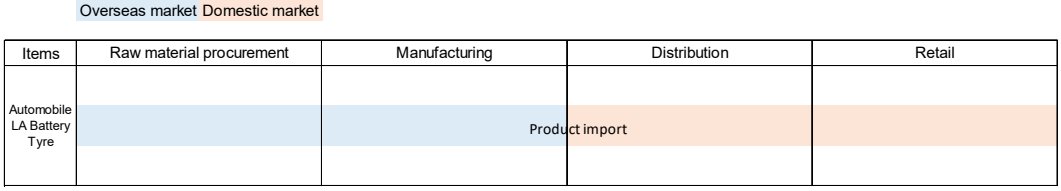
Country	Type of Business	Number of Answers Received
Palau	Automobile retailers and importers	0 received out of 2 companies
	Home appliance retailers and importers	1 received out of 2 companies
	Manufacturers and importers of lubricants	0 received out of 4 companies
	Manufacturers, retailers and importers of plastic products	0 received out of 4 companies
	Beverage manufacturers, retailers and importers	0 received out of 3 companies
Micronesia	Automobile retailers and importers	0 received out of 3 companies
	Home appliance retailers and importers	0 received out of 4 companies
	Manufacturers and importers of lubricants	0 received out of 3 companies
	Manufacturers, retailers and importers of plastic products	0 received out of 6 companies
	Beverage manufacturers, retailers and importers	0 received out of 4 companies
Marshall	Automobile retailers and importers	0 received out of 4 companies
	Home appliance retailers and importers	1 received out of 9 companies
	Manufacturers and importers of lubricants	0 received out of 5 companies
	Manufacturers, retailers and importers of plastic products	1 received out of 5 companies
	Beverage manufacturers, retailers and importers	1 received out of 5 companies
Papua New Guinea	Automobile retailers and importers	1 received out of 1 companies
	Home appliance retailers and importers	0 received out of 1 companies
	Manufacturers and importers of lubricants	0 received out of 1 companies
	Manufacturers, retailers and importers of plastic products	0 received out of 1 companies
	Beverage manufacturers, retailers and importers	0 received out of 1 companies

Country	Type of Business	Number of Answers Received
Solomon	Automobile retailers and importers	0 received out of 1 companies
	Home appliance retailers and importers	0 received out of 1 companies
	Manufacturers and importers of lubricants	0 received out of 1 companies
	Manufacturers, retailers and importers of plastic products	0 received out of 1 companies
	Beverage manufacturers, retailers and importers	0 received out of 1 companies
Vanuatu	Automobile retailers and importers	0 received out of 1 companies
	Home appliance retailers and importers	0 received out of 1 companies
	Manufacturers and importers of lubricants	0 received out of 1 companies
	Manufacturers, retailers and importers of plastic products	0 received out of 1 companies
	Beverage manufacturers, retailers and importers	0 received out of 1 companies
Fiji	Automobile retailers and importers	1 received out of 4 companies
	Home appliance retailers and importers	0 received out of 3 companies
	Manufacturers and importers of lubricants	0 received out of 2 companies
	Manufacturers, retailers and importers of plastic products	1 received out of 7 companies
	Beverage manufacturers, retailers and importers	1 received out of 3 companies (Data obtained from the Output 2 of JPRISM Phase2 is referred to above 3 companies)
Tonga	Automobile retailers and importers	0 received out of 1 companies
	Home appliance retailers and importers	0 received out of 1 companies
	Manufacturers and importers of lubricants	0 received out of 1 companies
	Manufacturers, retailers and importers of plastic products	0 received out of 2 companies
	Beverage manufacturers, retailers and importers	0 received out of 1 companies
Samoa	Automobile retailers and importers	0 received out of 3 companies
	Home appliance retailers and importers	0 received out of 2 companies
	Manufacturers and importers of lubricants	1 received out of 4 companies
	Manufacturers, retailers and importers of plastic products	1 received out of 4 companies
	Beverage manufacturers, retailers and importers	1 received out of 3 companies

2.2.2 Result of the survey

Result of the survey is described below. The beginning part summarizes the general information for each type of business from the view point of supply flow and collection of used product based on understanding of the survey team as well as information collected from existing document. Then, for the companies which replied to the questionnaire, details of the answers for each survey items are described in the table. For the survey items which wasn't answered was described as "N/A".

Supply flow was developed by item. The flow covers the phase from procurement of raw material until the item is retailed. The color of the bar shows whether each phases is done by overseas market (with blue color) or domestic market (with orange color). A sample supply flow is show below.



a. Palau

a.1 Automobile retailers and importers

There is no manufacturing base for automobile products in Palau. In general, used cars are imported from Japan and distributed in the market. End of life vehicles are dismantled at part of area at M-dock landfill then exported together with scrap metal recovered from other products. Even in Palau, which is relatively environmentally advanced country, not all end of life vehicles are collected and issue on the abandoned end of life vehicles is remarkable. As for used tyre, since there is no paper mills or cement plants, thermal recycle is not conducted. Used tyres are cut into pieces and landfilled[2]. Collected used lead acid battery are stored by Environmental Quality Protection Board (EQPB).

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Automobile LA Battery Tyre				
		Product import		

a.2 Home appliance retailers and importers

There is no manufacturing base for home appliances in Palau. Therefore, all the products such as white goods, PCs and mobile phones are imported.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
White goods PC Cell phone				
		Product import		

B. Company profile

Following information outlines a company which provided answer to the survey.

Details of item and sales amount	Freezer : 117 units Refrigerator : 137 units Washing Machine : 189 units Air conditioner : 174 units Microwave : 34 units
Sales destination (method)	Domestic: Individual (Import / Retail)
Market Share	N/A
Origin (Country/location) of imported item (method)	N/A(Import home appliance)
Collection of waste products and destination of disposal (method) and the reason	No collection.
The location (method) of processing / selling waste products and the reason	N/A
Type of industrial waste generated from the business itself and disposal destination of the industrial waste	N/A

[2] As for used tyre, under activity of Pac Waste Plus (PWP), it is pursued to establish “an End of Life Tyres (ELT) management programme”. The program consist from 1) introduction of legislation, 2) establishment of infrastructure to allow in-country recycling of ELT, 3) targeted education and awareness.

The location (method) of processing / selling the industrial waste generated from the business itself and the reason	N/A

a.3 Manufacturers and importers of lubricants

There is no manufacturing base for lubricant products in Palau. Therefore, all the products are imported. Similar to the collection of lead acid battery, waste lubricant oil is collected by EQPB.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Lubricant oil			Product import	

a.4 Manufacturers, retailers and importers of plastic products

In Palau, it is prohibited to import as well as sell the plastic bag, which accounts for the major portion of single use plastics used in Palau, at retail under the national law enforced in 2019. Other single use plastic products are not manufactured in the country but imported from abroad.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Single use plastic			Product import	

a.5 Beverage manufacturers, retailers and importers

In general, most of the beverage products are imported in Palau. Nevertheless, there are some local manufactures producing beer and mineral water and distribute them into the domestic market. Those manufacturers import raw material of beverage container (preform), produce the products, and sell them to retailers. In Palau where the CDL has been introduced, used beverage containers are supposed to be collected through CDL. Of those collected containers, aluminum cans are exported to overseas countries.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Beverage	Raw material import		Product import	

b. Micronesia

b.1 Automobile retailers and importers

Similar to Palau, there is no manufacturing base for automobile products in Micronesia. Thus, most of the products are imported from Japan and distributed in the market. The disposal of end of life vehicles have been commonly recognized as a critical issue among all the states.
With regard to the lead acid batteries discharged from end of life vehicles, only 2 states, namely Yap and Kosrae, provide collection services at collection centers designated for CDL[3].

[3] In Yap, the private company operating the collection center voluntarily collects the used lead acid batteries. On

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Automobile LA Battery Tyre			Product import	

B. Collection of used products in Yap and Kosrae

Items	Collection method	Conditions at the time of collection	Processing	Destination	Conditions at the time of handover
Lead acid battery	Stationary collection	Yap: Purchased Kosrae: Collected by CDL	packing	Overseas	Sold to buyer

b.2 Home appliance retailers and importers

There is no manufacturing base for home appliances in Micronesia. All the white goods, PCs, and mobile phones are imported.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
White goods PC Cell phone			Product import	

b.3 Manufacturers and importers of lubricants

There is no manufacturing base for lubricant products in Micronesia; thus all the products are imported. The absence of official collection system for waste lubricant oil has been recognized as a critical environmental issue among all the states. In Pohnpei, a private company entrusted the management of the final disposal site accepts the waste lubricant oil and stores in the premises of the disposal site with those lubricant oil being contained in drums. Micronesia once attempted to export the waste lubricant oil to New Zealand with support from international donors; however, this attempt remained a tentative solution. Thus, a permanent solution needs to be considered in other ways.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Lubricant oil			Product import	

b.4 Manufacturers, retailers and importers of plastic products

The federation government and all of 4 states prohibited to import as well as use single use plastics in Micronesia.

the other hand, used lead acid batteries are collected as collection items of CDL in Kosrae.

b.5 Beverage manufacturers, retailers and importers

There is no manufacturing base for beverage products in Micronesia; therefore, all the products are imported from abroad. In Yap, Ponhpei, and Kosrae, where CDL system has been introduced, collection of specific beverage containers have been conducted after the products are consumed. Of those collected containers, aluminum cans are exported to overseas countries owing to the high market value.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Beverage		Product import		

c. Marshall

c.1 Automobile retailers and importers

There is no manufacturing base for automobile products in Marshall; therefore, all new cars as well as used cars are imported from abroad. Since the traffic rule regulates right-side driving, which allows only cars with left-steering wheel to drive on the road, few automobile products are imported from Japan. The disposal of end of life vehicle has also been recognized as a critical issue in Marshall. The lead acid batteries extracted from the end of life vehicle have been collected at collection center for CDL.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Automobile LA Battery Tyre		Product import		

B. Collection of used products

Items	Collection method	Conditions at the time of collection	Processing	Destination	Conditions at the time of handover
Lead acid battery	Stationary collection	Purchased	packing	Overseas	Sold to buyer

c.2 Home appliance retailers and importers

There is no manufacturing base for home appliances in Marshall; therefore, all the white goods, PCs, and mobile phones are imported from abroad.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
White goods PC Cell phone		Product import		

B. Company profile

Following information outlines a company which provided answer to the survey.

Details of item and sales amount	Television : 181 units Refrigerator : 0 units Washing machine : 0 units Air conditioner : 194 units Microwave : 10 units PC : 30 units Mobile phone : 1,999 units
Sales destination (method)	Domestic : Individual (Import / Retail)
Market Share	N/A
Origin (Country/location) of imported item (method)	N/A(Import home appliance)
Collection of waste products and destination of disposal (method) and the reason	No collection.
The location (method) of processing / selling waste products and the reason	N/A
Type of industrial waste generated from the business itself and disposal destination of the industrial waste	N/A
The location (method) of processing / selling the industrial waste generated from the business itself and the reason	N/A

c.3 Manufacturers and importers of lubricants

There is no manufacturing base for lubricant products in Marshall; thus all the products are imported from abroad. The absence of official collection system for waste lubricant oil has been recognized as a critical environmental issue among all the states[4]. Although Marshalls Energy Company (MEC), a major discharger of waste lubricant oil, once attempted to export the waste lubricant oil to New Zealand with support from international donors, this attempt remained a tentative solution; therefore, a permanent solutions needs to be considered in other ways.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Lubricant oil			Product import	

c.4 Manufacturers, retailers and importers of plastic products

It is prohibited to import as well as use single use plastic in Marshall. However, only the plastic products which have already been stored as inventory at shop are allowed to be distributed in retail. Therefore, those inventory products are still sold by retailers in the country as shown in the table below.

[4] In case there is a still capacity in the storage tank, MEC accepts waste lubricant oil at US$25 per drum (208L) from households and other companies for the sake of storage.

A. Company profile

Following information outlines a company which provided answer to the survey.

Details of item and sales amount	Plastic packaging : 9,165 pcs Plastic bag : 39,920 pcs Plastic straw : 13,960 pcs Plastic cutlery: 7,365 sets
Sales destination (method)	Domestic : Individual (Import / Retail)
Market Share	N/A
Origin (Country/location) of imported item (method)	N/A(Import plastic product)
Collection of waste products and destination of disposal (method) and the reason	No collection.
The location (method) of processing / selling waste products and the reason	N/A
Type of industrial waste generated from the business itself and disposal destination of the industrial waste	N/A
The location (method) of processing / selling the industrial waste generated from the business itself and the reason	N/A

c.5 Beverage manufacturers, retailers and importers

In general, most of beverage products are imported in Marshall. Nevertheless, there are a few local manufactures producing mineral water and distributed the products in the domestic market. The manufacturers import raw material of beverage container (preform), manufacture the products, and then distribute the products to retailers. In Marshall where the CDL has been introduced, used beverage containers are supposed to be collected through CDL. Of the collected containers, aluminum cans are exported to overseas countries owing to the high market value.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Beverage	Raw material import		Product import	

B. Company profile

Following information outlines a company which provided answer to the survey.

Details of item and sales amount	Beer product : N/A
Sales destination (method)	Domestic : Individual (Import / Retail)
Market Share	N/A
Origin (Country/location) of imported item (method)	New Zealand (Import Beer product)
Collection of waste products and destination of disposal (method) and the reason	No collection
The location (method) of processing / selling waste products and the reason	N/A
Type of industrial waste generated from the business itself and disposal destination of the industrial waste	N/A
The location (method) of processing / selling the industrial waste generated from the business itself and the reason	N/A

d. Papua New Guinea

d.1 Automobile retailers and importers

Automobile retailers/importers sell imported new/used vehicles to general customers. A used vehicles are not disposed by themselves, Final dispose is contracted out to a recycler. There is a vehicles registration system in Papua New Guinea, but there is no procedure for deregistration, therefore, statistics on the number of vehicles owned and used are not accurate.

New tires are imported, and new tires and old tires are being replaced in own maintenance facility. At that time, old tires are picked up and disposed of own maintenance facility. New lead acid batteries are imported, and new lead acid battery and used lead acid battery are being replaced. At that time, used lead acid battery is picked up, but it depends on the customer, it may be taken home without requesting disposal.

Used lead acid battery is either returned to the manufacturer or sold as a used battery to a company whose headquarter is located in Fiji.

A. Supply flow

A.0 Automobile

Items	Raw material procurement	Manufacturing	Distribution	Retail
Automobile			Product import	

A.1 Lead acid battery and tyre

Items	Raw material procurement	Manufacturing	Distribution	Retail
LA Battery Tyre			Product import	

B. Company profile

Following information outlines a company which provided answer to the survey.

B.0 Automobile

Details of item and sales amount	New) Passenger car : 1,850 units Used) Passenger car : 1 units New) Truck : 191 units New) Bus : 834 units New) Motorcycle : 112 units
Sales destination (method)	Domestic : Individual, Business (Import / Retail)
Market Share	N/A
Origin (Country/location) of imported item (method)	N/A (Import new and used car)
Collection of waste products and destination of disposal (method) and the reason	No collection.
The location (method) of processing / selling waste products and the reason	N/A

Type of industrial waste generated from the business itself and disposal destination of the industrial waste	N/A
The location (method) of processing / selling the industrial waste generated from the business itself and the reason	N/A

B.1 Lead acid battery and tyre

Details of item and sales amount	Tires for passenger cars : 122 units Tires for buses : 16,424 units Tires for motorcycle : 20 units Batteries for passenger cars : 8,297 units
Sales destination (method)	Domestic : Individual, Business (Import / Retail)
Market Share	N/A
Origin (Country/location) of imported item (method)	N/A (Import tire and battery)
Collection of waste products and destination of disposal (method) and the reason	No collection
The location (method) of processing / selling waste products and the reason	N/A
Type of industrial waste generated from the business itself and disposal destination of the industrial waste	N/A
The location (method) of processing / selling the industrial waste generated from the business itself and the reason	N/A

d.2 Home appliance retailers and importers

There is no manufacturing base in Papua New Guinea, and all white goods, PCs, and mobile phones are imported.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
White goods PC Cell phone				
		Product import		

d.3 Manufacturers and importers of lubricants

Lubricant oil is imported by retailers for such as construction machinery and is not manufactured in Papua New Guinea.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Lubricant oil				
		Product import		

d.4 Manufacturers, retailers and importers of plastic products

There is a polyurethane mattress manufacturing factory in Papua New Guinea, by which plastic products such as beverage bottles, buckets, and plastic bags etc. are manufactured and distributed. Some of the plastic containers are imported products, while the others are

manufactured domestically by the imported raw materials

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Single use plastic	Raw material import		Product import	

d.5 Beverage manufacturers, retailers and importers

Most of beverages are imported in Papua New Guinea, but there are manufacturers of mineral water and beer, which also manufactured domestically. Domestic manufacturers manufacture products and sell them to retailers. A major domestic beer manufacturer collects empty bottles, and it cleans, disinfects, and reuses as own bottles in own facility.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Beverage	Raw material import		Product import	

e. Solomon

e.1 Automobile retailers and importers

There is no manufacturing base in Solomon, and vehicles imported from overseas are distributed. Although there is a vehicle registration system, a vehicle disposal system is not established, and scrapped vehicles are left everywhere

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Automobile LA Battery Tyre			Product import	

e.2 Home appliance retailers and importers

There is no manufacturing base in Solomon, and all white goods, PCs, and mobile phones are imported.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
White goods PC Cell phone			Product import	

e.3 Manufacturers and importers of lubricants

Lubricant oil is imported by such as used vehicles retailer and is not manufactured in Solomon.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Lubricant oil			Product import	

e.4 Manufacturers, retailers and importers of plastic products

Most single use plastics are imported. Although there are companies that recycle their own waste plastic to manufacture plastic bags, single use plastics are hardly manufactured domestically. The Ministry of Environment, Climate Change, Disaster Management and Meteorology is considering laws and regulations regarding the prohibition of the use of single use plastics.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Single use plastic			Product import	

e.5 Beverage manufacturers, retailers and importers

Most of beverages are imported in Solomon, but there are manufacturers of mineral water and beer, and which also manufactured domestically. A major domestic beer manufacturer collects empty bottles and it cleans, disinfects, and reuses as own bottles in own facility. The efforts to collect empty bottles have been understood by the residents, and many empty bottles have been collected.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Beverage	Raw material import		Product import	

f. Vanuatu

f.1 Automobile retailers and importers

There is no manufacturing base in Vanuatu, and vehicles imported from overseas are distributed. Some ferrous scrap and used lead acid batteries are taken over by domestic recyclers and exported as recyclable.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Automobile LA Battery Tyre				
			Product import	

f.2 Home appliance retailers and importers

There is no manufacturing base in Vanuatu, and all white goods, PCs, and mobile phones are imported. There is a case which a domestic recycler took over a part of the PCs discharged from the government agency as a recyclable.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
White goods PC Cell phone				
			Product import	

f.3 Manufacturers and importers of lubricants

Lubricant oil is imported by retailers for such as ship fuel and is not manufactured in Vanuatu. One of policy in the National Waste Management and Pollution Control Strategy 2016-2020 is to establish a new Waste Oil stewardship system by 2018, but it has not been realized as of 2021.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Lubricant oil				
			Product import	

f.4 Manufacturers, retailers and importers of plastic products

Single use plastics are not manufactured domestically, and some part of single use plastics are totally prohibited from being imported, sold or used by law. Single use plastic ban is gradually expanding the scope of items, and single use plastic bags, straws, styrofoam containers, etc. has been banned since 2018 (Phase 1). In addition, after 2019, single use plastic packaging materials of vegetable and fruit (nylon mesh net and styrofoam tray), cutlery, plastic plates, cups, stirrer, egg trays, artificial flowers, etc. are prohibited (Phase 2).

f.5 Beverage manufacturers, retailers and importers

Most of beverages are imported in Vanuatu, but there are manufacturers of mineral water and beer, which also manufactured domestically. Domestic manufacturers import containers, fill with the produced beverages domestically, and sell them to retailers. A leading manufacturer of beer in Vanuatu collects empty bottles and it cleans, disinfects, and reuses as own bottles in own facility.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Beverage	Raw material import		Product import	

g. Fiji

g.1 Automobile retailers and importers

In general, cars, batteries, and tires are imported and distributed to the retail market in Fiji, although some parts of battery are manufactured by local manufacturer. Some parts of imported cars, batteries and tires are exported.

With regard to the waste products, lead acid batteries are collected by manufactures for recycling, while car bodies are dismantled to retrieve scrap metals by recycling companies and exported to the overseas market as valuables.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Automobile LA Battery Tyre	Raw material import (LA battery)		Product import Product export	

B. Collection of used products

The details about collection activities by recycling companies are described in result of survey on recycling activities by the private sector (private recycling companies).

C. Company profile

Following information outlines a company which provided answer to the survey.

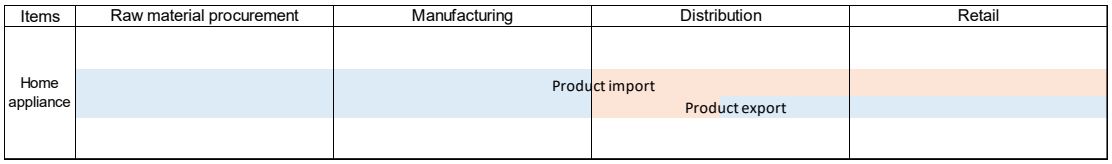
Details of item and sales amount	Used) Passenger cars : 630 units Used) Trucks : 110 units Used) Buses : 5 units
Sales destination (method)	Domestic : Individual, Business (Import / Retail) Overseas : Individual/ Business (Import / export)
Market Share	N/A
Origin (Country/location) of imported item (method)	Japanese corporation (Import used car)
Collection of waste products and destination of disposal (method) and the reason	No collection.
The location (method) of processing / selling waste products and the reason	N/A
Type of industrial waste generated from the business itself and disposal destination of the industrial waste	N/A
The location (method) of processing / selling the industrial waste generated from the business itself and the reason	N/A

g.2 Home appliance retailers and importers

All the white goods, PCs, and mobile phones are imported and distributed into the retail market in Fiji. Some of the home appliances are exported.

With regard to the used home appliances, the majority of the products remain uncollected, although some of them have been collected by recycling companies to extract and export the scrap metals as valuables.

A. Supply flow



B. Collection of used products

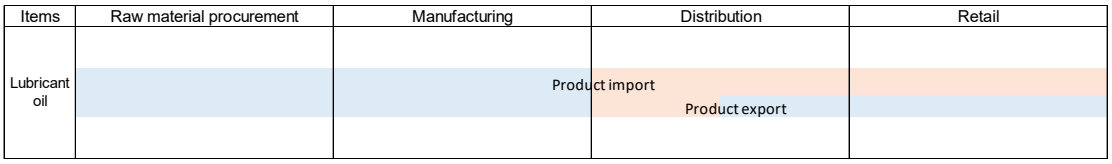
The details about collection activities by recycling companies are described in result of survey on recycling activities by the private sector (private recycling companies).

g.3 Manufacturers and importers of lubricants

All lubricant oil products are imported and distributed into the retail market. Part of lubricant oil products are exported.

Waste lubricant oil is collected by recycling companies and used as fuel.

A. Supply flow



B. Collection items for used products

The details about collection activities by recycling companies are described in result of survey on recycling activities by the private sector (private recycling companies).

g.4 Manufacturers, retailers and importers of plastic products

The single use plastic products are manufactured in Fiji with the raw materials being imported. Meanwhile, some of the single use plastic products are imported.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Single use plastic	Raw material import		Product import	

B. Company profile

Following information outlines a company which provided answer to the survey.

Details of item and sales amount	Plastic cutleries and cups : 100 ton Plastic straws : 2 ton
Sales destination (method)	Domestic : Business (Plastic cutleries and cups : Import plastic cutlery and cup products, Plastic straw : Manufacture / Distribution)
Market Share	Plastic cutleries and cups : N/A Plastic straw : 70%
Origin (Country/location) of imported item (method)	China (Import plastic products and raw material)
Collection of waste products and destination of disposal (method) and the reason	No collection.
The location (method) of processing / selling waste products and the reason	N/A
Type of industrial waste generated from the business itself and disposal destination of the industrial waste	N/A
The location (method) of processing / selling the industrial waste generated from the business itself and the reason	N/A

g.5 Beverage manufacturers, retailers and importers

Beverage products are manufactured in Fiji with raw materials such as preforms and aluminum cans being imported. Meanwhile, some of the beverage products are imported. Of the beverage products locally manufactured, some of them are exported to the overseas market.

With regard to the used beverage containers, PET bottles and aluminum cans are collected by manufacturers. Those collected containers are separated, and then compressed for packing for export. In the meantime, the PET bottles and aluminum cans that remains uncollected by manufactures are collected by recycling companies for export. Concerning the used glass bottles, such as beer bottle, the bottles are collected by manufactures for the purpose of recycling and disposed of after being reused several times.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Beverage	Raw material import		Product export	

B. Collection of used products

<PET Bottle and Aluminum can>

Collected by	Items	Item details	Collection method	Conditions at the time of collection	Processing	Destination	Conditions at the time of handover
Beverage manufacturer	Beverage	Empty PET bottle Empty cans (aluminum cans)	Door to door collection Stationaly collection Others	Purchase or Free pick-up	Sorting compression packing	Overseas	Sold to buyer

The details about collection activities by recycling companies are described in result of survey on recycling activities by the private sector (private recycling companies).

<Glass bottle>

Collected by	Items	Item details	Collection method	Conditions at the time of collection	Processing	Destination	Conditions at the time of handover
Beverage manufacturer	Beverage	Empty glass bottle	Coor to door collection Stationary collection	Purchase	Reuse	-	-

C. Company profile

Following information outlines a company which provided answer to the survey. There are 3 stations where PET bottles and aluminum cans are collected. At the stations, eligible PET bottles and aluminum cans are purchased with rate of 1 FJD/kg. For some areas, door to door collection is provided with using collection vehicle. In case of the door to door collection, eligible PET bottles and cans are purchased with rate of 0.5 FJD/kg. Collected PET bottles and aluminum cans are sorted, baled, packed then exported with container. As for PET bottles and aluminum cans, there are several buyers which is selected depending on the market price, but usually these are exported to Malaysia or New Zealand. Although the export of PET bottles is in the red, it is being continued as a corporate social responsibility initiative of the company.

Details of item and sales amount	Soft drink (PET bottle) : Approx. 18,500,000 bottles Soft drinks (Aluminum cans) : Approx. 13,600,000 bottles
Sales destination (method)	Domestic : Business (Manufacture / Distribution) Overseas : Business (Manufacture / Export)
Market Share	N/A
Origin (Country/location) of imported item (method)	Australia (Import preform, empty cans)
Collection of waste products and destination of disposal (method) and the reason	Collecting empty PET bottles and Aluminum cans of own brand for recycling through station collection and door to door collection.
The location (method) of processing / selling waste products and the reason	Sell to the buyers overseas (Malaysia or New Zealand) after sorted, compressed and packed
Type of industrial waste generated from the business itself and disposal destination of the industrial waste	N/A
The location (method) of processing / selling the industrial waste generated from the business itself and the reason	N/A

h. Tonga

h.1 Automobile retailers and importers

In Tonga, cars, lead acid batteries and tires are imported and distributed in the retail market. End of life vehicles are collected by recycling companies with a view to extracting scrap metal and used lead acid batteries, and then exported to the overseas market as valuables.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Automobile LA Battery Tyre		Product import		

B. Collection of used products

The details about collection activities by recycling companies are described in result of survey on recycling activities by the private sector (private recycling companies).

h.2 Home appliance retailers and importers

All the white goods, PCs, and mobile phones are imported in Tonga. Collection of the used products are conducted by not suppliers but recycling companies which export the collected products to the overseas market as valuables.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Home appliance		Product import		

B. Collection of used products

The details about collection activities by recycling companies are described in result of survey on recycling activities by the private sector (private recycling companies).

h.3 Manufacturers and importers of lubricants

All the lubricant oil products are imported in Tonga.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Lubricant oil		Product import		

h.4 Manufacturers, retailers and importers of plastic products

All the single use plastic products are imported in Tonga.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Single use plastic			Product import	

h.5 Beverage manufacturers, retailers and importers

All the beverage products including PET bottles, aluminum cans, and glass are imported in Tonga. Concerning the used containers, recycling companies collect aluminum cans and export to the overseas market as valuables.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Beverage			Product import	

B. Collection of used products

The details about collection activities by recycling companies are described in result of survey on recycling activities by the private sector (private recycling companies).

i. Samoa

i.1 Automobile retailers and importers

In Samoa, cars, batteries, and tires, are imported from abroad. End of life vehicles are collected by recycling companies with a view to extracting scrap metal as well as used lead acid batteries, and then exported to the overseas market as valuables.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Automobile LA Battery Tyre			Product import	

B. Collection of used products

The details about collection activities by recycling companies are described in result of survey on recycling activities by the private sector (private recycling companies).

i.2 Home appliance retailers and importers

All the white goods, PCs, and mobile phones are imported in Samoa. Collection of the used products are conducted by recycling companies with a view to extracting scrap metal. Scrap metal is exported to the overseas market as valuables.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Home appliance			Product import Product export	

B. Collection of used products

The details about collection activities by recycling companies are described in result of survey on recycling activities by the private sector (private recycling companies).

i.3 Manufacturers and importers of lubricants

All the lubricant products are imported in Samoa. The used products are collected as well as stored by importers. The collected lubricant oil is partly recycled and reused in the country.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Lubricant oil			Product import	

B. Collection of used products

Items	Items details	Collection method	Conditions at the time of collection	Processing	Destination	Conditions at the time of handover
Lubricant oil	Waste engine oil	Stationary collection	Pick up free of charge	Storage	Domestic	Free

C. Company profile

Following information outlines a company which provided answer to the survey.

The company imports engine oil (including hydraulic oil) and distributing and retailing in Samoa. As for waste oil, the company provides free onsite collection upon the request made by specific customers. Average monthly amount of collected waste oil is 8 drums (Approx.1,700 liters). Basically collected waste oil is simply stored by the company as there is no recycling facility. Occasionally, there is a demand of waste oil from some customer, in such a case, the company provides waste oil to them for free.

Details of item and sales amount	Engine oil : Approx. 180 tons
Sales destination (method)	Domestic : Individual, Business (Import / Distribution / Retail)
Market Share	N/A
Origin (Country/location) of imported item (method)	N/A (Import Engine oil product)
Collection of waste products and destination of disposal (method) and the reason	Provide onsite collection of specific customers for storage.
The location (method) of processing / selling waste products and the reason	Storage/ Provide for free for specific customer.
Type of industrial waste generated from the business itself and disposal destination of the industrial waste	N/A
The location (method) of processing / selling the industrial waste generated from the business itself and the reason	N/A

i.4 Manufacturers, retailers and importers of plastic products

All the single use plastic products are imported in Samoa.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Single use plastic			Product import	

B. Company profile

Following information outlines a company which provided answer to the survey.
The company import plastic packaging and plastic bags then distributing and retailing in Samoa.

Details of item and sales amount	Single use plastics : Approx. 45 tons
Sales destination (method)	Domestic : Business (Import / Distribution / Retail)
Market Share	N/A
Origin (Country/location) of imported item (method)	China (Import single use plastic product)
Collection of waste products and destination of disposal (method) and the reason	No collection.
The location (method) of processing / selling waste products and the reason	N/A
Type of industrial waste generated from the business itself and disposal destination of the industrial waste	N/A
The location (method) of processing / selling the industrial waste generated from the business itself and the reason	N/A

i.5 Beverage manufacturers, retailers and importers

Beverage products are manufactured in Samoa with raw materials such as preforms, aluminum cans and glass bottles being imported. Meanwhile, some of the beverage products are n also imported. Of the beverage products locally manufactured, some of them are exported to the overseas market.

With regard to the used beverage containers, the used glass bottles, such as beer bottle, are collected by manufactures for the purpose of reusing and disposed of after being reused several times. Meanwhile, the used aluminum cans are collected by recycling companies and exported to the overseas market.

A. Supply flow

Items	Raw material procurement	Manufacturing	Distribution	Retail
Beverage	Raw material import		Product export Product import	

B. Collection of used products

<Aluminum can>

The details about collection activities by recycling companies are described in result of survey on recycling activities by the private sector (private recycling companies).

<Glass bottle>

Items	Items details	Collection method	Conditions at the time of collection	Processing	Destination	Conditions at the time of handover
Beverage	Empty glass bottle	Door to door collection Stationary collection	Purchase for a fee	Reuse	-	-

C. Company profile

Following information outlines a company which provided answer to the survey.

The company locally manufactures and imports beverage products. The used glass bottles of the company's brand are collected by themselves with a range of 0.2 – 0.4 WST per a bottle. There are two collection channels namely, door to door collection with using collection vehicle and collection at designated location. Since used glass bottles are reused for several times, there is no definite collection rate but the quantity of collected used glass bottles (605,052 cases) in 2019 were equivalent to 73% of annual production (820,700 cases) of the company.

Details of item and sales amount	<Locally manufactured products> Soft drink (Glass bottle) : 420,600 cases Beer (Glass bottle) : 400,100 cases Soft drink (PET bottle) : 1,511 cases <Imported products> Beer (Glass bottle) : 1,511 cases Soft drink (Aluminum can) : 33,453 cases
Sales destination (method)	Domestic : Individual, Business (Import / Distribution)
Market Share	N/A
Origin (Country/location) of imported item (method)	New Zealand / Fiji (Import beverage product, Import beverage container)
Collection of waste products and destination of disposal (method) and the reason	Collect used glass bottles by door to door collection at part of area or some designated collection points.
The location (method) of processing / selling waste products and the reason	Collected glass bottles are washed and reused.
Type of industrial waste generated from the business itself and disposal destination of the industrial waste	Glass, Plastic, Cardboard, Paper : Disposed at landfill Scrap metal : Hand over to recycling company
The location (method) of processing / selling the industrial waste generated from the business itself and the reason	Used glass bottles which are no more reusable are disposed at landfill after crushed as there is no recycling facility.

2.3 Survey on Recycling Activities by the Private Sector (Private Recycling Companies)

2.3.1 Outline of the survey

In this survey, the questionnaire B.3 for private recycling companies was developed and used the same format for 9 field survey target countries. The questionnaire was distributed to the private recycling companies of which most of them are engaged in collection and export of scrap metals. Number of answer received or each country is summarized in the table below.

Table 2-26 Number of answer received for each country

Country	Number of Answer Received
Palau	0 received out of 3 companies
Micronesia	1 received out of 2 companies
Marshall	1 received out of 3 companies
Papua New Guinea	1 received out of 3 companies
Solomon	1 received out of 3 companies
Vanuatu	0 received out of 1 companies
Fiji	3 received out of 6 companies (Data obtained from the Output 2 of JPRISM Phase2 is referred to 4 out of 6 companies)
Tonga	2 received out of 2 companies
Samoa	1 received out of 2 companies

2.3.2 Result of the survey

For the companies provided answer to this survey as shown in the table 2-11, their handling item, basic information such as the company size are summarized in the table below. For survey item which was not answered is described as “N/A”.

Most of recycling companies of the filed survey target countries are handling scrap metal and waste home appliances. Basically, most of recycling companies collect recyclables then sort, compress and pack them for exporting overseas with container. In Fiji, there are recycling companies locally recycle (including repair and incineration) used paper, waste lubricant oil and used lead acid battery.

In general, the larger size of country has larger market size of the recycling industry. The result of the survey shows it is likely the more number of staffs of the recycling company in the country has larger population. Most of surveyed recycling companies are private except for public enterprise in Micronesia and Marshall.

Table 2-27 List of the companies surveyed

Country (Company)	Handling Items	No. of Staffs	Site area
Micronesia (Company A)	Scrap metal Waste home appliance	N/A	N/A
Marshall (Company A)	Scrap metal Aluminum can PET bottle Glass Used lead acid battery Waste home appliance	51	N/A
Papua New Guinea (Company A)	Aluminum can Scrap metal	4	N/A
Solomon (Company A)	Plastic	3	N/A
Fiji (Company A)	Used paper	75	N/A

Fiji (Company B)	Scrap metal Plastic Cardboard Glass Waste home appliance	44	N/A
Fiji (Company C)	Waste lubricant oil	N/A	N/A
Fiji (Company D)	Used lead acid battery	N/A	N/A
Tonga (Company A)	Scrap metal Used lead acid battery	9	N/A
Tonga (Company B)	Scrap metal Used lead acid battery Waste home appliance	12	8 acre
Samoa (Company A)	Scrap metal Waste home appliance	15	4 acre

Detail result of the survey in line with survey items of the questionnaire is described below. As for Company D in Fiji, although there was no answer provided for distributed questionnaire, relevant information is summarized based on the survey data collected through output 2 of J-PRISM Phase2. As for Palau, since there was no response received from the target companies, the information based on the understanding of the survey team is summarized.

a. Palau

There was no response received from the target companies. With regard to the recycling of end of life vehicle done a company, since the project has obtained the information from other sources, those information was described in the result of survey on distribution and retail industries.

b. Micronesia

b.1 Company A

There was a response from a company which is entrusted with the management of disposal site from the state government. According to the company, scrap metals as well as large-size home appliances brought to the disposal site have been stored in the same premises. However, the received amount of above items has not been grasped properly.

A. Type of items collected, stored, and processed

Type of items	Scrap metal, Plastic, Used paper, Waste home appliances, Glass, End of life vehicle

B. Processing capacity and scale of recycling / processing amount by type of items and etc.

Type of items	Processing method	Processing capacity and scale (tons/day)	Processing amount (tons/year)	Export amount (tons/year)	Domestically recycled amount (tons/year)	Final disposal amount (tons/year)
All items	Collect Sort	N/A	N/A	Stored at landfill		

C. Methods of collection/sale/receipt, sales price, processing route and etc.

Type of items	Methods of collection/receipt	Condition of collection/receipt	Method of sales	Sales price	Processing route
All items	Collection at designate site	N/A	Stored at landfill		

D. Materials and equipment used for collection/storage/processing

There was no answer provided on materials and equipment used for collection / storage / processing.

E. Trends in the international market for recyclable materials and sale prices (market prices)

There was no clear answer provided on the trends in the international market for recyclable materials and sale prices (market prices). It seems that based on the market situation, the company store items when those market price is low and waiting for appropriate exporting opportunity to come for instance a situation when the market price rises.

c. Marshall

c.1 Company A

There was a response from Majuro Atoll Waste Company which is responsible for waste management in Majuro atoll. According to the company, the used products brought into the disposal site, such as scrap metal and white goods have been stored in the same premises without being landfilled. The received amount of above items has not been grasped properly. Furthermore, the company also collects the used beverage containers at the collection center under CDL, and exports aluminum cans together with the scrap metal as container cargo.

A. Type of items collected, stored, and processed

Type of items	Aluminum can, Scrap metal (non-ferrous), Used lead acid battery, Home appliance (Refrigerator, washing machine. air conditioner, microwave), Glass

B. Processing capacity and scale of recycling / processing amount by type of items and etc.

Type of items	Processing method	Processing capacity and scale (tons/day)	Processing amount (tons/year)	Export amount (tons/year)	Domestically recycled amount (tons/year)	Final disposal amount (tons/year)
Aluminum can	Collect Sort Compress Pack	1.1	138	138	0	0
PET bottle	Collect Sort Compress Pack	0.76	80	Stored at landfill		

Glass	Collect Sort	0.48	50	Stored at landfill		
Used lead acid battery	Collect Pack	N/A	N/A	N/A	N/A	N/A
Other scrap metal	Collect Disassemble Compress Pack	N/A	N/A	N/A	N/A	N/A

C. Methods of collection/sale/receipt, sales price, processing route and etc.

Type of items	Methods of collection/receipt	Condition of collection/receipt	Method of sales	Sales price	Processing route
Aluminum can	Collection through CDL	Refund 0.05USD/can	Sell to overseas buyer	0.80～0.99 USD/kg	ROK*
PET bottle	Collection through CDL	Refund 0.05USD/bottle	Stored at landfill		
Glass	Collection through CDL	Refund 0.05USD/bottle	Stored at landfill		
Used lead acid battery	Collection at designated site	Buy 0.3USD/kg	Sell to overseas buyer	700 USD/ton	ROK*

* ROK: Republic of Korea

D. Materials and equipment used for collection/storage/processing

Type of materials and equipment	Quantity	Procurement method	Price
Compressor (Scrap metal)	1 unit	From Japan	260,106 USD
Compressor (Plastic)	1 unit		

E. Trends in the international market for recyclable materials and sale prices (market prices)

There was no clear answer provided on the trends in the international market for recyclable materials and sale prices (market prices). It seems that based on the market situation, the company store items when those market price is low and waiting for appropriate exporting opportunity to come for instance a situation when the market price rises.

d. Papua New Guinea

d.1 Company A

Answers were received from a company. The company buys aluminum can and copper brought in from general customers or companies. Aluminum cans are compressed and packed using the company's own aluminum compression packing machine, copper is stored in 24-gallon drums, and other non-ferrous metals are stored in 20-foot containers and then the company is selling after reaching a certain amount. The company recycles about 2 tons annually.

A. Type of items collected, stored, and processed

Type of items	Aluminum can, Scrap metal (copper, non-ferrous)

B. Processing capacity and scale of recycling / processing amount by type of items and etc.

Type of items	Processing method	Processing capacity and scale (tons/day)	Processing amount (tons/year)	Export amount (tons/year)	Domestically recycled amount (tons/year)	Final disposal amount (tons/year)
Aluminum can	Collect Sort Compress Pack	1	120	120	N/A	2
Scrap metal (copper)	Collect Sort Compress Pack	0.2	20	20	N/A	
Scrap metal (non-ferrous)	Collect Sort Cut	0.1	20	20	N/A	

C. Methods of collection/sale/receipt, sales price, processing route and etc.

Type of items	Methods of collection/receipt	Condition of collection/receipt	Method of sales	Sales price	Processing route
Aluminum can	Collection at designated site	Buy 2PGK/kg	Sell to overseas buyer or domestic buyer	0.89 USD/kg (Overseas) 2.5 PGK/kg (Domestic)	Australia or domestic
Scrap metal (copper)	Collection at designated site	Buy 9PGK/kg	Sell to overseas buyer or domestic buyer	4.9 USD/kg (Overseas) 11 PGK/kg (Domestic)	Australia or domestic
Scrap metal (non-ferrous)	Collection at designated site	N/A	Export overseas	N/A	N/A

D. Materials and equipment used for collection/storage/processing

Type of materials and equipment	Quantity	Procurement method	Price
Compressor (Aluminum)	1 unit	Bought from China	23,000 USD

E. Trends in the international market for recyclable materials and sale prices (market prices)

Following answer was provided on trends in the international market for recyclable materials and sale prices (market prices).

- Fluctuations of scrap metal market prices is common in the industry. In 2019, the prices of scrap metals badly decline which affected many small scrap metal companies like

the company. The decline in the market prices affected export of scrap metal to buyers in Brisbane Australia. Recently, Covid19 added another blast to the scrap recycling company by affecting to the small scrap companies' operations. It caused the company to stop selling locally and try to rebuild the operations again. Regardless the situation, the company is still helping to manage waste removal in Papua New Guinea.

e. Solomon

e.1 Company A

Answers were received from a company. The company manufactures and sells plastic bags by recycling a pieces of plastic waste, which are generated from its own factories, as raw materials.

A. Type of items collected, stored, and processed

Type of items	Plastic

B. Processing capacity and scale of recycling / processing amount by type of items and etc.

Type of items	Processing method	Processing capacity and scale (tons/day)	Processing amount (tons/year)	Export amount (tons/year)	Domestically recycled amount (tons/year)	Final disposal amount (tons/year)
Plastic	Collect Recycle	0.005	N/A	0	N/A	2

C. Methods of collection/sale/receipt, sales price, processing route and etc.

Type of items	Methods of collection/receipt	Condition of collection/receipt	Method of sales	Sales price	Processing route
Plastic	Collection at designated site	Free of charge	N/A	N/A	N/A

D. Materials and equipment used for collection/storage/processing

Type of materials and equipment	Quantity	Procurement method	Price
Re-milling machine	1 unit	N/A	Approx. 600 USD

E. Trends in the international market for recyclable materials and sale prices (market prices)

Following opinion was provided on current recycling practice and challenges although there was no clear answer provided on trends in the international market for recyclable materials and sale prices (market prices).

- Current recycling practice is not enough. More should be done to recycle all types of materials, such as plastics, paper, glass, rubber, etc. There should be nine plastic recycling plants in the Solomon Is (one in each Province) to buy recyclable plastic bottles & other plastics wastes.

f. Vanuatu

Questionnaire was not collected.

g. Fiji

g.1 Recycling company A

The company A is a business enterprise recycling used paper into toilet paper in Fiji. According to the company, the emergence of imported toilet paper has been threatening the domestic market in recent years since the existing products has been losing the competitiveness in price. The issue of imported products has been recognized as a critical matter for the company.

A. Type of items collected, stored, and processed

Type of items	Used paper (Office paper)

B. Processing capacity and scale of recycling / processing amount by type of items and etc.

Type of items	Processing method	Processing capacity and scale (tons/day)	Processing amount (tons/year)	Export amount (tons/year)	Domestically recycled amount (tons/year)	Final disposal amount (tons/year)
Used Paper	Collect Sort Recycle	12	1,517	0	885	N/A

C. Methods of collection/sale/receipt, sales price, processing route and etc.

Type of items	Methods of collection/receipt	Condition of collection/receipt	Method of sales	Sales price	Processing route
Used paper	Door to door collection Collection at designated site	Fee 0.5 FJD/kg	N/A	N/A	N/A

D. Materials and equipment used for collection/storage/processing

Type of materials and equipment	Quantity	Procurement method	Price
Truck (Large)	2 unit	N/A	N/A
Truck (Small)	1 unit		
Forklift	N/A		
Compression packing machine	1 unit		
Recycling plant	1 set		

E. Trends in the international market for recyclable materials and sale prices (market prices)

Following answer was provided on trends in the international market for recyclable materials and sale prices (market prices).

- Imported products (Toilet paper such as made in China) in the market in Fiji are competitive with the recycled products since they are cheaper in retail price. Major cost for producing toilet paper is electricity, water and chemicals and these tends to be cheaper in China than in Fiji. In addition, as recycling costs are included in the price of recycled product, it is difficult for the industry without sufficient support from government and international donners as well as cooperation from people.

g.2 Recycling Company B

The company B is a recycling company which collects a varieties of used items, such as scrap metals (both ferrous and non-ferrous metals), plastic, PET bottles, card boards, and used home appliances. The company exports those collected items to overseas market as valuables by compression packing. According to the company, the market value of recycled valuables has been decreased in recent years, which subsequently squeezes the company profits.

A. Type of items collected, stored, and processed

Type of items	Scrap metal (ferrous), Aluminum can, PET bottle, Plastic, Cardboard

B. Processing capacity and scale of recycling / processing amount by type of items and etc.

Type of items	Processing method	Processing capacity and scale (tons/day)	Processing amount (tons/year)	Export amount (tons/year)	Domestically recycled amount (tons/year)	Final disposal amount (tons/year)
Scrap metal (ferrous)	Collect Disassemble Compress Pack	N/A	2,668	2,160	0	36
Aluminum can	Collect Disassemble Wash Compress Pack	1		80	0	
PET bottle	Collect Sort Compress Pack	1		100	0	
Plastic	Collect Sort Compress Pack	1		92	0	
Cardboard	Collect Sort Compress Pack	3		200	0	

C. Methods of collection/sale/receipt, sales price, processing route and etc.

Type of items	Methods of collection/receipt	Condition of collection/receipt	Method of sales	Sales price (AUD/ton)	Processing route
Scrap metal (ferrous)	Collection at designated site	N/A	Sell to overseas buyer	N/A	New Zealand

Aluminum Cans		Buy 0.80 FJD/kg	Sell to overseas buyer	1,370	New Zealand
PET bottle		Fee 15 FJD/bag	Hand over to domestic company or sell to overseas buyer*	50	New Zealand or domestic beverage manufacturer
Plastic		Fee 10.5 FJD/bag	Sell to overseas buyer	170	New Zealand
Cardboard		Fee 20 FJD/bag	Sell to overseas buyer	170	New Zealand

*As for PET bottle, defective raw material of beverage container (preforms) generated in the manufacturing process are sold to buyer in New Zealand, while other eligible PET bottles which are used for local product are handed over to domestic beverage manufacturer.

D. Materials and equipment used for collection/storage/processing

Type of materials and equipment	Quantity	Procurement method	Price
Compressor	3 unit	Purchased from New Zealand	50,000 NZD/unit
Shearing Machine	3 unit	Purchased from New Zealand	20,000 NZD/unit

E. Trends in the international market for recyclable materials and sale prices (market prices)

Following answer was provided on trends in the international market for recyclable materials and sale prices (market prices).

- The international market is dropped compared to past years, which has really affected the recycling industry with high shipping rates with less margin for individual items. Seeking help from any organization to assist in exporting recyclable items.

g.3 Recycling Company C

The company C is a business enterprise which manufactures as well as sells reinforcing steels. The company collect the waste oils and reuse them as fuels for the electric furnace when manufacturing the products

A. Type of items collected, stored, and processed

Type of items	Waste lubricant oil

B. Processing capacity and scale of recycling / processing amount by type of items and etc.

Type of items	Processing method	Processing capacity and scale (liter/day)	Processing amount (liter/year)	Export amount (tons/year)	Domestically recycled amount (tons/year)	Final disposal amount (tons/year)
Waste oil	Collect Incinerate	5,500	120,003,000	0	0	0

C. Methods of collection/sale/receipt, sales price, processing route and etc.

Type of items	Methods of collection/receipt	Condition of collection/receipt	Method of sales	Sales price	Processing route
Waste lubricant oil	Collection at designated site	Free of charge	Incinerated at furnace		

D. Materials and equipment used for collection/storage/processing

There was no answer provided on materials and equipment used for collection/storage/processing.

E. Trends in the international market for recyclable materials and sale prices (market prices)

There was no direct answer provided on trends in the international market for recyclable materials and sale prices (market prices). Since the company collects target recyclable generated domestically and processes it domestically, there is no direct effect caused by trends in the international market for recyclable materials and sale prices (market prices).

g.4 Recycling Company D

The company D is a business enterprise which manufactures as well as sells lead acid batteries. The company collects as well as repairs the used lead acid batteries, and export them to the overseas market for recycling.

A. Type of items collected, stored, and processed

Type of items	Used lead acid battery

B. Processing capacity and scale of recycling / processing amount by type of items and etc.

Type of items	Processing method	Processing capacity and scale (tons/day)	Processing amount (tons/year)	Export amount (tons/year)	Domestically recycled amount (tons/year)	Final disposal amount (tons/year)
Used lead acid battery	Collect Repair Pack	24	1,170	N/A	1,170	0

C. Methods of collection/sale/receipt, sales price, processing route and etc.

Type of items	Methods of collection/receipt	Condition of collection/receipt	Method of sales	Sales price	Processing route
Used lead acid battery	Collection at designated site	Free of charge	N/A		

D. Materials and equipment used for collection/storage/processing

There was no answer provided on materials and equipment used for collection/storage/processing.

E. Trends in the international market for recyclable materials and sale prices (market prices)

There was no direct answer provided on trends in the international market for recyclable materials and sale prices (market prices). Since the company collects target recyclable generated domestically and processes it domestically, there is no direct effect caused by trends in the international market for recyclable materials and sale prices (market prices).

h. Tonga

h.1 Recycling Company A

The company A is a business enterprise which recycles the scrap metal (both ferrous and non-ferrous metals) as well as used lead acid battery. The collected products are separated according to the items, compressed for packing, and then exported to overseas markets as valuables.

A. Type of items collected, stored, and processed

Type of items	Scrap metal (Ferrous, non-ferrous), Used lead acid battery

B. Processing capacity and scale of recycling / processing amount by type of items and etc.

Type of items	Processing method	Processing capacity and scale (tons/day)	Processing amount (tons/year)	Export amount (tons/year)	Domestically recycled amount (tons/year)	Final disposal amount (tons/year)
Scrap metal (ferrous)	Collect Disassemble Compress Pack	0.5	201	54	0	1
Scrap metal (non-ferrous)	Collect Disassemble Compress Pack	0.7		150	0	
Used lead acid battery	Collect Sort Pack	0.05		6	0	

C. Methods of collection/sale/receipt, sales price, processing route and etc.

Type of items	Methods of collection/receipt	Condition of collection/receipt	Method of sales	Sales price	Processing route
Scrap metal (ferrous)	Collection at designated site	Buy	Sell to overseas buyer	N/A	N/A
Scrap metal (non-ferrous)	Collection at designated site	Buy	Sell to overseas buyer	N/A	N/A
Used lead acid battery	Collection at designated site	Buy	Sell to overseas buyer	N/A	N/A

D. Materials and equipment used for collection/storage/processing

There was no answer provided on materials and equipment used for collection/storage/processing.

E. Trends in the international market for recyclable materials and sale prices (market prices)

There was no direct answer provided on trends in the international market for recyclable materials and sale prices (market prices). The company recognizes that there is a potential to grow recycling industry in the future in Tonga.

h.2 Recycling Company B

The company B is a business enterprise which recycles the scrap metals (both ferrous and non-ferrous metals), waste batteries, and used home appliances. The collected products are separated according to the items, compressed for packing, and then exported to overseas markets as valuables. Under the COVID-19 pandemic, there has been few impact made on the market price of non-ferrous scrap metals as well as waste batteries, while the market price of ferrous scrap metals has been decreased, which has been recognized as a critical issue for the company.

A. Type of items collected, stored, and processed

Type of items	Scrap metal (ferrous, non-ferrous), Used lead acid battery, Home appliance

B. Processing capacity and scale of recycling / processing amount by type of items and etc.

Type of items	Processing method	Processing capacity and scale (tons/day)	Processing amount (tons/year)	Export amount (tons/year)	Domestically recycled amount (tons/year)	Final disposal amount (tons/year)
Scrap metal (ferrous)	Collect Disassemble Compress Pack	5-10	345	60	0	5
Scrap metal (non-ferrous)	Collect Disassemble Compress Pack	5-10		252	0	
Used lead acid battery	Collect Sort Pack	5-10		28	0	

C. Methods of collection/sale/receipt, sales price, processing route and etc.

Type of items	Methods of collection/receipt	Condition of collection/receipt	Method of sales	Sales price	Processing route
Scrap metal (ferrous)	Collection at designated site Collection from landfill	Fee	Sell to overseas buyer	N/A	N/A
Scrap metal (non-ferrous)	Collection at designated site Collection from landfill	Buy	Sell to overseas buyer	N/A	N/A
Used lead acid battery	Collection at designated site Collection from landfill	Buy	Sell to overseas buyer	N/A	N/A

D. Materials and equipment used for collection/storage/processing

Type of materials and equipment	Quantity	Procurement method	Price
Compressor	2 unit	Bought domestically	5,000 USD/unit
3-ton truck	1 unit	Bought domestically	20,000 USD/unit
5-ton truck	1 unit	Bought from New Zealand	4,000 USD/unit
Forklift	1 unit	Bought domestically	12,000 USD/unit
Tractor	1 unit	Bought domestically	16,000 USD/unit

E. Trends in the international market for recyclable materials and sale prices (market prices)

Following answer was provided on trends in the international market for recyclable materials and sale prices (market prices).

- Despite the COVID-19 impact, prices for non-ferrous and used lead acid battery remains unchanged or even better. However, price for ferrous metal is still low and discouraging recyclers to buy and export. The export is picking up for non-ferrous and the company currently shipping two containers a month since the beginning of 2021.

i. Samoa

i.1 Recycling company A

The company A is a business enterprise which recycles scrap metal (both ferrous and non-ferrous), and home appliance. The collected items are separated according to the items, compressed for packing, and then exported to overseas markets as valuables. Recently, the cost of marine freight has been high, which makes it difficult to transport the products to the areas where the better trading price can be expected.

A. Type of items collected, stored, and processed

Type of items	Scrap metal (ferrous, non-ferrous), Used lead acid battery, Home appliance

B. Processing capacity and scale of recycling / processing amount by type of items and etc.

Type of items	Processing method	Processing capacity and scale (tons/day)	Processing amount (tons/year)	Export amount (tons/year)	Domestically recycled amount (tons/year)	Final disposal amount (tons/year)
Scrap metal (ferrous)	Collect Disassemble Compress Pack	1.7	551	426	0	8
Scrap metal (non-ferrous)	Collect Disassemble Compress Pack	1.1		117	0	

C. Methods of collection/sale/receipt, sales price, processing route and etc.

Type of items	Methods of collection/receipt	Condition of collection/receipt	Method of sales	Sales price	Processing route
Scrap metal (ferrous)	Collection at designated site Collection from landfill	Free of charge or buy	Sell to overseas buyer or domestic buyer	N/A	N/A
Scrap metal (non-ferrous)	Collection at designated site Collection from landfill	Free of charge or buy	Sell to overseas buyer or domestic buyer	N/A	N/A

D. Materials and equipment used for collection/storage/processing

Type of materials and equipment	Quantity	Procurement method	Price
Compression packing machine	1 unit	N/A	150,000 WST/unit
Forklift	2 unit	Bought domestically	16,000 WST/unit
Excavator	1 unit	Bought from New Zealand	80,000 WST/unit
Electric Power Cutter	1 unit	N/A	N/A

E. Trends in the international market for recyclable materials and sale prices (market prices)

Following answer was provided on trends in the international market for recyclable materials and sale prices (market prices).

- Recyclable Material Prices varies from time to time as the first 6 months of every year are the always the good time while the other last 6 months toward the end of the year are always the fragile times to export.
- The current issue facing the exportation of recyclable materials are the ocean freight cost as it is too high in cost for some global region residing good market prices.

2.4 Survey on Recycling Activities by the Public Sector (Central and Local Governments)

As for the field survey target countries, through hearings with the central government such as the Ministry of the Environment and major local governments, information on target items, processing amount, and processing method of recycling activities by the public sector was collected and organized as follows. It was efficiently collected by requesting J-PRISM Phase2 personnel to provide materials and conducting hearings with them.

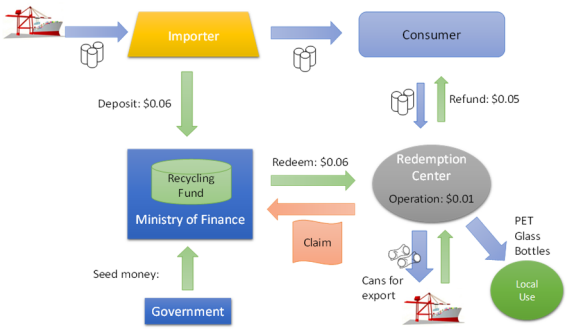
Table 2-28 List of survey target organization

Country	Name of organization
Palau	Bureau of Public Works (BPW), Ministry of Public Infrastructure, Industries and Commerce (MPIIC)
Micronesia	Yap EPA/ Chuuk EPA* / Pohnpei EPA / Kosrae Island Resource Management Authority (KIRMA)
Marshall	Environmental Protection Authority / Majuro Atoll Waste Company (MAWC)
Fiji	Nadi Town Council

*Environmental Protection Agency (EPA)

2.4.1 CDL in Micronesia Region

a. Scheme of CDL



Of the 14 Pacific countries covered by this survey, CDL is introduced in Palau, three states of Micronesia, Marshall and Kiribati as a national or state system. The system shown in the figure on the right is same in the above countries except Palau[5].
Importers of beverages in aluminum cans, glass containers and PET bottles pay deposit of 6 cents for one container with import tax. All of the deposits are put into the recycling fund of the Ministry or Bureau of Finance. Part of this 6 cents is passed on to consumer prices. Consumers bring empty beverage containers to a collection center and receive a refund of 5 cents per container. Companies and public corporations entrusted with the operation of the collection center keep a record of the amount and number of refunds to the residents and submit them to the Ministry or Bureau of Finance every week together with the payment request. Six cents will be redeemed from the Ministry of Finance's recycling fund. The difference between 6 cents redeemed and 5 cents refunded to the residents, 1 cent, is the operating cost of the organization that operates the collection center.

b. Overview of CDL in each country and state

The table below outlines the systems in Palau, Micronesia (Yap, Pohnpei, Kosrae), and the Marshall, where the system is currently being introduced.

[5] Under Palau's system, a deposit is 10 cents. Consumers who bring an empty container to the collection center receive 5 cents from the deposit. Half of the difference of 5 cents, 2.5 cents, is paid to the agency that operates the collection center as operating expenses, and the remaining 2.5 cents are accumulated and used for waste management related expenses.

Table 2-29 Overview of public sector recycling projects in the Micronesia Region

Survey item	Palau	Micronesia	Marshall
Overview of CDL	A recycling law was enacted in 2006, and an enforcement ordinance on beverage container recycling was enacted in 2009. The actual operation is from 2011. There are two collection centers in Koror. Containers are mainly brought to the collection center from Koror, where 70% of the population lives, and Babeldaob Island, which is connected to the land. Containers are also regularly recovered from Peleliu Island (a remote island).	<Yap > Introduced in 2007 with the support of UNDP. Main beverage containers made of aluminum, glass and PET have been recovered throughout the main island of Yap. There is one collection center, and its operation is outsourced to the private sector. <Pohnpei> Introduced in the 2010s by the then mayor of Colonia. Collection centers are located in Colonia and Madelenium and are operated by both cities. Only aluminum cans are targeted for collection. There are plans to improve the system, such as privatizing the operation of the collection center and expanding the target items. <Kosrae> Introduced in 2007 with the support of UNDP. The main beverage containers made of aluminum, glass and PET are recovered throughout the area. There is one collection center, and its operation is outsourced to the private sector. *Used lead acid batteries are also recovered at collection centers in Yap and Kosrae. In Kosrae, Used lead acid battery is subject to CDL.	<Majuro Atoll> The main beverage containers made of aluminum, glass and PET are recovered at Majuro Atoll. There is one collection center, and its operation is outsourced to a public corporation. <Kwajalein Atoll> Deposits are charged for imported beverage products at the customs office of the atoll, but the operation of the collection center has not started yet. The Kwajalein Atoll local government, which plans to operate the collection center, has procured press machines, etc., and preparations are in progress.
Item	PET bottle, Aluminum can, Steel can, Glass bottle, Tetra Pak	<Yap> PET bottle, Aluminum can, Glass bottle <Kosrae> PET bottle, Aluminum can, Glass bottle, Used lead acid battery <Pohnpei> Aluminum can	Aluminum can, PET bottles, Glass bottle
Number of handling - aluminum can	9,918,461[1)]	<Yap> 2,422,288 <Kosrae> 951,615 <Pohnpei> 5,697,467	9,205,723[7)]
Number of handling - PET bottle	5,103,979[1)]	<Yap> 322,359 <Kosrae> 182,740	6,366,856[7)]
Regulatory agency	BPW MPIIC	State EPA	EPA

Survey item	Palau	Micronesia	Marshall
Collection center (Operator)	• Koror State Government • Belau Garbage and Scrap Company (private sector)	<Yap> Island Paradise (private sector) <Pohnpei> Colonia, Madelenium (local government) <Kosrae> Micronesian Eco Corp (private sector)	<Majuro Atoll> Majuro Atoll Waste Corporation (MAWC) <Kwajalein Atoll> Kwajalein Atoll Local Government (KALGOV) *Scheduled
Recovery rate (Number of recovered / Number of deposits charged)	90.3%[1)]	<Yap> 85.5% <Kosrae> 86.1% <Pohnpei> 57.2%	109.5%
Equipment used to process the recovered containers	(Koror State Government Collection Center) Automatic container measuring machine, large aluminum compression and packing machine, glass crusher	<Yap> Large scrap metal press machine, PET shredder <Pohnpei> Small can compressor <Kosrae> Small can compressor	Large scrap metal press machine
Collection method	Bring to the collection center	Bring to the collection center	Bring to the collection center
Frequency of receiving containers at the collection center	5 days a week (Monday-Friday)	<Yap> 3 days a week (Wednesday-Friday) <Pohnpei> 4-5 times a year <Kosrae> Monthly	4 days a week
Annual deposit charge	1,762,000 USD[1)]	<Yap> 275,358 USD[4)] <Pohnpei> 597,489 USD[5)] <Kosrae> 83,796 USD[6)]	860,000 USD[7)]
Business expenses2)	398,000 USD[1)]	<Yap> 193,149 USD[4)] <Pohnpei> Half of the gain on sale + α <Kosrae> 11,856 USD[6)]	157,000 USD[7)]
Gain on sale of valuables3)	—	<Yap> 12,000USD <Pohnpei> 64,000USD <Kosrae> 14,200USD	110,000 USD[7)]
Selling price (market price)	N.A.	N.A.	Aluminum can: $0.80 – 0.99/Kg

Survey item	Palau	Micronesia	Marshall
Challenges in operating the system	Of the two collection centers, the containers brought in are concentrated in the Belau Garbage and Scrap Company (private sector). It may put pressure on the operation of the Koror State Government Collection Center, so caution is required.	<Yap> The system is operating sustainably. Expanding the target items (Used lead acid battery and End of life vehicle) is also being considered. <Pohnpei> Currently, only aluminum can is targeted for collection, but PET bottle and glass bottle should also be targeted, and collection operations should be outsourced to the private sector as soon as possible. <Kosrae> Due to the small population (about 5,000 people), it was not possible to operate the collection center with an operating cost of 1 cent per container. Therefore, the operating cost has just been changed to 2 cents per container. (That is, the deposit was increased to 7 cents.) It is necessary to monitor the future operation status.	The introduction of the system preceded in the densely populated Majuro Atoll. At present, beverage containers are being recovered only in Majuro. Both the collection status and operation status in Majuro are good. Currently, preparations are underway for introduction at Kwajalein Atoll (Ebeye), where the population is also concentrated, and introduction support is needed.

1) MPIIC-BPW, Beverage Container Recycling Program Annual Report FY2018, 2018
2) Amount received by the collection center
3) Gain on sale of the operator of the collection center (the latest sale, the exact amount is unknown)
4) Internal materials of Yap EPA, 2018
5) Internal materials of Pohnpei State Finance Bureau, 2017
6) Internal materials of KIRMA, 2017
7) Internal materials of MAWC, 2019

2.4.2 Recycling activities in Koror State, Palau

Koror State, where about 70% of Palau's population lives, has abundant tourism resources and plays a central role in Palau's economy. In Koror State, the state government is taking the initiative in manufacturing glass products using glass, composting using used paper and cardboard, and converting plastic into oil. The outline of each recycling activity is as follows.

Table 2-30 Overview of recycling activities in Koror State, Palau

Type of activity	Amount of recovery	Overview
Compost using used paper and cardboard	0.6 tons / month (actual)	In the 149 months since January 2009, compost has been produced using 89.2 tons of used paper and cardboard. It is still ongoing.
Glass products using glass	0.6 tons / month (results up to June 2021) 21.6 tons / month (planned)	A glass center has been established to produce glass products using glass recovered under CDL. In the future, the center will play a central role in developing the business as a facility where tourists can experience glass production. When the tourism industry recovers steadily in the future, it is expected to use 21.6 tons of glass per month.
Conversion of plastic into oil	11 tons / month (planned)	If the oil conversion equipment using plastic resumes its activities in earnest, it is planned to use 11 tons of plastic per month. Plastics are being collected in collaboration with ICETT's activities[6]. However, it cannot be said that it is a technically established processing method, and it is extremely difficult to operate and maintain it. Therefore, it is necessary to pay attention to the future operation status.

2.4.3 Separate collection of recyclables in Fiji

In the Waste Minimization and Recycling Promotion Project (October 2008 - March 2012) implemented by JICA, separate recyclable collection was introduced in Lautoka City and Nadi Town from September 2009.

Table 2-31 Introducing separate collection of recyclables in Lautoka and Nadi

Survey item	Lautoka	Nadi
Target recyclables (common)	PET bottle, plastic bag, hard plastic, scrap metal, used paper (newsprints, magazine, office paper, cardboard)	
Collection frequency	Residential area: Once every two weeks Commercial district and school: Once a week	Once a week
Collector	Directly managed by the city of Lautoka	Contractor

Both local governments outsourced the collection of municipal waste to private companies. However, since the collection in Lautoka was twice a week, it was decided that the city would directly manage the separate collection of recyclables. On the other hand, in Nadi, the frequency of collection was three times a week, so two days were devoted to general waste collection and one day was allocated to separate collection of recyclables, and the consignment fee was the same as before. At the beginning of the introduction, the collected recyclables were taken over by recyclers for a fee. In Lautoka, the gain on the sale covered the city's collection and operating costs, but in the case of Nadi, it was returned to the community. However, as the recycling market became sluggish, there was almost no profit on sale.

Under these circumstances, the city of Lautoka stopped the separate collection of recyclables and set up a recycling center in the park under the jurisdiction of the city to change the system

[6] Separate collection of plastic is conducted under the JICA project “The Project on working together with the government and citizens for zero waste society promotion in Ibobang, Ngatpang and Mongami, Aimeliik, Republic of Palau” implemented by ICETT(International Center for Environmental Technology Transfer)

so that citizens can bring their recyclables. On the other hand, Nadi is still continuing the separate collection of recyclables. The table below outlines the current separate collection of recyclable in Nadi.

Table 2-32 Overview of recyclable separate collection in Nadi in 2021

Survey item	Result
Target item	Paper, cardboard, newspaper, office paper, magazine, cloth, PET bottle, plastic container, scrap metal (ferrous, copper, aluminum), small home appliance
Processing method	Manual sorting
Handling volume	1 ton / month
Type and number of equipment	Collection vehicle: 1
Method for obtaining equipment	Donated by the Embassy of Japan
Equipment price (procurement price)	82,450FJD *As of 2009
Collection method	Door to door collection
Processing route	Home → Collection by the town → Recycler → International / domestic market
Collection frequency	Once a month
Collection fee	Free (24FJD / year / number of collected container for general waste)
Fee collection system	-
Collection, storage and processing capacity and scale	1 ton
Expenses	Approximately 6,000 FJD / month (including general waste collection)
Earnings	None (valuable recyclables are handed over to recyclers free of charge)
Market trends for recyclables	-
Changes in selling price	-

2.5 Survey on the Current Legal System for Waste Management

Basic information including the following items regarding the current status of waste management law systems in each country was collected and organized. The survey was carried out efficiently by requesting materials related to J-PRISM Phase2 and conducting hearings.

In this survey, questionnaire (waste management law system) was prepared.

Further details on the survey form is as attachment. This questionnaire was basically used in common in the nine countries that were the subject of the field survey. The questionnaire was distributed mainly to government officials (mostly organizations that have jurisdiction over waste management, such as the Ministry of the Environment and the Ministry of Public Works). As for the countries which were not responded, supplemental information collected by survey team is described.

As for 5 literature survey target countries, desktop survey based on the internet was conducted. Documents available on the web were collected through the desktop survey.

Table 2-33 List of surveyed organizations

Country	Name of organization
Palau	Bureau of Public Works (BPW), Ministry of Public Infrastructure, Industries and Commerce (MPIIC) / Environmental Quality Protection Board
Micronesia	DT&PW / Chuuk EPA / Pohnpei EPA
Marshall	Environmental Protection Authority
Papua New Guinea	Conservation & Environment Protection Authority (CEPA) / National Capital District Commission (NCDC) / Ministry of Environment Conservation & Climate Change (MEC & CC)
Solomon	Ministry of Environment, Climate Change, Disaster Management and Meteorology (MECDM) / Honiara City Council (HCC)
Vanuatu	Ministry of Climate Change Adaptation, Meteorology, Geo-Hazards, Environment, Energy and Disaster Management (MCC)
Fiji	Minister of Waterways and Environment
Tonga	Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change and Communications
Samoa	Ministry of Natural Resources and Environment

The outline of the current status of the waste management system identified in this survey is as follows.

Table 2-34 Outline of basic waste management legislation

	Environment Management Act*	Waste Management Act	Laws related to recycling (Except for strategy, etc.)
Palau	Enacted	N/A	Law on beverage recycling enacted
Micronesia	4 States are independently managed under state code	N/A	Law on beverage recycling enacted in 3 states Law on end of life vehicle is enacted in 1 state.
Marshall	Enacted	N/A	Law on beverage recycling enacted
Papua New Guinea	Enacted	N/A	Not in particular
Solomon	Enacted	N/A	Not in particular
Vanuatu	Enacted	Enacted	Not in particular
Fiji	Enacted	N/A	Regulated license for recyclers and trading scrap metal Regulated trade of scrap metal (non-ferrous)
Tonga	Enacted	Enacted	Law on controlling Hazardous waste enacted in association with Basel convention

	Environment Management Act*	Waste Management Act	Laws related to recycling (Except for strategy, etc.)
Samoa	Enacted	Enacted	Not in particular
Cook	Enacted	N/A	Law on promoting reuse of empty bottle enacted
Kiribati	Enacted	N/A	Law on beverage recycling enacted
Nauru	N/A	N/A	Not in particular
Niue	Enacted	N/A	Not in particular
Tuvalu	Enacted	Enacted	Law on beverage recycling enacted

*Include Environmental act, Environmental Basic Act, Environmental Protection Act and etc.

Table 2-35 Outline of the current status of the waste management system

	Outline of the basic legal system in waste management	Overview of the legal system for recycling and proper disposal of surveyed items
Palau	No waste management law has been enacted, and the Environment Quality Protection Act (1821) is the basic law. At the national level, the Department of Public Works (BPW) of the Ministry of Public Infrastructure, Industry and Commerce (MPIIC) manages and supervises municipal waste in general, and the Environmental Protection Agency (EQPB) manages and supervises hazardous waste. There are 16 states in Palau, and the waste management work of each state is the responsibility of the state government.	In the country, the so-called CDL system, which is a deposit system for beverage containers (aluminum cans, steel cans, PET bottles, beverages in glass bottles), has been successful. The basis of this system is the Recycling Act 2006 (RPPL No. 7-24). In addition, matters necessary for implementing this system, such as deposit billing, purchase centers, and business registration, are stipulated in the Beverage Container Recycling Regulation 2009.
Micronesia	At the national level, the Department of Environment, Climate Change and Crisis Management (DECCEM) is primarily responsible for formulating national environmental policies and coordinating between state environmental departments, while the Ministry of Transport and Communications Infrastructure develops infrastructure primarily for solid waste. No waste management law has been enacted. On the other hand, the four states practice waste management based on the State Code.	The legal system is being developed in each state as follows.
	【Yap】 “Solid Waste Management Regulations 2015”	【Yap】 “Recycling Program Law 2008”, “Recycling Program Regulations (Dec 2008)”, “Recycling Finance Law 2009”
	【Chuuk】 “Chuuk State Code”, “Chuuk State Clean Environmental Act 2018 (Amended in 2020)”	【Chuuk】 “Chuuk State Clean Environmental Act 2018 (Amended in 2020)” stipulates the handling of scrapped vehicles.
	【Pohnpei】 Pohnpei State Code	【Pohnpei】 "Pohnpei State Code Title 27, Chapter 3" stipulates recycling of aluminum cans.
	【Kosrae】 Kosrae State Code	【Kosrae】 "Kosrae State Code Title 19. Environmental Protection and Management" stipulates the recycling of PET, aluminum cans and glass.
Marshall	No waste management law has been enacted, and the Marshall Islands Environmental Protection Agency supervises the status of waste management under the "National Environmental Protection Act 1984".	Under the following laws, a deposit system for beverage containers has been introduced since 2018. "Styrofoam Cups and Plates and Plastic Products Prohibition and Container Deposit Act 2016", "The Amendment to the above 2018", "Recycling Program Regulations 2018"

		Under this deposit system, the Majuro Atoll Waste Public Corporation operates a purchase center called the Redemption Center under the supervision of the Environmental Protection Agency.
Papua New Guinea	・Environment Act 2000 It is a major environmental protection law, as well as the law sets for constitutional requirements and regulates the environmental impact of development activities and national water resource management. State and local governments can develop environmental laws, policies and bylaws for waste management. It is also required to formulate national policies, national solid waste management strategies and their related regulations. Water quality standards were added in 2002, local governments were empowered to formulate environmental legislation, policies and regulations. It is also required for a national policy on national waste management. ・Public Health Act 1973 Penalties for cleaning, waste disposal and illegal dumping is stipulated. This act is managed by the Ministry of Health. ・Organic Law on Provincial Governments and Local-level Governments The law empowers local governments to develop waste management policies, legislation and articles of association. ・National Capital District Commission Act 2001 This law stipulates for the protection of public welfare related to waste and environmental management	・ National Climate Compatible Development Management Policy The Policy mentions the development of the environmental industry, infrastructure for solid waste management and recycling. ・ National Strategy for Responsible Sustainable Development for PNG (StaRS) The Strategy mentions green growth policies that include cost recovery in waste management and environmental taxes such as environmental pollution tax. ・Third PNG Medium Term Development Plan (NTDP III) The Plan mentions to support waste management activities from a medium-term perspective. ・National Health Plan 2011-2020 The Plan mentions effective waste treatment from the perspective of reducing the incidence of illness.
Solomon	・Environmental Act 1998 Solomon have no legislation for waste management, but the Environmental Law (1998) indicates articles related to waste management. This is included regulating the transport, collection, treatment, storage and disposal of waste and "complying with and implementing environmentally relevant regional and international treaties and obligations". ・Environment Health Act 1980) The law covers environmental (public) health from the perspectives of food safety, facility cleanliness, adoption of hygiene measures, and management of infectious diseases, pests and vectors. Therefore, although there are limited references to medical waste generated in hospitals and clinics, there are references to cases that waste causes infections and illnesses. In addition, in order to ensure and maintain environmental hygiene, illegal dumping of wastewater and waste into sewers and rivers that serve as water sources is prohibited. ・Honiara City Act 1999 Sch 5 Part I Section 4 allocates waste collection, road cleaning and waste treatment to the Honiara City Council.	・ National Waste Management and Pollution Control Strategy (2017-2026) Issues based on the actual state of waste management, legal system, and progress of "National Waste Management and Pollution Control Strategy (2009-2014)" are compiled, and nine policies (environment, society, economy, and institutional aspects) are set out based on the issues. A specific action plan is described. ・National Implementation Plan (NIP) for the Stockholm Convention of POPs 2018 The NIP stated a policy of fulfilling the obligations of the 28 Stockholm Conferences.

	・Litter Ordinance Decree to keep Honiara city clean. It stipulates waste containers for collection. It also stipulates that the Honiara City installs containers for waste collection. ・Provincial Government Act 1997 In Schedule 3 based on "s 26 (3)", the state congress has the role of waste treatment. ・ Honiara City Council Solid Waste Management Plan (2018-2027) The Plan stipulates priority of waste management in Honiara. It aims to improve the current situation through an action plan.	
Vanuatu	・Waste Management Act 2014 This legislation stipulates environmental protection by encouraging effective waste services and operations. Waste definition, waste collection, waste disposal, waste management planning/reporting, and responsibilities of hazardous waste management is described. ・Pollution Control Act, 2013 Sewage and wastewater are managed under the law. "Pollutants", including gases, liquids, or solids that could be harmful to the environment, are defined and also requirements for hazardous wastes are defined. ・Environment and Conservation Act 2002 The environmental conservation and sustainable development & management in Vanuatu, and the role of the agencies responsible for them are comprehensively regulated. Opportunities for environmental impact assessment, biodiversity, protected areas, and bioprospecting (research) are provided. ・Vanuatu 2030: National Sustainable Development Plan 2016 to 2030 The plan describes improvements of administrative services in rural area including the goal of reducing waste/ pollution and owning waste disposal facilities in three states by 2030 through effective waste management and pollution control. It also includes their monitoring and evaluation.	・ Waste Management Regulations 2018(2019 revision The regulation stipulates license authentication and penalties related to the operation of waste transfer station and waste management. The use of certain plastics is prohibited. ・Vanuatu National Waste Management, Pollution Control Strategy and Implementation Plan 2016-2020 This strategy covers all sources of solid waste (residential, commercial, disaster waste, electronic waste and scrap metal, etc.), hazardous waste (used oil, etc.), and liquid waste (mainly pollutants). This is a strategy/action plan aimed at minimizing the amount of waste generation and the amount of final disposal.
Fiji	No waste management law has been enacted, and Environmental Management Act 2005 is the basic law. The Environmental Management Law stipulates the role of the Environment Bureau and regulations and permits related to waste treatment. Waste management by local governments is stipulated in The Local Government Act 1972, and it is stipulated that local governments provide sanitary services. Environmental Management Act It is a general environmental control and pollution control law that also applies to pollution by hazardous wastes and various other wastes. Within the Ministry of the Environment, a department in charge of waste management and pollution prevention is established. Part 5 contains provisions on waste management and pollution control. Permission to discharge waste and pollution is dealt with. According	The Environment Management (Waste Disposal and Recycling) Regulations2007 stipulates the operation of recycling facility and the businesses which handles lead acid battery and PET bottle. A feasibility study on the introduction of the CDL system for aluminum cans and PET bottles was conducted about 10 years ago and is still under discussion. It has not been actually introduced. Although it is not from the viewpoint of recycling, Scrap Metal Trade Act 2011 restricts the trade of scrap metal (non-ferrous metal) because of the theft of public property one after another. Environment Management (Waste Disposal and Recycling) Regulations It stipulates permission requirements for waste classification, final disposal, and recycling.

	to Article 45A, which was inserted in January 2020, it is a crime to manufacture plastic bags. Litter Act It defines illegal dumping and stipulates penalties and illegal activities. Glass, sharp metals, oil, fuel, automobiles, etc. are defined as dangerous illegal dumping. The Local Government Act (Revised in 2018) Waste management by local governments is stipulated in The Local Government Act 1972, and it is stipulated that local governments provide sanitary services. With the 2018 revision, local governments are now responsible for providing sanitary services not only to citizens but also to people living in designated surrounding areas.	Environment Management (Container Deposit) Regulations 2011 It stipulates a framework for recycling by CDL in Fiji (CDL has not been introduced as of 2021). Environment & Climate Adaptation Levy (Plastic Bags) Regulations It stipulates the collection of taxes on plastic bags. Customs Act It stipulates the conditions for importing specific items (including biodegradable plastic bags and radioactive substances). A draft national waste management strategy has been prepared (unapproved).
Tonga	Waste Management Act (Revised in 2016) It stipulates the scope of waste management services, stipulates that the waste public corporation will be the implementing body of general waste management service projects, and also stipulates the role of Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change and Communications. Articles 24 to 26 define specific illegal acts related to waste such as littering, dumping, and movement of hazardous waste, and provide provisions for enforcement and prosecution. Hazardous Wastes and Chemicals Act (Revised in 2016) It regulates the regulation and proper management of hazardous wastes and chemicals in accordance with internationally recognized practices and international treaties applicable to the use of hazardous substances, cross-border movements and final disposal. It refers to the Stockholm Convention, the Rotterdam Convention, the Basel Convention, and the Waigani Convention. Environment Management Act It was set for the purpose of proper environmental management and sustainable development. Based on the law, there are rules that stipulate regulations and prohibitions on air, water, and land pollution. Public Health Act (Revised in 2016) It stipulates waste collection, containers, and disposal of solid and hazardous waste. It prohibits the import of toxic and hazardous waste. Environment Management (Litter and Waste Control) Regulations 2016 It defines activities and illegal activities related to waste pollution, such as the dumping of waste and hazardous waste, the waste that causes pollution, and the incineration of waste. It also shows penalties and enforcement rules.	Waste Management Act stipulates that the waste public corporation is obliged to promote recycling, but no specific details have been set. It is understood that the regulations based on the Hazardous Wastes and Chemicals Act are applied to waste batteries and waste oil. Waste Management (Plastic Levy) Regulations 2013 A 10% tax is levied on the import of all plastic products. It authorizes (the staff of) the waste public corporation to collect taxes. Tonga National Infrastructure Investment Plan (NIIP) (2013–2023) The "solid waste" sector has been given a high priority, with an estimated $ 4 million invested in new landfills and transit stations. Tonga National Strategic Development Framework 2015-2025 It sets goals to improve waste management, reduce waste and create a cleaner environment based on recycling, and reduce pollution from household and corporate activities. To achieve these goals, programs are planned for controlling the generation of solid waste (including E-waste) and proper disposal (separation, disposal, recycling) throughout Tonga.

Samoa	Waste Management Act 2010 has been enacted, which stipulates the role of Ministry of Natural Resources and Environment in waste management projects. A national waste management strategy was established in 2019, and goals and priority activities are set for each item. Lands, Surveys and Environment Act 1989 Regarding waste, Section 8 “Littering Regulations” stipulates littering measures. The dumping of waste in public places and private land is defined as littering. In addition, Section 8 generally stipulates penalties for violating the provisions of the law. Waste Management Act 2010 It is the most basic law of waste management in Samoa, and defines the roles and responsibilities of MNRE and related organizations for each waste classification. It also defines 17 functions that MNRE should perform. National Waste Management Strategy 2019-2023 Samoa's first national waste management strategy, targeting both solid waste management and hazardous waste management.	Waste Management Act 2010 stipulates that Ministry of Natural Resources and Environment is obliged to promote recycling, but no specific details have been set. With the support of the EU, investigations and plans are currently underway with the aim of introducing the CDL system. These are related to many of the items covered by this survey. The national waste management strategy sets a target value of 61% for the recycling rate of aluminum cans on the main island by 2023. Legislation envisioned in the future includes charging for waste collection, establishing a CDL system, establishing rules for E-Waste, and formulating a disaster waste treatment plan.
Cook	The main laws governing the management of solid waste are the Environment Act 2003 and the Public Health Act 2004. Under the Environment Act, the Ministry of Environment is in charge of formulating and promulgating legislation and for the illegal waste dumping. The current legislation, however, is confusing because the responsibility for waste management is distributed among several ministries: The Ministry of Health is responsible for medical waste under the Public Health Act, the Ministry of Infrastructure is responsible for the construction of waste management facilities and the collection and disposal of waste, etc. A new waste management law has been proposed in the National Waste Management Strategy to consolidate the responsibilities under a single body.	Reuse of Bottles Act 1988 : This law defines the ownership of bottle containers and provides for the re-use of bottle containers by the (new) owner. The history and purpose of the law are not clear, but it is interpreted as a legal recognition of the secondary reuse of empty bottles as containers for other products. National Sustainable Development Plan 2016-2020: Its Goal 3 is to promote sustainable and effective solid and hazardous waste management, with the total amount of waste recycled as the indicator. Cook Islands Solid Waste Management Policy 2016 – 2026 It is prepared to promote the sharing of waste management responsibilities among stakeholders to improve solid waste management in Cook, and to provide a framework within which a more detailed solid waste strategy can be operationalized, and the actions required to implement the policy.
Kiribati	Environment Act 1999 and Environment (Amendment) Act 2007 The above act governs the transport, collection, treatment, storage and disposal of waste. It also provides for compliance with regional and international environmental conventions and obligations. Local Government Act 1984: The Act places responsibility for the collection of waste and the management of final disposal sites in the hands of the local councils within their respective jurisdictions.	Legislation for recycling are also Environment Act 1999 and the Environment (Amendment) Act 2007 which shown on the left. The aim of those acts are to promote the reduction, reuse, recycling, composting and recovery of waste in an economically viable way. Special Fund (Waste Materials Recovery) Act 2004 (for implementation of CDL) : This Act provides for CDL, established to regulate the levy deposits for waste material recovery. It sets out the items on which the deposit is payable, when it must be paid, the amount, to whom it must be

		paid and the percentage of the deposit that is refundable.
Nauru	Environmental Management and Climate Change Act 2020 The act makes provisions for the management and protection of the environment, climate change, the promotion of sustainable development. Part 7 of the act stipulates about pollution control and waste management. As control of litter, it states all litter shall be placed in a contained manner, separate from vegetarian and be collected for disposal. Litter Prohibition Act 1983 and Litter Prohibition (Amendment) Act 2014 The act stipulates prohibition on littering and offence provisions. It prohibits any person to throw down, drop or deposit in. Then for the amended act in 2014, the section for provisions for business premises had added. By this, business premises are asked to make ensure that their building shall be free of any litter, refuse or rubbish of any kind.	Under the support of SPREP, a draft National Waste Management Strategy (2011-2020) has been prepared and it is proposed that by 2020 a 30% reduction from the amount of waste delivered to landfills in 2011 will be achieved through the introduction of CDLs for aluminum cans, steel cans, glass containers and PET bottles, composting of organic waste and banning of plastic bags , but the development of this strategy has not been confirmed. (Only Version 0 was available on the Internet)
Niue	There is no basic law on waste management itself. Environment Act 2015 stipulates development consents for activities will or may have a significant environmental impact including waste disposal. The Village Council Act 2006 gives village councils the function to provide health and sanitation services for the purposes of establishing and maintaining village cleanliness and for the prevention of pollution of water sources and land resources.	The draft National Integrated Waste Management Strategy 2010-2015 includes a target of 25% recycling of cans, bottles, plastics and paper by December 2013 and a 25% reduction in the generation of household and commercial waste. However, the development of this strategy has not yet been confirmed.
Tuvalu	Waste Operations and Services Act 2009, Waste Management Act 2017 : Under the act, Department of Environment is responsible for formulating the legislation relating to waste management. The actual body responsible for waste management is the Kaupule (council) in each jurisdiction as set out in the Falekaupule (Local Government) Act 1997 (revised 2008). The Kaupule may designate byelaws in accordance with the above-mentioned Local Government Act and exercise powers as the local waste management authority. The Solid Waste Authority of Tuvalu (SWAT) under the Ministry of Home Affairs will provide financial support to the Kaupule, direct that efficient and effective waste management is carried out, and if the Kaupule fails to comply with its instructions, may withdraw any support to the Kaupule until the situation improves.	Waste Management (Levy Deposit) Regulation 2019 It provides for deposit fees and refunds to promote recycling of certain imported goods, and penalties for illegal waste collection, illegal dumping and obstruction at recycling facilities.

Following counties had the registration and licensing system for waste collection, processing (recycling) and final disposal businesses.

Table 2-36 Registration and permission system on waste collection, processing (recycling) and final disposal

Country	Registration and licensing system
Fiji	Based on “Environmental Management Regulations”, the businesses which operate waste collection, processing (recycling) and final disposal are requested to obtain permit issued by Department of Environment. The system is practically enforced as without permit, these businesses can’t be operated.
Tuvalu	Based on “Waste Operations and Services Act 2009”, Solid Waste Agency of Tuvalu (SWAT) permitted processing (recycling) only for a private company. The private company is responsible for collection, processing and export of recyclables based on the contract between SWAT.
Papua New Guinea	Based on “Environment Act 2000”, any business processing (recycling) is requested to obtain Environment Permit.
Vanuatu	Based on “Waste Management Regulations Order No. 15 of 2018”, private businesses which operate waste collection, processing (recycling) and final disposal are requested to obtain permit.

2.6 Survey on Marine Plastic Litter Control, Including Regulation of Single Use Plastics

2.6.1 Outline of the survey

A survey on the current status of single use plastic regulations and marine plastic waste countermeasures in each country was conducted.

In this survey, questionnaire (plastic measures) was prepared. Further details on the questionnaire is as attached. This questionnaire was basically used in common in the 9 field survey target countries. The questionnaires were distributed mainly to the government officials. Many of them belong to organizations that have jurisdiction over marine plastic waste countermeasures, such as the Ministry of the Environment, the Ministry of Public Works, and the Marine Safety Bureau. As for the countries which were not responded, supplemental information collected by survey team is described.

As for 5 literature survey target countries, desktop survey based on the internet was conducted. Documents available on the web were collected through the desktop survey.

Table 2-37 List of surveyed organizations

Country	Name of organization
Palau	Bureau of Public Works (BPW), Ministry of Public Infrastructure, Industries and Commerce (MPIIC) / Environmental Quality Protection Board
Micronesia	DT&PW / Chuuk EPA / Pohnpei EPA
Marshall	Environmental Protection Authority
Papua New Guinea	Conservation & Environment Protection Authority (CEPA) / Ministry of Environment Conservation & Climate Change (MEC & CC) / National Capital District Commission (NCDC)
Solomon	Ministry of Environment, Climate Change, Disaster Management and Meteorology (MECDM) / Honiara City Council (HCC)
Vanuatu	Ministry of Climate Change Adaptation, Meteorology, Geo-Hazards, Environment, Energy and Disaster Management (MCC) / Ministry of Foreign Affairs, International Cooperation and External Trade / Ministry of Finance and Economic Management (MFEM)
Fiji	Minister of Waterways and Environment
Tonga	Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change and Communications
Samoa	Ministry of Natural Resources and Environment

The outline of marine plastic waste countermeasures including single use plastic regulations, which was identified in this survey is as follows.

Table 2-38 Outline of marine plastic waste countermeasures including single use plastic regulations

Country	Outline
Palau	Banned importing shopping plastic bag except for biodegradables
Micronesia	Banned importing single use plastic (shopping bag, Styrofoam, drinking straw). Each state performs its regulations respectively.
Marshall	Banned production, sales and distribution of single use plastic (shopping bag, Styrofoam and other containers)
Papua New Guinea	Banned importing plastic shopping bag. License for production and retail of the plastic bags is suspended and not renewed.
Solomon	Under consideration and discussion
Vanuatu	Banned production and use of single use plastic (shopping bag, container, drinking straw and cutlery)
Fiji	Banned using plastic shopping bags thinner than 50 micron.
Tonga	Levies 10% for importing of plastic product except for items determined in the regulation
Samoa	Banned importing, production, exporting, sales and distribution of single use plastic (shopping bag, Styrofoam and drinking straws)
Cook	Roadmap to banning single use plastic was formulated under Single Use Plastic Ban Policy 2018-2023
Kiribati	Under consideration and discussion
Nauru	Banned importing, production, sales and distribution of single use shopping plastic bag
Niue	Banned using single use shopping plastic bag
Tuvalu	Banned importing, production, sales and distribution of single use plastic (shopping bag, beverage container, cutlery, drinking straw)

2.6.2 Result of the survey

a. Status of formulation and operation of laws, national strategies, and basic policies related to marine plastic waste control

Table 2-39 Status of formulation and operation of laws, national strategies, and basic policies related to marine plastic waste control

	Laws, national strategies, and basic policies related to marine plastic waste control	Status of formulation and operation
Palau	• Plastic Bag Reduction Act (2017) • Executive Order No. 417: To Establish Zero Disposable Plastic Policy (2018)	Under the "Plastic Bag Reduction Act (2017) (RPPL 10-14)", the distribution of non-biodegradable plastic shopping bags has been prohibited at retail stores after two years passed from the enforcement date (November 8, 2017). In addition, after one year passed from the enforcement date, it has been prohibited for individuals and businesses to import non-biodegradable plastic shopping bags. Under “Executive Order No. 417: To Establish Zero Single use Plastic Policy (2018)”, all government agencies have declared that they will immediately cease the practice of providing disposable plastic and polystyrene beverage containers to employees and guests.

Micronesia	• Regulation Governing the Prohibition on the Importation of One-Time-Use Disposal Styrofoam and Plastic Food Service Items and Plastic Shopping Bags • FSM Public Law 21-76 【Yap】 • Plastic Bag Prohibition Regulations (2014) 【Chuuk】 • Chuuk State Clean Environmental Act of 2018 (Amended in 2020) 【Pohnpei】 • Pohnpei State Code Title 27 【Kosrae】 • Kosrae State Code	"FSM Public Law 21-76" The law came into effect on July 1, 2020 and banned the import of disposable Styrofoam and plastic tableware (plates, cups, utensils, plastic shopping bags, etc.). Under the new law, imports of reusable Styrofoam, recycled plastic food containers, and plastic shopping bags are exempted from the restrictions. Imports of biodegradable plastic bags and food service items are also allowed. "Regulation Governing the Prohibition on the Importation of One-Time-Use Disposal Styrofoam and Plastic Food Service Items and Plastic Shopping Bags" The regulation came into effect in June 2020. Imports of plastic bags, foamed styrene food containers, disposable straws, and disposable containers are prohibited. In addition, the legal system is being developed in each state as follows. 【Yap】 "The Plastic Bag Prohibition Regulations (2014)" prohibit retailers from distributing plastic shopping bags to customers. 【Chuuk】 "The Chuuk State Clean Environmental Act of 2018 (Amended in 2020) "prohibits the use of Styrofoam, single use shopping bags, and plastic straws. 【Pohnpei】 "Pohnpei State Code Title 27" prohibits the import, use and disposal of non-recyclable plastic shopping bags with a thickness of less than 5 mm. 【Kosrae】 The "Kosrae State Code" prohibits the sale and distribution of single use shopping bags.
Marshall	• Styrofoam Cups and Plates, and Plastic Products Prohibition and Container Deposit Act 2016	"Styrofoam Cups and Plates, and Plastic Products Prohibition and Container Deposit Act 2016" came into effect in October 2018. Manufacture, sale and distribution of "plastic bags", "foam food containers" and "disposable containers" are prohibited.
Papua New Guinea	• Customs (Prohibited Imports) (Plastic Shopping Bags) Regulation 2009 • Customs (Prohibited Imports) Plastic Shopping Bags (Amendment) Regulation 2011 under Customs Act 1951 and	The import of plastic shopping bags is prohibited through "Customs (Prohibited Imports) (Plastic Shopping Bags) Regulation 2009" and "Customs (Prohibited Imports) Plastic Shopping Bags (Amendment) Regulation 2011 under the Customs Act 1951 and the Amendment in 2009 and 2014". CEPA has also issued a suspension of business license renewals and import bans for plastic bag manufacturers and retailers that use plastic bags

	the Amendment in 2009 and 2014 ・ Environment (Control of Biodegradable Plastic Shopping Bags) Regulation 2011 ・ Environment (Ban on Non-biodegradable Plastic Shopping Bags) Policy 2009	nationwide starting March 2020. In addition, “Environment (Control of Biodegradable Plastic Shopping Bags) Regulation 2011” regulates the manufacture and import of biodegradable plastic bags by issuing environmental permits. In accordance with this regulation, biodegradable plastic bags are required to meet the standards of the Department of Environmental Protection and be labeled.
Solomon	・ SHIPPING (MARINE POLLUTION) REGULATIONS 2011 :	The country has started the process of regulating single use plastics with the aim of developing a Single Use Plastic Ban in January 2019. “SHIPPING (MARINE POLLUTION) REGULATIONS 2011”, which addresses pollution incidents affecting the marine environment, and “National Ocean Policy 2018”, which covers all activities affecting the ocean in Solomon, provides for the development of an appropriate waste management system for the entire national coastal zone and shipping industry as part of the strategy of the policy.
Vanuatu	・ Waste Management Regulations Order No. 10 of 2018 Part 2 ・ Waste Management Regulations Order (Amended in October 2019)	“Waste Management Regulations Order No. 10 of 2018 Part 2” bans the manufacture and use of single use plastic bags and polystyrene containers, plastic straws. “Waste Management Regulations Order (Amended in October 2019)” stipulates a prohibition of the manufacture and use of 7 items plastics (cups, plates, spoons, etc.) as plastics bans regulation.
Fiji	・ Environment and Climate Adaptation Levy Act 2015 ・ Environment Management (Budget Amendment) Act 2019 ・ Customs Prohibited Imports and Exports Regulation 2021 ・ Marine Pollution Prevention Management Regulation 2014 ・ Maritime Safety Authority Of Fiji Act 2009 ・ Maritime Transport Act 2013 ・ Ship Registration Act 2013 ・ Litter Act 2008	"Environment and Climate Adaptation Levy Act 2015" levied a tax on the use of plastic bags and increased the charge for plastic bags from $0.20 to $0.50. Subsequently, the use of disposable plastic bags was banned in Section 45A of the Environment Management (Budget Amendment) Act 2019, where the above Act was amended in 2019. Specifically, the ban applies to plastic bags with a thickness of 50 microns or less (depending on the use) that are partially or entirely made up of polyethylene or PET. "Customs Prohibited Imports and Exports Regulation 2021". Appendix 1-18 (Prohibited Items) refers to plastic bags under Article 45A above. The Fijian government is also considering a new ban on Styrofoam food containers from August 2021. "Marine Pollution Prevention Management Regulation 2014” prohibits the discharge of all waste into Fiji waters from vessels, offshore

		facilities, etc., with the exceptions specified in Section 7, paragraph 51, "Discharge of Waste. "Maritime Safety Authority Of Fiji Act 2009" Aims to organize an authority for maritime safety and provides for the supervision of marine dumping. "Maritime Transport Act 2013" sets out the responsibilities, rules and regulations associated with maritime activities, plans to prevent illegal activities and marine pollution, and the response to spills. "Ship Registration Act 2013" provides for the registration of ships. "Litter Act 2008" restricts illegal dumping of waste in public places, but does not specifically address marine plastics.
Tonga	・ Environment Management (Litter & Waste) Regulation 2016 ・ Marine Pollution Prevention Act 2008(Amended 2016) ・ Waste management (Plastic levy) Regulations 2013	"Environment Management (Litter & Waste) Regulation 2016" It defines activities and illegal activities related to waste pollution, such as dumping of waste and hazardous waste, pollution-causing waste, and waste incineration, and provides penalties and enforcement rules. Restrictions are made on illegal dumping of waste, but not specifically on combating marine plastics. "Marine Pollution Prevention Act 2008 (revised in 2016)" The purpose of the Act is to provide for the prevention of and response to marine pollution and waste dumping, and to give effect to international marine pollution conventions. "Waste management (Plastic levy) Regulations 2013" As mentioned above, a 10% tax is levied on the import of plastic products (plastic bags and containers) with some exceptions. The waste corporation has the authority to collect taxes. As a community awareness campaign, a no-plastic campaign has been found to refrain from using single use plastics by using eco-bags and baskets.
Samoa	・ Waste (Plastic Bag) Management Regulations 2018 ・ National Waste Management Strategy ・ Shipping Act 1998 ・ Ship Registration Act 2001 ・ Shipping Registration Regulations2001 ・ Shipping (Maritime	"The Waste (Plastic Bag) Management Regulations 2018" has been enacted for the regulation of single use plastics. Under the regulations, the use of plastic bags, styrofoam food containers, and disposable straws are regulated, with some exceptions. In addition, "National Waste Management Strategy "has set targets for reducing plastic emissions. "Shipping Act 1998" and "Ship Registration Act 2001" and "Shipping Registration Regulations

	Security) Regulations 2004 ・ Small Vessels Regulations 1998	2001" set mandatory for registration of ships. "Shipping (Maritime Security) Regulations 2004" regulates the safety of ships, crew and passengers. "Small Vessels Regulations 1998" provides for the registration of small vessels (including small local fishing vessels).
Cook	・ Single Use Plastic Ban Policy 2018-2023 ・ Prevention of Marine Pollution Act 1998	Single Use Plastic Ban Policy 2018-2023: The policy sets out the process for regulating the importation of single use plastic products into Cook and does not provide for actual regulations. The regulations will be contained in the new Solid and Hazardous Waste Bill. It provides a detailed list of single use plastics to be regulated, and further divides them into those that should be regulated immediately (e.g. plastic shopping bags, disposable tableware) and those that should be regulated in the future but not urgently (e.g. PET bottles, plastic drinking water containers), including potential alternatives. The policy also lists potential alternatives. Prevention of Marine Pollution Act 1998: The act prevents the dumping of waste into the sea and the transport of other waste by ship in the waters of Cook, and to give effect to the various conventions relating to marine pollution. Chapter 2 prohibits the dumping of any plastic waste into the ocean in accordance with the MARPOL 73/78 Convention.
Kiribati	・ Kiribati Integrated Environment Policy (2013) ・ Maritime Act 2017	Although not formulated at this time, the Environment and Conservation Division is working with Customs and the Attorney General's Office to prepare a law banning the importation of single use plastic bags. Kiribati Integrated Environment Policy (2013): This policy presents the national waste management capacity building policy in the order of reduce, reuse, recycle and recover, and proper disposal according to the "waste hierarchy". Maritime Act 2017: The act provides for the prevention of pollution of the marine environment and matters relating to the implementation of international conventions and international treaties.
Nauru	・ Environmental Management and Climate Change Act 2020 ・ Environmental Management and Climate Change (Ban on Single Use Plastic Shopping Bags) Regulations 2021	Environmental Management and Climate Change Act 2020: The Act makes provisions for environmental management and conservation, climate change, promotion of sustainable development and compliance with international and regional environmental obligations and, as part of its commitment to sustainable environmental protection, the following regulation banning single use plastic bags has been issued under Article 62. Environmental Management and Climate Change

		(Ban on Single Use Plastic Shopping Bags) Regulations 2021: Developed in accordance with the Environment Management and Climate Change Act 2020. It prohibits the use of plastic bags other than biodegradable, degradable or reusable plastic bags. For the purposes of this regulation, a biodegradable plastic bag is a compostable bag made from a natural material such as cornstarch that breaks down into organic matter in water or the environment.
Niue	• Customs Import Prohibition (Plastic Shopping Bags) Order 2020	Customs Import Prohibition (Plastic Shopping Bags) Order 2020: The import of plastic shopping bags is banned. On the other hand, the ban will not apply to multi-use synthetic multi-purpose shopping bags (plastic bags 45-70 microns thick, constructed from nylon, polypropylene or polyester fabric and designed for multiple uses) or bags certified by an accredited body as being capable of carrying a 5kg load for a minimum of 55 uses over a distance of 100 meters and certified by an organization accredited under the Joint Accreditation Scheme of Australia and New Zealand.
Tuvalu	• Waste Management (Prohibition on the Importation of Single-Use Plastic)Regulation 2019) • Marine Pollution (Amendment) Act (2017) and Marine and Pollution Act 1991 • Ozone Layer Protection Act (2008 Revised) • Integrated Waste Policy and Action Plan 2017 - 2026	Waste Management (Prohibition on the Importation of Single-Use Plastic) Regulation 2019: Banns the import, manufacture, sale and wholesale of plastic shopping bags, drinking water containers of 1.5 liters or more and drinking containers of 1.5 liters or less, plastic straws, tableware, etc. Marine Pollution (Amendment) Act (2017) and Marine and Pollution Act 1991 An Act to make provision for the prevention and control of marine pollution and for dealing with it, giving effect to relevant international conventions. Ozone Layer Protection Act (2008 Revised): Prohibits the importation of goods manufactured using gases or volatile liquids, such as extruded polystyrene foam, polystyrene board stock and thermoformed plastic containers. Integrated Waste Policy and Action Plan 2017 – 2026: The plan sets target for the management of single use plastics. For Goal 1 "Strengthening institutional systems to address gaps in waste management", refers to a review of existing waste-related policies, including plastic bans, waste incineration bans and litter prevention.

b. Organizational structure and roles of relevant ministries and agencies in relation to marine plastic waste measures

The table below shows the roles of relevant ministries and agencies in combating marine plastic waste. Basically, only those countries and organizations that provided clear answers on the role of the relevant ministries in the questionnaire, or for which information was available through desk research, mainly in the 5 literature survey target countries, are listed.

Table 2-40 Roles of relevant ministries and agencies in relation to marine plastic waste measures

	Relevant ministries and departments responsible for combating marine plastic waste	Roles
Palau	Bureau of Marine Resources, Ministry of Natural Resources, Environment & Tourism	Promotion, exploration, utilization, protection, and management of the Republic's natural resources in the areas of marine and fisheries, agriculture, aquaculture, forests, minerals, other terrestrial and marine resources, and tourism.
Micronesia	FSM Department of Environment, Climate Change, and Emergency Management	Supervise and provide advice on laws and regulations, and promote national efforts to combat marine plastic waste.
	State EPAs/KIRMA (Yap, Chuuk, Pohnpei, and Kosrae)	Regulate the collection and disposal of marine plastic waste.
	National Oceanic Resource Management Authority (NORMA)	Advice on fisheries management (discards from fishing gear and nets): Provide advice on fisheries management (discards of fishing gear, nets, etc.) and regulatory oversight of marine pollution from fishing activities.
Papua New Guinea	Ministry of Health and Department of Health	Responsible for protecting the health of citizens from waste.
	Conservation & Environment Protection Authority (CEPA)	Environmental protection
	National Maritime Safety Authority (NMSA)	Prevent and control marine pollution caused by dumping and burning of wastes and other materials in Papua New Guinea waters and on ships.
Solomon	Solomon Islands Maritime Authority	Responsible for preventing and combating marine pollution from all threats, including ensuring the safe operation of ships, oil spills from land, untreated sewage, heavy siltation, nutrient enrichment, invasive species, residual organic matter, heavy metals from mines and shipyards, acidification, radioactive materials, marine debris, overfishing, and destruction of coastal marine habitats.
Fiji	Maritime Safety Authority of Fiji	Responsible for maritime security and marine environmental protection.
	Ministry of Environment and Waterways	Promote environmental sustainability as a regulator
	Ministry of Economy	One of the stakeholders in the discussion of environmental policies that may have economic impacts.
Tonga	Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change and Communications (MEIDECC)	The Ministry has jurisdiction over the Environment Management Act 2010 and has enforcement powers under the Act, including the issuance of infringement notices by the officer in charge. It also prescribes, monitors and enforces standards for environmentally friendly waste management methods and facilities under the Waste Management Act.
	Waste Authority Limited (WAL)	Collection Authority of the Plastic Levy.

Samoa	Division of Environment and Conservation, Ministry of Natural Resources and Environment	In accordance with the Waste Management Act 2010, it is responsible for waste-related regulations, waste volume reduction, waste collection services, and contract management for the maintenance of final disposal sites, as well as the implementation of international conventions such as the Basel Convention and the Waigani Convention.
	Maritime Division, Ministry of Works, Transport and Infrastructure	In addition to the implementation of the Marine Pollution Act 2008 and the Marpol Convention, it is responsible for the registration of ships and the implementation of marine environmental protection in addition to the safety management of ships, crew, passengers and ports.
Cook	National Environment Service(NES)	Involved in policy development, education and awareness, monitoring and evaluation as well as enforcement.
	Ministry of Health (MOH)	Involved in policy development and implementation in relation to public health under the Public Health Act 2004 and the Ministry of Health Act 2013.
	Ministry of Finance and Economic Management/Cook Islands	Responsible for the collection of taxes and tariffs on imported goods and also monitoring for the entry of prohibited or restricted goods.
	Infrastructure Cook Islands	Responsible for the administration of the landfill and recycling centre and the collection of rubbish and recyclables on Rarotonga.
	Island Governments (Local governments)	Responsible for waste management on their respective islands.
	Te Ipukarea Society (NGO)	An environmental NGO in Cook which runs the first Recycling Centre on Rarotonga conducting awareness and practical activities on environmental issues including waste management.
Tuvalu	Department of Environment ,Marine Department (Ministry of Transport, Energy and Tourism)	Ensures proper regulation and control of pollution, littering, wastes (including hazardous wastes) in Tuvalu, and shall take appropriate measures to minimize the impacts of pollution, litter and wastes on the environment. Responsible for the regulation of waste disposal at sea under the Marine and Pollution Act 1991 together with Department of Environment which implements the relevant international conventions.。
	Kaupule (Local Council)	Responsible for providing solid waste collection services to households and businesses, keeping roads, paths, and other public places free of rubbish. Moreover, Funafuti Kaupule stipulates “Plastic Free Island” in its “Strategic Plan 2011-2015” as one of the key strategies and setting 3 practical actions; namely, 1. Place a stronger mandate on the controlling of importing of all types plastic bags from abroad, 2. Enforce Kaupule bye-law and ban plastics bags, and 3. Raise public awareness.

c. Evaluation of biodegradable plastics and contents of standard setting, etc.

The table below shows the evaluation of biodegradable plastics in each country and the content of standard setting. Basically, only the countries that responded clearly to the questionnaire are listed.

Table 2-41 Evaluation of biodegradable plastics and contents of standard setting, etc.

Country	Status of implementation of specific measures in each country for promotion, target items, evaluation of biodegradability and setting of standards, etc.
Palau	(1) Status of implementation of specific measures in each country for promotion: No response (2) Target items: No specific items (3) Evaluation of biodegradability and details of standard setting a) Degraded by bacteria and other organisms within 5 years b) Compostable plastic bags: degrade in a controlled aerobic environment at a specific temperature and humidity, and undergo biological degradation to a level that is not visible at the compost site, to carbon dioxide, water, and inorganic compounds, and at a rate comparable to known compostable materials
Micronesia	(1) Status of implementation of specific measures in each country for promotion: No response (2) Target items: No specific items (3) Evaluation of biodegradability and setting of standards a. Biodegradable bags: Not plastic bags, but compostable or biodegradable bags made of vegetable starch. In addition, the following can be used Paper bags: Not made of plastic and biodegradable quickly.
Papua New Guinea	(1) Status of implementation of specific measures in each country for promotion: No response (2) Target items: No specific items (3) Evaluation of biodegradability and details of standard setting The U.S. ASTM standard has been applied. It has standards for exposure and testing of plastics to a combination of oxidation and biodegradation and consists of three components: Tier 1 measures the loss of properties and molecular weight due to thermal and biological processes, Tier 2 measures the biodegradation of Tier 1, and Tier 3 measures the ecotoxicity of products in the oxidation and biodegradation stages.

d. Examples of concrete measures taken by each country to combat marine plastic waste

The table below shows specific examples of efforts in each country for combating marine plastic waste. Basically, only those countries that responded clearly to the questionnaire are listed.

Table 2-42 Examples of specific policies and initiatives in each country to combat marine plastic waste

Country	Examples of Policies and Initiatives
Palau	Coastal cleanup activities to collect marine debris are held annually in each state, involving government agencies, state governments, students, and local communities.
Micronesia	A variety of activities are being conducted in the four states to combat marine plastic litter, including quarterly municipal beach cleanups and awareness campaigns.
Micronesia (Chuuk)	・ Shoreline Clean up: volunteers from NGOs and Government offices went out at the shoreline and picked up waste of many kinds. ・ Environment Day: volunteers from Dublon Island and Udot joint efforts with EPA staff, picking you trash at the shoreline at Public Markets in Downtown Weno. ・ There are plans to have a Micronesia Cleanup Day, Earth Day, and Environment Day, supported by DECEM.
Papua New Guinea	・ Coastal cleanup Campaigns in 1999 and 2020 ・ Plastic Buy Back scheme undertaken in local village in 1998 (Failed initiative) ・ Public awareness by various Groups and NGO in-country.

Country	Examples of Policies and Initiatives
Solomon	・ Mataniko River Litter Boom Pilot Project 2015 : The objective of this project is to reduce marine litter from Mataniko river. Booms were installed and data collected over 6 months. Public awareness is also conducted during the cause of the project. ・ CEFAS CLIP Project 2018-2019 : The project supported the development, implementation, and coordination of marine litter reduction programs in the Commonwealth countries and assisted in the development, implementation, and coordination of the Commonwealth marine litter reduction programs, and carried out the following activities. ・ Development of a management approach to marine litter pollution that is consistent with international approaches. ・ Preventing and reducing marine debris, reducing its impact on marine life, habitat, public health and safety, and reducing socio-economic costs. ・ Removal of litter from the marine environment in a practical and feasible manner. ・ Increase knowledge and awareness of marine litter pollution. ・ The capacity of Solomon to tackle marine litter sources has been improved under the project. ・ Specific activities include waste generation and management, audits of receiving facilities, marine litter assessment, training and best practices, socio-economic surveys, desk studies, etc. A report was prepared showing the results of these activities. Other activities include workshops and training for communities on marine litter monitoring, and training for government officials on monitoring marine litter and micro plastics using scientific methods.
Vanuatu	・ Clean-up Campaign during the National Environmental Week and World Clean-up Day etc.
Samoa	・ The enforcement of prohibition on importation, distribution, selling, use, manufacturing of some single use plastics mainly plastic shopping bags, plastic packing bags, plastic straws and lately Styrofoam bowls, cups, plates, trays and compartment take away food containers.

2.6.3 Recommendations for future support measures for marine plastic litter

Based on the above organizations, legal systems, policies, standards, and regulations, as well as the status of specific activities, the following items are proposed as examples of future cooperation measures to combat marine plastics in the 14 countries of the Pacific region covered in this report.

(1) Proper management of municipal waste to prevent from flowing into the ocean and becoming marine waste

In order to reduce the generation of marine waste, first of all, it is assumed that there are areas where the risk of municipal waste, including plastic waste, being discharged into the ocean is high due to low collection rates of waste on land and inappropriate management of final disposal sites. Therefore, as part of appropriate waste management on land, support for the improvement of collection and treatment of municipal solid waste in the Pacific region, including the already implemented project such as J-PRISM, is expected to lead to support for measures against marine plastic waste. In addition, it would be possible to support the understanding of the material flow of plastic in the target countries to determine where and how much is generated in the source, so that appropriate management of plastic waste can be carried out in this way.

(2) Support for organization and formulation of legal systems, plans, and targets related to marine plastic waste

As mentioned above, the status of progress of the development of systems to control marine plastic waste, including the establishment of organizations to combat marine plastic waste, as well as the legal systems to ban single use plastics as the basis for the establishment of such organizations, methods to implement bans set forth in similar regulations, and the setting of specific reduction targets, varies among the 14 countries in the Pacific region. Therefore, by

referring to the examples of countries in the Pacific region that are making rapid progress, or countries in other regions that are making advanced efforts, it can be proposed that support for the development of a system that meets the actual conditions of each country.

(3) Support for promoting the use of biodegradable plastics and other products that are alternatives to single use plastics in each country

In this survey, it was confirmed that biodegradable plastic shopping bags and cutleries are already in use as alternatives to single use plastics (Palau, Micronesia, and Papua New Guinea).

It was also confirmed that there are countries that have not yet started to commercialize actual products, but are developing specific plans to replace single use plastic products by alternatives (Cook). For those countries that have already started using alternatives for single use plastics in the market, it is possible to provide support to ensure their sustainability, and for those countries that are considering alternatives, it is possible to provide support to make the content of them feasible.

(4) Recovery of marine waste which including plastic waste, and technical support for analysis and investigation

While the above items (1) through (3) are support for reducing the generation of plastic waste that could become marine plastic waste, this is support for identifying and collecting plastic waste that has already been discharged into the ocean.

For example, in Thailand, the Department of Environment of Bangkok Metropolitan Administration regularly cleans waste from large rivers, and the Department of Drainage and Sewerage Bangkok Metropolitan Administration regularly removes waste from small waterways. There are many countries targeted in this project that are already conducting coastal cleanup activities as part of their awareness-raising activities, but support for efforts to regularly collect debris from the ocean could be considered in addition to those spot activities.

It is also important to analyze the composition of the waste that has been discharged into the waterways in order to carry out the above-mentioned collection, and side support for this analysis technology can be considered.

2.7 Basic Information Survey on Import and Export of Recyclable Materials

2.7.1 Outline of the survey

Through distribution of questionnaire to related organizations such as the Ministry of Environment of the field survey target countries, a survey was conducted on the current status of system operation related to the export criteria for recyclable and waste.

In this survey, questionnaire (import and export system) was prepared. Details of the questionnaire is as attached. This questionnaire was basically used in common in the 9 field survey target countries. The questionnaires were distributed mainly to the government officials. Many of them are staff members of the Revenue and Customs Bureau and the Ministry of the Environment. The table below shows a list of institutions surveyed in each country.

In addition, since there is a lot of information that can be grasped from the Internet, etc., an additional desktop survey was conducted.

Table 2-43 List of surveyed institutions

Country	Name of organization
Palau	Environmental Quality Protection Board
Micronesia	DT&PW / Chuuk EPA / Pohnpei EPA
Marshall	Environmental Protection Authority
Papua New Guinea	Conservation & Environment Protection Authority (CEPA) / National Capital District Commission (NCDC) / PNG Customs Services / Ministry of Environment Conservation & Climate Change (MEC & CC)
Solomon	Ministry of Environment, Climate Change, Disaster Management and Meteorology (MECDM) / Honiara City Council (HCC)
Vanuatu	Ministry of Climate Change Adaptation, Meteorology, Geo-Hazards, Environment, Energy and Disaster Management (MCC) / Ministry of Foreign Affairs, International Cooperation and External Trade / Ministry of Finance and Economic Management (MFEM)
Fiji	Minister of Waterways and Environment
Tonga	Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change and Communications
Samoa	Ministry of Natural Resources and Environment

2.7.2 Result of the survey

The results of the survey are shown below. For the parts for which sufficient information could not be obtained from the questionnaire alone, the information obtained from the additional desktop survey was shown.

a. Waigani Convention and Basel Convention

The cross-border movement of waste is closely related to the Waigani Convention and the Basel Convention. The outline of both conventions is shown below.

The Basel Convention is a treaty formulated in Basel, Switzerland, which stipulates international frameworks and procedures for the regulation of cross-border movement of certain hazardous wastes. This was in response to problems such as waste from developed European countries being left in developing countries in Africa and causing environmental pollution in the 1980s. There was a problem that hazardous waste was moved across national borders without any prior contact or consultation, and the ultimate responsibility was unclear[7].

[7] Ministry of Foreign Affairs of Japan. “Basel Convention”. Ministry of Foreign Affairs website. December

On the other hand, in the Pacific region, there was growing concern about human and environmental safety due to the danger of becoming a dumping site for radioactive waste as well as hazardous waste. In response to this, the Waigani Convention was adopted in Waigani, Papua New Guinea as a regional convention that complements the Basel Convention[8].

b. Status of conclusion of Basel Convention and Waigani Convention in each country

A desk survey provided sufficient information on the status of the conclusion (including ratification) of the conventions. In addition, the answers to the questionnaire confirmed that the information obtained from the desk survey was correct. None of the non-contracted countries mentioned through the questionnaire that they plan to conclude (including ratify) the conventions in the future. The results of the desk survey are shown below.

The status of the conclusions of the Basel Convention and the Waigani Convention in each country was confirmed from the SPREP site, etc. as follows. Regarding the definition of terms that indicate the status of conclusion, according to the website of the Ministry of Foreign Affairs of Japan, "signature" is a basic expression of support for the purpose and content of the convention. On the other hand, "conclusion" is to express the state's consent to be bound by the convention. "Conclusion" methods include "ratification" and "joining". In the case of Japan, "ratification" requires the approval of the Emperor, and "joining" is a method of concluding a convention that has already been signed or entered into force between other foreign countries[9]. In this report, the difference in the method of conclusion is not the focus of discussion, so from now on, only "signature" and "conclusion" will be distinguished as the status of conclusion of the convention. In addition, "conclusion" is used for acts that conclude a convention, but "contracting countries" are used for countries that have concluded a convention.

Table 2-44 Explanation of terms related to the convention

Term	Explanation
Signature	To express basic support for the purpose and content of the convention. It is done prior to the conclusion and is not bound by the convention at the signing stage.
Conclusion	To express the country's consent to be bound by the convention. There are ratification, acceptance, approval, accession, exchange of official texts, etc. as the method of conclusion, but which method is used depends on the provisions of the convention itself.
Ratification	One of the methods of concluding a treaty by obtaining certification from the emperor.
Joining	One of the methods of concluding a treaty. To conclude a convention that has already been signed or entered into force between other foreign countries in a multilateral treaty.

*Created by the survey team based on the website of the Ministry of Foreign Affairs of Japan (Procedure for Concluding a Treaty approved by the Diet) [9].

Contracted countries of the Basel Convention are required to submit a National Report every year, but none of them have submitted it, according to the National Report submission status of the survey target countries on the Basel Convention site.

13, 2021.
https://www.mofa.go.jp/mofaj/gaiko/kankyo/jyoyaku/basel.html, (Browsing date: February 4, 2021).

[8] KITAZAWA Tsuneto. "Transformation of the Waste Management in the Independent State of Samoa: Annex: the preamble of the Waigani Convention". Social-Human Environmentology. 2004, vol. 1, no. 6, p. 69-90. https://ci.nii.ac.jp/naid/110004729100/, (Browsing date: February 4, 2021)

[9] Ministry of Foreign Affairs of Japan. "Procedures for concluding a parliamentary approval treaty". Ministry of Foreign Affairs website. n.d.
https://www.mofa.go.jp/mofaj/gaiko/tpp/pdfs/tpp03_03.pdf, (Browsing date: February 4, 2021).

Table 2-45 Status of conclusions of the Basel Convention and the Waigani Convention in each country (From SPREP website[10] , etc. and the Basel Convention website[11])

Country	Waigani Convention	Basel Convention	Submission status of Basel Convention National Report
Palau	Signed	Concluded	Not submitted
Micronesia	Concluded	Concluded	Not submitted
Marshall		Concluded	Not submitted
Papua New Guinea	Concluded	Concluded	Not submitted
Solomon	Concluded		―
Vanuatu		Concluded	Not submitted
Fiji	Concluded		―
Tonga	Concluded	Concluded	Not submitted
Samoa	Concluded	Concluded	Not submitted
Cook	Concluded	Concluded	Not submitted
Kiribati	Concluded	Concluded	Not submitted
Nauru	Signed	Concluded	Not submitted
Niue	Concluded		―
Tuvalu	Concluded	Concluded	Not submitted

c. National laws of each country regarding the Basel Convention and the Waigani Convention

The responses to the questionnaire and the desk survey confirmed the laws related to the Basel Convention and the Waigani Convention in the survey target countries as shown in the table below.

Table 2-46 Laws related to the Basel Convention and the Waigani Convention in the survey target countries

Country	Survey method	Laws related to the Basel Convention and the Waigani Convention
Micronesia	Questionnaire	FSM Regulation to control transboundary movement of hazardous waste
Solomon	Questionnaire	Environmental Act 1998
Samoa	Questionnaire	Waste Management Act 2010 Waste (Plastic Bag) Management 2018
Tonga	Desktop survey	HAZARDOUS WASTES AND CHEMICALS ACT 2010

Of these, the original texts of the laws were obtained for Samoa, Tonga, and Solomon, and the contents were investigated. As a result, Tonga's HAZARDOUS WASTES AND CHEMICALS ACT 2010 was the only domestic law under the Basel Convention and the Waigani Convention (which stipulates details of procedures for cross-border movement of hazardous waste). Other laws were understood to be related laws with the purpose of waste management and environmental protection. In addition, neither law stipulates national criteria for waste covered by the Basel Convention and the Waigani Convention.

[10] SPREP. “Waigani Convention”. SPREP website. n.d. https://www.sprep.org/convention-secretariat/waigani-convention, (Browsing date: February 4, 2021).
[11] UNEP. “Basel Convention National Reports – Year 2019”. Basel Convention website. n.d. http://www.basel.int/Countries/NationalReporting/NationalReports/BC2019Reports/tabid/8645/Default.aspx (Browsing date: July 9, 2021)

d. Regulations and criteria related to the Basel Convention and the Waigani Convention

Among the survey target countries, Micronesia and Samoa responded on the criteria. Basically, other than PET bottle, used lead acid battery, waste lubricant oil, ferrous scrap, non-ferrous scrap, and plastic are subject to (or can be) regulated by the conventions from the viewpoint of toxicity, flammability, and corrosiveness.

Table 2-47 The criteria for each item in field survey target countries

Item	Samoa	Micronesia
Used lead acid battery	Hazardous	Hazardous
Waste lubricant oil	Hazardous / Flammable	Hazardous
Ferrous scrap	Corrosive	Hazardous
Non-ferrous scrap	Corrosive	Hazardous
Plastic	Hazardous	Hazardous
PET bottle	-	-

Since waste to be regulated and the criteria differ depending on the convention and the country to be exported, the information obtained based on the desktop survey is summarized below.

d.1 Waste regulated by the Basel Convention

Those subject to regulation under the Basel Convention are those that fall under Annex I and Annex III, and specifically those that fall under Annex VIII. In addition, Annex IX shows items that are not subject to regulation in principle. Based on the statements regarding Annex VIII and IX of the Basel Convention in the published materials of the Ministry of the Environment of Japan[12] and the Ministry of Economy, Trade and Industry of Japan[13] , those subject to regulation and those not subject to regulation in the principles of the Convention are classified as shown in the table below.

It is said that the specific criteria for determining non-hazardous plastic waste differ depending on the country, but the details of the interpretation in Japan will be described in "Revision of the Convention on Dirty Plastic Waste".

Table 2-48 Application of Basel Convention regulations on target recyclables

Target recyclables	Classification in Annex VIII or IX of the Basel Convention		Application of regulations
Used lead acid battery	A1160	Lead acid battery waste (whether crushed or not)	Subject to regulation in principle
Waste lubricant oil	A3020	Mineral oil not suitable for originally intended use	Subject to regulation in principle
Ferrous scrap	B1010	Steel scraps	Not subject to regulation in principle
Non-ferrous scrap		Copper scraps, nickel scraps, aluminum scraps, zinc scraps, etc.	Not subject to regulation in principle

[12] Ministry of the Environment, “Criteria for determining whether or not the plastic export is subject to the Basel Law”
https://www.env.go.jp/recycle/yugai/pdf/r021130.pdf (Browsing date: September 2, 2021)
[13] Ministry of Economy, Trade and Industry, “8 Procedures for import and export of waste, etc.”
https://www.meti.go.jp/policy/recycle/main/3r_policy/policy/pdf/grobal/ref_08.pdf (Browsing date: September 2, 2021)

Used tyre	B3040	Rubber waste	Not subject to regulation in principle
Single use plastic PET bottle	A3210	Hazardous plastic waste	Subject to regulation in principle
	B3011	Non-hazardous plastic waste	Not subject to regulation in principle
Glass	B2020	Glass waste with a shape that does not scatter	Not subject to regulation in principle
Used paper	B3020	Paper, paperboard and paper product waste	Not subject to regulation in principle

d.2 Differences between the Basel Convention and the Waigani Convention

Since the Waigani Convention is based on the Basel Convention and aims to be implemented in the region, its purpose and regulations are quite similar, but there are also the following differences.

- The Waigani Convention also covers radioactive waste.
- The Basel Convention covers up to 12 nautical miles (territorial waters) from the land, while the Waigani Convention covers up to 200 nautical miles (EEZ).

In addition, SPREP's Waigani Convention website has the following description.

"The objective of the Convention is to reduce and eliminate transboundary movements of hazardous and radioactive waste, to minimize the production of hazardous and toxic wastes in the Pacific region and to ensure that disposal of wastes in the Convention area is completed in an environmentally sound manner"

The parties are not significantly different as shown in Table 2-21, but Fiji and Solomon are non-contracted countries to the Basel Convention, while they are contracting countries to the Waigani Convention. The Marshall are the opposite. Vanuatu has not concluded either convention.

Australia and New Zealand have concluded both the Basel Convention and the Waigani Convention. For countries that are members of wide-area recycling in the Pacific region, it is desirable to adapt to both the Basel Convention framework and the Waigani Convention framework, and to become contracted countries to both Conventions to facilitate the procedures for importing and exporting valuable recyclables with each country.

In addition, the website of the Ministry of Foreign Affairs of Japan has the following description about the Basel Convention:

(1) Export of hazardous waste and other waste specified in this Convention (hereinafter referred to as "waste" in this document) requires the written consent of the importing country (Articles 6 1-3).

(2) Contracted countries ensure that domestic waste generation is minimized and that domestic disposal facilities are available as much as possible for environmentally sound disposal of waste (4 Article 2 (a) and (b)).

(4) In principle, the import and export of waste with non-contracted countries is prohibited (Article 4.5).

(6) Only authorized persons can transport and dispose of waste (Article 4.7 (a)).

(7) Transfer of waste across national borders requires the attachment of appropriate transfer documents stipulated by the Convention (Article 4 (c)).

(10) Contracted countries provide technical and other international cooperation, mainly to developing countries, in order to dispose of waste in an environmentally sound manner (Article 10).

(11) Bilateral or multilateral agreements on the cross-border movement of waste may be concluded with non-concluded countries, as long as it does not violate the intent of the Convention (Article 11).

While in (4), it says "In principle, the import and export of waste with non-contracted countries is prohibited", in (11), it says "Bilateral or multilateral agreements on the cross-border movement of waste may be concluded with non-concluded countries, as long as it does not violate the intent of the Convention (Article 11) ".

Although both the Basel Convention and the Waigani Convention have the main purpose of restricting the cross-border movement of hazardous waste, both of them list "Y46 Household waste: Wastes collected from households" as subject to the restriction. In the Basel Convention, Y46 is CATEGORIES OF WASTES REQUIRING SPECIAL CONSIDERATION and is not designated as harmful, but the Japanese government basically takes the stance of targeting selected beverage containers of Y46 (Except if crushed into flakes etc.).

The Waigani Convention specifies "Y46 Wastes collected from households" as a hazardous classification. On the other hand, there is also a description "exception of clean sorted recyclable wastes which do not possess any of the hazardous characteristics defined in Annex II", which is not in Basel, and its stance is clearly stated.

In any case, regarding general recyclables such as PET bottles and aluminum cans that look harmless at first glance, it seems to be necessary to consider these international conventions in view of the current situation (It's not flaked or completely clean sorted).

d.3 Regulations under the Basel Convention and other agreements

Regulations of the Basel Convention apply between the contracted countries of the Convention, but separate regulations apply between the member states of the Organization for Economic Co-operation and Development (hereinafter referred to as "OECD") and, if any, other bilateral agreements.

The Ministry of Economy, Trade and Industry's website summarizes the regulations that apply depending on the status of the conclusion of the Basel Convention and the status of accession to the OECD as follows.

In the case of Japan (a contracted country of the Basel Convention and a member of the OECD), if the trading partner is an OECD member, the regulations determined by the OECD Council will apply regardless of whether the country is a contracted country of the Basel Convention. For non-OECD members and contracted countries of the Basel Convention, the regulations of the Basel Convention apply. There are no applicable regulations for non-OECD members and non-contracted countries to the Basel Convention, but regulated items by the Basel Convention are not allowed to be exported or imported (in principle).

Table 2-49 Regulations applicable depending on the status of the conclusion of the Basel Convention and the status of OECD accession

	Partner country	Applicable regulations
Contracted countries of Basel Convention	OECD member countries: ROK, UK, France, Germany, Australia, Canada, etc.	OECD Board decision
	Non-OECD countries: China, Philippines, Malaysia, etc.	Basel Convention
Non-contracted countries of Basel Convention	OECD member countries: USA	OECD Board decision
	Non-OECD countries	None (Basel regulated items cannot be imported or exported)

d.4 Amendment of the Convention on dirty plastic waste

On May 10, 2019, the Conference of the contracted countries of the Basel Convention in Geneva adopted an amendment to regulate dirty plastic waste that is not suitable for recycling. Due to the serious marine pollution caused by plastics, the export of dirty plastic waste is legally restricted.

The Basel Convention is an international convention that defines hazardous waste and regulates imports and exports of it. About 180 countries and regions have concluded this convention. This amendment was first proposed by Norway and realized by the approval of concluded countries including Japan. The revised treaty came into force on January 1, 2021 and requires the consent of the partner country to export dirty plastic waste[14].

According to the Ministry of the Environment of Japan, although the revised Annex IX defines plastic waste that is not covered by the Convention as "those for the purpose of recycling in an environmentally sound manner that are almost uncontaminated, containing almost no other types of waste", since what kind of plastic is subject to regulation depends on the interpretation of each treaty party, the interpretation is defined as follows based on Japanese domestic laws[15].

(1) Criteria for determining whether or not the waste that is not a mixture of multiple types of plastic resin is applicable (extracted from the Ministry of the Environment data[15]).

As a general rule, those that meet all of the following conditions A to D are exempt from regulation (B3011):

A: No dirt such as food and drink, mud, oil, etc. is attached.

B: No foreign matter other than plastic is mixed in

C: Consists of a single plastic resin

D: Processed and adjusted as a material for recycling

[14] Japan External Trade Organization (JETRO). “Dirty waste plastic is regulated by the Basel Convention”. JETRO website. May 21, 2019.
https://www.jetro.go.jp/biznews/2019/05/8b624be5eec14dad.html, (Browsing date: February 4, 2021).
[15] Ministry of the Environment of Japan. “Judgment Criteria for Applicable or Not Applicable to Basel Law for Plastic Exports”. Ministry of the Environment website. 2020-9-28.
https://www.env.go.jp/press/files/jp/114830.pdf, (Browsing date: February 4, 2021).

1. Pelletized plastic	
2. Flake or fluffy, almost colorless and transparent or monochromatic plastic	
3. Sheet-shaped, roll-shaped, or veil-shaped plastic discharged from the manufacturing process of products	
4. Ingot-shaped expanded polystyrene (PS)	

Figure 2-1 Criteria for determining whether or not the waste that is not a mixture of multiple types of plastic resin is applicable

(2) Criteria for determining whether or not the waste containing a mixture of multiple plastic resins (PE, PP, and PET) is applicable (extracted from Ministry of the Environment Document[15])

The mixture of plastic waste consisting of polyethylene (PE), polypropylene (PP) or polyethylene terephthalate (PET) is designed assuming a mixture of bottle body, cap and label of PET bottles. As criteria for determining, as a general rule, those that meet all of the following conditions A to C are exempt from regulation (B3011).

A: Separated and free of plastic resin and foreign matter other than bottles, caps and labels.

B: Washed and has no stains such as beverages and mud.

C: Cut into flakes.

Photo credits: Panasonic Environmental Technology Solutions Co., Ltd., Pana-chemical Co., Ltd.

Figure 2-2 Examples of judgment that plastics derived from PET bottles are not subject to regulation

e. Tax incentives, tax burden, and special procedures when recycling companies import or export recyclables

Any country answered that they have special tax incentives or tax burden for import or export of recyclables. As for special procedures, answers were provided from Micronesia and Samoa.

As for recyclables which is subject to Basel Convention, prior to import or export, it is required to take permission from the governments of countries of origin, destination and the countries where vessel transits. The procedure requires designated application forms, contract document on transaction of import and export, detail description on the item and insurance cover and etc.

Table 2-50 Special procedures when recycling companies import or export recyclables

Country	Special procedures when recycling companies import or export recyclables
Micronesia	(National government) • The procedures to follow include a thorough cleanup of items to be sent, weighing certain amount of items to be sent, and packaging them according to Basel Rules.
Samoa	• (As for recyclables which is subject to the convention) Recyclers are advised to submit required documents as per transboundary movement of chemical and hazardous wastes process. (Application forms (notification and movement), Sales agreement or contract between importer and exporter, Wastes description and details, Insurance cover)

The information to be provided on notification and movement documents which is required for import or export are detailed in “HAZARDOUS WASTES AND CHEMICALS ACT 2010” of Tonga which was collected through desktop survey. Following description is quoted from Schedule 1 of the act (Information to be provided on notification)[16]. Although there are some

[16] The Kingdom of Tonga, “HAZARDOUS WASTES AND CHEMICALS ACT 2010”. https://ago.gov.to/cms/images/LEGISLATION/PRINCIPAL/2010/2010-0028/HazardousWastesandChemicalsAct2010_1.pdf (Browsing date: September 2, 2021)

differences, information to be provided on notification document and the one for movement document is almost the same.

Table 2-51 HAZARDOUS WASTES AND CHEMICALS ACT 2010 (Schedule 1)[16]

INFORMATION TO BE PROVIDED ON NOTIFICATIONS OF TRANSBOUNDARY MOVEMENT OF HAZARDOUS WASTES	
1	Reason for waste export
2	Exporter of the waste (details as set out in Note 1)
3	Generator(s) of the waste and site of generation (details as set out in Note 1)
4	Disposer of the waste and actual site of disposal (details as set out in Note 1)
5	Intended carrier(s) of the waste or their agents, if known (details as set out in Note 1)
6	Country of export of the waste Competent authority (details as set out in Note 2)
7	Expected countries of transit Competent authority (details as set out in Note 2)
8	Country of import of the waste Competent authority (details as set out in Note 2)
9	General or single notification
10	Projected date(s) of shipment(s) and period of time over which waste is to be exported and proposed itinerary (including point of entry and exit) (details as set out in Note 3)
11	Means of transport envisaged (road, rail, sea, air, inland waters)
12	Information relating to insurance (details as set out in Note 4)
13	Designation and physical description of the waste including Y number and UN number and its composition (details as set out in Note 5) and information on any special handling requirements including emergency provisions in case of accidents
14	Type of packaging envisaged (e.g. bulk, drummed, tanker)
15	Estimated quantity in weight/volume (details as set out in Note 6)
16	Process by which the waste is generated (details as set out in Note 7)
17	For wastes listed in Annex I, classifications from Annex III: hazardous characteristic, H number, and UN class
18	Method of disposal as per Annex IV
19	Declaration by the generator and exporter that the information is correct
20	Information transmitted (including technical description of the plant) to the exporter or generator from the disposer of the waste upon which the latter has based his assessment that there was no reason to believe that the wastes will not be managed in an environmentally sound manner in accordance with the laws and regulations of the country of import
21	Information concerning the contract between the exporter and disposer.
Notes	
1	Full name and address, telephone or telefax number and the name, address, telephone, telex or telefax number of the person to be contacted.
2	Full name and address, telephone, telex or telefax number.
3	In the case of a general notification covering several shipments, either the expected dates of each shipment or, if this is not known, the expected frequency of the shipments will be required.
4	Information to be provided on relevant insurance requirements and how they are met by exporter, carrier and disposer.
5	The nature and the concentration of the most hazardous components, in terms of toxicity and other dangers presented by the waste both in handling and in relation to the proposed disposal method.
6	In the case of a general notification covering several shipments, both the estimated total quantity and the estimated quantities for each individual shipment will be required.
7	Insofar as this is necessary to assess the hazard and determine the appropriateness of the proposed disposal operation.

f. Issues related to the export of recyclable materials in each country

Provided answers on issues related to the export of recyclable materials in each country are shown below. In common with each country, issues on financial sustainability on export of

recyclable materials are mentioned.

Table 2-52 Issues related to the export of recyclable materials

Country	Issues related to the export of recyclable materials
Micronesia	(State government) • Issues are the lack of viable markets and the shipping costs for materials are high. (Chuuk State) • CDL has not yet introduced.
Papua New Guinea	• High freight cost making export and recycling not economically viable for many recyclables. • No local recycling Company in the country that can recycle items • No Environmental law, guidelines to promote recycling of items • Recycling only confined to few items such as can, waste oil, used lead acid battery and scrap metal. No PET bottle, packaging, etc. • Draft Policy to include subsidies on waste management but need other policies to support. • Government also needs to provide the financial support to establish such waste management facilities. Currently very little support provided by Government.
Solomon	• Issues with regards to export of recyclable for recyclers who are currently exporting are export tax and small scale recyclers need support in the form of equipment, truck hire and simple business management techniques. • The issue with export of waste oil is that it is uneconomical and therefore was not considered by waste oil producers. Local processing facility will need support and strict enforcement from authorities to be effective in pollution prevention and financially sustainable.
Samoa	• The main challenge is to do with recovery of materials. Further, there is no waste segregation or separate collection for recyclable materials. • Recycling in the country is mainly concentrate on high valued materials mainly scrap metals despite freight costs are still a burden to recyclers.
Vanuatu	• There is still a lot of work to be done to manage the recyclables and waste such as awareness on waste management control and legislation to education household and Industries as people have limited understand on the waste management controls. • Cost of operating a recycling company is a major challenge for recycling Company. Company needs financial support in order to go to the outer islands to collect recyclable items and ship to mainland to be exported overseas.

g. Type of recyclables or waste with high priority on promotion of export

As for type of recyclables or waste with high priority on promotion of export, only Solomon provided clear answer that the country wish to prioritize export of waste lubricant oil and waste home appliance. On the other hand, Micronesia answered that they are seeking the method of recycling in country rather than export. Provided answers from each country are shown below.

Table 2-53 Type of recyclables or waste with high priority on promotion of export

Country	Type of recyclables or waste with high priority on promotion of export
Micronesia	(National government) • At the moment, the states are finding ways to reduce and reuse recyclables within the communities (Example: plastic bottles have been crushed and used as frames for windows)
Papua New Guinea	• At this stage, most of all commodities are exported for recycling. In the very near future, there is potential for some recycling at domestic level (Only some used oil is recycled locally whilst the majority of used oil is exported).
Solomon	• Waste Oil (because it is stockpiled) and E-waste are priority.
Samoa	• The government's position in safeguarding the environment is to recover all recyclables and export them for recycling and appropriate disposal instead of stockpiling on islands which have certain adverse impacts through contamination and pollution.
Vanuatu	• Currently it is focusing recyclable materials eligible for export under the BASEL and WAIGANI Convention such as ferrous scrap and used lead acid battery.

2.8 Import and Export Statistical Data

Trade statistics are important data that can serve as a basis for creating material flows for target items. However, judging from the results obtained individually from the customs offices of each country so far, there are certain issues in the classification and reliability of the data provided, as well as in the willingness to cooperate. Therefore, it is desirable to obtain and analyze data from one information source.

2.8.1 Data source

With reference to Kuroko (2013)[17], data from the United Nations Commodity Trade Statistics Database (Hereinafter referred to as "Comtrade".) and the Trade Statistics Database (BASE POUR L'ANALYSE DU COMMERCE INTERNATIONAL was obtained. Hereinafter referred to as "BACI".) of the Le Centre d'études prospectives et d'informations internationals (CEPII) in France was obtained[18]. Although BACI is based on Comtrade, it unifies exports and imports in a unique way. Since Comtrade is faithful to the original data, there are problems such as the lack of data for many countries covered by this survey and the difference in data for the same transaction between importing and exporting countries. BACI uses its own estimation method to sort out the differences, and is suitable for projects such as this survey that deal with multiple small countries (plus Australia and Asian countries) in a unified manner.

The BACI data was compared with the 2018 trade statistics from the Fiji Statistics Bureau obtained through J-PRISM Phase2, confirming that there was no significant discrepancy.

2.8.2 HS Code

The HS Code is a code for trade statistics items established under the HS Convention. Most target countries (only the Marshall have not been confirmed) set import tariffs based on the HS code.

The HS Code broadly classifies all traded items into 21 "Sections" and represents them with 6-digit numbers. Of the 6 digits, the first 2 digits are called a "chapter", the first 4 digits including a chapter are called a "heading", and the first 6 digits including a heading are called a "sub-heading".

Up to 6 digits of the HS code is an internationally common code, and 7 to 9 digits can be decided according to each country's own standard. For example, in Japan, up to 9 digits are used. Although the target countries for this survey have up to 8 digits, in most cases, up to 6 digits are used for operation.

Example:

Chapter 39: plastic products

Heading 3915: Plastic waste

Sub-heading 391510: Ethylene polymer (waste)

Sub-heading 391590: Other plastics (waste)

[17] KUROKO Masato. "Series: The state of statistics in emerging regions, Part 9: Trade statistics". Journal of Information Processing and Management. 2013, vol. 56, no. 5, p. 310-317. https://www.jstage.jst.go.jp/article/johokanri/56/5/56_310/_html/-char/ja, (Browsing date: February 4, 2021)
[18] Data was downloaded from "http://www.cepii.fr/CEPII/en/welcome.asp" in March 2021.

2.8.3 Codes to be investigated in this survey

The following chapters were set as the targets of this survey. These chapters are called "target chapters". In addition, Sub-headings that are particularly closely related to the items subject to this survey were extracted from the target chapters (See attachment). Based on the sub-headings set here, the import and export statistical data was analyzed, and numerical basis of the material flow described later is set. Here, from Chapter 27 that refer to mineral fuels, Sub-heading 271000 “Petroleum oils and oils from bituminous minerals, not crude: preparations n.e.c. containing by weight 70% or more of petroleum oils or oils from bituminous minerals: these being the basic constituents of the preparations: waste oils” is extracted. However, although this sub-heading mentions waste oil, it actually contains a large amount of general oil, and the amount is also large. Therefore, it is not included in the analysis values.

The amount of imports and exports of the target sub-headings is just the amount of trade products, not the value of the target recyclable itself. For example, if 1000 tons of drinking water are imported annually, the amount of beverage containers such as PET bottles contained in this is a small value. The conversion from the quantity of this product to the quantity of recyclables is done during the process of creating a material flow (In the case of beverage containers, the content is subtracted and only the container amount is converted as a recyclable.).

Table 2-54 Target codes of this survey

Target chapter	Related items subject to this survey
22 Beverages, spirits and vinegar	PET bottle, aluminum can, glass
27 Mineral fuels, mineral oils and products of their distillation; bituminous substances mineral waxes	Waste lubricant oil
39 Plastics and articles thereof	Single use plastic, PET bottle
40 Rubber and articles thereof	Used tyre
47 Pulp of wood or of other fibrous cellulosic material; recovered (waste and scrap) paper or paperboard	Paper, cardboard
48 Paper and paperboard; articles of paper pulp, of paper or of paperboard	Paper, cardboard
49 Printed books, newspaper, pictures and other products of the printing industry; manuscripts, typescript and plans	Paper, cardboard
70 Glass and glassware	Glass
72 Iron and steel	Scrap metal (ferrous)
74 Copper and articles thereof	Scrap metal (non-ferrous)
75 Nickel and articles thereof	Scrap metal (non-ferrous)
76 Aluminium and articles thereof	Scrap metal (non-ferrous)
78 Lead and articles thereof	Scrap metal (non-ferrous)
79 Zinc and articles thereof	Scrap metal (non-ferrous)
80 Tin and article thereof	Scrap metal (non-ferrous)
81 Other base metals; cermets; article thereof	Scrap metal (non-ferrous)
84 Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof	Waste home appliance (air conditioner, refrigerator, washing machine, computer)
85 Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles	Used lead acid battery, waste home appliance (microwave oven, cell phone, Television set)
87 Vehicles other than railway or tramway rolling-stock, and parts and accessories thereof	End of life vehicle

2.8.4 Nine field survey target countries

Import and export statistical data for each target item is described in attachment. The figures of import and export for each target item are applied in material flow and those details are described there.

a. Import data of the target sub-headings

Papua New Guinea has the largest total import volume of target sub-headings. This is followed by the Marshall and Fiji. This trend is basically the same from 2012 to 2019. Although it varies from country to country, comparing 2012 and 2019, imports have not increased significantly overall.

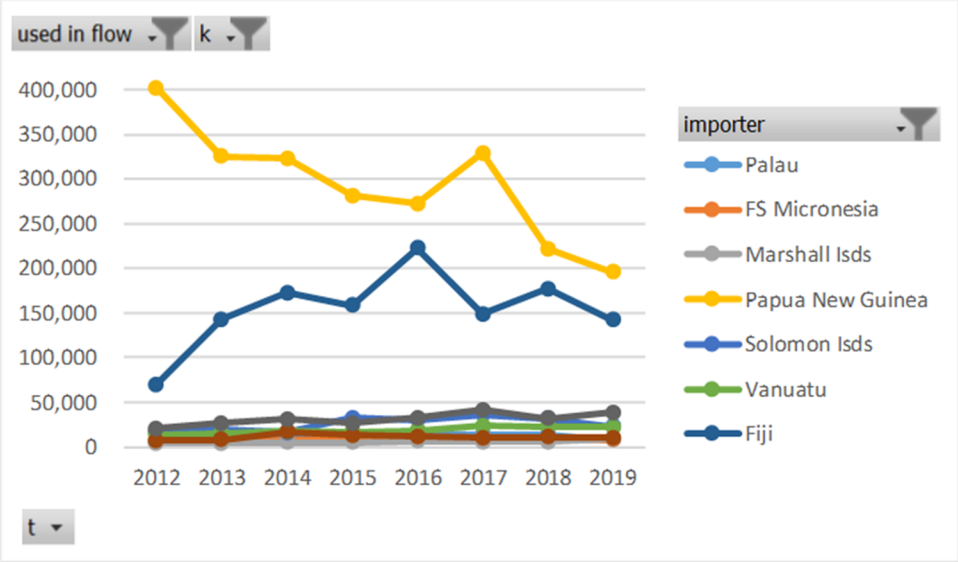


Figure 2-3 Total annual import value (thousand USD) of the target sub-headings of the nine surveyed countries

b. Export data of the target sub-headings

Fiji has the highest total export volume of the target sub-headings. This is followed by the Marshall and Papua New Guinea. This trend is basically the same from 2012 to 2019. The volume of Fiji's exports is increasing year by year. It is speculated that this may be due to the large growth in mineral water exports. The Marshall have been increasing their exports since 2015.

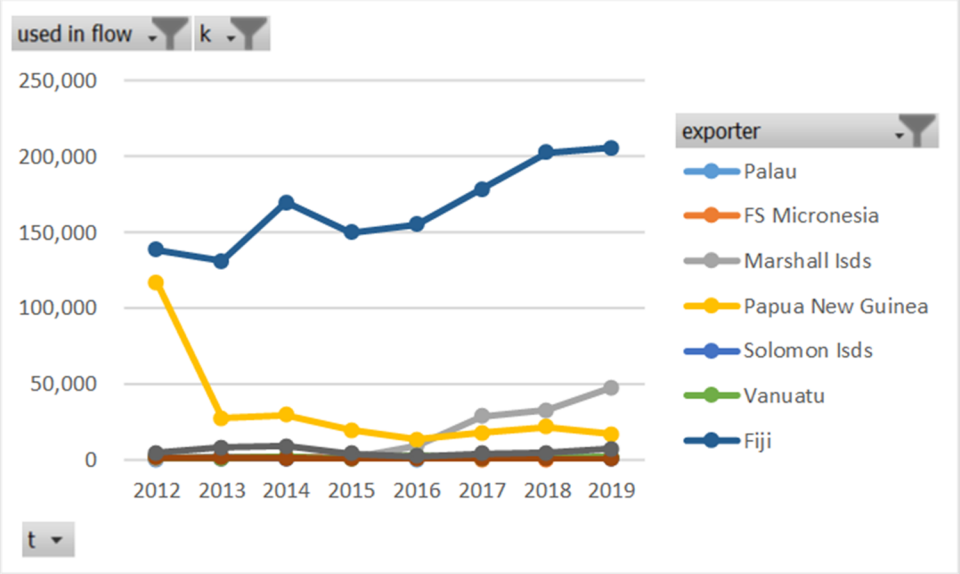


Figure 2-4 Total annual export value (thousand USD) of the target sub-headings of the nine surveyed countries

This section describes the export data of the target sub-headings, especially the exports that are obvious as waste and scraps. Regarding scrap metal, the amount of Papua New Guinea in 2012 showed a very high value, which is difficult to compare. Therefore, 2013 data is used here.

The table below shows the total export volume of the surveyed sub-headings in 2013 and 2019 that are specified as "waste" in the sub-headings of HS code, that is, those that are assumed to be recyclables. There is not much change in total volume between 2013 and 2019. Scrap metal accounts for more than 90% of the export volume of recyclables[19]. In 2019, items other than ferrous scrap increase slightly compared to 2013, but the amount of ferrous scrap decreases significantly. Overall, the total volume has fallen after deducting the Marshall.

By country, Papua New Guinea, Fiji, and the Marshall occupy the top export volumes.

Table 2-55 Total exports of recyclables (tons) of the target sub-headings in the nine surveyed countries in 2013

Exporter	Waste Glass	Ferrous scrap	Non-ferrous scrap	Waste plastic	Used paper	Used tyre	Used lead acid battery	Total
Palau		1,116	161	76				1,353
Micronesia		1,461	172	20			24	1,677
Marshall		4,478	202				106	4,786
Papua New Guinea		39,449	5,358	352	1,078		756	46,993
Solomon		614	346	31			36	1,027
Vanuatu		1,114	168				66	1,348
Fiji		20,061	209	744	1,592			22,606
Tonga		3,253	143		55		62	3,513
Samoa		3,112	442	103			9	3,666
Grand total		**74,658**	**7,201**	**1,326**	**2,725**		**1,059**	**86,969**

[19] Except for plastic of Marshall.

Table 2-56 Total exports of recyclables (tons) of the target sub-headings of the nine surveyed countries in 2019

Exporter	Waste Glass	Ferrous scrap	Non-ferrous scrap	Waste plastic	Used paper	Used tyre	Used lead acid battery	Total
Palau		1,157	199	95			160	1,611
Micronesia		828	94				97	1,019
Marshall		5,967	116	43,293			43	49,419
Papua New Guinea		15,538	8,720		559		999	25,816
Solomon		3,926	413	0				4,339
Vanuatu		814	123				220	1,157
Fiji	73	13,546	939	1,250	2,474	9		18,291
Tonga		249	90	0			173	512
Samoa		2,582	290	0	0		195	3,067
Grand total	**73**	**44,607**	**10,984**	**44,638**	**3,033**	**9**	**1,887**	**105,231**

The table below shows the volume and value of scrap metal exported from the nine filed survey target countries. In terms of the value of ferrous scrap per unit, it is 303 USD per ton in 2013, but it has dropped to 228 USD in 2019. In recent years, scrap companies and others have often said that they were shrinking their businesses because the take-back price had fallen. That point is indicated by numbers. Although the unit price of non-ferrous scrap is originally high, it has fallen from 2,008 USD to 1,496 USD.

Table 2-57 Total export volume (tons) and value of scrap metal from the nine surveyed countries in 2013 and 2019

2013				
	Ferrous scrap		Non-ferrous scrap	
Exporter	Tons	Thousand USD	Tons	Thousand USD
Palau	1,116	277	161	176
Micronesia	1,461	425	171	369
Marshall	4,478	787	203	516
Papua New Guinea	39,449	13,353	5,358	10,753
Solomon	613	268	346	314
Vanuatu	1,114	280	168	284
Fiji	20,061	5,432	209	472
Tonga	3,253	893	143	268
Samoa	3,111	893	442	1,312
Grand total	**74,656**	**22,605**	**7,201**	**14,463**
2019				
	Ferrous scrap		Non-ferrous scrap	
Exporter	Tons	Thousand USD	Tons	Thousand USD
Palau	1,157	197	199	241
Micronesia	828	185	94	107
Marshall	5,967	1,396	116	141
Papua New Guinea	15,537	3,429	8,720	12,105
Solomon	3,926	188	413	376
Vanuatu	814	206	123	249
Fiji	13,546	3,847	939	2,558
Tonga	248	91	90	209

Samoa	2,582	647	289	444
Grand total	**44,605**	**10,185**	**10,983**	**16,431**

The table below shows the total export volume of scrap metal (ferrous and non-ferrous) exported from the nine surveyed countries by export partner country. In both 2013 and 2019, the Republic of Korea (ROK) collected the most scrap metal, both ferrous and non-ferrous, from the nine surveyed countries.

Regarding ferrous, Singapore has the second highest number in both 2013 and 2019. Australia has tripled since 2013 and is the third largest country in 2019. On the contrary, Indonesia was the third in 2013, but it has retreated significantly in 2019. Malaysia remains in 4th place.

Table 2-58 Total export volume (tons) and value of ferrous scrap exported from the nine surveyed countries (by export partner country) in 2013 and 2019

2013			2019		
Importer	Total / q	Total / v	Importer	Total / q	Total / v
Rep. of Korea	16,062	4,423	Rep. of Korea	8,563	2,825
Singapore	12,009	3,577	Singapore	7,004	1,280
Indonesia	11,417	4,020	Australia	6,148	731
Malaysia	7,248	2,048	Malaysia	5,892	1,312
New Zealand	5,894	1,512	USA	4,808	975
India	4,529	1,696	Bangladesh	3,632	1,002
Other Asia, nes	4,082	1,177	India	2,413	438
China	4,082	1,463	Indonesia	2,388	702
Poland	2,769	459	Other Asia, nes	1,986	400
Australia	2,119	997	New Zealand	767	93
Viet Nam	1,961	700	China	583	310
Dem. People's Rep. of Korea	1,142	205	#N/A	177	43
Spain	575	81	Sri Lanka	78	10
Pakistan	231	87	Portugal	65	10
USA	209	37	Thailand	45	50
Japan	187	49	Chile	22	1
Croatia	73	14	Kiribati	21	2
China, Hong Kong SAR	46	38	Spain	10	0
Thailand	12	14	Morocco	2	0
Colombia	5	1	Pakistan	1	0
Kiribati	2	2			
Tonga	2	3			
Wallis and Futuna Isds	1	2			
Grand total	**74,656**	**22,605**	**Grand total**	**44,605**	**10,185**

Regarding non-ferrous metals, Australia has the second highest number in both 2013 and 2019. Malaysia and Germany have higher volumes in 2019 than in 2013.

Table 2-59 Total export volume (tons) and value of non-ferrous scrap exported from the nine surveyed countries (by export partner country) in 2013 and 2019

2013			2019		
Importer	Total / q	Total / v	Importer	Total / q	Total / v
Rep. of Korea	3,360	5,261	Rep. of Korea	4,071	5,398
Australia	2,058	3,004	Australia	2,420	5,292
China	457	2,914	Malaysia	2,162	1,367
New Zealand	452	944	Germany	1,254	1,598
Other Asia, nes	361	795	Singapore	290	797
China, Hong Kong SAR	147	371	Other Asia, nes	258	421
Japan	145	967	China, Hong Kong SAR	204	172
Malaysia	87	68	Japan	135	740
Poland	67	9	New Zealand	65	134
India	43	67	India	64	315
Singapore	26	63	USA	38	62
			China	19	128
			United Arab Emirates	3	7
			Samoa	0	2
Grand total	**7,201**	**14,463**	**Grand total**	**10,983**	**16,431**

Below is a table showing the breakdown of exports from the nine surveyed countries to the major scrap metal importing countries.

Regarding ferrous, Fiji has the largest exports to ROK in both 2013 and 2019. On the other hand, Papua New Guinea exports the most to Singapore. Papua New Guinea also exports the largest amount to Southeast Asian countries such as Indonesia and Malaysia. In 2019, most exports to Australia come from the Solomon.

Table 2-60 Breakdown of export volume from the nine surveyed countries to the major ferrous scrap importing countries in 2013 and 2019

Importer	Exporter	2013 (tons)	2019 (tons)
Rep. of Korea	Fiji	13,327	5,765
	Samoa	315	1,736
	Micronesia	495	768
	Marshall	550	260
	Tonga	765	
	Papua New Guinea	588	
	Vanuatu	11	34
	Palau	12	
Total of Rep. of Korea		16,062	8,563
Singapore	Papua New Guinea	8,960	7,003
	Fiji	1,323	
	Samoa	814	
	Solomon	581	
	Tonga	316	
	Micronesia	15	
	Vanuatu		1
Total of Singapore		12,009	7,004
Indonesia	Papua New Guinea	9,615	2,276

	Fiji	1,359	113
	Samoa	443	
Total of Indonesia		11,417	2,388
Malaysia	Papua New Guinea	7,248	5,342
	Solomon		550
Total of Malaysia		7,248	5,892
Australia	Solomon	3	3,376
	Fiji	968	1,602
	Samoa	522	709
	Papua New Guinea	627	162
	Tonga		248
	Marshall		41
	Vanuatu		9
Total of Australia		2,119	6,148

Regarding non-ferrous metals, Papua New Guinea is the largest exporter to ROK in both 2013 and 2019. Most of the exports to other countries such as Australia and Malaysia are from Papua New Guinea.

Table 2-61 Breakdown of export volume from the nine surveyed countries to the major non-ferrous scrap importing countries in 2013 and 2019

Importer	Exporter	2013	2019
Rep. of Korea	Papua New Guinea	2,969	3,663
	Fiji	130	237
	Micronesia	71	57
	Tonga	89	21
	Marshall	15	78
	Samoa	63	16
	Solomon	19	
	Palau	3	
Total of Rep. of Korea		3,360	4,071
Australia	Papua New Guinea	1,657	1,271
	Fiji	53	593
	Solomon	240	113
	Samoa	76	251
	Vanuatu	32	123
	Tonga		69
Total of Australia		2,058	2,420
Malaysia	Papua New Guinea	87	2,066
	Solomon		96
Total of Malaysia		87	2,162
Germany	Papua New Guinea		1,254
Total of Germany			1,254
Other Asia, nes	Palau	158	199
	Micronesia	55	37
	Marshall	79	
	Samoa	70	
	Papua New Guinea		22
Total of Other Asia, nes		361	258

2.8.5 Five literature survey target countries

This section describes the import and export data of the five literature survey target countries.

a. Import data of the target sub-headings

Cook has the highest total import value of the target sub-headings. This is followed by Nauru and Kiribati. Swapping among the top three countries has continued since 2012. On the other hand, although the import value of Niue and Tuvalu is increasing, they are consistently in the lower ranks.

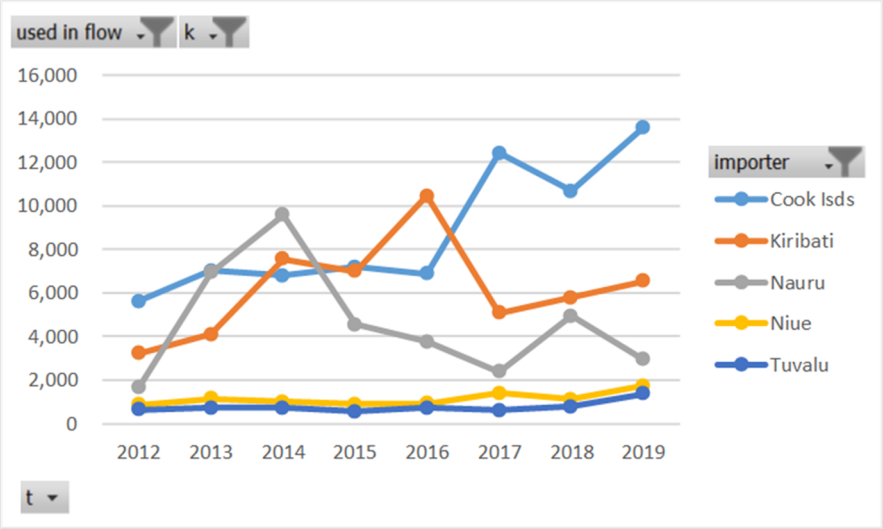


Figure 2-5 Total import value (thousand USD) of target sub-headings for each year of the five surveyed countries

b. Export data of the target sub-headings

Unlike imports, exports are highly exchanged among the five countries, and no constant trend can be seen. As of 2019, the amount is large in the order of Nauru, Cook, Kiribati, Tuvalu, Niue, and the difference between the top three countries and the bottom two countries is clear.

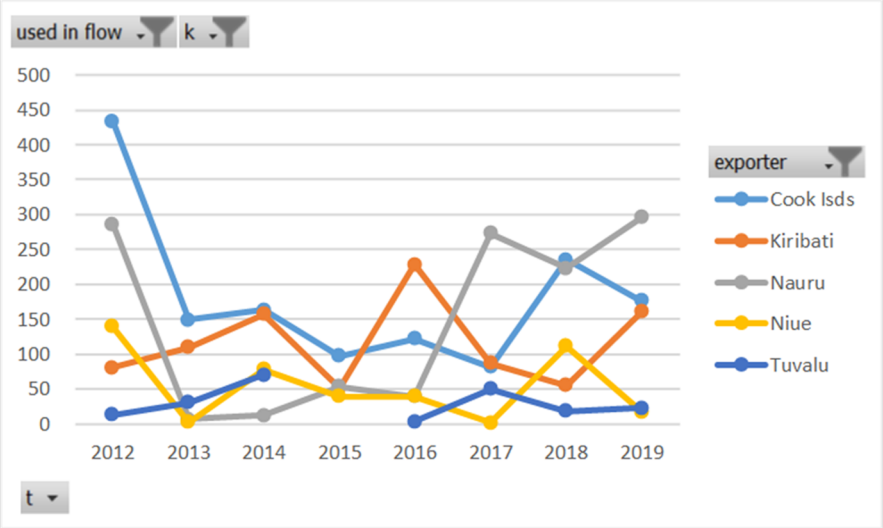


Figure 2-6 Total export value (thousand USD) of target sub-headings for each year of the five surveyed countries

As described above for the nine countries surveyed in the field, this section describes the export data of the target sub-headings of the five countries surveyed in the literature, especially of the exports that are obvious as waste and scraps.

The tendency that scrap metal accounts for the majority in the countries surveyed in the field is even more pronounced in the countries surveyed in the literature. In 2013 and 2019, there are no exports of recyclables other than scrap metal. Moreover, in both 2013 and 2019, two out of five countries do not even export scrap metal. Cook has the highest amount of recyclables, followed by Kiribati. Cook exports the most ferrous scrap, and Kiribati exports the most non-ferrous scrap. Since Kiribati has introduced CDL, it is thought that the export of aluminum cans has led to an increase in the export volume of non-ferrous scrap.

Comparing 2013 and 2019, the fact that the export volume is higher in 2019 is different from the tendency of the countries surveyed in the field.

Table 2-62 Total exports of recyclables (tons) of the target sub-headings of the five surveyed countries in 2013

Exporter	Waste Glass	Ferrous scrap	Non-ferrous scrap	Waste plastic	Used paper	Used tyre	Used lead acid battery	Total
Cook	0	278	10	0	0	0	0	288
Kiribati	0	30	41	0	0	0	0	71
Nauru	0	0	0	0	0	0	0	0
Niue	0	0	0	0	0	0	0	0
Tuvalu	0	24	7	0	0	0	0	31
Grand total	**0**	**332**	**58**	**0**	**0**	**0**	**0**	**390**

Table 2-63 Total imports of recyclables (tons) of the target sub-headings of the five surveyed countries in 2019

Exporter	Waste Glass	Ferrous scrap	Non-ferrous scrap	Waste plastic	Used paper	Used tyre	Used lead acid battery	Total
Cook	0	493	14	0	0	0	0	507
Kiribati	0	0	71	0	0	0	0	71
Nauru	0	72	17	0	0	0	0	89
Niue	0	0	0	0	0	0	0	0
Tuvalu	0	0	0	0	0	0	0	0
Grand total	**0**	**565**	**102**	**0**	**0**	**0**	**0**	**667**

The table below shows the volume and value of scrap metal exported from the five surveyed countries. In terms of the value of ferrous scrap per unit, it was 220 USD per ton in 2013, but it has dropped to 142 USD in 2019. This downward trend is similar to that of the countries surveyed in the field. Since 2013, the unit price of the countries surveyed in the literature has been lower than that of the countries surveyed in the field. Although the unit price of non-ferrous scrap is originally high, it has fallen from 2,190 USD to 1,569 USD. This unit price is close to the value of the countries surveyed in the field both before and after the decline.

Table 2-64 Total export volume (tons) and value of scrap metal from the five surveyed countries in 2013 and 2019

2013				
	Ferrous scrap		Non-ferrous scrap	
Exporter	Tons	Thousand USD	Tons	Thousand USD
Cook	278	57	10	12
Kiribati	30	8	41	97
Nauru	0	0	0	0
Niue	0	0	0	0
Tuvalu	24	8	7	17
Grand total	**332**	**73**	**58**	**127**
2019				
	Ferrous scrap		Non-ferrous scrap	
Exporter	Tons	Thousand USD	Tons	Thousand USD
Cook	493	64	14	4
Kiribati	0		71	147
Nauru	72	17	17	8
Niue	0	0	0	0
Tuvalu	0	0	0	0
Grand total	**565**	**80**	**102**	**160**

New Zealand is the country where the five countries surveyed in the literature export the most ferrous scrap both in 2013 and 2019. In the case of the nine countries surveyed in the field, exports to New Zealand are the fifth highest in 2013, but the tenth highest in 2019. In 2019, New Zealand's unit price is 130 USD, while ROK's is 236 USD.

Table 2-65 Total export volume (tons) and value of ferrous scrap exported from the five surveyed countries (by export partner country) in 2013 and 2019

2013			2019		
Importer	Total / q	Total / v	Importer	Total / q	Total / v
New Zealand	289	63	New Zealand	493	64
Australia	30	8	Rep. of Korea	72	17
Croatia	13	2	Kiribati	21	2
Kiribati	2	2			
Nauru	0	19			
Grand total	**334**	**94**	**Grand total**	**586**	**82**

Australia had the highest amount of non-ferrous scrap exported from the five countries surveyed in the literature in 2013, but ROK had the highest amount in 2019. The fact that ROK has the largest number is common with the export volume of the countries surveyed in the field.

Table 2-66 Total export volume (tons) and value of non- ferrous scrap exported from the nine surveyed countries (by export partner country) in 2013 and 2019

2013			2019		
Importer	Total / q	Total / v	Importer	Total / q	Total / v
Australia	15	7	Rep. of Korea	62	57
Other Asia, nes	14	63	Other Asia, nes	20	91
USA	12	27	New Zealand	14	4
So. African Customs Union	10	12	USA	6	8
New Zealand	7	17			
Grand total	**58**	**127**	**Grand total**	**102**	**160**

2.9 Material Flow of Each Item of Field Survey Target Countries

2.9.1 Outline of current and future estimations

a. Target materials

Target items are as shown in Section 1.6.

b. Target years of estimation

Present is defined as year of 2020 and the as defined as year of 2030.

c. Items to be estimated

Population, number of households, number of vehicles owned, number of home appliances owned, unit generation rate of PET bottle, paper / cardboard and aluminum can, material flow of each item (including amount of used/expired target items, amount of recyclable material generated, amount of recyclable material locally recycled and etc.) were estimated.

2.9.2 Methods and results of current and future estimation

Methods and results of current and future estimation are shown below. Although the method is outlined here, further details of each procedure of estimation are provided in the attachment.

a. Population / Number of households

As for population, following data source was adopted, while number of households was estimated from the value of the population and the number of people per household obtained from the census of each country.

Table 2-67 Data sources used for estimation of population and number of households

Items	Data sources
Population	UN, Word Population Prospects 2019
Number of households	Calculated by the study team from population data of the UN Word Population Prospects 2019 and the number of people per household obtained from the national census of each country.

Result of estimation of population and number of households in 2020 and 2030 are shown below.

Table 2-68 Population and number of households of each country in 2020 and 2030

Countries	2020		2030	
	Population	Number of Households	Population	Number of Households
Palau	18,092	4,828	18,468	4,928
Micronesia	115,021	18,752	126,699	20,656
Marshall	59,194	8,705	64,998	9,559
Papua New Guinea	8,947,027	1,690,506	10,709,351	2,023,490
Solomon	686,878	124,887	864,603	157,201
Vanuatu	307,150	62,597	383,377	78,132
Fiji	896,444	191,010	966,019	205,834
Tonga	105,697	18,906	115,616	20,680
Samoa	198,410	29,771	220,368	33,066

b. Number of vehicles owned

Regarding the number of vehicles owned, data on the number of registered vehicles in each country shown below was adopted as the basis of estimation. Ownership rate of the base year (2019) was set based on the acquired basis data with considering the GDP growth rate from the data year, then number of vehicles owned in 2020 and 2030 were estimated in consideration of the GDP growth rate from the base year.

Table 2-69 Basis of estimation for the number of vehicles owned

Countries	Data sources
Palau	2019 data from “2020 Statistical Yearbook”
Micronesia	2019 data from “FSM Statistics Office”
Marshall	2013 data from “WHO Number of registered vehicles”
Papua New Guinea	2016 data from “WHO Number of Registered vehicles”
Solomon	2010 data from “WHO Number of Registered vehicles”
Vanuatu	2013 data from “WHO Number of Registered vehicles”
Fiji	Number of registered vehicles of Fiji Bureau of Statistics (2018)
Tonga	2016 data from "Social-statistics-bulletin-2019-update-May-2021” published by Tonga Statistics Department
Samoa	2018 data from "Annual Report 2018-2019" published by Land Transport Authority

The results of estimation of the number of vehicles owned in 2020 and 2030 are shown below.

Table 2-70 Estimated number of vehicles owned

Countries	2020	2030
Palau	7,798	11,347
Micronesia	11,949	12,481
Marshall	2,549	2,851
Papua New Guinea	116,484	142,528
Solomon	17,009	23,127
Vanuatu	17,175	20,964
Fiji	124,036	177,930
Tonga	17,827	21,140
Samoa	26,145	34,372

c. Number of home appliances owned

Regarding the number of home appliances owned, the data from the following national censuses and the survey on consumers' behavior dealing with recyclables and etc. were used as the basis of estimation. The ownership rate in the base year (2019) was set based on the acquired basis data considering GDP growth rate from the data year of each countries, and increase in the number of households and the GDP growth rate from the base year was considered. Then the number of household appliances owned in 2020 and 2030 were estimated.

Table 2-71 Basis of estimation of number of home appliances owned

Countries	Data sources
Palau	Number of vehicles owned as shown in the 2015 Census Report
Micronesia	Number of vehicles owned provided by the Statistics Bureau based on the 2010 census
Marshall	Ownership rates shown in the 2011 Census Report
Papua New Guinea	Since there is no data on home appliances, the ownership rate of Vanuatu is applied.

Countries	Data sources
Solomon	Since there is no data on home appliances, the ownership rate of Vanuatu is applied.
Vanuatu	Ownership rate shown in the 2016 Census Report
Fiji	The ownership rate of home appliances obtained from the results of the consumer survey was corrected and applied. (Since the surveyed areas are Suva and Lautoka, which have relatively high living standards in Fiji, the value obtained by multiplying the obtained ownership rate by the correction value (0.8) was applied nationwide.)
Tonga	Number of vehicles owned as shown in the 2016 Census Report
Samoa	Ownership rate shown in the "Energy Labeling and Minimum Energy Performance Standards for Appliances and Lighting" by the Australian AID Funding Program

The result of estimation of number of home appliances owned in 2020 and 2030 are shown below.

Table 2-72 Estimated number of home appliances owned

Country	Year	TV	Refrigerator	Washing machine	Air conditioner	Microwave oven	Computer	Cell phone
Palau	2020	2,393	2,687	3,493	1,562	1,174	1,529	2,651
	2030	4,361	4,896	6,364	2,846	2,139	2,786	4,831
Micronesia	2020	10,587	7,025	6,565	1,508	1,339	2,089	8,488
	2030	12,944	8,589	8,026	1,844	1,637	2,554	10,378
Marshall	2020	6,690	5,765	3,480	3,847	1,896	1,338	6,456
	2030	8,866	7,639	4,611	5,098	2,512	1,773	8,555
Papua New Guinea	2020	885,859	311,248	747,135	171,658	152,395	191,537	1,819,603
	2030	1,382,474	485,734	1,165,980	267,890	237,828	298,913	2,839,676
Solomon	2020	58,307	20,486	49,176	11,299	10,031	12,607	119,766
	2030	109,560	38,494	92,403	21,230	18,848	23,689	225,042
Vanuatu	2020	21,425	7,528	18,070	4,152	3,686	4,632	44,008
	2030	37,467	13,164	31,600	7,260	6,445	8,101	76,959
Fiji	2020	168,725	182,732	168,088	34,382	101,235	121,737	518,209
	2030	344,222	372,799	342,923	70,143	206,533	248,359	1,057,216
Samoa	2020	17,807	11,388	17,227	576	8,022	10,651	49,235
	2030	24,852	15,893	24,042	805	11,196	14,865	68,714
Tonga	2020	25,369	15,778	7,116	1,547	11,447	8,663	37,435
	2030	43,627	27,134	12,237	2,660	19,685	14,897	64,377

d. Unit generation rate of PET bottle, Paper / Cardboard, Aluminum can

The following table shows the estimated generation rate of PET bottles, paper/cardboard and aluminum cans in 2020 and 2030, based on the population of each country as estimated in "Population and households" and the amount of PET bottle, paper/cardboard and aluminum can as estimated in "Material flow of each item".

Table 2-73 Estimated generation rate of PET bottle, Paper / Cardboard and Aluminum can

Target year	Unit	PET bottle	Paper / Cardboard	Aluminum can
2020	kg/capita/year	0.806	0.869	0.630
2030	kg/capita/year	0.783	1.112	0.625

e. Material flow of each item

e.1 Definitions of the material flow

Although material flows are prepared for each counties are separated by "current" flow and "future" flow, the components of each of flows are the same. Terms used in material flow are "Items", "Amount used/exported", "Amount of generation of recyclable material", "Recycled in the country", "Exported recyclable material " and "Unmanaged or disposed". Unit of figures indicated in material flow is ton per year.

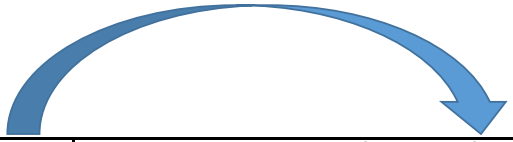
The definition of each of terms are summarized in the table below.

Table 2-74 Definitions of terms used in the material flow

Terms	Definition
Items	Name of target items
Amount used/expired	Amount of used/expired target items (As for “End of life vehicle (Automobile)” and “Waste home appliance”, the amount includes non-recyclable material generated from itself.)
Amount of generation of recyclable material	Amount of recyclable materials generated from target items
Recycled in the country	Amount of recyclable material locally (domestically) recycled. (The rate of the amount of recyclable materials locally recycled to the amount of recycled materials generated is indicated as "%" together with the amount.)
Exported recyclable material	Amount of recyclable materials exported (The rate of the amount of recyclable materials exported to the amount of recyclable materials generated is shown as "%" together with the amount.)
Unmanaged or disposed	Amount of recyclable material unmanaged or disposed and therefore remains in country. (The rate of the amount of recyclable unmanaged or disposed to the amount of recyclables materials generated is indicated as "%" together with the amount.)

e.2 Explanation of material flow

The calculation method of material flow will be described later, here, how to read the flow is explained using the material flow of Palau as an example. From the figure of “Amount used/expired”, amount of each of used/expired items in the year can be grasped. Based on the figure of “Amount used/expired”, the figure of “Amount of generation of recyclable material” is calculated. In this calculation process, non-recyclable material contained in end of life vehicles and waste home appliance are excluded. This is the reason why the total figure of “Amount used/expired” does not match the total figure of “Amount of generation of recyclable material” as for automobile and waste home appliance.



1. Palau

Items	Amount used/expired (ton)	Amount of generation of recyclable material (ton)								
		Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
PET bottle	170			170						
Aluminum can	165		165							
Glass	198				198					
End of Life Vehicle	1,348	414	12				100	144	17	
Automobile	1,151	414	12				12	35	17	
Used LA battery	88						88			
Used tyre	109							109		
Waste home appliance	70	39	8							
Television set	7	3	0							
Refrigerator	25	14	3							
Washing machine	22	12	2							
Air conditioner	10	5	3							
Microwave oven	4	3	0							
Computer	2	2	0							
Cell phone	0	0	0							
Waste lublicant oil	178								178	
Paper, cardboard	147					147				
Single use plastic	40									40
Total (ton/year)	**2,316**	453	185	170	198	147	100	144	195	40

	Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
Recycled in the country (ton/year)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	6 (4.4%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Exported recyclable material (ton/year)	1,052 (232.3%)	203 (109.9%)	96 (56.2%)	0 (0.0%)	0 (0.0%)	44 (44.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Unmanaged or disposed (ton/year)	-	-	74 (43.8%)	198 (100.0%)	141 (95.6%)	56 (55.9%)	144 (100.0%)	195 (100.0%)	40 (0.0%)

There are three treatment categories for recyclable material namely, "Recycled in the country", "Exported recyclable material", and "Unmanaged or disposed". In the lower part of material flow, the figure of “Amount of generation of recyclable material” are separated into these three categories according to the amount of each category has. Basically, the total figure of “Amount of generation of recyclable material” is equal to the sum of these three categories’ figures, "Recycled in the country", "Exported recyclable material" and "Unmanaged or disposed". Recycling rate is expressed as a percentage of figure of "Recycled in the country" to total figure of “Amount of generation of recyclable material”. The exceptions are ferrous scrap and non-ferrous scrap. “Exported recyclable material” of ferrous scrap and non-ferrous scrap include ferrous scrap and non-ferrous scrap derived from other than target items. This is because ferrous scrap and non-ferrous scrap derived from end of life vehicle and waste home appliance, which are the target items of this survey, and ferrous scrap and non-ferrous scrap derived from the others can’t be separated in the process of estimation of “Export of recyclable material”. In addition, the figure of “Unmanaged and disposed” is calculated from three figures, namely “Amount of generation of recyclable material”, “Recycled in the country”, and “Exported recyclable material”. As mentioned above, since “Exported recyclable material” of ferrous scrap and non-ferrous scrap include ferrous scrap and non-ferrous scrap originating from other than target items, no value was allocated to “Unmanaged or disposed” of ferrous scrap and non-ferrous scrap.

1. Palau

Items	Amount used/expired (ton)	Amount of generation of recyclable material (ton)								
		Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
PET bottle	170			170						
Aluminum can	165		165							
Glass	198				198					
End of Life Vehicle	1,348	414	12				100	144	17	
Automobile	1,151	414	12				12	35	17	
Used LA battery							88			
Used tyre								109		
Waste home appliance	70	39	8							
Television set	7	3	0							
Refrigerator	25	14	3							
Washing machine	22	12	2							
Air conditioner	10	5	3							
Microwave oven	4	3	0							
Computer	2	2	0							
Cell phone	0	0	0							
Waste lublicant oil	178								178	
Paper, cardboard	147					147				
Single use plastic	40									40
Total (ton/year)	**2,316**	453	185	170	198	147	100	144	195	40

	Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
Recycled in the country (ton/year)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	6 (4.4%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Exported recyclable material (ton/year)	1,052 (232.3%)	203 (109.9%)	96 (56.2%)	0 (0.0%)	0 (0.0%)	44 (44.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Unmanaged or disposed (ton/year)	-	-	74 (43.8%)	198 (100.0%)	141 (95.6%)	56 (55.9%)	144 (100.0%)	195 (100.0%)	40 (0.0%)

e.3 Calculation method of material flow

The calculation method of the material flow is as follows. First, the base year data as of 2019 was set for “Amount used/expired”, “Amount of generation of recyclable material”, “Recycled in the country”, “Exported recyclable materials”, and “Unmanaged or disposed”. Then, based on the base year data of “Amount used/expired”, change in figures over time was estimated from 2020 to 2030. Based on the result of the estimation of “Amount used/expired” from 2020 to 2030, “Amount of generation of recyclable material”, “Recycled in the country”, “Exported recyclable materials”, and “Unmanaged or disposed” in 2020 and 2030 were estimated. Based on the above procedure, material flow in 2020 and 2030 were calculated.

A. Setting of base year data

In estimating the material flows, 2019 was defined as the base year and the base year data was set. The table below shows the basis for setting the base year data.

Table 2-75 Basis for setting of base year data

Terms	Items or recyclable materials	Basis for setting
Amount used/expired	End of life vehicle (automobiles), waste home appliances (TVs, refrigerators, washing machines, air conditioners, microwave ovens, computers, cell phones)	It was set based on the number of vehicles owned, the number of home appliances owned, the average number of years of use grasped by the consumers' survey, etc., and the unit weight published by the Japanese public institution.
	Waste lubricant oil	The volume of waste lubricant oil generated (liter) based on the report of an international organization was converted into weight by the specific gravity of waste oil.
	End of life vehicle (used lead acid batteries, used tyre), PET bottles, aluminum cans, glass, paper, cardboard, single use plastics	It was set from the import / export statistical data of each country or the field survey data of this survey.

Terms	Items or recyclable materials	Basis for setting
Amount of generation of recyclable material	Ferrous scrap	It was the sum of the following 2 figures. ・The amount of ferrous scrap associated with end of life vehicle calculated by multiplying the amount of end of life vehicle (automobile) generated in the "Amount used/expired" by the weight ratio of each recyclable material to the automobiles published in Japan. ・The amount of ferrous scrap associated with waste home appliance calculated by multiplying the amount of waste home appliances generated in the "Amount used/expired" by the weight ratio of each recyclable material to one home appliance published in Japan.
	Non-ferrous scrap	It was the sum of the following 3 figures. ・The amount of aluminum can in the "Amount used/expired". ・The amount of non-ferrous scrap associated with end of life vehicle calculated by multiplying the amount of end of life vehicle (automobile) generated in the "Amount used/expired" by the weight ratio of each recyclable material to the automobiles published in Japan. ・The amount of non-ferrous scrap associated with waste home appliance calculated by multiplying the amount of waste home appliances generated in the "Amount used/expired" by the weight ratio of each recyclable material to one home appliance published in Japan.
	Used LA battery, used tyre, waste lubricant oil	It is the sum of the following two figures. ・Amount generated for each item in "Amount used/expired " ・The amount of each recyclable material associated with End of life vehicle calculated by multiplying the amount of End of life vehicle (automobiles) generated in the "Amount used/expired" by the weight ratio of each recyclable material to the automobiles published in Japan.
	PET bottle, glass, paper/cardboard, single use plastic	Equivalent to the amount generated for each item in "Amount used/expired".
Recycled in the country	Ferrous scrap, non-ferrous scrap, PET bottle, glass, paper/cardboard, used LA battery, used tyre, waste lubricant oil, single use plastic	It was set from the data obtained from the field survey conducted in this survey.
Exported recyclable material	Ferrous scrap, Non-ferrous scrap, PET bottle, Glass, Paper / cardboard, Used LA battery, Used tyre, Waste lubricant oil, Single use plastic	It was set from the import / export statistical data of each country or the data obtained in the field survey conducted in this survey.
Unmanaged or disposed	Ferrous scrap, Non-ferrous scrap	Since the amount of exported recyclable material for only the target items is unknown, no value was given.
	PET bottle, Glass, Paper / cardboard, Used LA battery, Used tyre, Waste lubricant oil, Single use plastic	It was set as the difference was calculated by subtracting the amount of recycled in the country and the amount of exported recyclable material from the amount of recyclable material generated.

B. Estimation of amount used/expired from 2020 to 2030

Based on the base year data, the amount of Amount used/expired from 2020 to 2030 was estimated. The basis for estimation is shown in the table below.

Table 2-76 Basis for estimation of amount used/expired from 2020 to 2030

Terms	Target items	Basis for estimation
Amount used/expired	End of life vehicle (automobile, used LA battery, Used tyre), Waste home appliance (TV, Refrigerator, Washing machine, Air conditioner, Microwave oven, Computer, Cell phone), Waste lubricant oil, Paper, cardboard	2020-2023: The amount generated in the base year (2019) was multiplied by the GDP growth rate of each year (2020-2022) of WB Global Economic Prospects June 2021. 2023-2030: The amount generated in the base year (2019) was multiplied by the GDP growth rate of 2023 shown in "WB Global Economic Prospects June 2021" (It was assumed that the GDP growth rate after 2023 will be maintained at the level of 2023).
	PET bottle, Aluminum can, Glass	The amount generated in the base year (2019) was multiplied by the ratio of the population of each year (2020-2030) to the 2019 population of “Word Population Prospects 2019”.
	Single use plastic	2020-2025: The amount generated in the base year (2019) was multiplied by the ratio of the population of each year (2020-2025) to the 2019 population of “Word Population Prospects 2019”. 2026-2030: It was set to 0 (prohibition of use of single use plastic).

C. Estimation of amount of generation of recyclable material and etc. in 2020 and 2030

From the amount of amount used/expired in 2020 and 2030, amount of generation of recyclable material, recycled in the country, exported recyclable material, and unmanaged or disposed in 2020 and 2030 were estimated. The basis for estimation is shown in the table below.

Table 2-77 Basis for estimation of amount of generation of recyclable material and etc. in 2020 and 2030

Terms	Recyclable material	Basis for estimation
Amount of generation of recyclable material	Ferrous scrap, Non-ferrous scrap, PET bottle, Glass, Paper / cardboard, Used LA battery, Used tyre, Waste lubricant oil, Single use plastic	Based on the estimated “Amount used/expired” in each year (2020, 2030), it was calculated by the same calculation method as the setting of “Amount of generation of recyclable material” of the base year data.
Recycled in the country	Ferrous scrap, Non-ferrous scrap, PET bottle, Glass, Paper / cardboard, Used LA battery, Used tyre, Waste lubricant oil, Single use plastic	The ratio of “Recycled in the country” to the “Amount of generation of recyclable material” in 2019 (base year) was multiplied by the estimated “Amount of generation of recyclable material” in each year (2020, 2030).
Exported recyclable material	Ferrous scrap, Non-ferrous scrap, PET bottle, Glass, Paper / cardboard, Used LA battery, Used tyre, Waste lubricant oil, Single use plastic	The ratio of “Exported recyclable material” to “Amount of generation of recyclable material” in 2019 (base year) was multiplied by the estimated “Amount of generation of recyclable material” in each year (20202030).
Unmanaged or disposed	PET bottle, Glass, Paper / cardboard, Used LA battery, Used tyre, Waste lubricant oil, Single use plastic	It was calculated by reducing “Recycled in the country” and “Exported recyclable material” from “Amount of generation of recyclable material” each year.

e.4 Material flows for each country

The current (2020) and future (2030) material flows based on the results of estimation are shown by country.

1. Palau

Items	Amount used/expired (ton)	Amount of generation of recyclable material (ton)								
		Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
PET bottle	170			170						
Aluminum can	165		165							
Glass	198				198					
End of Life Vehicle	1,348	414	12				100	144	17	
Automobile	1,151	414	12				12	35	17	
Used LA battery	88						88			
Used tyre	109							109		
Waste home appliance	70	39	8							
Television set	7	3	0							
Refrigerator	25	14	3							
Washing machine	22	12	2							
Air conditioner	10	5	3							
Microwave oven	4	3	0							
Computer	2	2	0							
Cell phone	0	0	0							
Waste lublicant oil	178								178	
Paper, cardboard	147					147				
Single use plastic	40									40
Total (ton/year)	**2,316**	453	185	170	198	147	100	144	195	40

	Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
Recycled in the country (ton/year)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	6 (4.4%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Exported recyclable material (ton/year)	1,052 (232.3%)	203 (109.9%)	96 (56.2%)	0 (0.0%)	0 (0.0%)	44 (44.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Unmanaged or disposed (ton/year)	-	-	74 (43.8%)	198 (100.0%)	141 (95.6%)	56 (55.9%)	144 (100.0%)	195 (100.0%)	40 (0.0%)

Figure 2-7 Material flow in 2020 (Palau)

1. Palau

Items	Amount used/expired (ton)	Amount of generation of recyclable material (ton)								
		Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
PET bottle	172			172						
Aluminum can	166		166							
Glass	201				201					
End of Life Vehicle	2,311	710	20				171	247	30	
Automobile	1,972	710	20				20	59	30	
Used LA battery	151						151			
Used tyre	188							188		
Waste home appliance	115	63	14							
Television set	8	4	0							
Refrigerator	43	24	4							
Washing machine	39	21	4							
Air conditioner	19	9	6							
Microwave oven	4	3	0							
Computer	2	2	0							
Cell phone	0	0	0							
Waste lublicant oil	306								306	
Paper, cardboard	251					251				
Single use plastic	0									0
Total (ton/year)	**3,522**	773	200	172	201	251	171	247	336	0

	Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
Recycled in the country (ton/year)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	11 (4.4%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Exported recyclable material (ton/year)	1,796 (232.3%)	220 (109.9%)	97 (56.2%)	0 (0.0%)	0 (0.0%)	75 (44.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Unmanaged or disposed (ton/year)	-	-	75 (43.8%)	201 (100.0%)	240 (95.6%)	96 (55.9%)	247 (100.0%)	336 (100.0%)	0 (0.0%)

Figure 2-8 Material flow in 2030 (Palau)

2. Micronesia

Items	Amount used/expired (ton)	Amount of generation of recyclable material (ton)								
		Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
PET bottle	98			98						
Aluminum can	312		312							
Glass	1,231				1,231					
End of Life Vehicle	2,239	658	18				165	320	27	
Automobile	1,827	658	18				18	55	27	
Used LA battery	147						147			
Used tyre	265							265		
Waste home appliance	169	93	18							
Television set	36	17	2							
Refrigerator	72	41	7							
Washing machine	44	24	5							
Air conditioner	10	5	3							
Microwave oven	5	4	1							
Computer	2	2	0							
Cell phone	0	0	0							
Waste lublicant oil	278								278	
Paper, cardboard	87					87				
Single use plastic	53									53
Total (ton/year)	**4,467**	751	348	98	1,231	87	165	320	305	53

	Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
Recycled in the country (ton/year)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Exported recyclable material (ton/year)	825 (109.8%)	94 (27.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	95 (57.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Unmanaged or disposed (ton/year)	-	-	98 (100.0%)	1,231 (100.0%)	87 (100.0%)	70 (42.3%)	320 (100.0%)	305 (100.0%)	53 (0.0%)

Figure 2-9 Material flow in 2020 (Micronesia)

2. Micronesia

Items	Amount used/expired (ton)	Amount of generation of recyclable material (ton)								
		Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
PET bottle	108			108						
Aluminum can	342		342							
Glass	1,356				1,356					
End of Life Vehicle	2,400	704	20				178	345	29	
Automobile	1,956	704	20				20	59	29	
Used LA battery	158						158			
Used tyre	286							286		
Waste home appliance	175	96	18							
Television set	36	17	2							
Refrigerator	79	45	8							
Washing machine	43	23	4							
Air conditioner	10	5	3							
Microwave oven	5	4	1							
Computer	2	2	0							
Cell phone	0	0	0							
Waste lublicant oil	299								299	
Paper, cardboard	94					94				
Single use plastic	0									0
Total (ton/year)	**4,774**	800	380	108	1,356	94	178	345	328	0

	Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
Recycled in the country (ton/year)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Exported recyclable material (ton/year)	879 (109.8%)	103 (27.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	103 (57.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Unmanaged or disposed (ton/year)	-	-	108 (100.0%)	1,356 (100.0%)	94 (100.0%)	75 (42.3%)	345 (100.0%)	328 (100.0%)	0 (0.0%)

Figure 2-10 Material flow in 2030 (Micronesia)

3. Marshall

Items	Amount used/expired (ton)	Amount of generation of recyclable material (ton)								
		Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
PET bottle	248			248						
Aluminum can	179		179							
Glass	74				74					
End of Life Vehicle	463	129	4				87	32	5	
Automobile	359	129	4				4	11	5	
Used LA battery	83						83			
Used tyre	21							21		
Waste home appliance	137	75	19							
Television set	23	11	1							
Refrigerator	57	32	6							
Washing machine	23	13	2							
Air conditioner	26	12	9							
Microwave oven	7	6	1							
Computer	1	1	0							
Cell phone	0	0	0							
Waste lublicant oil	169								169	
Paper, cardboard	255					255				
Single use plastic	63									63
Total (ton/year)	**1,588**	204	202	248	74	255	87	32	174	63

	Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
Recycled in the country (ton/year)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Exported recyclable material (ton/year)	5,688 (2788.3%)	116 (57.4%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	41 (47.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Unmanaged or disposed (ton/year)	-	-	248 (100.0%)	74 (100.0%)	255 (100.0%)	46 (52.7%)	32 (100.0%)	174 (100.0%)	63 (0.0%)

Figure 2-11 Material flow in 2020 (Marshall)

3. Marshall

Items	Amount used/expired (ton)	Amount of generation of recyclable material (ton)								
		Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
PET bottle	273			273						
Aluminum can	196		196							
Glass	84				84					
End of Life Vehicle	550	154	4				104	35	6	
Automobile	428	154	4				4	13	6	
Used LA battery	100						100			
Used tyre	22							22		
Waste home appliance	157	86	24							
Television set	24	12	1							
Refrigerator	66	37	7							
Washing machine	24	13	3							
Air conditioner	35	17	12							
Microwave oven	7	6	1							
Computer	1	1	0							
Cell phone	0	0	0							
Waste lublicant oil	203								203	
Paper, cardboard	305					305				
Single use plastic	0									0
Total (ton/year)	**1,768**	240	224	273	84	305	104	35	209	0

	Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
Recycled in the country (ton/year)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Exported recyclable material (ton/year)	6,692 (2788.3%)	129 (57.4%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	49 (47.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Unmanaged or disposed (ton/year)	-	-	273 (100.0%)	84 (100.0%)	305 (100.0%)	55 (52.7%)	35 (100.0%)	209 (100.0%)	0 (0.0%)

Figure 2-12 Material flow in 2030 (Marshall)

4. Papua New Guinea

Items	Amount used/expired (ton)	Amount of generation of recyclable material (ton)								
		Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
PET bottle	4,618			4,618						
Aluminum can	5,905		5,905							
Glass	13,813				13,813					
End of Life Vehicle	28,002	5,980	166				1,757	10,298	249	
Automobile	16,611	5,980	166				166	498	249	
Used LA battery	1,591						1,591			
Used tyre	9,800							9,800		
Waste home appliance	12,764	6,968	1,468							
Television set	2,959	1,433	182							
Refrigerator	3,060	1,734	317							
Washing machine	4,869	2,653	508							
Air conditioner	1,121	534	381							
Microwave oven	514	418	55							
Computer	200	163	21							
Cell phone	41	33	4							
Waste lublicant oil	4,152								4,152	
Paper, cardboard	4,514					4,514				
Single use plastic	3,452									3,452
Total (ton/year)	**77,220**	12,948	7,539	4,618	13,813	4,514	1,757	10,298	4,401	3,452

	Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
Recycled in the country (ton/year)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Exported recyclable material (ton/year)	15,577 (120.3%)	8,772 (116.4%)	0 (0.0%)	0 (0.0%)	537 (11.9%)	960 (54.6%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Unmanaged or disposed (ton/year)	-	-	4,618 (100.0%)	13,813 (100.0%)	3,977 (88.1%)	797 (45.4%)	10,298 (100.0%)	4,401 (100.0%)	3,452 (0.0%)

Figure 2-13 Material flow in 2020 (Papua New Guinea)

4. Papua New Guinea

Items	Amount used/expired (ton)	Amount of generation of recyclable material (ton)								
		Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
PET bottle	5,527			5,527						
Aluminum can	7,068		7,068							
Glass	16,533				16,533					
End of Life Vehicle	36,508	7,797	217				2,290	13,427	325	
Automobile	21,658	7,797	217				217	650	325	
Used LA battery	2,073						2,073			
Used tyre	12,777							12,777		
Waste home appliance	16,637	9,082	1,916							
Television set	3,857	1,868	237							
Refrigerator	3,988	2,259	413							
Washing machine	6,348	3,460	663							
Air conditioner	1,461	696	497							
Microwave oven	670	545	72							
Computer	261	212	28							
Cell phone	52	42	6							
Waste lublicant oil	5,412								5,412	
Paper, cardboard	5,886					5,886				
Single use plastic	0									0
Total (ton/year)	**93,571**	16,879	9,201	5,527	16,533	5,886	2,290	13,427	5,737	0

	Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
Recycled in the country (ton/year)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Exported recyclable material (ton/year)	20,306 (120.3%)	10,706 (116.4%)	0 (0.0%)	0 (0.0%)	701 (11.9%)	1,251 (54.6%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Unmanaged or disposed (ton/year)	-	-	5,527 (100.0%)	16,533 (100.0%)	5,185 (88.1%)	1,039 (45.4%)	13,427 (100.0%)	5,737 (100.0%)	0 (0.0%)

Figure 2-14 Material flow in 2030 (Papua New Guinea)

6. Solomon

Items	Amount used/expired (ton)	Amount of generation of recyclable material (ton)								
		Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
PET bottle	722			722						
Aluminum can	118		118							
Glass	109				109					
End of Life Vehicle	3,037	903	25				182	446	38	
Automobile	2,509	903	25				25	75	38	
Used LA battery	157						157			
Used tyre	371							371		
Waste home appliance	826	451	95							
Television set	192	93	12							
Refrigerator	198	112	21							
Washing machine	315	172	33							
Air conditioner	72	34	24							
Microwave oven	33	27	4							
Computer	13	11	1							
Cell phone	3	2	0							
Waste lublicant oil	684								684	
Paper, cardboard	507					507				
Single use plastic	498									498
Total (ton/year)	6,501	1,354	238	722	109	507	182	446	722	498

	Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
Recycled in the country (ton/year)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Exported recyclable material (ton/year)	3,730 (275.5%)	406 (170.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Unmanaged or disposed (ton/year)	-	-	722 (100.0%)	109 (100.0%)	507 (100.0%)	182 (100.0%)	446 (100.0%)	722 (100.0%)	498 (0.0%)

Figure 2-15 Material flow in 2020 (Solomon)

5. Solomon

Items	Amount used/expired (ton)	Amount of generation of recyclable material (ton)								
		Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
PET bottle	908			908						
Aluminum can	148		148							
Glass	139				139					
End of Life Vehicle	4,530	1,348	37				270	665	56	
Automobile	3,744	1,348	37				37	112	56	
Used LA battery	233						233			
Used tyre	553							553		
Waste home appliance	1,234	674	142							
Television set	287	139	18							
Refrigerator	295	167	31							
Washing machine	469	256	49							
Air conditioner	106	50	36							
Microwave oven	52	42	6							
Computer	22	18	2							
Cell phone	3	2	0							
Waste lublicant oil	1,021								1,021	
Paper, cardboard	755					755				
Single use plastic	0									0
Total (ton/year)	8,735	2,022	327	908	139	755	270	665	1,077	0

	Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
Recycled in the country (ton/year)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Exported recyclable material (ton/year)	5,571 (275.5%)	558 (170.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Unmanaged or disposed (ton/year)	-	-	908 (100.0%)	139 (100.0%)	755 (100.0%)	270 (100.0%)	665 (100.0%)	1,077 (100.0%)	0 (0.0%)

Figure 2-16 Material flow in 2030 (Solomon)

6. Vanuatu

Items	Amount used/expired (ton)	Amount of generation of recyclable material (ton)								
		Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
PET bottle	87			87						
Aluminum can	23		23							
Glass	661				661					
End of Life Vehicle	2,672	849	24				87	322	35	
Automobile	2,358	849	24				24	71	35	
Used LA battery	63						63			
Used tyre	251							251		
Waste home appliance	289	158	32							
Television set	67	32	4							
Refrigerator	69	39	7							
Washing machine	110	60	11							
Air conditioner	25	12	8							
Microwave oven	12	10	1							
Computer	5	4	1							
Cell phone	1	1	0							
Waste lublicant oil	203								203	
Paper, cardboard	248					248				
Single use plastic	100									100
Total (ton/year)	4,283	1,007	79	87	661	248	87	322	238	100

	Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
Recycled in the country (ton/year)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Exported recyclable material (ton/year)	733 (72.8%)	113 (143.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	44 (51.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Unmanaged or disposed (ton/year)	-	-	87 (100.0%)	661 (100.0%)	248 (100.0%)	43 (49.0%)	322 (100.0%)	238 (100.0%)	100 (0.0%)

Figure 2-17 Material flow in 2020 (Vanuatu)

6. Vanuatu

Items	Amount used/expired (ton)	Amount of generation of recyclable material (ton)								
		Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
PET bottle	107			107						
Aluminum can	33		33							
Glass	825				825					
End of Life Vehicle	3,746	1,190	33				122	451	50	
Automobile	3,305	1,190	33				33	99	50	
Used LA battery	89						89			
Used tyre	352							352		
Waste home appliance	399	217	46							
Television set	95	46	6							
Refrigerator	98	56	10							
Washing machine	153	83	16							
Air conditioner	35	17	12							
Microwave oven	12	10	1							
Computer	5	4	1							
Cell phone	1	1	0							
Waste lublicant oil	283								283	
Paper, cardboard	347					347				
Single use plastic	0									0
Total (ton/year)	5,740	1,407	112	107	825	347	122	451	333	0

	Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
Recycled in the country (ton/year)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Exported recyclable material (ton/year)	1,024 (72.8%)	160 (143.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	62 (51.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Unmanaged or disposed (ton/year)	-	-	107 (100.0%)	825 (100.0%)	347 (100.0%)	60 (49.0%)	451 (100.0%)	333 (100.0%)	0 (0.0%)

Figure 2-18 Material flow in 2030 (Vanuatu)

7. Fiji

Items	Amount used/expired (ton)	Amount of generation of recyclable material (ton)								
		Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
PET bottle	2,542			2,542						
Aluminum can	349		349							
Glass	3,960				3,960					
End of Life Vehicle	19,139	5,707	159				906	3,016	238	
Automobile	15,852	5,707	159				159	476	238	
Used LA battery	747						747			
Used tyre	2,540							2,540		
Waste home appliance	3,551	2,037	395							
Television set	480	232	29							
Refrigerator	1,533	869	159							
Washing machine	935	510	98							
Air conditioner	192	91	65							
Microwave oven	292	238	31							
Computer	109	89	12							
Cell phone	10	8	1							
Waste lublicant oil	2,187								2,187	
Paper, cardboard	3,331					3,331				
Single use plastic	339									339
Total (ton/year)	**35,398**	7,744	903	2,542	3,960	3,331	906	3,016	2,425	339

	Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
Recycled in the country (ton/year)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1,229 (36.9%)	0 (0.0%)	0 (0.0%)	2,425 (100.0%)	0 (0.0%)
Exported recyclable material (ton/year)	10,975 (141.7%)	823 (91.1%)	296 (11.6%)	74 (1.9%)	2,004 (60.2%)	378 (41.8%)	7 (0.2%)	0 (0.0%)	0 (0.0%)
Unmanaged or disposed (ton/year)	-	-	2,246 (88.4%)	3,886 (98.1%)	98 (2.9%)	528 (58.2%)	3,009 (99.8%)	0 (0.0%)	339 (0.0%)

Figure 2-19 Material flow in 2020 (Fiji)

7. Fiji

Items	Amount used/expired (ton)	Amount of generation of recyclable material (ton)								
		Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
PET bottle	2,739			2,739						
Aluminum can	379		379							
Glass	4,267				4,267					
End of Life Vehicle	36,233	10,804	300				1,713	5,709	450	
Automobile	30,011	10,804	300				300	900	450	
Used LA battery	1,413						1,413			
Used tyre	4,809							4,809		
Waste home appliance	6,724	3,857	749							
Television set	908	440	56							
Refrigerator	2,901	1,644	301							
Washing machine	1,772	966	185							
Air conditioner	365	174	124							
Microwave oven	553	450	59							
Computer	206	168	22							
Cell phone	19	15	2							
Waste lublicant oil	4,141								4,141	
Paper, cardboard	6,307					6,307				
Single use plastic	0									0
Total (ton/year)	**60,790**	14,661	1,428	2,739	4,267	6,307	1,713	5,709	4,591	0

	Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
Recycled in the country (ton/year)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2,327 (36.9%)	0 (0.0%)	0 (0.0%)	4,591 (100.0%)	0 (0.0%)
Exported recyclable material (ton/year)	20,778 (141.7%)	1,301 (91.1%)	319 (11.6%)	79 (1.9%)	3,795 (60.2%)	716 (41.8%)	14 (0.2%)	0 (0.0%)	0 (0.0%)
Unmanaged or disposed (ton/year)	-	-	2,420 (88.4%)	4,188 (98.1%)	186 (2.9%)	997 (58.2%)	5,695 (99.8%)	0 (0.0%)	0 (0.0%)

Figure 2-20 Material flow in 2030 (Fiji)

8. Tonga

Items	Amount used/expired (ton)	Amount of generation of recyclable material (ton)								
		Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
PET bottle	141			141						
Aluminum can	50		50							
Glass	469				469					
End of Life Vehicle	3,119	986	27				146	342	41	
Automobile	2,740	986	27				27	82	41	
Used LA battery	119						119			
Used tyre	260							260		
Waste home appliance	336	194	33							
Television set	61	30	4							
Refrigerator	115	65	12							
Washing machine	115	63	12							
Air conditioner	4	2	1							
Microwave oven	28	23	3							
Computer	12	10	1							
Cell phone	1	1	0							
Waste lublicant oil	199								199	
Paper, cardboard	217					217				
Single use plastic	30									30
Total (ton/year)	**4,561**	1,180	110	141	469	217	146	342	240	30

	Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
Recycled in the country (ton/year)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Exported recyclable material (ton/year)	244 (20.7%)	90 (81.8%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	33 (22.8%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Unmanaged or disposed (ton/year)	-	-	141 (100.0%)	469 (100.0%)	217 (100.0%)	113 (77.2%)	342 (100.0%)	240 (100.0%)	30 (0.0%)

Figure 2-21 Material flow in 2020 (Tonga)

8. Tonga

Items	Amount used/expired (ton)	Amount of generation of recyclable material (ton)								
		Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
PET bottle	151			151						
Aluminum can	51		51							
Glass	512				512					
End of Life Vehicle	3,859	1,220	34				181	424	51	
Automobile	3,390	1,220	34				34	102	51	
Used LA battery	147						147			
Used tyre	322							322		
Waste home appliance	415	238	41							
Television set	76	37	5							
Refrigerator	143	81	15							
Washing machine	143	78	15							
Air conditioner	4	2	1							
Microwave oven	36	29	4							
Computer	12	10	1							
Cell phone	1	1	0							
Waste lublicant oil	247								247	
Paper, cardboard	268					268				
Single use plastic	0									0
Total (ton/year)	**5,503**	1,458	126	151	512	268	181	424	298	0

	Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
Recycled in the country (ton/year)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Exported recyclable material (ton/year)	302 (20.7%)	103 (81.8%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	41 (22.8%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Unmanaged or disposed (ton/year)	-	-	151 (100.0%)	512 (100.0%)	268 (100.0%)	140 (77.2%)	424 (100.0%)	298 (100.0%)	0 (0.0%)

Figure 2-22 Material flow in 2030 (Tonga)

9. Samoa

Items	Amount used/expired (ton)	Amount of generation of recyclable material (ton)								
		Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
PET bottle	511			511						
Aluminum can	34		34							
Glass	800				800					
End of Life Vehicle	4,590	1,379	38				248	664	57	
Automobile	3,831	1,379	38				38	115	57	
Used LA battery	210						210			
Used tyre	549							549		
Waste home appliance	352	204	35							
Television set	86	42	5							
Refrigerator	157	89	16							
Washing machine	47	26	5							
Air conditioner	11	5	4							
Microwave oven	40	33	4							
Computer	10	8	1							
Cell phone	1	1	0							
Waste lublicant oil	287								287	
Paper, cardboard	538					538				
Single use plastic	843									843
Total (ton/year)	**7,955**	1,583	107	511	800	538	248	664	344	843

	Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
Recycled in the country (ton/year)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Exported recyclable material (ton/year)	2,495 (157.6%)	281 (262.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	203 (81.8%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Unmanaged or disposed (ton/year)	-	-	511 (100.0%)	800 (100.0%)	538 (100.0%)	45 (18.2%)	664 (100.0%)	344 (100.0%)	843 (0.0%)

Figure 2-23 Material flow in 2020 (Samoa)

9. Samoa

Items	Amount used/expired (ton)	Amount of generation of recyclable material (ton)								
		Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
PET bottle	568			568						
Aluminum can	34		34							
Glass	888				888					
End of Life Vehicle	6,560	1,971	55				356	948	82	
Automobile	5,475	1,971	55				55	164	82	
Used LA battery	301						301			
Used tyre	784							784		
Waste home appliance	496	285	50							
Television set	121	59	7							
Refrigerator	224	127	23							
Washing machine	65	35	7							
Air conditioner	19	9	6							
Microwave oven	56	46	6							
Computer	10	8	1							
Cell phone	1	1	0							
Waste lublicant oil	410								410	
Paper, cardboard	770					770				
Single use plastic	0									0
Total (ton/year)	**9,726**	2,256	139	568	888	770	356	948	492	0

	Ferrous scrap	Non-ferrous scrap	PET bottle	Glass	Paper / cardboard	Used LA battery	Used tyre	Waste lubricant oil	Single use plastic
Recycled in the country (ton/year)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Exported recyclable material (ton/year)	3,556 (157.6%)	365 (262.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	291 (81.8%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Unmanaged or disposed (ton/year)	-	-	568 (100.0%)	888 (100.0%)	770 (100.0%)	65 (18.2%)	948 (100.0%)	492 (100.0%)	0 (0.0%)

Figure 2-24 Material flow in 2030 (Samoa)

2.10 Basic Information on Shipping Routes and Port Facilities

2.10.1 Basic information on port facilities

Basic information on port facilities in the filed survey target countries was surveyed from the websites of the port authorities of each country. As for countries that do not have websites of the port authority, information was collected from the port list website. The locations (Coordinates) of ports in each country are indicated as displayed on the websites. The basic information of port facilities compiled for each country is shown below.

Table 2-78 List of main international ports in each country

Country	Name of port	Main port(s) coming from	Main port(s) going to	Berth length (Cargo handling facility)
Palau	Malakal	Yap	Pohnpei	315 m
Micronesia	Pohnpei	Chuuk	Kosrae	264 m
Marshall	Delap Dock	Yokohama Kosrae	Tarawa Ebeye	308 m
Papua New Guinea	Alotau	Oro Bay	Honiara	149 m
	Kimbe	Lihir	Port Klang	302.5 m
	Lae	Motukea Port Moresby Hong Kong Spratly	Honiara Auckland Lihir Port Moresby Rabaul Motukea Oro Bay	681.2 m
	Madang	Jakarta Rabaul	Lae Port Klang	167 m
	Oro Bay	Lae	Alotau	95.3 m
	Port Moresby	Tauranga	Lae Townsville	642 m
	Rabaul	Lae Lihir	Port Moresby Madang	274 m
Solomon	Honiara	Lae Lihir Motukea Yokohama Tarawa Alotau Suva	Brisbane Prony Bay Noumea Santo Lihir Suva	260 m
Vanuatu	Port Vila	Suva Santo	Santo Noumea	More than 152.4 m
	Santo	Honiara Port Villa Noumea	Port Villa Tauranga Takao, Taiwan	More than 152.4 m
Fiji	Suva	Honiara Port Villa Sigave Lautoka Auckland Chrismas Island Nuku'alofa Tauranga	Honiara Lautoka Matautu Apia Port Villa Honolulu Pago Pago Nuku'alofa Auckland	844 m
	Lautoka	Suva Noumea	Port Villa Tauranga	290 m

		Port Villa Brisbane Nuku'alofa	Wallis Suva	
Tonga	Nuku'alofa	Pago Pago Suva	Melbourne Suva Apia	523 m
Samoa	Apia	Suva Nuku'alofa	Pago Pago	305 m

* The main ports where ships coming from and going to, are quoted from the results of the shipping route survey conducted by the survey team.

a. Palau

Regarding port facilities in Palau, the Belau Transfer and Terminal Company (private company) own and managed the facilities[20].

a.1 Port of Malakal

Malakal Port is Palau's main port and is located on Malakal Island, which is adjacent to Koror Island. The port is in a protected lagoon area and is operated by shipping companies Kyowa, Matson Navigation and PIL / Mariana Line routes from Guam and Asia. There are two main docks in the port, each of them is able to handle vessels up to 500 feet in length. The port can be access via a channel through the outer coral reef. Two docks are 164m and 154m respectively.

Freight transportation is mainly containerized, 200 to 400 containers is received each month and about 100 tons of freight is carried each month. Malakal Port is adjacent to a fishing port owned and operated by Tan Holdings Corporation. This adjacent dock facility is dedicated to unloading and exporting packaging for fishing vessels and does not deal with general cargo.

Table 2-79 Port of Malakal

Item	Item detail	Specifications
Port Location	Latitude	7.331256
	Longitude	134.456967
Tugboat support		No
Local Pilot		Yes
Main port(s) coming from		Yap (Micronesian)
Main port(s) going to		Pohnpei (Micronesian)
Cargo handling facility	Main Berth	Length = 160m, Max. draft = 9 (7m safe draft)
	Secondary Berth	Length = 155m, Max. draft = 9 (7m safe draft)

https://dlca.logcluster.org/display/public/DLCA/2.1+Palau+Port+of+Koror

b. Micronesia

Regarding port in Micronesia, the Pohnpei Port Authority (PPA), founded in 1991, is responsible for the development, management, operation and maintenance of Pompeii's ports and facilities[21].

b.1 Pohnpei Port

It deals with domestic and overseas freight, and the actual operations such as warehouse management and container delivery are carried out by the Federated Shipping Company

[20] https://dlca.logcluster.org/display/public/DLCA/2.1+Palau+Port+of+Koror
[21] https://www.pacificports.org/pohnpei-port-authority-micronesia/

(FSCO), a private company.

Table 2-80 Pohnpei Port

Item	Item detail	Specifications
Port Location	Latitude	6° 58' 50" N
	Longitude	158° 12' 5" E
Cargo handling facility	International dock	Length=264m, Max. draft = 12m
Main port(s) coming from		Chuuk(Micronesian)
Main port(s) going to		Kosrae(Micronesian)

c. Marshall

Regarding port facilities in Marshall, the Republic of Marshall Islands Port Authority (RMIPA) is responsible for the development, maintenance and operation of all seaports, including Uliga and Delap ports and Amata Kabua airport in Majuro[22].

c.1 Delap Dock

This is main commercial cargo dock in Majuro Atoll. Luggage are loaded and unloaded by Majuro Stevedore & Terminal Company. The RMIPA office assists in the management of containers and general cargo. The main dock is located on the southeast side of Majuro Atoll, about 308m east to west.

Table 2-81 Delap Dock

Item	Item detail	Specifications
Port Location	Latitude	07,050745
	Longitude	171.2154.29
Cargo handling facility	Berth	Length = 308 m, Max. draft = 13 m
Main port(s) coming from		Yokohama (Japan) Kosrae (Micronesian)
Main port(s) going to		Tarawa (Kiribati) Ebeye (Marshall)

https://dlca.logcluster.org/display/public/DLCA/2.1.1+++++Marshall+Islands+%28RMI%29+Port+of+Delap+Dock

c.2 Uliga Dock

The government vessels owned and operated are moored by the Republic of Marshall Islands Marine Resource Authority (MIMRA), Department of Transport and Communications, and port authority (RMIPA).

d. Papua New Guinea

The port facilities in Papua New Guinea are owned by the Ministry of Transport, and the public corporation PNG Ports Corporation Limited (PNGPCL) manages and operates the facilities of state-owned ports. PNG Ports Corporation Limited manages 15 port facilities (Aitape, Alotau, Buka, Daru, Kavieng, Kieta, Kimbe, Lae, Lorengau, Madang, Oro Bay, Port Moresby, Rabaul, Vanimo and Wewak) out of 23 ports in the country (Declared Ports)[23].

Specifications of each port in Papua New Guinea are cited from web sites of PNG Ports Corporation.

[22] https://www.pacificports.org/republic-of-the-marshall-islands-port-authority/
[23] http://www.pngports.com.pg/

d.1 Aitape Port

Aitape Port is part of a small coastal town in Sandaun Province, Papua New Guinea. It is located between Vanimo and Wewak, it was founded in 1905 as a part of the German colonial station. Wharf is not installed and cranes and vessels use gear for unloading / loading, but mobile cranes are available and can lift containers up to 10-15 tons. The warehouse is about 125 m2 with a roof and about 1,000 m2 with an open area.

d.2 Alotau Port

Alotau Port is located at the eastern end of the mainland. Alotau town became the state capital in 1969 and is the gateway to the world's most remote island community. As available handling equipment and machinery at the wharf, there are forklifts and semi-trailers capable of handling containers up to 40 footers. Also, as for fuel, only road tankers can be used.

The warehouse is 2,430 m2 with a roof and 7,640 m2 with an open area.

Table 2-82 Alotau Port

Item	Item detail	Specifications
Port Location	Latitude	10°20'S
	Longitude	150°22'E
Tugboat support		No
Local Pilot		Yes, No piloting required
Main port(s) coming from		Oro Bay (Papua New Guinea)
Main port(s) going to		Honiara (Solomon)
Cargo handling facility	Berth 1 (Overseas)	L = 93 m, W = 10.02 m, Depth = 10 m, Deck height = 2.4 m
	Berth 2 (Coastal)	L = 56 m, W = 9.8 m, Depth = 4.9 m, Deck height = 2.1 m
	Barge ramp	Width = 8 m, Grade 1 in 12

d.3 Buka Port

Buka Port is located in the town of Buka on the island of Buka in the Bougainville Autonomous Region. Cranes are not installed on the wharf, but mobile devices and machines are available of lifting containers of up to 20 tons. The warehouse is 165 m2 with a roof and 1,000 m2 with an open area.

d.4 Daru Port

Daru Port is located on Daru Island, near the river-mouth of the Fly River in the west. Daru Island is located in the northern part of the Torres Strait and the northern part of Queensland, and is the second largest southern coastal city after Port Moresby. Currently, there are no cranes attached to the wharf. The warehouse is about 1,000 m2 with an open area.

Table 2-83 Daru Port

Item	Item detail	Specifications
Port Location	Latitude	09° 50.4'S
	Longitude	143°12.6'E
Tugboat support		No
Local Pilot		No
Cargo handling facility	Berth 1 (Main wharf)	L = 30 m, W = 12.2 m, Depth = 2.4 LAT, Deck height = 4.8 m
	Barge (Ramp)	W = 6 m, Grade 1 in 8

d.5 Kavieng Port

Kavieng Port is a major port in New Ireland. Cranes are not installed on the wharf, but mobile devices and machines are available of lifting containers of up to 20. The warehouse is 750 m2 with a roof and 3,000 m2 with an open area.

Table 2-84 Kavieng Port

Item	Item detail	Specifications
Port Location	Latitude	02° 35.1'S
	Longitude	150° 47.7'E
Tugboat support		No
Local Pilot		Piloting is not compulsory.
Cargo handling facility	1 (Main Overseas Wharf)	L = 94 m, W = 12 m, Depth = 7.0 m, Deck height = 2.7 m
	Small Ships	L1 = 16 m/L2 = 12 m, W = 4 m, Depth = 1.5 m, Deck height = 1.4 m

d.6 Kieta Port

Kieta Port is located on the east coast of Bougainville and is primarily recognized as a means of transportation (wharf and airfields). Cranes are not installed on the wharf, but cranes capable of lifting containers up to 14 tons and spreaders capable of lifting containers up to 40 tons are available. The warehouse is 2,780 m2 with a roof and 14,200 m2 with an open area.

Table 2-85 Kieta Port

Item	Item detail	Specifications
Port Location	Latitude	06° 13.27'S
	Longitude	155° 38.25'E
Tugboat support		No
Local Pilot		Piloting is not compulsory.
Cargo handling facility	Berth (Overseas)	L = 124.5 m, W = 10.9 m, Depth = 7.5 m, Deck height = 3.0 m
	Berth 2 (Coastal wharf)	L = 68.4m, W = 11.0 m, Depth = 4.8 m, Deck height = 3.0 m
	Berth 3 (Feeder)	L = 69 m, W = 10.0 m, Depth = 4.8 m, Deck height = 2.3 m
	Barge Ramp	Width 12 m, Grade 1 in 8

d.7 Kimbe Port

Kimbe Port is located on the east coast of Kimbe Port is located in the port city of West New Britain in Kimbe Bay. Cranes capable of lifting containers up to 14 tons and spreaders capable of lifting containers up to 40 tons are available. The warehouse is 740 m2 with a roof and 6,000 m2 with an open area.

Table 2-86 Kimbe Port

Item	Item detail	Specifications
Port Location	Latitude	09° 28.7'S
	Longitude	147° 08.35'E
Tugboat support		Yes (24 hours)
Local Pilot		Yes (24 hours)
Main port(s) coming from		Lihir (Papua New Guinea)
Main port(s) going to		Port Klang (Malaysia)

Cargo handling facility	Berth 1 (Main wharf)	L = 117 m, W = 14.7, Depth = 10.7, Deck height = 3.1 m
	Berth 2 (Small ships)	L = 52.5 m, W = 9.0 m, Depth = 5.5 m, Deck height = 3.1 m
	Berth 3 (Small ships)	L = 27 m, W = 5.1 m, Depth = 5.9 m, Deck height = 3.1 m
	Barge Ramp	Width 12m, Grade 1 in 8
	Coastal wharf (New)	L = 106 m, W = 20 m, Depth = 6.1 m, Deck height = 2.7 m

d.8 Lae Port

Lae Port is located in Morobe Province and is one of the largest ports in the country. Forklifts capable of lifting containers up to 14 tons are available. There are grain suction machine, a tanker berth, and an LNG facility in the port. The warehouse is 12,600 m2 with a roof and 39,000 m2 with an open area.

Table 2-87 Lae Port

Item	Item detail	Specifications
Port Location	Latitude	06° 44.0'S
	Longitude	146° 59.0'E
Tugboat support		Yes
Local Pilot		Yes
Main port(s) coming from		Motukea (Papua New Guinea) Port Moresby (Papua New Guinea) Hong Kong Nansha (China)
Main port(s) going to		Honiara (Solomon) Oakland (New Zealand) Lihir (Papua New Guinea) Port Moresby (Papua New Guinea) Rabaul (Papua New Guinea) Motukea (Papua New Guinea) Oro Bay (Papua New Guinea)
Cargo handling facility	1. Overseas (main wharf)	L = 154.5 m, W = 12 m, Depth = 12 m, Deck height = 2.7 m
	2. Overseas (main wharf)	L = 92.2 m, W = 34.5 m, Depth = 12 m, Deck height = 2.7 m
	3. Overseas (main wharf)	L = 220 m, W = 34.5 m, Depth = 12 m, Deck height = 2.7 m
	4. Overseas Extension	L = 108 m, W = 34.5 m, Depth = 13.7 m, Deck height = 3.26 m
	5. Coastal wharf	L = 54 m, W = 13 m, Depth = 4.9 m
	6. Coastal wharf	L = 52.5 m, Depth = 3.0 m, Deck height = 2.9 m
	Tanker Berth	L = 69.27 m, W = 10 m, Depth = 13.7 m, Deck height = 3.5 m
	Barge Ramp	Width = 12 m, Grade 1 in 8
	Tidal Basin	L = 240 m, W = 39.6 m, Depth = 14 m, Deck height = 3.5 m

d.9 Lorengau Port

The Lorengau port is located in Manus Province, Papua New Guinea. Cranes are not installed on the wharf, but mobile devices and machines are available of lifting containers of up to 20. The warehouse is uncovered and 1,000 m2 with an open area.

Table 2-88 Lorengau Port

Item	Item detail	Specifications
Port Location	Latitude	02° 000.08'S
	Longitude	147° 16.3'E
Tugboat support		No
Local Pilot		Piloting is not compulsory.

Cargo handling facility	Berth 1 (North Wharf)	L = 15 m, W = 9.1 m, Depth = 5.1 m, Deck height = 2.9 m
	Berth 2 (Salasia Wharf)	L = 40 m, W = 20 m, Depth = 1.4 m, Deck height = 1.5 m

d.10 Madang Port

Madang Port is located on the north coast and can be one of a port for cruises between Australia and Asia. It opens from 8am to 10pm on weekdays and from 8am to noon on Saturdays (normal hours). The port is guarded by a private company. The warehouse is 2,200 m2 with a roof, the warehouse with the open area is 3,528 m2 (unpaved) and 1,625 m2 (paved) on the east side, and 3,250 m2 (50% unpaved) on the west side.

Table 2-89 Madang Port

Item	Item detail	Specifications
Port Location	Latitude	05° 12.50'S
	Longitude	145° 48.05'E
Tugboat support		Yes
Local Pilot		Yes, Piloting required
Main port(s) coming from		Jakarta (Indonesia) Rabaul (Papua New Guinea)
Main port(s) going to		Lae (Papua New Guinea) Port Klang (Malaysia)
Cargo handling facility	Overseas	L = 137 m, W = 12.8 m, Depth = 10.1 m, Deck height = 3.1 m
	Small ships	L = 30 m, W = 4.5 m, Depth = 1.6 m, Deck height = 1.8 m
	Barge ramp	Water Depth = 2.0 m

d.11 Oro Bay Port

Oro Bay Port is known as Dyke Ackland Bay. Historically, it was used as a US base during World War II. Cranes are not installed on the wharf, but mobile devices and machines are available of lifting containers of up to 20. The warehouse is 740 m2 with a roof and 4,650 m2 with an open area.

Table 2-90 Oro Bay Port

Item	Item detail	Specifications
Port Location	Latitude	08° 50.0'S
	Longitude	148° 30.00'E
Tugboat support		No
Local Pilot		Yes, Piloting is not compulsory. Can be dispatched from Port Moresby or Lae within 48 hours
Main port(s) coming from		Lae (Papua New Guinea)
Main port(s) going to		Alotau (Papua New Guinea)
Cargo handling facility	Berth 1 (Main wharf)	L = 70 m, W = 12.2 m, Depth = 11.4 m, Deck height = 2.82 m
	Berth 2 (Small ships)	L = 23 m, W = 12.1 m, Depth = 10.5 m, Deck height = 2.5 m
	Berth 3 (Small ships)	L = 2.3 m, W = 12.1 m, Depth = 10.5 m, Deck height = 2.5 m
	Barge Ramp	Width = 6 m, Grade 1 in 12

d.12 Port Moresby Port

Port Moresby Port is located on the southeast coast. Port Moresby is the capital and commercial center. Cranes are not installed on the wharf, but mobile devices and machines are available of lifting containers of up to 20. The warehouse in a major wharf is 5,300 m2 with a roof and 3,100 m2 with an open area. The warehouse in a container terminal is 5,110 m2 with a roof and 28,400 m2 with an open area.

Table 2-91 Port Moresby Port

Item	Item detail	Specifications
Port Location	Latitude	09° 28.7'S
	Longitude	147° 08.35'E
Tugboat support		Yes (24 hours)
Local Pilot		Yes
Main port(s) coming from		Tauranga (New Zealand)
Main port(s) going to		Lae (Papua New Guinea) Townsville (Australia)
Cargo handling facility	4A: Container	L = 125 m, W = 25.3 m, Depth = 10 m, Deck height = 3.6 m
	4B	L = 25 m, W = 5.0 m, Depth = 3 m, Deck height = 2 m
	Motukea port	
	Berth 1	L = 206 m, W = 81 m, Depth = 12.5 m, Deck height = 4.5 m
	Berth 2	L = 206 m, Depth = 12.5 m, Deck height = 4.5 m
	Berth 3	L= 80 m, Depth = 12.5 m, Deck height = 4.5 m

d.13 Rabaul Port

The town where Rabaul Port is located is a tourist site. Cranes are not installed on the wharf, but mobile devices and machines are available of lifting containers of up to 20. The warehouse is 10,179 m2 with a roof and 23,000 m2 with an open area.

Table 2-92 Rabaul Port

Item	Item detail	Specifications
Port Location	Latitude	03° 35.0'S
	Longitude	152° 10.36'E
Tugboat support		Yes (24 hours)
Local Pilot		Yes
Main port(s) coming from		Lae (Papua New Guinea) Lihir (Papua New Guinea)
Main port(s) going to		Port Moresby (Papua New Guinea) Madang (Papua New Guinea)
Cargo handling facility	Berth 1: Blanche St	L = 122 m, W = 12.12 m, Depth = 7.0m, Deck height = 2.8 m
	Berth 2: Bay Road	L = 152 m, W = 15.2 m, Depth = 10.2m, Deck height = 2.8 m

d.14 Vanimo Port

Vanimo Port is located in a small town centered on the timber industry. Cranes are not installed on the wharf, but mobile devices and machines are available of lifting containers of up to 20. The warehouse is 135 m2 with a roof and 9,000 m2 with an open area.

Table 2-93 Vanimo Port

Item	Item detail	Specifications
Port Location	Latitude	02° 41.09'S
	Longitude	141° 17.84'E
Tugboat support		Yes, Private company approved by Papua New Guinea Port Commission
Local Pilot		Yes, Can be dispatched from Madang within 48 hours
Cargo handling facility	Berth 1	L = 28.6 m, W = 10 m, Depth = 4.51 m, Deck height = 2.7 m
	Old berth	L = 19.0 m, W = 6 m, Depth = 4.5 m, Deck height = 2.7 m

d.15 Wewak Port

Wewak Port is located on the north coast and is the main port of the coastal town of Wewak. Two arms are installed on the main wharf and are connected to the wharf by a causeway with a length of 500 m. The warehouse is 2,220 m2 with a roof and 11,500 m2 with an open area.

Table 2-94 Wewak Port

Item	Item detail	Specifications
Port Location	Latitude	02° 41.09'S
	Longitude	141° 17.84'E
Tugboat support		Yes, Private company approved by Papua New Guinea Port Commission
Local Pilot		Yes, Can be dispatched from Madang and Lae within 48 hours
Cargo handling facility	Berth 1 (Overseas wharf)	L = 73 m, W = 12.1 m, Depth = 6.2 m, Deck height = 3.5 m
	Berth 2 & 3 (Coastal wharf)	L = 30 m, W = 12.5 m, Depth = 3.0 m, Deck height = 1.3 m

e. Solomon

Regarding port facilities in Solomon, the facilities are owned by the Solomon Islands Ports Authority (SIPA) and managed by the public corporation, Solomon Ports[24].

e.1 Honiara Port

It consists of one domestic berth and two international berths. The domestic berth is 7-10m long and 2-5m deep, and the international berth No1 is 110m long and 10.5m deep, and the berth No2 is 150m long and 11.5m deep.

Table 2-95 Honiara Port

Item	Item detail		Specifications
Port Location	Latitude		09° 26.0'S
	Longitude		159° 57.0'E
Maximum permissible draft		Quay	Berth 1 = 9.5 m, Berth 2 = 10.5 m
Maximum receiving ship type			Max. length = 296 m
The size of the turning water area			Depth = 11 m, Diameter = 300 m
Tugboat support			Yes
Local Pilot			Yes
Main port(s) coming from			Lae (Papua New Guinea) Lihir (Papua New Guinea) Motukea (Papua New Guinea) Yokohama (Japan) Tarawa (Kiribati) Alotau (Papua New Guinea) Suva (Fiji)
Main port(s) going to			Brisbane (Australia) Prony Bay (New Caledonian) Noumea (New Caledonian) Santo (Vanuatu) Lihir (Papua New Guinea) Suva (Fiji)
Cargo handling facility	Berth 1		L = 110 m, Depth = 10.5 m
	Berth 2		L = 150 m, Depth = 11.5 m

https://www.sipa.com.sb/sipa-facilities/ports/honiara-port/

[24] https://www.sipa.com.sb/

e.2 Noro Port

Noro Port is located on New Georgia Island in the Western Province. It deals with domestic / international cargo and is 60m long and 12m deep.

Table 2-96 Noro Port

Item	Item detail	Specifications
Port Location	Latitude	-8° 13.70 S
	Longitude	157° 11.72 E
Maximum permissible draft	Waterway	16 m
Maximum receiving ship type		
The size of the turning water area		Depth = 35 m, Diameter = 5 cables
Tugboat support		No
Local Pilot		
Cargo handling facility	Main wharf	L = 62.4 m, Depth = 17-20 m
	Local wharf	L = 15 m, Depth = 6-7 m

https://www.sipa.com.sb/sipa-facilities/ports/noro-port/

f. Vanuatu

Regarding port facilities in Vanuatu, the Department of Ports and Marine, which is under the Ministry of Infrastructure & Public Utilities, owns and manages Port Vila Port and Santo Port (Port of Luganville)[25]. The size of ships that can be moored by the Port Vila Port Authority is up to 500 feet or more, and the depth of the waterways is 36-40 feet.

f.1 Port Vila Port

Table 2-97 Port Vila Port

Item	Item detail	Specifications
Port Location	Latitude	-17°-41′ 00″ S
	Longitude	168°18′ 47″ E
Maximum permissible draft	Waterway	11 - 12.2 m in depth
	Quay	9.4 - 10 m in depth
Maximum receiving ship type		L = more than 152.4 m
Tugboat support		Yes
Local Pilot		Yes
Main port(s) coming from		Suva (Fiji) Santo (Vanuatu)
Main port(s) going to		Santo (Vanuatu) Noumea (New Caledonian)
Cargo handling facility		

https://www.searates.com/port/port_vila_vu.htm

[25] https://www.searates.com/maritime/vanuatu.html

f.2 Santo Port

Table 2-98 Santo Port

Item	Item detail	Specifications
Port Location	Latitude	-15°-30′ -36″ S
	Longitude	167°10′ 58″ E
Maximum permissible draft	Quay	9.4 - 10 m in depth
Main port(s) coming from		Honiara (Solomon) Port Villa (Vanuatu) Noumea (New Caledonian)
Main port(s) going to		Port Villa (Vanuatu) Tauranga (New Caledonian) Takao (Taiwan)
Maximum receiving ship type		L = 152.4 m (Max)

https://www.searates.com/port/santo_vu.htm

g. Fiji

Regarding port facilities in Fiji, the facilities are owned by the Ministry of Works, Transport and Public Utilities. Fiji Port Corporation Limited (FPCL) manages two major ports (Suva port and Lautoka port) and four sub-ports (Malau port, Wairiki Port, Levuka Port and Rotuma Port)[26].

g.1 Port of Suva

The Port of Suva is the largest international container terminal in Fiji and is a major hub between neighboring countries, Australia, New Zealand and Asian countries. The Port of Suva has large cranes, forklifts and spreaders for containers, which are managed by private companies.

Table 2-99 Port of Suva

Item	Item detail	Specifications
Port Location	Latitude	18°11.34'S
	Longitude	178°23.31'E
Maximum permissible draft	Waterway	minimum depth: 60m, Width: 450 m
	Quay	North Kings: 12m, South Kings: 11m, Walu bay: 8.5m
Maximum receiving ship type		68456dwt
The size of the turning water area		Depth = 20m, Diameter = 300 m
Tugboat support		Yes
Local Pilot		Yes
Main port(s) coming from		Honiara (Solomon) Port Villa (Vanuatu) Sigave (Iles Wallis) Lautoka (Fiji) Auckland (New Zealand) Chrismas Island (Australia) Nuku'alofa (Tonga) Tauranga (New Zealand)
Main port(s) going to		Honiara (Solomon) Lautoka (Fiji) Matautu (Iles Wallis) Apia (Samoa) Port Villa (Vanuatu) Honolulu (USA) Pago Pago (American Samoa)

[26] https://fijiports.com.fj/

		Nuku'alofa (Tonga) Auckland (New Zealand)
Cargo handling facility	Berth 1: Kings wharf	L = 492 m, Min depth = 10 m, Berth height above CD = 6.5 m
	Berth 2: Walu bay berth	L = 189 m, Min depth = 7 m, Berth height above CD = 6.4 m
	Berth 3: Princess wharf	L = 163 m, Min depth = 5 m, Berth height above CD = 4.2 m

https://fijiports.com.fj/port-of-suva/

g.2 Port of Lautoka

The Port of Lautoka is the largest port for bulk cargo in Fiji, specializing in sugar, molasses, wood chips, oil and gas. It covers the shipping needs of West Viti Levu and is hub of famous Blue Lagoon Cruises in Fiji.

Table 2-100 Port of Lautoka

Item	Item detail	Specifications
Port Location	Latitude	18º-8' S
	Longitude	178º-26' E
Maximum permissible draft	Waterway	Depth : 7.1 - 9.1 meters
Tugboat support		Yes
Local Pilot		Yes：No piloting required
Main port(s) coming from		Suva (Fiji) Noumea (New Caledonian) Port Villa (Vanuatu) Brisbane (Australia) Nuku'alofa (Tonga)
Main port(s) going to		Port Villa (Vanuatu) Tauranga (New Zealand) Wallis (Iles Wallis) Suva (Fiji)
Cargo handling facility	Berth	L = 290 m, Depth = 11.5 m, Height of berth = 3.9 m

https://fijiports.com.fj/port-of-lautoka/

g.3 Port of Malau

The Port of Malau is located on the northwest side of Vanua Levu Island, which is the second largest island in Fiji. It is primarily a facility for carrying molasses and is also used as a mooring place for submersibles.

Table 2-101 Port of Malau

Item	Item detail	Specifications
Port Location	Latitude	-16.35
	Longitude	179.3667
Maximum permissible draft	Quay	12.8 m in depth
Tugboat support		Yes：Provided by South Sea Towage Limited, arranged by Suva prior to arrival.
Local Pilot		-

https://dlca.logcluster.org/display/public/DLCA/2.1.4+Fiji+Port+of+Malau

g.4 Port of Wairiki

The Port of Wairiki is located on the southeastern side of Vanua Levu Island. It is a port for transporting wood chips that is mainly made by tropical forests and contributes to the logging industry on Vanua Levu Island. The operation will be transferred to Tropik Woods Fiji Limited.

g.5 Port of Levuka

The port of Levuka is primarily intended for fishing vessels to moor to supply Levuka's canning plant managed by PAFCO.

Table 2-102 Port of Levuka

Item	Item detail	Specifications
Port Location	Latitude	17º 40’ 31’’S
	Longitude	178º 49’ 50’’E
Maximum permissible draft	Quay	12.8 m in depth
Tugboat support		Yes：Provided by South Sea Towage Limited, arranged by Suva prior to arrival.
Local Pilot		No

https://www.searates.com/jp/port/levuka_fj.htm

g.6 Port of Rotuma

Rotuma Island is a volcanic island of approximately 43 square kilometers and the port of Rotuma became a formal port of entry in 2012 to facilitate trade not only within Fiji but also with other island nations such as Tuvalu and Kiribati.

h. Tonga

Regarding port facilities in Tonga, the facilities are owned by Port Authority Tonga and operated and maintained by Nuku’alofa Port[27].

h.1 Nuku’alofa Port

The port of Nuku’alofa is located on the main island of Tongatapu and is the main port of the Kingdom of Tonga, and serving important international trade in the country through a wide range of cargo handling and logistics services.

Table 2-103 Nuku’alofa Port

Item	Item detail	Specifications
Port Location	Latitude	21º 7’ 60.00’’S
	Longitude	175º 11’ 60.00’’S
Maximum permissible draft	Waterway	10 ~15 m
Main port(s) coming from		Pago Pago (American Samoa) Suva (Fiji)
Main port(s) going to		Melbourne (Australia) Suva (Fiji) Apia (Samoa)
Cargo handling facility	Conventional Berth	L = 320 m, Max. draft = 15 m
	Container berth 1	L = 93 m, Max. draft = 12 m
	Container berth 2	L = 110 m, Max. draft = 11 m

http://ports.com/tonga/port-of-nukualofa/

[27] https://www.portsauthoritytonga.com/

i. Samoa

Regarding port facilities in Samoa, the Samoa Ports Authority owns and manages Apia Port[28].

i.1 Apia Port

The Apia Port is the main port of Samoa, which accounts for almost 100% of international freight transportation. The Apia Port is with a total length of 302 m, it has facilities for international freight transport, container ships, fuel and gas tankers, cruise ships, bulk petroleum products, and passenger facilities. There are also 25 yacht marina commissioned in 2011. Apia Port caters for national consumer demand for all commodities, including petroleum products, groceries, beverages, automobiles and construction products.

Table 2-104 Apia Port

Item	Item detail	Specifications
Port Location	Latitude	13º 49' 42"S
	Longitude	171º 45' 45"W
Maximum permissible draft	Waterway	23.2m - OVER
	Quay	7.1 - 9.1 meters
Maximum receiving ship type		L = more than 152 m
Tugboat support		Yes
Local Pilot		Yes
Main port(s) coming from		Suva (Fiji) Nuku'alofa (Tonga)
Main port(s) going to		Pago Pago (American Samoa)
Cargo handling facility	Wharf	Length = 305m, Depth = 7.1m - 9.1m

https://dlca.logcluster.org/display/public/DLCA/2.1.1+Samoa+Port+of+Apia

2.10.2 Information on shipping routes

The existing shipping routes in the field survey target countries were surveyed from the following website.

The shipping routes for each region are shown in the figures and tables below.

- ANL https://www.anl.com.au/products-services/line-services/solution
- PDL https://www.pdl123.co.nz/schedules/
- PFL https://www.pacificforumline.com/schedules/
- Swire https://info.swireshipping.com/
- Hapag-Lloyd https://www.hapag-lloyd.com/en/online-business/schedules/interactive-schedule.html
- Matson https://www.matson.com/matnav/ports/index.html
- Hamburg Sud http://www.sevenseas.co.jp/schedule.html
- Kyowa Shipping https://www.kyowa-line.co.jp/schedule/
- NYK https://nbpc.co.jp/Semi_Liner_Service.html

[28] https://www.spasamoa.ws/

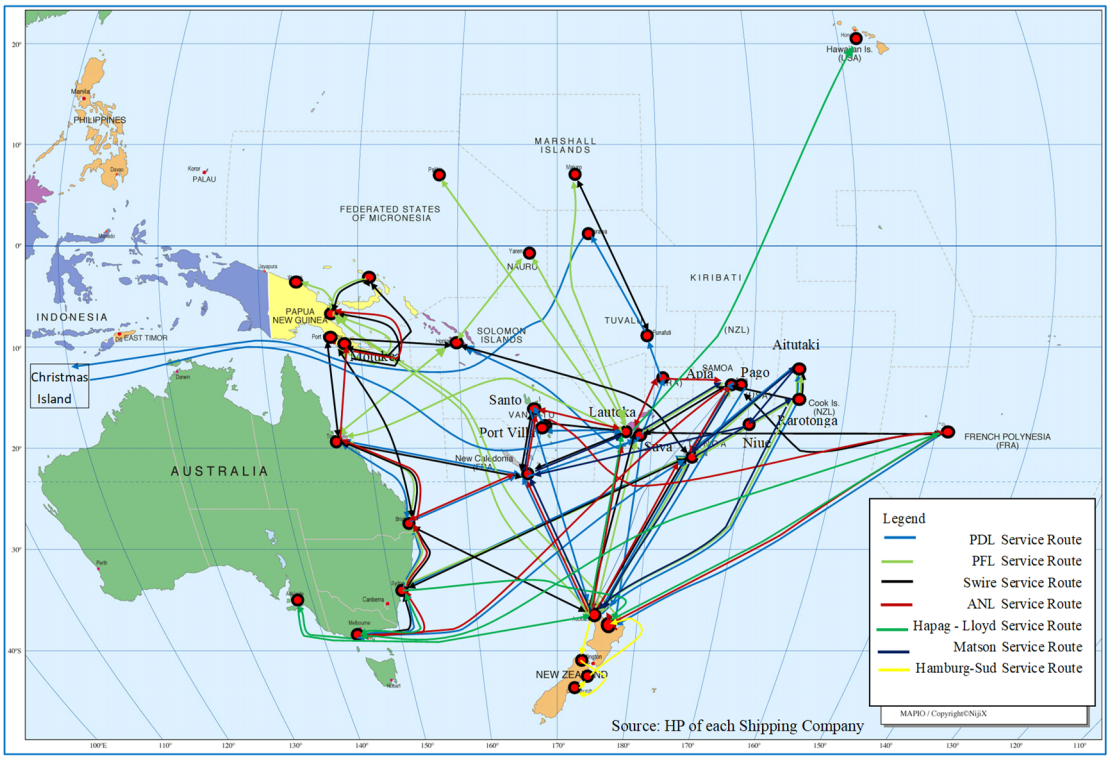


Figure 2-25 Shipping routes between Oceania Region and Australia / New Zealand

Table 2-105 Shipping routes between Oceania Region and Australia / New Zealand

No	Shipping Company	Ship Name	Route
1	ANL	CAPITAINE TASMAN (PDL), MAERSK NEWHAVEN, SEASPAN HANNOVER	Tauranga (New Zealand) -Auckland (New Zealand) -Suva (Fiji) -Lautoka (Fiji) -Tauranga (New Zealand)
2	ANL	CAPITAINE WALLIS (PDL)	Suva (Fiji) -Lautoka (Fiji) -Port Villa (Vanuatu) -Suva (Fiji) -Matautu (Wallis and Futuna) -Sigave (Wallis and Futuna) -Suva (Fiji)
3	ANL	KOKOPO CHIEF (PDL), SOUTHERN MOANA (PDL)	Melbourne (Australia) -Sydney (Australia) -Brisbane (Australia) -Noumea (New Caledonia) -Port Villa (Vanuatu) -Lautoka (Fiji) -Suva (Fiji) -Apia (Samoa) -Pago Pago (American Samoa) –Nuku'alofa (Tonga) -Melbourne (Australia)
4	ANL	SOUTHERN TRADER (PDL)	Auckland (New Zealand) -Nuku'alofa (Tonga) -Apia (Samoa) -Pago Pago (American Samoa) -Auckland (New Zealand)
5	ANL	CAPITAINE MAGELLAN (PDL)	Tauranga (New Zealand) -Auckland (New Zealand) -Noumea (New Caledonia) -Port Vila (Vanuatu) -Papeete (French Polynesia) -Tauranga (New Zealand)

No	Shipping Company	Ship Name	Route
6	ANL	SOFRANA SURVILLE (ANL), SOFRANA TOURVILLE (ANL)	Tauranga (New Zealand) -Auckland (New Zealand) -Noumea (New Caledonia) -Brisbane (Australia) -Townsville (Australia) -Motukea (Papua New Guinea) -Lae (Papua New Guinea) -Honiara (Solomon) -Brisbane (Australia) -Tauranga (New Zealand)
7	PDL	SOUTHERN LILY	Auckland (New Zealand) –Nuku'alofa (Tonga) -Apia (Samoa) -Pago Pago (American Samoa) -Auckland (New Zealand)
8	PDL	SOUTHERN MOANA	Tauranga (New Zealand) -Auckland (New Zealand) -Noumea (New Caledonia) -Lautoka (Fiji) -Suva (Fiji) -Port Villa (Vanuatu) -Santo (Vanuatu) -Tauranga (New Zealand)
9	PDL	CAPITAINE TASMAN, CAPITAINE DAMPIER	Tauranga (New Zealand) -Auckland (New Zealand) -Suva (Fiji) -Lautoka (Fiji) -Tauranga (New Zealand)
10	PDL	SOUTHERN PEARL	Suva (Fiji) -Lautoka (Fiji) -Wallis (Wallis and Futuna) -Futuna (Wallis and Futuna) -Funafuti (Tuvalu) -Tarawa (Kiribati) -Christmas Island (Australia) -Suva (Fiji)
11	PDL	IMUA II & LILOA	Auckland (New Zealand) -Rarotonga (Cook) -Aitutaki (Cook) -Vava'u (Tonga) -Auckland (New Zealand)
12	PDL	FORUM SAMOA, MELANESIAN PRIDE	Melbourne (Australia) -Sydney (Australia) -Brisbane (Australia) -Noumea (New Caledonia) -Port Villa (Vanuatu) -Lautoka (Fiji) -Suva (Fiji) -Apia (Samoa) -Pago Pago (American Samoa) -Nuku'alofa (Tonga) -Melbourne (Australia)
13	PFL	N/A	Melbourne (Australia) -Sydney (Australia) -Brisbane (Australia) -Lautoka (Fiji) -Suva (Fiji) -Apia (Samoa) -Pago Pago (Samoa) -Nuku'alofa (Tonga) -Melbourne (Australia)
14	PFL	N/A	Tauranga (New Zealand) -Auckland (New Zealand) -Rarotonga (Cook) -Aitutaki (Cook) –Vava'u (Tonga) -Tauranga (New Zealand)
15	PFL	N/A	Tauranga (New Zealand) -Auckland (New Zealand) -Nuku'alofa (Tonga) -Suva (Fiji) -Lautoka (Fiji) -Tauranga (New Zealand)
16	PFL	N/A	Tauranga (New Zealand) -Auckland (New Zealand) -Suva (Fiji) -Lautoka (Fiji) -Tauranga (New Zealand)
17	PFL	N/A	Lautoka (Fiji) -Suva (Fiji) -Apia (Samoa) -Pago Pago (American Samoa) -Nuku'alofa (Tonga) -Melbourne (Australia) -Sydney (Australia) -Brisbane (Australia) -Lautoka (Fiji)

No	Shipping Company	Ship Name	Route
18	PFL	N/A	Auckland (New Zealand) -Tauranga (New Zealand) -Port Moresby (Papua New Guinea) -Lae (Papua New Guinea) -Auckland (New Zealand)
19	PFL	N/A	Auckland (New Zealand) -Nuku'alofa (Tonga) -Apia (Samoa) -Pago Pago (American Samoa) -Auckland (New Zealand)
20	Swire	LIORA II, OLOMANA, ISLAND CHIEF	Auckland (New Zealand) -Nuku'alofa (Tonga) -Lautoka (Fiji) -Suva (Fiji) -Apia (Samoa) -Rarotonga (Cook) -Aitutaki (Cook) -Niue (Niue) -Vava'u (Tonga) -Nuku'alofa (Tonga) -Auckland (New Zealand)
21	Swire	SOUTHERN MOANA, KOKOPO CHIEF	Melbourne (Australia) -Sydney (Australia) -Brisbane (Australia) -Prony Bay (New Caledonia) -Noumea (New Caledonia) -Port Villa (Vanuatu) -Lautoka (Fiji) -Suva (Fiji) -Apia (Samoa) -Pago Pago (American Samoa) -Nuku'alofa (Tonga) -Melbourne (Australia)
22	Swire	MOROBE CHIEF, NICKIE B	Melbourne (Australia) -Sydney (Australia) -Brisbane (Australia) -Motukea (Papua New Guinea) -Lae (Papua New Guinea) -Lihir (Papua New Guinea) -Honiara (Solomon) -Prony Bay (New Caledonia) -Melbourne (Australia)
23	Hapag-Lloyd	N/A	Sydney (Australia) -Melbourne (Australia) -Adelaide (Australia) -Auckland (New Zealand) -Suva (Fiji) -Honolulu (USA)
24	Hapag-Lloyd	N/A	Melbourne (Australia) -Sydney (Australia) -Tauranga (New Zealand) -Papeete (French Polynesia) -Melbourne (Australia)
25	Matson	LIORA II	Auckland (New Zealand) -Nuku'alofa (Tonga) -Suva (Fiji) -Apia (Samoa) -Rarotonga (Cook) -Aitutaki (Cook) -Auckland (New Zealand)
26	Matson	OLOMANA	Auckland (New Zealand) -Nuku'alofa (Tonga) -Suva (Fiji) -Pago Pago (American Samoa) -Apia (Samoa) -Rarotonga (Tonga) -Aitutaki (Cook) -Niue (Niue) -Nuku'alofa (Tonga) –Vava'u (Tonga) -Oakland (New Zealand)
27	Hamburg Sud	N/A	Auckland (New Zealand) -Nelson (New Zealand) -Timaru (New Zealand) -Littleton (New Zealand) -Tauranga (New Zealand) -Suva (Fiji) -Lautoka (Fiji) -Tauranga (New Zealand) -Auckland (New Zealand)

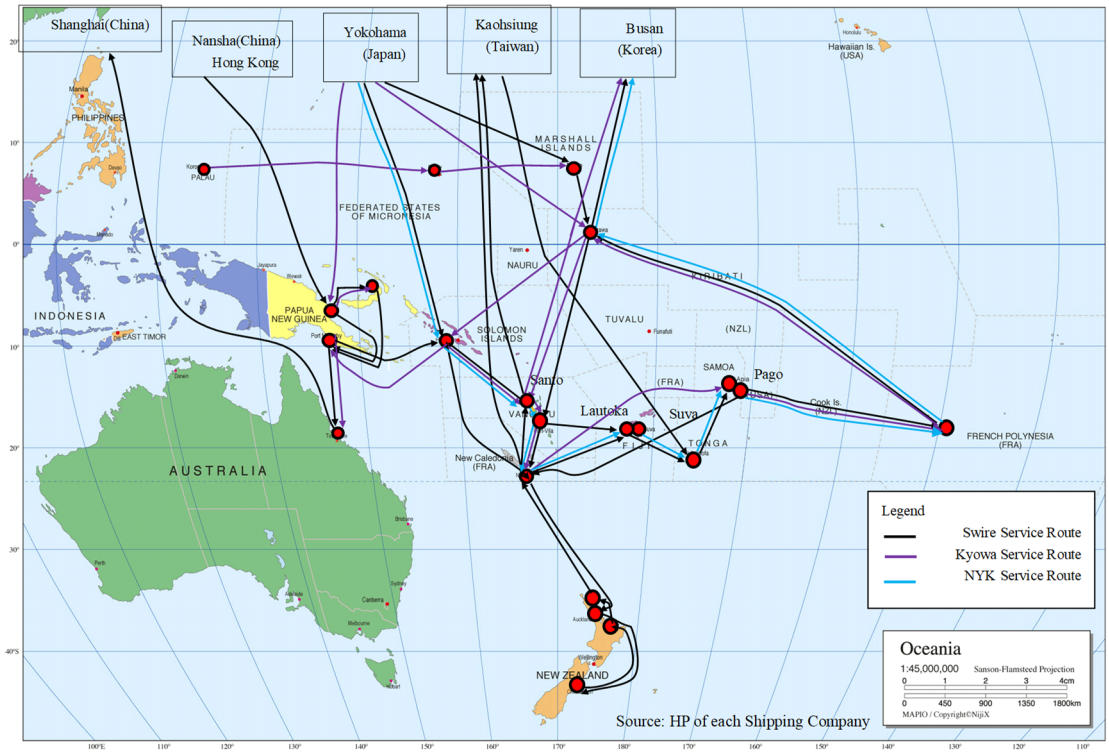


Figure 2-26 Shipping routes between Oceania Region and East Asia

Table 2-106 Shipping routes between Oceania Region and East Asia

No	Shipping Company	Ship Name	Route
1	Swire	LAE CHIEF, NOUMEA CHIEF, SUVA CHIEF	Shanghai (China) -Ningbo (China) -Nansha (China) -Hong Kong (Hong Kong) -Lae (Papua New Guinea) -Port Moresby / Motukea (Papua New Guinea) -Townsville (Australia) -Shanghai (China)
2	Swire	SOOCHOW, SIANGTAN, SHENGKING, SHUNTIEN	Kaohsiung (Taiwan) -Hatsukaichi (Japan) -Yokohama (Japan) -Osaka (Japan) -Busan (ROK) -Ningbo (China) -Nansha (China) -Lae (Papua New Guinea) -Rabaul (Papua New Guinea) -Motukea (Papua New Guinea)-Honiara (Solomon) -Noumea (New Caledonia) -Oakland (New Zealand) -Timaru (New Zealand) -Tauranga (New Zealand) -Marsden Point (New Zealand) -Noumea (New Caledonia) -Vavouto (New Caledonia) -Kaohsiung (Taiwan)
3	Swire	CORAL CHIEF, HIGHLAND CHIEF, NEW GUINEA CHIEF, PAPUAN CHIEF, SOUTH ISLANDER (NYK), CORAL ISLANDER II (KYOWA), PACIFIC ISLANDER II (NYK), TROPICAL ISLANDER	Busan (ROK) -Kobe (Japan) -Nagoya (Japan) -Yokohama (Japan) -Honiara (Solomon) -Santo (Vanuatu) -Port Villa (Vanuatu) -Noumea (New Caledonia) -Lautoka (Fiji) -Suva (Fiji) -Nuku'alofa (Tonga) -Apia (Samoa) -Pago Pago (American Samoa) -Papeete (French Polynesia) -Tarawa (Kiribati) -Busan (ROK)

No	Shipping Company	Ship Name	Route
		(KYOWA)	
4	Swire	Ditto	Kaohsiung (Taiwan) -Tianjin (China) -Qingdao (China) -Busan (ROK) -Yokohama (Japan) -Majuro (Marshall) -Tarawa (Kiribati) -Port Villa (Vanuatu) -Noumea (New Caledonia) -Lautoka (Fiji) -Suva (Fiji) -Nuku'alofa (Tonga) -Apia (Samoa) -Pago Pago (American Samoa) -Noumea (New Caledonia) -Santo (Vanuatu) -Kaohsiung (Taiwan)
5	Kyowa Shipping	KYOWA ORCHID KYOWA FALCON KYOWA STORK KYOWA ROSE	Busan (ROK) -Kobe (Japan) -Nagoya (Japan) -Yokohama (Japan) -Saipan (USA) -Guam (USA) -Yap (Micronesia) -Kosrae (Micronesia) -Chuuk (Micronesia) -Pohnpei (Micronesia)- Kosrae (Micronesia) -Majuro (Marshall) -Ebeye (Marshall) - Kwajalein (Marshall)
6	Kyowa Shipping	PACIFIC CONDOR KYOWA ROSE	Busan (ROK) -Chofu / Moji (Japan) -Kobe (Japan) -Nagoya (Japan) -Yokohama (Japan) -Lae (Papua New Guinea) -Rabaul (Papua New Guinea) -Port Moresby (Papua New Guinea) -Townsville (Australia)
7	Kyowa Shipping	PAPUAN CHIEF TROPICAL ISLANDER HIGHLAND CHIEF PACIFIC ISLANDER II CORAL ISLANDER II NEW GUINEA CHIEF	Busan (ROK) -Kobe (Japan) -Nagoya (Japan) -Yokohama (Japan) -Tarawa (Kiribati) -Honiara (Solomon) -Santo (Vanuatu) -Port Villa (Vanuatu) -Noumea (New Caledonia) -Lautoka (Fiji) -Suva (Fiji) -Nuku'alofa (Tonga) -Apia (Samoa) -Pago Pago (American Samoa) -Papeete (French Polynesia) -Tarawa (Kiribati) -Santo (Vanuatu) -Busan (ROK)
8	NYK	CORAL ISLANDED II PACIFIC ISLANDED II TROPICAL ISLANDER SOUTH ISLANDER	Busan (ROK) -Kobe (Japan) -Nagoya (Japan) -Yokohama (Japan) -Honiara (Solomon) -Santo (Vanuatu) -Port Villa (Vanuatu) -Noumea (New Caledonia) -Lautoka (Fiji) -Suva (Fiji) -Nuku'alofa (Tonga) -Apia (Samoa) -Pago Pago (American Samoa) -Papeete (French Polynesia) -Tarawa (Kiribati) -Busan (ROK)

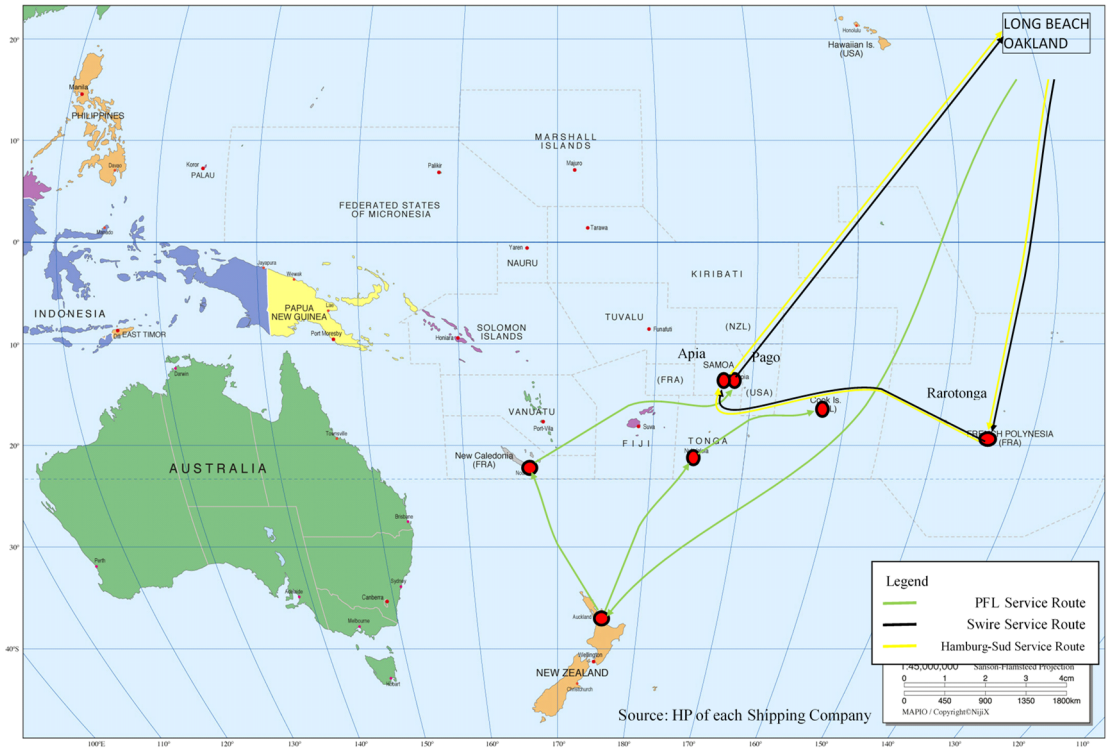


Figure 2-27 Shipping routes between Oceania Region and the United States

Table 2-107 Shipping routes between Oceania Region and the United States

No	Shipping Company	Ship Name	Route
1	PFL	N/A	Oakland (USA) -Long Beach (USA) -Auckland (NZ) -Nuku'alofa (Tonga) -Pago Pago (American Samoa) -Apia (Samoa)
2	PFL	N/A	Oakland (USA) -Long Beach (USA) -Auckland (NZ) -Rarotonga (Cook) -Aitutaki (Cook)
3	Swire	FESCO ASKOLD (Hamburg Sud)	Long Beach (USA) -Oakland (USA) -Papeete (French Polynesia) -Apia (Samoa) -Pago Pago (American Samoa) -Long Beach (USA)
4	Hamburg Sud	Ditto	Long Beach (USA) -Oakland (USA) -Papeete (French Polynesia) -Apia (Samoa) -Pago Pago (American Samoa) -Long Beach (USA)

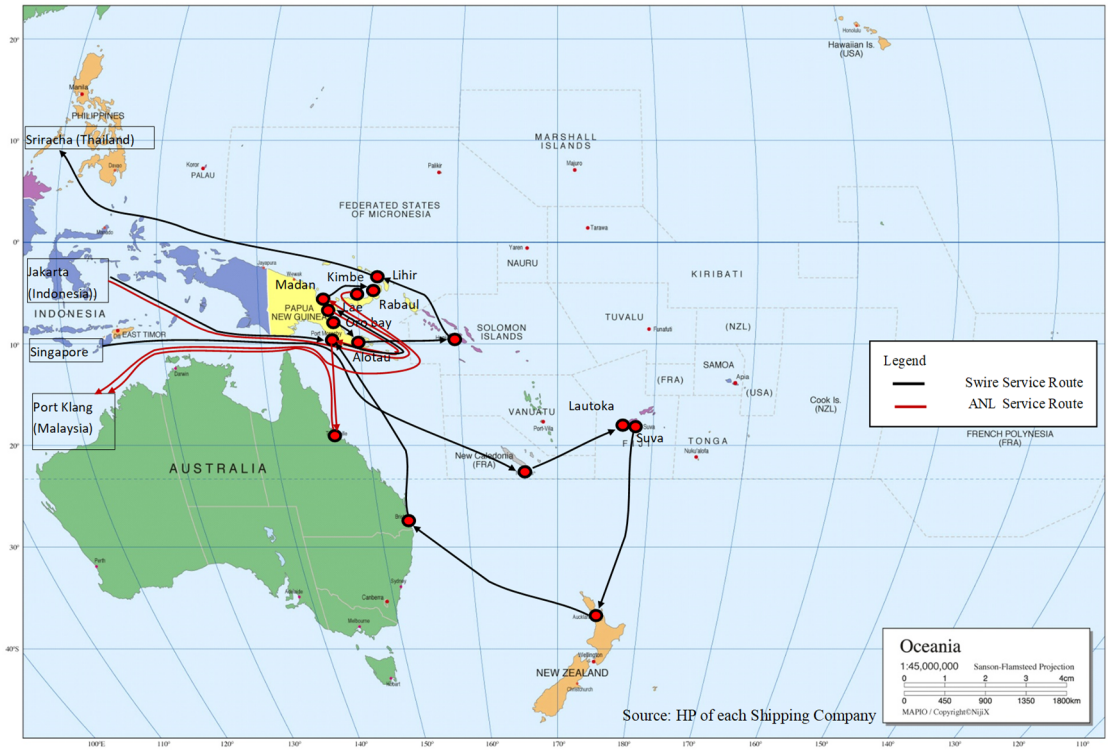


Figure 2-28 Shipping routes between Oceania Region and Southeast Asia

Table 2-108 Shipping routes between Oceania Region and Southeast Asia

No	Shipping Company	Ship Name	Route
1	ANL	FLORA DELMAS, HANSA REGENSBURG	Port Klang (Malaysia) -Singapore (Singapore) -Jakarta (Indonesia) -Madan (Papua New Guinea) -Lae (Papua New Guinea) -Motukea (Papua New Guinea) -Townsville (Australia) -Port Klang (Malaysia)
2	Swire	SHANSI, SZECHUAN, KWANGSI	Sriracha (Thailand) -Singapore (Singapore) -Noumea (New Caledonia) -Lautoka (Fiji) -Suva (Fiji) -Auckland (New Zealand) -Brisbane (Australia) -Motukea (Papua New Guinea) -Lae (Papua New Guinea) -Lihir (Papua New Guinea) -Sriracha (Thailand)
3	Swire	CARPENTERS SIRIUS, CHANGSHA, CHEFOO, MIA SCHULTE	Port Klang (Malaysia) -Singapore (Singapore) -Jakarta (Indonesia) -Motukea (Papua New Guinea) -Lae (Papua New Guinea) -Lihir (Papua New Guinea) -Rabaul (Papua New Guinea) -Madan (Papua New Guinea) -Port Klang (Malaysia)
4	Swire	Ditto	Port Klang (Malaysia) -Singapore (Singapore) -Motukea (Papua New Guinea) -Lae (Papua New Guinea) -Orobay (Papua New Guinea) -Alotau (Papua New Guinea) -Honiara (Solomon) -Lihir (Papua New Guinea) -Kimbe (Papua New Guinea) -Port Klang (Malaysia)

3 Challenges and Recommendations for the Promotion of Regional Recycling in the Pacific Region

In this chapter, challenges and recommendations for the promotion of regional recycling in the Pacific Region are described. “9 target countries” or “9 countries” used means 9 field survey target countries.

3.1 Outline

Table 3-1 Outline of challenges and recommendations by target item

Items	Current situation and challenges	Recommendation
Single use plastic	Both public and private sector have not recovered any of it, and there is no overseas export market. Import and use restrictions have been introduced in most countries.	Thoroughly enforce usage restrictions and strengthen operations
PET bottle	In countries where CDL has been introduced, the recovery rate is high, but in countries where CDL has not been introduced, recovery is limited, and even when recovered, recycling and export are not possible.	In countries without CDL, consider introducing it; in countries with CDL, explore the possibility of recycling and export.
Aluminum can	Both the public and private sectors are recovering relatively well. In countries where CDL has not been introduced, the private sector has been collecting the materials, except for some countries. Exports are also being carried out without any problems.	In countries where CDL has not yet been introduced, thorough efforts should be made to improve the recovery rate with the aim of introducing CDL. Consider tax exemption for private exporters to promote recycling.
Glass	In the countries where CDL has been introduced, glass bottles are recovered, but with some exceptions, they remain on the island. In countries where CDL has not been introduced, the reuse cycle for beer bottles is generally well established.	In countries where CDL has been introduced, pursue different ways to use the glass. In countries where there is no beer bottle recovery system and CDL is not introduced, CDL will be considered.
Paper, cardboard	There is little recovery except in a few countries, with some export from Papua New Guinea and Fiji. In Fiji, there is another company that produces toilet paper from waste paper, but they are struggling to procure raw materials and compete on price.	Promotion of sorting education in schools and citizens, promotion of purchasing recycled toilet paper (Green Purchasing Law, etc.), addition of tariffs to imported toilet paper, etc.
Scrap metal(Ferrous, Non-ferrous)	A lot of recovery and export is being done on a private sector basis. Many of the products are derived from industrial wastes, and the involvement of government and public organizations is likely to be limited.	Although it is difficult to cite specific recommendation, scrap metal recycling could be promoted in collaboration with relevant industry.
End of life vehicle	The recovery of scrap metal from end of life vehicles was identified in four countries, but even in Fiji, the largest country, activities are limited.	A system for automobile recovery will be considered. The recovery tax or deposit system that imports or consumers bear the cost of recovery will be one option.
Used LA battery	Some of the countries that have introduced CDL are recovering it. There is a relatively high market value for exports, and transactions can be seen on a private sector basis.	Since the value is relatively high, a system for recovery should be established. In particular, the item will be designated as target item in CDL.
Used tyre	As a matter of fact, there is almost no recovery or export (Used tyre is collected and shredded then landfilled in Palau).	There are no specific measures, but countries with particularly large challenges with the item will be considered on an individual basis.

Items	Current situation and challenges	Recommendation
Waste lubricant oil	Although there have been cases of recovery and export on a trial or pilot scale, there are few cases of constant recovery and utilization. Even in those few cases, the purpose is not to collect and use the waste lubricant oil.	Consider the establishment of a legislation of discharger responsibility for (especially large discharger) proper treatment. Once the legislation in place, reuse of the item will be promoted.
Waste home appliance	Although private companies collect for scrap metal recovery purposes, the volume is not large.	Consider introducing a system similar to Japan's Home Appliance Recycling Law.

Table 3-2 Outline of challenges and recommendations by country

Country	Current situation and challenges	Recommendation
Palau	CDL (plus tax) has already been introduced then the recovery rate for aluminum cans, PET bottles and glass bottles is high. Recycling efforts are active in Koror State, and they are also trying to add value to PET bottles. A lot of recyclables are exported to Taiwan.	Promotion of intermediate treatment to increase the added value (flaking, etc.) of PET bottles, application of discharger's responsibility to waste lubricant oil, and addition of waste LA batteries to the CDL list could be specific targets.
Micronesia	The country consists of four independent states, and CDL has been introduced in three states. In Yap, the CDL covers aluminum cans, PET, and glass; in Kosrae, aluminum cans, PET, glass, and waste LA batteries; and in Pohnpei, only aluminum cans. Many of the products are exported to ROK and Taiwan.	Specific goals could include adding more value to PET bottles and securing export partner, establishing ways to use glass, improving the recovery of waste LA batteries, and applying discharger responsibility to waste lubricant oil.
Marshall	CDL was introduced in 2018. In Majuro Atoll, collection at the collection center started in the same year. In Kwajalein Atoll (Ebeye), collection at collection centers started in July 2021. The targets are aluminum cans, PET, and glass.	Specific goals could include adding more value to PET bottles and securing export partner, establishing a way to use glass, adding waste LA batteries to the list of items subject to CDL, and considering the responsibility of large waste lubricant oil dischargers such as the Energy Corporation for disposal.
Papua New Guinea	Recycling is conducted by private sector through the export of scrap metal (including aluminum cans), paper and waste LA batteries as recyclables. The main destination for scrap exports is Southeast Asia. It is characterized by the largest population and land area among the 9 target countries. It is also geographically adjacent to Indonesia and Australia.	There are no prospects for CDL at present, but initial surveys are desired first. Due to the industrial structure and other factors, the development and promotion of the recycling industry by the private sector is an issue. Another major issue is the system for the treatment of industrial waste, including waste lubricant oil, by discharger's responsibility.
Solomon	Similar to Papua New Guinea, but the country does not export paper as recyclables. It is the third largest country in terms of population and the second largest in terms of land area in the surveyed countries. CDL pre-feasibility study was conducted in the past.	Continue to study the introduction of CDL. It is a challenge to promote the activities of private recyclers.
Vanuatu	No exports of recyclables other than scrap metal and waste LA batteries have been observed from statistic. A cabinet decision on the introduction of CDL has been made and Working groups are underway to introduce it. A pre-paid bag system for garbage collection has been introduced.	Continue to promote the introduction of CDL (initially for aluminum cans, PET bottles, glass, etc.) and include LA batteries in the scope of CDL in the mid- to long-term. There is also room for consideration of introducing separate collection of recyclables by applying the existing pre-paid bag system.
Fiji	Although CDL has not been introduced, the country is one of the most active in recycling (recyclable export) on a private sector basis. The presence of the FIJI WATER brand is also characteristic. There is only one separate collection system in place by the local government.	The introduction of CDL is desirable in order to establish the recovery of aluminum cans and PET bottles. In addition, it will be important for the government to establish a system to systematically manage the recycling and export of recyclables, which is being promoted by the private sector.

Country	Current situation and challenges	Recommendation
Tonga	The Waste Management Authority runs a nationwide waste management service. There is no ban on the use of single use plastics, but there is an additional tariff on plastic imports. There are two private exporter of recyclables, but they are small business. Scrap metal is exported to Australia.	Since the potential for CDL seems to be relatively high due to the size of the country and its geographic situation, the possibility of its introduction should be examined first.
Samoa	The Ministry of the Environment is conducting a nationwide waste service project (contract implementation). Two companies have been identified as recyclable exporters, and recycling associations are active; the introduction of CDL is also being considered.	Strengthening cooperation between the Ministry of Natural Resources and Environment and recycling associations, and continuous promotion for the introduction of CDL could be the next concrete goal.

3.2 Summary on Current Status and Challenges on Regional Recycling

Table 3-3 Outline by country and target item 1

	Single use plastic	PET bottle	Aluminum can	Glass
Palau	<Generation>Banned import and use <Recovery>N/A <Treatment> N/A	<Generation> Imported only <Recovery> Recovered by CDL <Treatment>Due to the difficulty of export, pilot project for flaking is being implemented.	<Generation> Imported only <Recovery> Recovered by CDL <Treatment> Exported after compressing	<Generation> Most of part imported <Recovery> Recovered by CDL <Treatment>Not exported but reused at glass center (limited amount)
Micronesia	<Generation> Banned import and use <Recovery> N/A <Treatment> N/A	<Generation>Imported only <Recovery> Recovered by CDL <Treatment> Little	<Generation>Imported only <Recovery> Recovered by CDL <Treatment> Exported after compressing	<Generation>Imported <Recovery> Recovered by CDL <Treatment>N/A
Marshall	<Generation> Banned import and use <Recovery> N/A <Treatment> N/A	<Generation>Imported only <Recovery> Recovered by CDL <Treatment>N/A	<Generation>Imported only <Recovery> Recovered by CDL <Treatment> Exported after compressing	<Generation>Imported <Recovery> Recovered by CDL <Treatment>N/A
Papua New Guinea	<Generation> Banned import and use <Recovery> N/A <Treatment> N/A	<Generation>Imported and produced <Recovery> Small part recovered for street bottling <Treatment>N/A	<Generation>Imported only <Recovery> Some collected by private recyclers <Treatment> Exported after compressing	<Generation> Imported and produced <Recovery> Bottle collection by brewing company <Treatment> Reused after washing
Solomon	<Generation> Imported <Recovery> N/A <Treatment> N/A	<Generation>Imported and produced <Recovery>N/A <Treatment>N/A	<Generation>Imported only <Recovery> Some collected by private recyclers <Treatment> Exported after compressing	<Generation>Imported and produced <Recovery> Bottle collection by brewing company <Treatment> Reused after washing

	Single use plastic	PET bottle	Aluminum can	Glass
Vanuatu	<Generation> Banned import and use <Recovery> N/A <Treatment> N/A	<Generation>Imported and produced <Recovery> N/A <Treatment> N/A	<Generation>Imported only <Recovery> Some collected by private recyclers <Treatment> Exported after compressing	<Generation>Imported and produced <Recovery> Bottle collection by brewing company <Treatment> Reused after washing
Fiji	<Generation> Banned import and use <Recovery> N/A <Treatment> N/A	<Generation>Imported and produced <Recovery>Voluntary recovered by beverage industry <Treatment> Exported after compressing	<Generation>Imported and produced <Recovery>Some collected by private recyclers <Treatment> Exported after compressing	<Generation>Imported and produced <Recovery> Bottle collection by brewing company <Treatment> Reused after washing
Tonga	<Generation> Tax imposed on Plastic import <Recovery> N/A <Treatment> N/A	<Generation>Imported and produced <Recovery> N/A <Treatment> N/A	<Generation>Imported and produced <Recovery> Some collected by private recyclers <Treatment> Exported after compressing	<Generation> Most of part imported <Recovery> Bottle collection by brewing company <Treatment> Reused after washing
Samoa	<Generation> Banned import and use <Recovery> N/A <Treatment> N/A	<Generation>Imported and produced <Recovery> N/A <Treatment> N/A	<Generation>Imported and produced <Recovery> Some collected by private recyclers <Treatment> Exported after compressing	<Generation>Imported and produced <Recovery> Bottle collection by brewing company <Treatment> Reused after washing

Table 3-4 Outline by country and target item 2

	Paper, cardboard	Scrap metal (Ferrous, Non-ferrous)	End of life vehicle	Used tyre
Palau	<Generation>Imported only <Recovery> Some recovered at only Koror state <Treatment> Composted	<Generation>Imported only <Recovery> Some collected by private recyclers <Treatment> Exported	<Generation>Imported only <Recovery> Some collected by private recyclers <Treatment>Scrap metal exported after dismantling	<Generation>Imported only <Recovery> Collected together end of life vehicle <Treatment>Shredded at disposal site
Micronesia	<Generation>Imported only <Recovery>N/A <Treatment> N/A	<Generation>Imported only <Recovery> N/A <Treatment>Exported	<Generation>Imported only <Recovery> N/A <Treatment>N/A	<Generation>Imported only <Recovery> N/A <Treatment> N/A
Marshall	<Generation>Imported only <Recovery> N/A <Treatment> N/A	<Generation>Imported only <Recovery> Some collected by private recyclers <Treatment>Exported	<Generation>Imported only <Recovery> N/A <Treatment> N/A	<Generation>Imported only <Recovery> N/A <Treatment> N/A
Papua New Guinea	<Generation>Imported only <Recovery>Unknown <Treatment>Exported seen in statistics	<Generation>Imported only <Recovery> Some collected by private recyclers <Treatment>Exported	<Generation>Imported only <Recovery> N/A <Treatment> N/A	<Generation>Imported only <Recovery> N/A <Treatment> N/A

	Paper, cardboard	Scrap metal (Ferrous, Non-ferrous)	End of life vehicle	Used tyre
Solomon	<Generation>Imported only <Recovery> N/A <Treatment>N/A	<Generation>Imported only <Recovery> Some collected by private recyclers <Treatment> Exported	<Generation>Imported only <Recovery>N/A <Treatment>N/A	<Generation>Imported only <Recovery>N/A <Treatment>N/A
Vanuatu	<Generation>Imported only <Recovery>N/A <Treatment>N/A	<Generation>Imported only <Recovery> Some collected by private recyclers <Treatment> Exported	<Generation>Imported only <Recovery>N/A <Treatment>N/A	<Generation>Imported only <Recovery>N/A <Treatment>N/A
Fiji	<Generation>Imported only <Recovery> Collected by private recycler <Treatment>Recycled producing toilet paper, or exported	<Generation>Imported only <Recovery> Some collected by private recyclers <Treatment> Exported	<Generation>Imported only <Recovery> Some collected by private recyclers <Treatment> Scrap metal exported after dismantling	<Generation>Imported only <Recovery>N/A <Treatment>Exported
Tonga	<Generation>Imported only <Recovery>N/A <Treatment>N/A	<Generation>Imported only <Recovery> Some collected by private recyclers <Treatment> Exported	<Generation>Imported only <Recovery> Some collected by private recyclers <Treatment> Scrap metal exported after dismantling	<Generation>Imported only <Recovery>N/A <Treatment>N/A
Samoa	<Generation>Imported only <Recovery>N/A <Treatment>N/A	<Generation>Imported only <Recovery> Some collected by private recyclers <Treatment> Exported	<Generation>Imported only <Recovery> Some collected by private recyclers <Treatment> Scrap metal exported after dismantling	<Generation>Imported only <Recovery>N/A <Treatment>N/A

Table 3-5 Outline by country and target item 3

	Used LA battery	Waste lubricant oil	Waste home appliance
Palau	<Generation>Imported only <Recovery>Some recovered <Treatment>Exported	<Generation>Imported only <Recovery>N/A <Treatment>N/A	<Generation>Imported only <Recovery>N/A <Treatment>N/A
Micronesia	<Generation>Imported only <Recovery>Kosrae state: recovered by CDL, Yap state: recovered by private recycler (CDL operator) <Treatment>Exported	<Generation>Imported only <Recovery>N/A <Treatment>N/A	<Generation>Imported only <Recovery> N/A <Treatment> N/A
Marshall	<Generation>Imported only <Recovery>Recovered by waste company (CDL operator) <Treatment>Exported	<Generation>Imported only <Recovery>N/A <Treatment>N/A	<Generation>Imported only <Recovery>N/A <Treatment>N/A

	Used LA battery	Waste lubricant oil	Waste home appliance
Papua New Guinea	<Generation>Imported only <Recovery>N/A <Treatment>Exported	<Generation>Imported only <Recovery>N/A <Treatment>N/A	<Generation>Imported only <Recovery> Collected by private recyclers <Treatment> Scrap metal exported after dismantling
Solomon	<Generation>Imported only <Recovery>N/A <Treatment>N/A	<Generation>Imported only <Recovery>N/A <Treatment>N/A	<Generation>Imported only <Recovery> Collected by private recyclers <Treatment> Scrap metal exported after dismantling
Vanuatu	<Generation>Imported only <Recovery>N/A <Treatment> Exported	<Generation>Imported only <Recovery>N/A <Treatment>N/A	<Generation>Imported only <Recovery> Recovered by private recyclers <Treatment> Scrap metal exported after dismantling
Fiji	<Generation>Imported and produced <Recovery>Some collected by battery manufacturer <Treatment>Reused byre-charging, or exported	<Generation>Imported only <Recovery> Some collected by construction material manufacturer <Treatment>Used as fuel	<Generation>Imported only <Recovery> Collected by private recyclers <Treatment> Scrap metal exported after dismantling
Tonga	<Generation>Imported only <Recovery> Collected by private recyclers <Treatment> Exported	<Generation>Imported only <Recovery>N/A <Treatment>N/A	<Generation>Imported only <Recovery> Collected by private recyclers <Treatment> Scrap metal exported after dismantling
Samoa	<Generation>Imported only <Recovery> Collected by private recyclers <Treatment>Exported	<Generation>Imported only <Recovery>Some collected by lubricant retailer <Treatment>N/A	<Generation>Imported only <Recovery> Collected by private recyclers <Treatment> Scrap metal exported after dismantling

3.2.1 Single use plastic

A total of 5,418 tons of single use plastics such as plastic bags, disposable tableware, etc. were generated in the nine countries under the study. The single use plastics in circulation are mainly made of materials such as polyethylene, polypropylene, and polystyrene. Restrictions on the use of single use plastics have been introduced in 10 of the 14 countries, and one other country has a policy in place to introduce them. As a result, the amount generated is expected to peak around 2019 and decrease in the future. There is no recycling or export of single use plastics.

The Basel Convention and the Waigani Convention have included used plastic as a regulated item since January 2021, and also the Japanese government has established its own regulations for used plastic. Different countries have different standards and regulations, and from an institutional point of view, the export of used plastics is likely to face greater obstacles than before. In addition, the Chinese Government revised import lists of foreign solid waste including the list of solid waste banned from being imported (the Banned List) in August 2017. The fact that the Banned List prohibits the import of waste plastics of domestic origin from December of the same year, has had a significant impact, too.

As plastics other than single use plastics are not included in the scope of this study, details are unknown, but the export of used plastic (industrial origin) has been confirmed by only one

company in Fiji[29].

Single use plastics are classified as so-called "other plastics" statistically, but they are made of a variety of raw plastics, and are often contaminated, and therefore they require complex processes for collection and treatment.

In conclusion, it would be more efficient to focus on reducing the generation and use of single use plastics, as many countries are already doing, rather than actively recycling them.

3.2.2 PET bottle

A total of 9,137 tons of PET bottles were generated in the nine countries under the Study, of which 392 tons were exported. Currently, local recycling is virtually nil, and 8,745 tons are retained and disposed of as waste in landfills.

Unlike the aforementioned single use plastics, PET bottles are uniform in material used and its shape. Currently, the recovery rate is low on average in the nine target countries, but it is high in the countries where CDL has been introduced. However, about 96% of the recovered PET bottles remains on the island because no export destination could be found. In Fiji, several beverage manufacturers sort, compress, and pack PET bottles through their own beverage container recovery programs and export them overseas for recycling, but since the cost of export exceeds the revenue, it is understood that the mechanism is established as corporate social responsibility for the companies. Although PET is generally more valuable than other plastics and there is a system in place to collect it, it is not being exported. Some countries are making plans to tackle this problem. Palau is now formulating a plan to process PET bottles recovered by CDL into flakes and pellets, and Samoa also has a plan to collect PET bottles and process them into products, although CDL has not yet been introduced in Samoa.

CDL has been introduced in only three of the nine countries surveyed, but there are moves to introduce it in other countries as well. PET bottles are one of the most popular plastic containers today, but at the same time, there are many problems such as littering. Therefore, it would be ideal to promote the introduction of CDL to increase the recovery rate, and at the same time, a system to properly dispose of the recovered PET needs to be considered.

3.2.3 Aluminum can

It is estimated that a total of 7,135 tons of aluminum cans are generated in the nine countries under the Study. The export volume of non-ferrous scrap including aluminum is 10,899 tons, but the percentage of aluminum cans in this volume is unknown. Currently, they are not recycled locally. Aluminum cans, like PET bottles, are generally a major target item of CDL, and are covered by all three countries that have already introduced the system. Although the value of aluminum scrap has decreased recently, it still has a high market value. Therefore, not only aluminum cans recovered by CDL, but also other aluminum scrap collected by private companies in all countries are exported to Australia, Southeast Asia, and other countries. Since the recovery rate is low in countries without CDL, the next step would ideally be to consider introducing CDL. In countries that have already introduced CDL, there do not seem to be any obvious issues. In order to promote the recycling of aluminum cans, the introduction of CDL could be the current priority.

[29] The statistics implies Marshall's export of used plastic (industrial origin), but the actual situation has not been confirmed.

3.2.4 Paper, cardboard

A total of 9,844 tons of paper and cardboard were generated in the nine countries, of which 2,541 tons were exported and 1,235 tons were recycled locally. Paper and corrugated cardboard are generally not subject to CDL because they are easily changeable in shape and are not easily littered. In the nine countries surveyed, recovery, export and material recycle by the private sector are rarely carried out except in Fiji. In the public, compost has been made in Koror, Palau for nearly 10 years using paper and cardboard (mixed with kitchen waste). In Fiji, some companies collect used paper to make toilet paper, but they are struggling to collect enough raw materials and compete with rival products. They distribute sorting containers to offices and business establishments and ask them to cooperate to sort, but they do not seem to do so properly. In addition, the finished product, toilet paper manufactured from recycled paper, seems to be less competitive compared with the low prices of imported toilet paper from China. If there is a mechanism to encourage purchase of recycled products, recycling could be further promoted. Also in Fiji, a company that collects plastic and paper and sends them to China started a business, but closed the business after about a year.

As for paper and cardboard, there are more examples of recycling than exporting, so it would be ideal to promote this trend further. To do so, it is necessary to introduce measures that i) promote sorting at the source and ii) give preferential treatment to recycled products (e.g., taxation on imports of toilet paper or adaptation of a law to encourage purchase of recycled products).

3.2.5 Scrap metal (ferrous)

The amount of scrap metals generated in the nine countries under the Study is unknown, but it is known that 41,320 tons have been exported. Of this amount, it is estimated that 17,005 tons of scrap metals have been derived from the end of life vehicles while 18,494 tons of them have been from used home appliances. Scrap metal is voluntarily recovered and exported by private recyclers in all the countries under the Study. Scrap metal is currently the most voluminous recyclables traded at the private level, but compared to around 2013, its volume has declined by nearly 60% in 2019 due to lower market prices. In addition, in the nine countries under the Study, the largest amount of scrap metal is considered to be derived from construction-related waste[30], and the trade volume of such scrap metals is considered to be large other than the trade volume of scrap metals that discharged by the public institutions and citizens. In Japan, there are solid statistical data on the amount of scrap metal recycled, but there are no such data on the amount of metals generated, and therefore the Japan Iron & Steel Recycling Institute (JISRI) announces the accumulated amount of iron and steel only. Scrap metal is traded based on the principles of market economy, and any intervention by the government or administration must be cautious. Scrap metal from end of life vehicles should be recovered in many countries, but in reality, there is only one recycling company in Fiji that specializes in recycling of end of life vehicles. Other companies said that they would like to expand their business to deal with automobile scrap, but they cannot afford to invest in a crusher large enough to dismantle cars. However, even companies that are currently scrapping automobiles seem to be taking in fewer and fewer due to the drop in prices of scrap metals. (*As the Study team was unable to visit them during the Study, this is the information obtained from the previous visit in 2018) They used to pick up end of life vehicles for free within 50km, but it seems they have changed its

[30] According to Non-Integrated Steel Producer's Association in Japan, ferrous scrap derived from construction accounts for 26 million tons (58%) of the 45 million tons
(http://www.fudenkou.jp/about_02_01.html)

reach within 15km.

As for scrap metals, they are already being recovered as much as possible based on the market principle, but it might be improved by finding a way to collect as much automobile scrap as possible. In such a case, it is important to reach out to the public, but it will be difficult to improve the situation further through market principles alone. Institutional measures, such as the introduction of a law like Japan's End of life Vehicle Recycling Law (strictly speaking, the law only covers difficult-to-process materials), will be necessary.

3.2.6 Scrap metal (non-ferrous)

From the nine countries under the Study, 10,899 tons of scrap metals (non-ferrous) were exported, although the amount generated is unknown. The aforementioned aluminum cans belong to this category, but this section will discuss nonferrous scrap metals other than aluminum cans only. Among the non-ferrous scrap, aluminum scrap was the most exported, accounting for about 75% of the total of the nine countries under the Study. This was followed by copper scrap, which accounted for about 23%. Copper scrap, for example, is discharged when power companies replace the power grid, and scrap dealers buy it on a tender and export it.

This category includes rare metals generated from home appliances (especially small appliances). In Japan, the Act on Recycling of Specific Kinds of Home Appliances and the Act on Promotion of Recycling of Small Waste Electrical and Electronic Equipment are in place, but even so, the issue of salvaging rare metals contained in cell phones and PCs is considered an issue to be improved. The same trend is seen in the Pacific Island Countries, with less ferrous scrap recovered from home appliances, but even less non-ferrous scrap from small appliances.

About 80% of all non-ferrous scrap is exported from Papua New Guinea to ROK and Southeast Asia. Among them, aluminum scrap is mainly exported to ROK, and copper scrap is mainly exported to Australia.

As with ferrous scrap, there seems to be little room for public intervention in nonferrous scrap, but a possible approach would be to introduce laws and acts similar to the Act on Promotion of Recycling of Small Waste Electrical and Electronic Equipment, or to conduct public awareness campaigns to promote recovery. It would be even better if economic incentives could be given to citizens, especially for collecting non-ferrous scrap, since it is particularly valuable. In addition, although the current CDL targets mainly beverage containers, it may be an option to target smart phones and notebook PCs, too.

3.2.7 End of life vehicle (automobile, used lead acid battery, used tyre)

It is estimated that 17,005 tons of ferrous scrap, 473 tons of non-ferrous scrap, 473 tons of used lead acid batteries, 1,418 tons of tires, and 707 tons of waste lubricant oil are generated from end of life vehicles in the nine countries under the Study.

Of the nine countries, only Fiji has a company that specializes in recycling end of life vehicles. In other countries, private recyclers with relatively small press machines collect only scrap metals from end of life vehicles. Because of the large size of the body, collection, transportation, dismantling and processing of end of life vehicles are costly. It is necessary to invest in equipment to handle end of life vehicles, which seems to be a major obstacle for private recyclers. However, since the problem of abandoned end of life vehicles is a significant problem in many Pacific Island Countries, the introduction of a recycling system of end of life vehicles should be considered in order to encourage the effective recovery of end of life vehicles, which is not very widely practiced at present.

In the nine countries under the Study, 3,678 tons of used lead acid batteries were generated, and 1,799 tons were exported. Used lead acid batteries are an item that is relatively well collected by private recyclers, but the total amount is not large. A state in Micronesia have included used lead acid batteries in its CDL, and this initiative will have an impact on efforts in other regions. In case that CDL targets used lead acid batteries, the designated redemption center will properly collect, and export them in accordance with the Basel Convention. In countries that have introduced CDL and have not yet listed used lead acid batteries as one of the targets, it is expected to do so soon. In addition, when used lead acid batteries are listed as a target item, they will be recovered at the designated redemption centers, which will ensure the proper recovery and export in accordance with the Basel Convention. In addition, since listing as a target item will enable the system to collect a certain amount of used lead acid batteries on a stable basis, it may be a good idea to consider introducing equipment to recondition them on islands. For countries that have not yet introduced CDL, it is recommended that they start by considering the introduction of CDL, with a view to adding used lead acid batteries to the list of target items in the future. It should also be noted that the import and export of used lead acid battery is subject to the Basel Convention.

Although 15,584 tons of waste tires are generated in the nine countries studied, no export is recorded statistically. Tires are difficult to transport and dispose of due to their shape and material, and are not recycled due to lack of demand as a recyclable.

3.2.8 Waste home appliance (white goods, etc.)

As for recyclables derived from waste home appliances (white goods, etc.), 18,494 tons of ferrous scrap and 2,103 tons of nonferrous scrap were generated. It is not clear how many tons of these are being recovered and exported, but based on information obtained from private companies, the amount is quite limited. Since white goods are large in size and costly to process, it is unlikely that recycling will be promoted by market principle. In Japan, the Act on Recycling of Specific Kinds of Home Appliances mandates recycling and disposal, a system in which consumers pay for the cost of recycling and collection. The act also defines the responsibilities and roles of manufacturers and retailers. The introduction of such a legal system will be inevitable for the recycling of waste home appliances. For example, Marshall has begun to examine the possibility of making white goods (as well as small home appliances such as cell phones and notebook PCs, which are not directly covered by the Study) subject to CDL. This is similar to the introduction of the Act on Recycling of Specific Kinds of Home Appliances in Japan in that it establishes a recovery mechanism through a legal system.

3.2.9 Waste lubricant oil

In the nine countries under the Study, 9,044 tons of waste lubricant oil was generated, of which 2,425 tons was recycled locally.

In the case of Japan, unlike other items, the specific recycling legislation related to waste lubricant oil is not yet in place. Most of the waste lubricant oil is generated as industrial waste[31], which must be disposed of properly according to the Waste Management and Public Cleansing Law. In principle, the industrial waste should be disposed of properly by the business entity that discharges it, but in general, in most cases where the business entity cannot dispose of it by itself, the disposal of waste lubricant oil will be outsourced to a licensed company. In this way, most of the waste lubricant oil is incinerated and recycled into heavy oil.

Based on Japan's experience, a fundamental measure would be to require the business entities

[31] Lubricant Oil Recycling Handbook (http://www.jalos.jp/jalos/paper/pdf/2014booklet01.pdf)

that discharge waste lubricant oil to dispose of it properly as their responsibility, rather than recycling it. In the nine countries under the Study, there are no laws that define industrial wastes and the responsibility of dischargers to dispose of them appropriately. For the proper treatment and recycling of waste lubricant oil, it is necessary to start with the establishment of such a legal structure.

In addition, with the exception of Fiji, no other countries under the Study has established a permit system for waste handling (collection, transportation, and treatment) businesses. In order to manage industrial waste such as waste lubricant oil, the introduction of a permit system should also be considered.

Lubricant oil can be divided into chlorinated, non-chlorinated, and water-based, each of which requires a different method of processing and disposal. It could be effective for some countries to take measures such as preferential taxes on the import of non-chlorinated lubricants that are more suitable for recycling.

3.3 Consideration and Recommendations of Target Items That Are Considered to Be Relatively Feasible and Effective in Promoting Regional Recycling

The division of roles between government, administration, the private sector and citizens is one of the most important issues when considering recycling. In Japan, the government has allocated a substantial budget for recycling, and recycling is being promoted from both the public and private sectors. On the other hand, in many developing countries, government intervention and support for recycling is basically very limited, and as a result, the recyclables recycled by private sector tend to be only high-value items such as scrap metals. Based on the results of this survey, the same trend can be observed in the nine pacific island countries under the Study.

In this context, CDL can be cited as a good practice where the government is collaborating with the private sector in the recycling business, even for low value plastics (PET bottles). In addition, although this is not recycling in a strict sense, the use of single use plastics, which are difficult to recycle and adversely affect the environment such as the oceans, has been banned in many countries, and this is another example of good measures taken by the government.

However, governments are not actually allocating budgets for these projects and measures. In this sense, it is expected that it will still take some time before governments and local governments are able to allocate budgets for recycling. For the time being, the government should design a system to curtail the generation of waste, provide incentives for recovery, make it mandatory for dischargers to take responsibility for its disposal, and provide tax exemptions and incentives for green business, in accordance with the situation of each item and country. The government is the main player in these systems, but it is essential to build good relationships with the private sector. To this end, it is more efficient to work with organizations such as recycling associations than to coordinate individually with each private recycler, given the capacity of the government.

Of course, it would be ideal to take an appropriate approach for all items to be targeted, but it is necessary to do so in a phased manner, prioritizing items based on feasibility. Items that have some market value and can be recovered, or that do not immediately have a significant negative impact on society or the environment, should be handled by the private sector, while government agencies should focus on items that have low market value and may have a certain negative impact on the environment.

The amount of single use plastic consumed in the pacific island countries is not that significant, and regulations are in place or in progress in many countries. The value of single use plastic as

a recyclable is very low, so the only realistic solution is to continue to regulate its use. Since usage of PET bottles are not subject to restrictions in many countries and consumption is relatively high, a considerable amount of used PET bottles are generated, and therefore recycling needs are considered to be high. Although PET bottles have a high resource value among plastics, they are currently not traded in the market as they are, and even if a large amount of them are recovered through CDL, they cannot be exported. Active support from governments and donors is required for the processing and recycling of PET bottles.

Ferrous and non-ferrous scrap metal, although less valuable than at one time, is currently the most valuable recyclable and is traded and exported on a market economy basis in many countries. In countries where CDL has been introduced, aluminum cans are recovered under the system, and the recovered aluminum cans are compressed and exported. As for scrap metal, direct government support does not seem to be necessary, except for the introduction of CDL that enables effective recovery of aluminum cans. Based on the fact that scrap metal is traded on a market economy basis, it may be possible to entrust the private sector with the recovery of scrap metal from automobiles and home appliances, but in reality automobiles and home appliances are also items for which recovery has not progressed well. Therefore, it may be effective for the government to adopt a law similar to Japan's End-of-Life Vehicles Recycling Law and Act on Recycling of Specific Kinds of Home Appliances, and introduce a system in which consumers bear the burden. In a sense, it is similar to CDL. Therefore, in countries where CDL has been introduced, it is desirable to examine the possibility of adding automobiles and home appliances to the list of items covered by CDL.

Although the recovery and recycling of used lead acid battery is relatively advanced among the targeted items, there is still room for improvement in many countries. Kosrae of Micronesia is collecting used lead acid battery as an item subject to CDL, and the recovered used lead acid batteries are being exported in accordance with the Basel Convention. Although the procedures for complying with the Basel Convention are somewhat complicated, returns (exports) are possible if the appropriate procedures are followed. With this example as a guide, it is desirable to consider ways to efficiently collect and export used lead acid battery, except in countries like Fiji where used lead acid battery can be recycled for the domestic market.

Considering the toxicity of waste lubricant oil and the nature of the discharger (it is basically discharged by businesses rather than households), the first priority should be to minimize environmental pollution caused by illegal dumping by making the discharger responsible for disposal, as is the case in Japan. Based on Japan's experience, it is believed that waste lubricant oil has a certain value as a recyclable, and optimistically, there is a possibility that the waste lubricant oil recovered by imposing the discharger responsibility will be reused in some way.

Waste paper is not suitable for a quantity-based recovery system such as CDL because it is not stable in shape and can be easily contaminated or torn during the distribution, collection, and transportation processes. In addition, waste paper does not have a high market value as a recyclable, so it is not exported by private recyclers. For the reasons mentioned, recycling within one's own country or region, as in the case of Fiji (e.g. toilet paper production), seems to be suitable.

As for glass bottles, except for small amount of local beer production, beer for local distribution is produced in five of the nine countries under the Study, and returnable bottles are being used and reused. In three of the remaining four countries, beer bottles are recovered by CDL, but the volume is basically smaller than that of aluminum cans and PET, and the bottles are disposed of in the country instead of being reused or exported. Basically, in the countries where beer is produced, those bottles are properly used, recovered and reused without much problems, but

for bottles recovered by CDL, it is desirable to consider the way to reuse domestically. Currently, innovative attempts and efforts are being made in the Micronesian region to reuse the waste glass as roadbed material, and to promote glass art using the waste glass.

As for CDL, it is a system that was initiated and popularized by targeting beverage containers. Currently, a state also covers used lead acid battery, but the expression "CDL" is still in common use. In this report, the existing systems are basically described, so the term "CDL" is used. However, as suggested in this section, when the systems are expanded to cover items other than beverage containers, including used lead acid battery, it will be necessary to use a generic term such as a recycling deposit system instead of CDL.

3.4 Consideration and Recommendations of Prioritized Countries in the Region That Are Recommended to Collaborate Each Other for Promoting Regional Recycling

3.4.1 Palau

Palau is well known as one of the most environmentally advanced nation among the Pacific Island Countries (PICs), with a high commitment to conserve the environment as a tourism resource. The country is keen on recycling activities too and introduced a beverage container deposit system 10 years ago. In the Micronesia region, three other states in Micronesia and Marshall have also introduced a beverage container deposit system. The particularity of the Palau system is that half of the money collected as a deposit is neither returned to the consumer as a refund, nor paid to the redemption centers as operation fees, but set aside in the environmental fund and used for waste management. Initially, only the Koror State Government was entrusted to operate a redemption center, but now, in addition to the Koror State Government, a private recycling company operates another redemption center, too.

As discussed previously, aluminum cans have a high recovery rate and an export rate, while PET bottles and glass remains in country after recovery; thus processing them for export is an important remaining issue. In Palau, the government of Koror State, which operates a redemption center, has just built a glass center to produce glass artifacts using waste glass, and started operations in April 2021. Despite such an advanced effort, even Palau faces difficulties in exporting and recycling the recovered PET bottles. Currently, Koror State Government is planning a project to convert PET bottles into plastic flakes or pellets in order to enable export. The project is still in the planning stage, but if implemented, it could be a very important example to promote PET bottle recycling, at least in countries that have a beverage container deposit system.

As for single use plastics, Palau allows biodegradable plastic bags and food containers, which is relatively tolerant compared to other pacific island countries. In the near future, it is required to take further measures to monitor the use of biodegradable plastic bags, which are said to be difficult to do so properly, and to reduce the use of other single use plastics such as food containers.

As for scrap metals, private recycling companies take the lead in exporting them mainly to Taiwan (“Other Asia, nes” in the statistics), which is the main export destination. Although there were no responses to the questionnaire for private recycling companies, a recycling company with a Taiwanese owner is very active, and thus one of the important export destinations is definitely Taiwan.

As for used lead acid battery and waste oil, without the recovery systems, it is not known to what extent they are being recovered properly, except for the waste oil that EQPB voluntarily

takes back. For example, used lead acid battery are likely to be added as a target item of the existing deposit system, and can be efficiently recovered and exported. For waste oil, EQPB should take the lead and start exploring the possibility to introduce discharger responsibility for large dischargers first.

By considering its geographical proximity to the Asia as well as its advancement in recycling activities, Palau is particularly suitable as a hub country to receive recyclables from the Micronesian region and process them. On the other hand, by considering shipping routes, it appears that the routes from Marshall and Micronesia to Palau and the Asian region currently do not exist, and it is necessary to keep this in mind when considering the framework for regional recycling.

3.4.2 Micronesia

Micronesia is a federal state consisting of four highly independent states. Except for Chuuk State, three other states have introduced a beverage container deposit system. It was introduced in Kosrae State in 2007 and in Yap State in 2008 with the support of UNDP. The main target items are aluminum cans, PET, and glass containers, and the average recovery rate for these items is nearly 85%. Both states also collect used lead acid battery, while in Yap, a private company running a redemption center collects them as its own initiative, in Kosrae, used lead acid battery is included in the deposit system as one of target items and recovered under the same system. In Pohnpei, the deposit system only targets aluminum cans, and the recovery rate is only about 50% to 60%.

As in Palau, the aluminum cans recovered under the deposit system are exported, but PET bottles and glass remain on the island even though they are recovered. A shredder for PET bottles has also been used in Yap, but the situation is the same. In addition, due to the distance between the four states, there is no exchange of recyclables between them. Import and export statistics show that most of the recyclables from Micronesia are exported to ROK and Taiwan (Other Asia, nes in the statistics).

As for single use plastics, State governments are increasingly regulating the importation of not only shopping bags but also food containers and straws.

In terms of population, economic scale and industrial structure, Micronesia is less developed in the region, and it is unrealistic to expect Micronesia to accept recyclables from neighboring countries for processing and recycling. Thus, it will be more realistic for Micronesia to find appropriate export destinations of the recyclables that tend to stay on the island. For example, if Palau starts processing some recyclables, say palletization of PET bottles, it is worth considering exporting PET bottles recovered under the deposit systems to Palau for further processing.

Used lead acid batteries are recovered as one of target items of the deposit system in Kosrae, while in Yap, they are collected by a voluntary initiative of a company that runs the redemption center. Though they are not recycled, they are exported in accordance with the Basel Convention. A comparison of Kosrae and Yap shows that used lead acid batteries are effectively recovered at a higher recovery rate, once they are included in the deposit system. Therefore, it is desirable for Yap and other states that operate the deposit scheme to include used lead acid battery officially as one of the target items of the deposit systems in the future.

Waste oil is considered as a grave environmental problem even in Micronesia, as recovery system and treatment method have not been established, while the environmental impact of improper disposal and abandonment is enormous. It is necessary to export it to a country where it can be properly treated, but such a system has not been established. In the future, as in

neighboring countries, it is desirable to start considering the introduction of discharger responsibility for large dischargers first.

3.4.3 Marshall

Statistically speaking, Marshall is a country with a large amount and volume of imports and exports, compared to its population and economic size. Like its neighbors, Marshall has introduced the container deposit system, too. The container deposit system, which started in Majuro Atoll in 2018, has been implemented in Kwajalein Atoll since July 2021, too. The container deposit system in Marshall targets aluminum cans, PET bottles, and glass bottles, but just like Palau and Micronesia, it faces the challenge of not being able to ship out PET bottles and glasses recovered under the system. Like the other two countries in the Micronesia region, Marshall does not export recyclables other than scrap metal and used lead acid battery[32].

Used lead acid battery has not been included in the container deposit system. Since the implementation of the system has been stable for about three years to date, EPA is currently considering expanding the target items, and it is desirable that used lead acid battery should be included in the list.

As for waste oil, the Marshalls Energy Company (MEC) is a major discharger of waste oil, and once, with the support of the Moana Taka project of SPREP, the waste oil held by MEC was transported off the island[33]. However, since a one-off outbound shipment relying on donor supports will not solve the fundamental problem, it is desirable to first consider introducing a system of discharger responsibility for large dischargers.

Marshall exports most of its recyclables to ROK, Taiwan (Other Asia, nes), India, the United States, and Nicaragua. Geographically, Marshall is one of the farthest countries from the Asia-Oceania region among the nine target countries, and it should be noted that shipping routes are limited as far as the survey indicated.

3.4.4 Papua New Guinea

In Papua New Guinea, only paper and used lead acid battery excluding scrap metal has been confirmed to export as recyclables. Exports of scrap metal from Papua New Guinea in 2019 are the highest among the nine target countries for both ferrous and non-ferrous metals. Regarding ferrous, it is 1.4 times as much as Fiji, but non-ferrous metals are by far the largest export volume among the nine target countries. Among them, aluminum accounts for 75%, followed by tungsten scrap at 13%. It is common scene that aluminum cans recovered and left on the road (it seems that they are crushed by passing cars and collected), but it is visually confirmed that a considerable amount of aluminum cans are recovered.

Export destinations of ferrous scrap are Singapore, Malaysia and Indonesia, which accounts for 90% of the total. ROK is the largest export destination of non-ferrous scrap, followed by Australia, Malaysia and Germany.

The most distinctive feature of Papua New Guinea is its population and economic scale. It has about 10 times the population of Fiji, which has the second largest population among the nine target countries. It is also geographically located between Oceania and Southeast Asia rather than the Pacific Islands. Considering the population and economic scale, it may be a good

[32] Though the statistics say that tens of thousands of tons of plastic waste are exported to Indonesia every year, by considering the size of the population and economy, it is unlikely that such a volume of the plastic waste is generated domestically, and the actual situation is not clear.
[33] Whenever there was room in the company's large waste oil tank, the Marshalls Energy Company used to pick up waste oil from the general public for US$25 per drum (208 liters).

location for recycling hub facility, but geographically, the distance from other Pacific countries is not so different from Australia and Southeast Asia, therefore, it is not expected much advantage in terms of at least the transportation cost. If you dare to mention it, it is relatively close to Solomon, and the connection between Solomon to Southeast Asia and Oceania is not so good, so accepting something from Solomon may be one of the options.

Although it does not count on as official statistic data in Papua New Guinea, many waste pickers are collecting PET bottles at the final disposal site. According to past interviews, this is because PET bottles are washed and reused for drinks, which is sold on the street. This is more in an individual's livelihood than being implemented as a business. It also has a subtle hygienic problem.

The introduction of CDL has not yet been considered. CDL has a proven track record of success in a rather narrow and closed nation, (typical island nation) (Australia is a continent but it is separated by states, therefore, the cross-border measures, such as labeling of beverage containers, is thoroughly implemented.). In that sense, Papua New Guinea may be the country with the most challenges in introducing CDL. It is difficult to control beverage containers because there are many manufacturers as well as importers. Above all, the national land is vast and 15 international ports are in operation, and the distribution of residences is diverse, including mountains land and flatland. There are many factors that can lead to system failure due to non-deposited beverage containers. On the other hand, it can be said that the large population and a large number of international ports indicates the potential, if cross-border measures are properly taken, the possibility of introduction of CDL cannot be denied.

Regarding Waste oil, generation amount is a large, because there are many industries. On the other hand, not only the legal definition of industrial waste, but also the responsibility for treatment of waste oil is not stipulated. Papua New Guinea is a country, which has unique features, it has one of the largest populations and economic scales, but it is one of the few nations in the nine countries when converted to GNI per capita. However, it is a fact that the scale of the industrial zone is the largest, and in such a situation, it must be great concerns that the liability provisions such as environment and industrial waste treatment for these businesses are not established. Recycling is important, but at this time, it is also an important issue to consider industrial waste regulation in Papua New Guinea.

3.4.5 Solomon

Only ferrous scrap and non-ferrous scrap have been identified as exports of recyclables from Solomon. Although CDL has not been introduced, the export of aluminum scrap is 393 tons per year in 2019, which is the second largest among the nine target countries after Papua New Guinea.

Also in Solomon, aluminum cans and PET bottles are collected by waste pickers in the city and at final disposal sites. Aluminum cans are collected everywhere in the city and at final disposal sites and sold to private companies. PET bottles are collected in the city, and reused, albeit in extremely small quantities, as containers for the sale of local drinking water. Half of the exports of non-ferrous scrap from Solomon are to Hong Kong, and about 30% are to Australia. 95% of non-ferrous scrap exports are aluminum scrap.

Export of ferrous scrap in 2019 was recorded at 3,730 tons, of which about 85% was exported to Australia. The introduction of CDL was examined and pre-feasibility study was conducted, but no concrete progress has been done since then.

Solomon have a population of about 670,000, it is the third largest country among the nine target countries after Fiji. The national land is divided into nine states based on the main islands,

and the main islands of each state are also large (five islands are over 3000 square kilometers) and diverse in culture and economy. There are two international ports.

The tourism industry is not so active, and security is relatively unstable, though not as much as in Papua New Guinea. The number of automobiles is increasing in the capital city of Honiara and traffic jams frequently occur in recent years. There are no companies engaged in dismantling business which mainly collects automobile scrap.

Solomon can be seen from the fact that the export of recyclables as shown in the material flow is only scrap metal, but most of the recycling depends on private economy-based activities. A private company exporting aluminum cans said around 2017 that it would introduce a PET bottle crusher to enter the export of plastics to Australia, but as far as the statistics of 2019 are seen (and according to local information), it seems that it has not been able to overcome the economic disadvantage of recycling PET bottles.

The ban on single use plastics is not the only correct way, but Solomon are a little behind the nine other target countries in terms of legislation to restrict the use of single use plastics.

3.4.6 Vanuatu

Vanuatu may be geographically just the center of the nine target countries. It is farther from Asia and Oceania than Papua New Guinea, Solomon, Palau, etc., and on the other hand, it is located to the west of South Pacific countries such as Polynesia. The population and industrial scale are not so large, but the tourism industry is very active.

Currently, the introduction of CDL is actively prepared, and although the official introduction schedule has not yet been decided, it is expected that a system for beverage containers such as aluminum cans and PET bottles will be introduced in the near future. One private company that operates a recycling business has been confirmed. The company mainly targets scrap metal. According to the material flow, as with Solomon, there is no export of recyclables other than scrap metal and used lead acid battery.

Regarding exports from Vanuatu, both ferrous and non-ferrous metals are ranked low in quantity among the nine target countries. Most of the ferrous scrap is exported to Taiwan (Other Asia, nes) and most of the non-ferrous scrap is exported to Australia.

From the perspective of the legal system, the Waste Management Law and laws prohibiting the manufacture and use of seven items of single use plastics have been enacted, and it can be said that the foundation is relatively well established.

The distinction of Vanuatu is that a prepaid system (prepaid bag system called yellow bag etc.) for municipal waste collection is adopted, and although it is not perfect, it is one of measures to secure financial resources for waste management. Not only the capital but also major cities have been introduced or is being prepared for introduction.

If CDL is introduced, PET bottles will be designated as target items with high probability, but the destination after recovery should be considered. Therefore, ideally, it is better to proceed preparations and plans for acceptance in neighboring Fiji.

Regarding waste batteries and waste oil, currently, there are no notable businesses, but the distribution of automobiles themselves is limited, so it is not clear whether this is an urgent issue. However, disregarding the abnormal situation in the COVID-19, Vanuatu is highly dependent on the tourism industry, and from that point of view, the priority for environmental conservation may be one or two among the nine target countries. So, control of the generation of single use plastics (control of use), proper treatment of waste oil, proper recovery and

treatment of PET bottles, etc. are issues that should be tackled with certainty.

3.4.7 Fiji

Although there is no recycling association established, considering its population, economic scale, geographical condition and ongoing active recycling activity practiced by private sector, Fiji is potentially addressed as center of recycling promotion in the Pacific region. As for recyclable other than scrap metal, the recycling or export for recycling is not so much conducted in the other target countries. There are many recycling activities conducted in Fiji but not in other target countries such as toilet paper production from used office paper, fuel use of waste oil although the amount is limited, repair of used lead acid batteries and export as products, export of plastic generated from industry, export of scrap metal recovered from end of life vehicle by recycler specialized in end of life vehicle. In addition, recyclable separate collection in Nadi town is rooted while in Lautoka, a recycle station is located in a park where recyclables brought by citizen are received. Although it could be addressed as slightly different types of activity from the point of recycling operation, in Fiji, a curriculum of Clean School Program is actively promoted as nation. It is expected to promote recycling in the mid and long term point of view, as the program successfully promoted avoiding use of single use package for lunch, reusing used tires for gardening, segregating used beverage containers and which helps building awareness of citizen on 3R.

Although CDL has not introduced yet in Fiji, Mission Pacific program through which eligible PET bottle and Aluminum cans are recovered and exported is co-operated by several beverage manufacturers. The program gives financial incentive to the citizen to collect PET bottle and Aluminum cans, as eligible container is purchased at the rate of 0.5 – 1.0 FJD per kg. According to the report of beverage manufacturer[34] which provided answer to the survey, approximately 175 tons of PET bottles and 10 tons of Aluminum cans were recovered and exported in 2019. As for PET bottle which is sold to buyer at the rate of 0.2 FJD/kg, after China's restriction on importation, the balance has been in the red but still PET bottle continues to be recovered and exported as social contribution, which comes from corporate social responsibility so called CSR. Although discussions on introduction of CDL progresses, it will take some more time to be realized.

As for single use plastic, use of shopping bag of less than designated thickness was banned already and use of styrofoam has just banned since August 2021.

Amount of scrap metal (both ferrous and non-ferrous) collected for recycling in Fiji was the 2nd largest among 9 target countries after Papua New Guinea. Especially for ferrous, the amount in Fiji was as much as 70 percent of the one in Papua New Guinea. Considering the geographical location of Fiji which is situated relatively far from economic center of Asia and Oceania compared with Papua New Guinea and Solomon Islands, the amount of scrap metal collected in Fiji is positively evaluated to a certain extent. Amount of export of Aluminum in Fiji (289 tons in 2019) was the 3rd largest after Papua New Guinea and Solomon Islands and most part of Aluminum was exported to Australia and ROK.

Since most of international ports are connected with the two large ports in Fiji, Suva and Lautoka by existing shipping lines combined with geographic factor of Fiji may assist efficient recyclable recovery and transportation.

It could be possible that certain system is established in Fiji to receive used paper, PET bottle, waste oil and used lead acid batteries from neighbor countries. However, in case Fiji receives

[34] Survey conducted under J-PRISM Phase2

afore mentioned recyclables from neighbor countries, it might be at least free of charge considering the transportation cost for limited amount of recyclable traded and administration cost occurred for importation and exportation of hazardous waste. Even in that case, receiving recyclable for free of charge seems difficult unless the recyclable is targeted under well established recovery system such as CDL or the item is generated from business and the business is facing issues in storing or processing.

Even the recycling company that produce recycled toilet paper from used paper is facing challenge in competition with imported product. It is expected some financial incentive will be introduced such as enforcement of green purchasing law or import tax on imported toilet paper.

Fiji is one of the countries that has not concluded Basel Convention. It is not always required to be a party of Basel Convention when trading recyclables, it is recommended that Fiji applies the same procedure with other countries when receiving hazardous waste and designated waste such as waste oil, used lead acid batteries and PET bottle. In order to ensure recovery of beverage container locally produced, continuous discussions on introduction of CDL is expected.

3.4.8 Tonga

Except for Micronesia Region, Tonga is one of the country which has smallest population and land area among 9 target countries. Waste management of Tonga is operated by Waste Authority Limited not only Tongatapu that is main land of the country but other main outer islands.

It was confirmed that the amount of exported scrap metal (both ferrous and non-ferrous) from Tonga in 2019 was the smallest among 9 target countries. There are two recycling companies and one of them had just started its operation as business in this 2 years. The other older company was affected by recent fall down of the market price of scrap metal and was forced to downsize its business operation.

One of the companies deals with tourism and retails of fishing item and marine sports gears. According to the statistic record, only destination of scrap metal exported from Tonga in 2019 was Australia. Among the 9 target countries, Tonga is one of the countries which have not introduced CDL, and is the only country where there is no waste pickers collecting recyclable at landfill. This might be because that Waste Authority Limited's well management of entry point at landfill and people's mentality based on their religion and culture, but it could also be one of the reasons that there is no active recovery and exportation of aluminum cans in the absence of the buyer.

As for other recyclables, there seems export of used lead acid batteries although the amount is limited but this could be considered as a positive factor on the issues on end life vehicle in Tonga.

There are few manufactures in Tonga including beverage industry. Therefore, Tonga relies on import for the most of products. Most of beer product can be found in the local market is imported although there are few local brand beer. Drinking water is bottle in Tonga.

Although there is no outstanding progress confirmed on discussions on CDL at this point, Tonga's situation is similar to countries in the Micronesian region in some aspects, and it seems to have more potential for introduction of CDL than countries in the Melanesian region.

It is said that Tonga hasn't banned but been considering of usage of single use plastics. Prior to the recent plastic issue, Tonga already introduced plastic levy that imposes 10% of tax on importation of plastic. The collected levy covers part of operation cost of the Waste Authority

Limited which occupies 15%[35] of revenue total of Waste Authority Limited.

Considering the situation that waste management service which is basis of recycling was just extended to outer islands at the end of 2020, Tonga is at the stage of stabilizing the operation in outer islands and shifting to recycling promotion as next step.

Although, there is few export of vehicle scrap metal and end of life vehicles are piled up in the suburb of Nuku'alofa. It seems initially, these were collected for export when the market price was good, but in fact they have been left there for a long time.

Tonga is relatively advanced in terms of legislation. A regulation for waste management is enforced and also Hazardous Wastes and Chemicals Act 2010 which is addressed as internal law for Basel Convention is enforced. There is regulations on ban of illegal dumping.

Considering its economic scale, it seems difficult to process recyclable in Tonga. Therefore, it would be the first step as Tonga to export recyclable. It would be ideal exporting recyclable to Fiji than exporting to Australia as there is more distance from Tonga.

Even though there are various challenges to promote recycling in Tonga, considering introduction of CDL could be a first step as visible initiatives.

3.4.9 Samoa

As main office of SPREP and J-PRISM are located, Samoa seems to be the country of regional cooperation implemented by international organization. Samoa's recycling association is one of the most active recycling association and the first established recycling association among 9 target countries. Types of recyclable exported from Samoa so far known are scrap metal (both ferrous and non-ferrous) and lead acid batteries. Amount of exported scrap metal in 2019 was in the middle among target 9 countries (The amount for scrap metal (ferrous) was in the 5th among 9 countries, while scrap metal (non-ferrous) is in the 4th.). Compared with 2013, in the most of countries, export amount of scrap metal was significantly decreased in 2019, but in Samoa there was decrease but relatively slight. The amount in 2013 was approximately 3,000 tons and 2,500 tons in 2019. It is said that there are 2 recycling companies which export recyclable.

It is rare to observe a scene that aluminum cans are collected in the street like target countries in Melanesian region, aluminum cans are collected by waste pickers at landfill and are sold to adjacent recycling company. At this point, there is not a sustainable initiative to collect aluminum cans. Samoa is targeting introduction of CDL and currently feasibility study on CDL is in progress. There is no local government and central government is solely responsible for waste management operation in Samoa. Samoa's population is not small but it is not dispersed across the islands. Domestic production of beverage products are limited and mostly depend on import. Therefore, CDL seems to be relatively simple to be introduced.

Samoa's recycling association is currently trying to implement pilot project which targets PET bottles (Flaking), waste lubricant oil (Collection and storage), waste plastic recovered from home appliances (Producing plastic brick).

As for single use plastic, since January 2019, use and importation of plastic bag, styrofoam food container, and single use straw are banned except for exemption item. As for shopping bag, before introduction of this regulation, use of biodegradable plastic shopping bag was allowed but based on the situation that there were challenges in quality inspection and monitoring and recent movement of banning single use plastic, the restriction was strengthened.

[35] Business Plan FY2018/19

Samoa is situated relatively far from economic center of Asia and Oceania and has medium population scale but is not ready to accept recyclable from other countries. Therefore, Samoa is expected country to supply recyclable to Fiji. There are some remarkable on going activities such as activities of recycling association including its pilot project, and activities towards introduction of CDL. Based on these activities, it is expected that consideration on what types of shapes of recyclable could be effectively exported to Fiji or other countries in consultation with recycling association that will be the window of exporting recyclable.

3.5 Consideration and Recommendation of Specific Priority Project

3.5.1 Palau, Micronesia, Marshall

It is worth mentioning that in the Micronesia region, the target items is effectively recovered thanks to the container deposit system introduced. However, the industrial base of the region is fragile, and domestic recycling is difficult, so exporting or shipping out of the island is a practical solution. However, except for aluminum cans, exporting or shipping out of the island is not possible, and PET, which has a large amount of recovery, continues to accumulate on the island. However, the industrial base of the region is rather weak, and domestic recycling is difficult, so exporting or shipping out of the island is a practical solution. However, except for aluminum cans, PET bottles and other items have never been exported or shipped out of the island and they continues to accumulate on the island.

Currently, aluminum can, PET bottle, and glass bottle are the main items recovered under the deposit system, while only in Kosrae of Micronesia, Used lead acid battery is also recovered by the system. By considering the high recovery efficiency of the system, Yap of Micronesia is currently exploring the possibility to manage end of life vehicles by adding it to the system. Also, Marshall is considering expanding the scope of the system to other home appliances. As such, it is desirable to consider the use of this system for efficient recovery of other items, too.

On the other hand, as already mentioned, there are issues regarding export and shipping out of recyclables other than aluminum cans, and even if new target items are added in the future, it is assumed that items with low market value will continue to stay and accumulate on the island. PET bottles are already piling up on the island, and is a major issue in many countries. Since these items are recovered in a relatively clean condition under the system, if the processing of PET starts in countries such as Palau, it becomes possible to consider a region-wide initiative to collect PET from Micronesia and Marshall, process it, and export it outside the region.

In addition to its geographical advantage of being the closest to the Asian region among the three countries surveyed in the Micronesia region, Palau is known as an advanced 3R country for its introduction and operation of the deposit system and its active recycling activities, and it can be said that Palau is a strong candidate for a hub country when considering the 3R+R system in the region. The neighboring Micronesia and Marshall also introduced the deposit system, but the population and industrial base are so small that there is no recycling industry, and they are currently facing challenges regarding the disposal of recovered PET bottles. In Palau as well, the export of PET bottles is difficult, and therefore the country is now considering for the flaking and pelletizing of PET bottles as a way to add values. If the initiative in Palau is realized, collecting PET bottles of Micronesia and Marshall in Palau and processing them, and exporting them could be possible.

However, even if the pelletizing and exporting of PET bottles becomes possible, if the price is not competitive enough, the profit from this business cannot be expected, and in that case, it will be an effort to enable returns through advanced processing. Also, it is likely that transactions with Micronesia and Marshall will not generate any profits and will basically be

based on free trade. In other words, although there is no great commercial merits for Palau in accepting PET from neighboring countries, there is only an advantage for Palau in obtaining raw materials free of charge, and an advantage for Micronesia and Marshall in taking over difficult-to-process materials at only the actual cost of transportation by Palau. If such a balanced and mutually beneficial trade can be agreed upon, the system can be established. As for the transportation costs that must be borne by the senders, it may be possible to raise only the deposit amount in the future, leave the refund amount unchanged, and use the difference to cover the transportation costs to guarantee the sustainability of the system. It should be noted that the actual establishment of such a system in the future will largely depend on whether the relevant organizations in Palau agree and participate in the establishment of the system and in taking the initiative as the key player of the system.

In addition to PET bottles, used lead acid batteries and glass are also recovered under the deposit system[36]. However, since used lead acid batteries are recovered and exported from each country and state without much problems, and the amount of waste glass is very small, it is desirable to start considering a measure for PET bottles, which are already recognized as an issue in each country and state. In order to establish such a new regional system, it is necessary for the relevant national authorities in each country to have sufficient consultations, but such consultations do not occur spontaneously, and support by a regional project such as J-PRISM II is considered essential.

3.5.2 Papua New Guinea, Solomon

Papua New Guinea and Solomon are geographically close to Asia and Australia. For Both countries, there are almost no recycling system or recycling business set up except for scrap metal. Therefore, it seems not very beneficial for these countries to be core of regional recycling.

3.5.3 Fiji, Vanuatu, Tonga, Samoa

Fiji could take a central role among neighbor countries considering its scale of population, economy and industry, advanced recycling activity as well as its geographical condition. For instance, accepting recyclables from Tonga, Samoa, Vanuatu is beneficial for these countries which are relatively far from economic center of Asia and Oceania provides wider options for these countries. However, when it comes to discussion of particular target item, there are many challenges. CDL hasn't been introduced in Fiji yet so recovery rate of Aluminum cans and PET bottles in Fiji seems not high. Especially for PET bottles, although Mission Pacific, which is recovery program, consists from several beverage companies collects PET bottles and Aluminum cans of own brands recovered rate is less than 10 percent. Under such situation, it would be too early to processing and pelletizing recovered PET bottles accepted from other countries. Basically, it would be desirable to consider accepting and processing of PET bottles from other countries at the point when PET bottles in Fiji are recovered sufficiently.

There is a recycling company collects used paper and produces toilet paper. The company faces issues in procurement of used paper. Therefore, it would be beneficial for the company to accept used paper from neighbor countries but considering the situation that even the domestic operation is not easy to make profit, it would be more difficult to buy used paper from other countries. On the other hand, from the perspective of those who exporting used paper, as currently there is no recovery system of used paper conducted by the government, recovery

[36] Currently, used lead acid batteries are recovered under the deposit system only in Kosrae. In Yap of Micronesia and Majuro of RMI, the operators of the redemption centers collect and export used lead acid batteries as their own initiatives.

and export of used paper will be done by private sector, and in that case, private sector needs to make profit from its operation, so it is hard for them to collect used paper for free of charge. It would be necessary to consider on how government can intervene in collaboration among private sector.

The situation for used lead acid batteries is similar to the one for used paper. There are private recycling companies that accept but not buy used lead acid batteries. In this regards, it can be said that used lead acid batteries are valuable but still the market price is not sufficient for those who export. Therefore, it would be necessary to examine whether if the operation, which neighbor countries' recycling companies collect used lead acid batteries domestically and export to Fiji would be profitable considering the cost for recovery in country and cost for exporting.

As for waste lubricant oil, a company collect for free of charge and used as fuel for furnace which produces reinforcing bar. The collection of waste lubricant oil under the company is not primarily aiming at recycling or as business but they collect the only necessary amount based on their operation's needs. Therefore, so far, it is not expected for the company to accept waste lubricant oil from neighbor countries.

Thus, there might be some possibility of regional collaboration for each of item when particular item is discussed, but at the same time, it seems there are a lot of challenges for considering comprehensive regional recycling system as there are different situations by types of item and different businesses deals different types of item. Especially in Fiji, relatively advanced recycling is conducted by private companies therefore Fiji has high potential to be core , meanwhile careful consideration and discussions might be required in order to organize them.

Attachment

1. Set of Questionnaires

Survey on Consumer's behavior in dealing with recyclables

QUESTIONNAIRE FOR CONSUMERS

Date	
Interviewer	

1. Basic Description of Respondent

1.1	Name (Mr / Mrs / Ms / others)			
1.2	Address:			
1.3	Telephone:		E-mail:	
1.4	Age Group : ☐ *13~19* ☐ *20~29* ☐ *30~39* ☐ *40~49* ☐ *50~59* ☐ *60 and above*			

2. Household Information

2.1 Total number of family members living in the house:

Age group	Number of person	Working	
		Yes	No
(a) 0 to 3 (baby)			
(b) 4 to 12 (children)			
(c) 13 to 19 (Teenage)			
(d) 20 to 59 (Adults)			
(e) Above 60 (Senior)			
Total			

3. Generation, Recycling and Disposal of Wastes from Households

3.1 Please specify the quantity of recyclable wastes produced from your house for the PAST ONE WEEK, and what was the disposal method (If sell, please indicate the selling prices in accordance to the units given).

Items	Quantity	Unit	Disposal Method	Price** ~~(FJ$/unit)~~
(1) Disposable plastics (single-use plastic*)			a b c d e f( )	FJ$ /kg
(2) PET bottles				
Less than 500ml			a b c d e f( )	FJ$ /kg
Less than 2.0 l			a b c d e f( )	FJ$ /kg
Over 2.0 l			a b c d e f( )	FJ$ /kg
(3) Aluminum cans			a b c d e f( )	FJ$ /kg
(4) Steel can			a b c d e F( )	FJ$ /kg
(5) Glass bottles			a b c d e f( )	FJ$ /bottle
(6) Paper			a b c d e f( )	FJ$ /kg
(7) Cardboard			a b c d e f( )	FJ$ /kg
(8) Others ( )			a b c d e f( )	FJ$ /kg

Notes:

a. Discharge it together with general waste (without sorting) when municipal waste is being collected.
b. Separate and discharge it when municipal waste is being collected.
c. Sell or give it to the collectors.
d. Take it to a recycling station / center and sell it.
e. Burn it in the yard
f. Others (pls. Specify _____)

* Single-use plastics: Single-use plastics, or disposable plastics, are used only once before they are thrown away or recycled. These plastics comprise polythene bags, plastic drinking bottles for milk, yogurt, etc., plastic bottle caps, food wrappers, plastic sachets, plastic wrappers, straws, stirrers and Styrofoam cups or plates.

** Price: “Price” means the Sales Price to the collector or buyer

3.2 Please choose below reason(s) you chose the disposal method above. You can choose multiple answers.

Items	Reasons for choosing the disposal method					
	a	b	c	d	e	f
(1) Disposable plastics						
(2) PET bottles						
Less than 500ml						
Less than 2.0 l						
Over 2.0 l						
(3) Aluminum cans						
(4) Steel can						
(5) Glass bottles						
(6) Paper						
(7) Cardboard						
(8) Others						

Why you chose this Disposal method

1. Because it was too much trouble to sort the waste
2. Because I followed the waste sorting guide given by the municipal council
3. Because I thought it would be recycled properly
4. Because I thought it would help the environment and resources
5. Because someone came to my house to pick up my recyclable waste or there was a place nearby to drop it off
6. Because I can exchange it for money
7. Because there is no government collection service
8. Because I don't want to leave my waste at home
9. Because I did not know where to put it
10. Other

4. Waste electrical appliances from households

4.1 What kind of electrical appliances do you have in your house?

Please answer the following questions about all the appliances you currently use in your house - if you have more than 3 appliances, please put the appliance number in brackets under Others and continue answering.

Items	1st Unit		2nd Unit	
	Brand-new or used	Year Bought	Brand-new or used	Year Bought
(1) Television	☐ N, ☐ U		☐ N, ☐ U	
(2) Refrigerator	☐ N, ☐ U		☐ N, ☐ U	
(3) Washing machine	☐ N, ☐ U		☐ N, ☐ U	
(4) Microwave	☐ N, ☐ U		☐ N, ☐ U	
(5) Air conditioner	☐ N, ☐ U		☐ N, ☐ U	
(6) Personal computers				
Desktop computer	☐ N, ☐ U		☐ N, ☐ U	
Laptop computer	☐ N, ☐ U		☐ N, ☐ U	
(7) Cell Phone				
Smartphone	☐ N, ☐ U		☐ N, ☐ U	
Flip phone	☐ N, ☐ U		☐ N, ☐ U	
(8) Others ( )	☐ N, ☐ U		☐ N, ☐ U	

N: Brand-new appliance, U: Used appliance

4.2 If you keep appliances in your home that you no longer use, please enter the number of each appliance and select a reason from the table below. You can choose multiple answers.

Items	Number of appliances	Reasons for storing waste home appliances at home
(1) Television		
(2) Refrigerator		
(3) Washing machine		
(4) Microwave		
(5) Air conditioner		
(6) Personal computers		
Desktop computer		
Laptop computer		
(7) Cell Phone		
Smartphone		
Flip phone		
(8) Others ( )		

Why you keep your used appliances at home

1. because the procedure and preparation for disposal is troublesome
2. because it is too much trouble to take it to the place of delivery
3. because I think it is expensive to dispose of it
4. because I am worried that my personal information will be leaked
5. because there is no opportunity to dispose of them
6. because I don't know if it will be recycled properly
7. because I have data I want to keep
8. because I don't know how to dispose of it
9. because I am keeping it as a spare part and do not intend to dispose of it
10. Other

4.3 Years of use of durable consumer goods

How long would you generally expect to use each of the following 7 appliances? Please indicate the number of years of use as if they were brand-new or used.

Items		Period of use (years)
(1) Television	B-New	1, 2, 3, 4, 5, 6, 7, 8, 9, more than 10 years
	Used	1, 2, 3, 4, 5, 6, 7, 8, 9, more than 10 years
(2) Refrigerator	B-New	1, 2, 3, 4, 5, 6, 7, 8, 9, more than 10 years
	Used	1, 2, 3, 4, 5, 6, 7, 8, 9, more than 10 years
(3) Washing machine	B-New	1, 2, 3, 4, 5, 6, 7, 8, 9, more than 10 years
	Used	1, 2, 3, 4, 5, 6, 7, 8, 9, more than 10 years
(4) Microwave	B-New	1, 2, 3, 4, 5, 6, 7, 8, 9, more than 10 years
	Used	1, 2, 3, 4, 5, 6, 7, 8, 9, more than 10 years
(5) Air conditioner	B-New	1, 2, 3, 4, 5, 6, 7, 8, 9, more than 10 years
	Used	1, 2, 3, 4, 5, 6, 7, 8, 9, more than 10 years
(6) Personal computers		
Desktop computer	B-New	1, 2, 3, 4, 5, 6, 7, 8, 9, more than 10 years
	Used	1, 2, 3, 4, 5, 6, 7, 8, 9, more than 10 years
Laptop computer	B-New	1, 2, 3, 4, 5, 6, 7, 8, 9, more than 10 years
	Used	1, 2, 3, 4, 5, 6, 7, 8, 9, more than 10 years
(7) Cell phone		
Smartphone	B-New	1, 2, 3, 4, 5, 6, 7, 8, 9, more than 10 years
	Used	1, 2, 3, 4, 5, 6, 7, 8, 9, more than 10 years
Flip phone	B-New	1, 2, 3, 4, 5, 6, 7, 8, 9, more than 10 years
	Used	1, 2, 3, 4, 5, 6, 7, 8, 9, more than 10 years

4.4 Disposal method of electrical and electronic wastes

How would you dispose of the following household appliances that you and your family members currently use, if they break down and cannot be repaired or are replaced? Please choose the disposal methods from "a" to "g" in the table below. You may choose more than one disposal method. If you would have to sell or pay for the disposal of the used appliance, please indicate the amount you would have to pay.

Type of appliance	Disposal method (Please select from a to g)								
(1) Television	a	b	c	d	e	f	g	FJ$	/unit
(2) Refrigerator	a	b	c	d	e	f	g	FJ$	/unit
(3) Washing machine	a	b	c	d	e	f	g	FJ$	/unit
(4) Microwave	a	b	c	d	e	f	g	FJ$	/unit
(5) Air conditioner	a	b	c	d	e	f	g	FJ$	/unit
(6) Personal computers									
Desktop computer	a	b	c	d	e	f	g	FJ$	/unit
Laptop computer	a	b	c	d	e	f	g	FJ$	/unit
(7) Cell Phone									
Smartphone	a	b	c	d	e	f	g	FJ$	/unit
Flip phone	a	b	c	d	e	f	g	FJ$	/unit

Notes:

a. Discard together with the other wastes for municipal waste collection
b. Give / Sell to the collectors or other peoples (if sell, please indicate the selling price)
c. Pay to the collector for disposal (please indicate the disposal price)
d. Bring to the recycling station / centre etc.
e. Keep at home
f. Dumping it in open spaces
g. Others (Pls. specify _____)

4.5 Please choose below reason(s) you chose the disposal method above. You can choose multiple answers.

Items	Reasons for choosing the disposal method						
	a	b	c	d	e	f	g
(1) Television							
(2) Refrigerator							
(3) Washing machine							
(4) Microwave							
(5)Air conditioner							
(6) Personal computers							
Desktop computer							
Laptop computre							
(7) Cell Phone							
Smartphone							
Flip phone							

Why you chose this Disposal method

1. Because it was too much trouble to sort the waste
2. Because I followed the waste sorting guide given by the municipal council
3. Because I thought it would be recycled properly
4. Because I thought it would help the environment and resources
5. Because someone came to my house to pick up my recyclable waste or there was a place nearby to drop it off
6. Because I can exchange it for money
7. Because there is no government collection service
8. Because I don't want to leave my waste at home
9. Because I did not know where to put it
10. Other

5. Questions about private cars

5.1 Does your family have a Passenger car, Truck, Motorcycle?

Yes ☐

No ☐ **Go to the End**

5.2 Number of cars owned and condition of cars at time of purchase

Please indicate the number of cars you have currently and the condition (brand-new or used) of the cars at the time of purchase.

Type of car	Number of unit	1st car	2nd car	3rd car
1. Passenger car		☐ New, ☐ Used	☐ New, ☐ Used	☐ New, ☐ Used
2. Truck		☐ New, ☐ Used	☐ New, ☐ Used	☐ New, ☐ Used
3. Motorcycle		☐ New, ☐ Used	☐ New, ☐ Used	☐ New, ☐ Used
4. Others		☐ New, ☐ Used	☐ New, ☐ Used	☐ New, ☐ Used

5.3 About the abandoned End-of-life vehicle

If you keep end of life vehicle(s) in your premises that you no longer use, please enter the number of each type of vehicle and select a reason from the table below. You can choose multiple answers.

Items	Number of vehicle	Reasons for leaving ELV in your premises (Multiple answer)
(1) Passenger car		
(2) Truck		
(3) Motorcycle		
(4) Others		

Why you keep End of Life Vehicle at home

1. Because the procedure and preparation for disposal is troublesome
2. Because it is too much trouble to take it to the place of delivery
3. Because I think it is expensive to dispose of it
4. Because there is no opportunity to dispose of it
5. Because I don't know if it will be recycled properly
6. Because I want to keep it
7. Because I don't know how to dispose of it
8. Because I keep it as a spare part and do not intend to dispose of it
9. Others

5.4 Years of use of the car

How many years do you intend to use your vehicle?

Type of car	New or used	Years of use
(1) Passenger car	Brand new	
	Second hand	
(2) Truck	Brand new	
	Second hand	
(3) Motorcycle	Brand new	
	Second hand	

5.5 How to maintain the car

Items		Frequency and quantity of replacement	How to dispose of used items				
1st car	Tires	Replace every □1, □2, □3, □4, □5 years	a	b	c	d	FJ$
	Car battery	Replace every □1, □2, □3, □4, □5 years	a	b	c	d	FJ$
	Lubricant	Liter per year	a	b	c	d	FJ$
2nd car	Tires	Replace every □1, □2, □3, □4, □5 years	a	b	c	d	FJ$
	Car battery	Replace every □1, □2, □3, □4, □5 years	a	b	c	d	FJ$
	Lubricant	Liter per year	a	b	c	d	FJ$
3rd car	Tires	Replace every □1, □2, □3, □4, □5 years	a	b	c	d	FJ$
	Car battery	Replace every □1, □2, □3, □4, □5 years	a	b	c	d	FJ$
	Lubricant	Liter per year	a	b	c	d	FJ$

Note:
a. The dealer's workshop takes it back free of charge.
b. Sell it to a recycler (please write the sale price)
c. Have it taken to a recycling company (if you pay a disposal fee, please state the amount)
d. Others (Pls. specify)

5.6 How to dispose of the end of life vehicles

Please indicate the disposal method of your car (If sell, please indicate the selling prices).

Items		Disposal method (Please select from a to f)						
1st car	(1) Car body	a	b	c	d	e	f	Price: FJ$
	(2) Tires	a	b	c	d	e	f	Price: FJ$
	(3) Car battery	a	b	c	d	e	f	Price: FJ$
2nd car	(1) Car body	a	b	c	d	e	f	Price: FJ$
	(2) Tires	a	b	c	d	e	f	Price: FJ$
	(3) Car battery	a	b	c	d	e	f	Price: FJ$
3rd car	(1) Car body	a	b	c	d	e	f	Price: FJ$
	(2) Tires	a	b	c	d	e	f	Price: FJ$
	(3) Car battery	a	b	c	d	e	f	Price: FJ$

Notes:
a. Trade in my car to a dealer.
b. Sell to a recycler (for reuse of used parts)
c. Sell to a scrap buyer
d. Leave it on the premises.
e. Leave it in an open space other than my premises.
f. Others (Pls. specify _____)

5.7 Please give reasons for your choice of disposal method in question 5.6 from the table below. Multiple answers are acceptable.

Items		Reasons for choosing the disposal method					
		a	b	c	d	e	f
1st Car	(1) Car body						
	(2) Tires						
	(3) Car battery						
2nd Car	(1) Car body						
	(2) Tires						
	(3) Car battery						
3rd Car	(1) Car body						
	(2) Tires						
	(3) Car battery						

Why you chose this Disposal method

1. Because I thought it would be easy to arrange and easy to hand over
2. Because they come to my house to take it out or there is a delivery address nearby
3. Because I thought it would be cheaper or less costly to pay
4. Because I was informed about the replacement
5. Because I thought it would be properly recycled at an approved delivery site
6. Because I did not know where to send it
7. Other

This is the end of questionnaire.
Thank you for kind cooperation!!

Japan International Cooperation Agency

B2-1-1: Recycling Survey Questionnaire for Import and Sales of Automobile

1. Company Profile

Name of Organization			
Type of Business			
Year of Incorporation	Year Website:		
Address	HQ: Phone: E-mail:		
Annual Sales (Turnover)		Number of Employees	
Please describe your business activities			

2. Import and Sales of Automobiles in 2019

Q1: What is your business?

☐ Import & Sale:

⇨ Please indicate the number of units imported, sold and where to sales for each type of vehicle in Table 1 (all columns).

☐ Sales:

⇨ Please indicate the number of units sold and where to sales for each type of vehicle in Table 1 (column of Sales and Where to sales).

Table 1: Imports and destinations of Automobiles

Handler / Type of Vehicle	Import		Sales		Where to sales	
	Number of units imported in 2019	Market share (%)	Number of units sold in 2019	Sales share (%)	Sales destination	Share (%)
1. Passenger car	Brand new: _____ Second hand:_____		Brand new: _____ Second hand:_____		1: Consumers	
					2: Retailers	
					3: Exporting (abroad)	
2. Truck	Brand new: _____ Second hand:_____		Brand new: _____ Second hand:_____		1: Consumers	
					2: Retailers	
					3: Exporting (abroad)	
3. Bus	Brand new: _____ Second hand:_____		Brand new: _____ Second hand:_____		1: Consumers	
					2: Retailers	
					3: Exporting (abroad)	
4. Motorcycle	Brand new: _____ Second hand:_____		Brand new: _____ Second hand:_____		1: Consumers	
					2: Retailers	
					3: Exporting (abroad)	

Note:

- For market share in the import column, please indicate your company's imports as a percentage of Fiji's total imports.
- For the share of sales in the retail column, please indicate your company's sales as a percentage of total sales in Fiji.
- For the share in the Where to sales column, please enter the percentage of your company's total sales volume for each appliance.

3. Handling of End-of-Life vehicles

Q2: Does your company collect the end-of-life vehicles?

☐ Yes. ⇨ Go to Q3 and Q4.

☐ No. ⇨ Go to End.

Q3: Please tick the appropriate box in the table below regarding the collection of the end-of-life vehicles.

Table 2: Collection of the end-of-life vehicles

Items	Quantity of end-of-Vehicles (unit/month)	Collection method (Please select from a to d)						
		Collection method					Cash flow (If you pay or paid when you handling the item)	
							You are *Paid*	You *Pay*
1. Passenger car		a	b	c	d		FJ$/Unit	FJ$/Unit
2. Truck		a	b	c	d		FJ$/Unit	FJ$/Unit
3. Bus		a	b	c	d		FJ$/Unit	FJ$/Unit
4. Motorcycle		a	b	c	d		FJ$/Unit	FJ$/Unit
5. Parts collected from end-of-life vehicles		a	b	c	d		FJ$/Unit	FJ$/Unit

Collection methods:

a. Door to door (Visit users' location (Offices / Households) and collect the item)

b. Pick up from collection point (Visit designated pick up point and collection the item)

c. Receive at the office (User brings the item to your office and receive the item)

d. Others (Pls. specify _____)

Q4: Please tick the appropriate box in the table below regarding the handling of the end-of-life vehicles

Table 3: Handling of end-of-life vehicles

Items	Quantity of end-of-Vehicles (unit/month)	Handling method (Please select from a to e)						
		Handling method					Cash flow (If you pay or paid when you handling the item)	
							You are *Paid*	You *Pay*
1. Passenger car		a	b	c	d	e	FJ$/Unit	FJ$/Unit

2. Truck		a	b	c	d	e	FJ$/Unit	FJ$/Unit
3. Bus		a	b	c	d	e	FJ$/Unit	FJ$/Unit
4. Motorcycle		a	b	c	d	e	FJ$/Unit	FJ$/Unit
5. Parts collected from end-of-life vehicles		a	b	c	d	e	FJ$/Unit	FJ$/Unit

Handling methods:

a. Hand over the collected item to the recycling companies

b. Hand over the collected item to the disposal company

c. Take the collected item to the landfill for disposal by yourself

d. Treat at your facility

e. Others (Pls. specify _____)

Please describe recycling company or disposal company related in above Table 3

Name of company	The company's business	Contact info, address

This is the end of questionnaire.

Thank you for kind cooperation!!

Japan International Cooperation Agency

B2-1-2: Recycling Survey Questionnaire for Import and Sales of tires and car batteries

1. Company Profile

Name of Organization			
Type of Business			
Year of Incorporation	Year Website:		
Address	HQ: Phone: E-mail:		
Annual Sales (Turnover)		Number of Employees	
Please describe your business activities			

2. Import and Sales of Tires and car batteries in 2019

Q1: What is your business?

☐ Import & Sale of tires:

⇨ Please indicate the number of units imported, sold and where to sales for each type of tire in Table 1 (all columns).

☐ Sales of Tires:

⇨ Please indicate the number of units sold and where to sales for each type of tire in Table 1 (column of Sales and Where to sales).

☐ Import & Sale of Car batteries

⇨ Please indicate the number of units imported, sold and where to sales of car battery in Table 1 (all columns).

☐ Sales of Car batteries

⇨ Please indicate the number of units sold and where to sales for each type of car battery in Table 1 (column of Sales and Where to sales).

Note:

- For market share in the import column, please indicate your company's imports as a percentage of Fiji's total imports.
- For the share of sales in the retail column, please indicate your company's sales as a percentage of total sales in Fiji.
- For the share in the Where to sales column, please enter the percentage of your company's total sales volume for each appliance.

Table 1: Imports and destinations of tires and car batteries

Handler / Type of Tires & Car batteries		Import		Sales		Where to sales	
		Number of units imported in 2019	Market share (%)	Number of units sold in 2019	Sales share (%)	Sales destination	Share (%)
Tires	1. Tires for passenger cars					1: Consumers	
						2: Retailers	
						2: Exporting (Abroad)	
	2. Tires for trucks & buses					1: Consumers	
						2: Retailers	
						2: Exporting (Abroad)	
	3. Tires for Motorcycle					1: Consumers	
						2: Retailers	
						2: Exporting (Abroad)	
Car batteries	1. Car batteries					1: Consumers	
						2: Retailers	
						2: Exporting (Abroad)	
	2. Batteries for trucks & buses					1: Consumers	
						2: Retailers	
						2: Exporting (Abroad)	
	3. Batteries for motorcycles					1: Consumers	
						2: Retailers	
						2: Exporting (Abroad)	

4. Handling of waste tires and car batteries

Q2: Does your company collect the waste tire and/or waste car batteries?

☐ Yes. ⇨ Go to Q3 and Q4.

☐ No. ⇨ Go to the End.

Q3: Please tick the appropriate box in the table below regarding the collection of the waste tires and/or waste car batteries.

Table 2: Collection of the waste tires and/or waste car batteries

	Items	Quantity of waste tires and batteries (unit/month)	Collection method (Please select from a to d)						
			Collection method					Cash flow (If you pay or paid when you collect the item)	
								You are *Paid*	You *Pay*
Waste tires	1. Tires for passenger cars		a	b	c	d		FJ$/unit	FJ$/unit
	2. Tires for trucks and buses		a	b	c	d		FJ$/unit	FJ$/unit
	3. Tires for motorcycles		a	b	c	d		FJ$/unit	FJ$/unit
Waste batteries	1. Car batteries for passenger cars		a	b	c	d		FJ$/unit	FJ$/unit
	2. Car batteries for trucks or Buses		a	b	c	d		FJ$/unit	FJ$/unit
	3. Batteries for motorcycles		a	b	c	d		FJ$/unit	FJ$/unit

Collection methods:

a. Door to door (Visit users' location (Offices / Households) and collect the item)

b. Pick up from collection point (Visit designated pick up point and collection the item)

c. Receive at the office (User brings the item to your office and receive the item)

d. Others (Pls. specify _____)

Q4: Please tick the appropriate box in the table below regarding the handling of the waste tires and/or waste car batteries

Table 3: Handling of waste tires and car batteries

	Items	Quantity of waste tires and batteries (unit/month)	Handling method (Please select from a to e)	
				Cash flow (If you pay or paid when

			Handling method					you handling the item)	
								You are *Paid*	You *Pay*
Waste tires	1. Tires for passenger cars		a	b	c	d	e	FJ$/unit	FJ$/unit
	2. Tires for trucks and buses		a	b	c	d	e	FJ$/unit	FJ$/unit
	3. Tires for motorcycles		a	b	c	d	e	FJ$/unit	FJ$/unit
Waste batteries	1. Car batteries for passenger cars		a	b	c	d	e	FJ$/unit	FJ$/unit
	2. Car batteries for trucks or Buses		a	b	c	d	e	FJ$/unit	FJ$/unit
	3. Batteries for motorcycles		a	b	c	d	e	FJ$/unit	FJ$/unit

Handling methods:

a. Hand over the collected item to the recycling companies

b. Hand over the collected item to the disposal company

c. Take the collected item to the landfill for disposal by yourself

d. Treat at your facility

e. Others (Pls. specify _____)

Please describe recycling company or disposal company related in above Table 3

Name of company	The company's business	Contact info, address

This is the end of questionnaire.

Thank you for kind cooperation!!

Japan International Cooperation Agency

B2-2: Recycling Survey Questionnaire for Import and Sales of Home appliances

1. Company Profile

Name of Organization			
Type of Business			
Year of Incorporation	Year Website:		
Address	HQ: Phone: E-mail:		
Annual Sales (Turnover)		Number of Employees	
Please describe your business activities			

2. Import and Sales of Home Appliances in 2019

Q1: What is your business?

☐ Import & Sale:

⇨ Please indicate the number of units imported, sold and where to sales for each appliance in Table 1 (all columns).

☐ Sales:

⇨ Please indicate the number of units sold and where to sales for each appliance in Table 1 (column of Sales and Where to sales).

Note:

- For market share in the import column, please indicate your company's imports as a percentage of Fiji's total imports.
- For the share of sales in the retail column, please indicate your company's sales as a percentage of total sales in Fiji.
- For the share in the Where to sales column, please enter the percentage of your company's total sales volume for each appliance.

Table 1: Home appliances imports and destinations

Handler / Home appliance	Import		Sales		Where to sales	
	Number of units imported in 2019	Market share (%)	Number of units sold in 2019	Sales share (%)	Sales destination	Share (%)
1. Television set					1: Consumers	
					2: Retailers	
					3: Exporting (abroad)	
2. Refrigerators					1: Consumers	
					2: Retailers	
					3: Exporting (abroad)	
3. Washing machine					1: Consumers	
					2: Retailers	
					3: Exporting (abroad)	
4. Air conditioner					1: Consumers	
					2: Retailers	
					3: Exporting (abroad)	
5. Microwave					1: Consumers	
					2: Retailers	
					3: Exporting (abroad)	
6. Personal computer					1: Consumers	
					2: Retailers	
					3: Exporting (abroad)	
7. Mobile phone					1: Consumers	
					2: Retailers	
					3: Exporting (abroad)	

3. Handling of End-of-Life Home Appliances

Q2: Does your company collect the end-of-life home appliances?

☐ Yes. ⇨ Go to Q3 and Q4.

☐ No. ⇨ Go to the End.

Q3: Please tick the appropriate box in the table below regarding the collection of the end-of-life home appliances.

Table 2: Collection of the end-of-life home appliances

Items	Quantity of the end-of-life appliances (unit/month)	Collection method (Please select from a to d)						
		Collection method					Cash flow (If you pay or paid when you collect the item)	
							You are *Paid*	You *Pay*
1. Television set		a	b	c	d		FJ$/unit	FJ$/unit
2. Refrigerators		a	b	c	d		FJ$/unit	FJ$/unit
3. Washing machine		a	b	c	d		FJ$/unit	FJ$/unit
4. Air conditioner		a	b	c	d		FJ$/unit	FJ$/unit
5. Microwave		a	b	c	d		FJ$/unit	FJ$/unit
6. Personal computer		a	b	c	d		FJ$/unit	FJ$/unit
7. Mobile phone		a	b	c	d		FJ$/unit	FJ$/unit

Collection methods:

a. Door to door (Visit users' location (Offices / Households) and collect the item)

b. Pick up from collection point (Visit designated pick up point and collection the item)

c. Receive at the office (User brings the item to your office and receive the item)

d. Others (Pls. specify _____)

Q4: Please tick the appropriate box in the table below regarding the handling of the end-of-life home appliances.

Table 3: Handling of end-of-life appliances

Items	Quantity of the end-of-life appliances	Handling method (Please select from a to e)

	(unit/month)	Handling method					Cash flow (If you pay or paid when you collect the item)	
							You are *Paid*	You *Pay*
1. Television set		a	b	c	d	e	FJ$/unit	FJ$/unit
2. Refrigerators		a	b	c	d	e	FJ$/unit	FJ$/unit
3. Washing machine		a	b	c	d	e	FJ$/unit	FJ$/unit
4. Air conditioner		a	b	c	d	e	FJ$/unit	FJ$/unit
5. Microwave		a	b	c	d	e	FJ$/unit	FJ$/unit
6. Personal computer		a	b	c	d	e	FJ$/unit	FJ$/unit
7. Mobile phone		a	b	c	d	e	FJ$/unit	FJ$/unit

Handling methods:

a. Hand over the collected item to the recycling companies

b. Hand over the collected item to the disposal company

c. Take the collected item to the landfill for disposal by yourself

d. Treat at your facility ((ex) Utilize the waste lubricant oil as fuel at your incinerator)

e. Others (Pls. specify _____)

Please describe recycling company or disposal company related in above Table 3

Name of company	The company's business	Contact info, address

This is the end of questionnaire.

Thank you for kind cooperation!!

Japan International Cooperation Agency

B2-3: Recycling Survey Questionnaire for Manufacturers and importers of Lubricants

1. Company Profile

Name of Organization			
Type of Business			
Year of Incorporation	Year Website:		
Address	HQ: Phone: E-mail:		
Annual Sales (Turnover)		Number of Employees	
Please describe your business activities			

2. Imports and sales of Lubricant in 2019

Q1: What is your business?

☐ Import & Sale:

⇨ Please indicate the volume of lubricants imported, sold and where to sales in Table 1 (all columns).

☐ Sales:

⇨ Please indicate the volume of lubricants sold and where to sales in Table 1 (column of Sales and Where to sales).

Table 1: Imports and destinations of Lubricants

Handler / Type of Lubricant	Import		Sales		Where to sales	
	Volume of lubricants imported in 2019 (liters)	Market share (%)	Volume of lubricants sold in 2019 (liters)	Sales share (%)	Sales destination	Share (%)
1.Engine Oil					1: Consumers	
					2: Retailers	
					3: Exporting (abroad)	
2. Hydraulic Fluids					1: Consumers	
					2: Retailers	
					3: Exporting (abroad)	
3. Metal Work Fluids (Non-chlorine)					1: Consumers	
					2: Retailers	
					3: Exporting (abroad)	

Note:

- For market share in the import column, please indicate your company's imports as a percentage of Fiji's total imports.
- For the share of sales in the retail column, please indicate your company's sales as a percentage of total sales in Fiji.
- For the share in the Where to sales column, please enter the percentage of your company's total sales volume for each appliance.

3. Handling of Waste lubricant Oil

Q2: Does your company collect the waste lubricant oil?

☐ Yes. ⇨ Go to Q3 and Q4.

☐ No. ⇨ Go to the End.

Q3: Please tick the appropriate box in the table below regarding the collection of the waste lubricants.

Table 2: Collection of waste lubricants

Items	Quantity of waste lubricants (liter/month)	Collection method (Please select from a to d)						
		Collection method					Cash flow (If you pay or paid when you collect the item)	
							You are *Paid*	You *Pay*
1. Engine Oil		a	b	c	d		FJ$/liter	FJ$/liter
2. Hydraulic Fluids		a	b	c	d		FJ$/liter	FJ$/liter
3. Metal Work Fluids (Non-chlorine)		a	b	c	d		FJ$/liter	FJ$/liter

Collection methods:

a. Door to door (Visit users' location (Offices / Households) and collect the item)

b. Pick up from collection point (Visit designated pick up point and collection the item)

c. Receive at the office (User brings the item to your office and receive the item)

d. Others (Pls. specify _____)

Q4: Please tick the appropriate box in the table below regarding the handling of the waste lubricants.

Table 3: Handling of waste lubricants

Items	Quantity of waste lubricants (liter/month)	Handling method (Please select from a to e)						
		Handling method					Cash flow (If you pay or paid when you handling the item)	
							You are *Paid*	You *Pay*
1. Engine Oil		a	b	c	d	e	FJ$/liter	FJ$/liter
2. Hydraulic Fluids		a	b	c	d	e	FJ$/liter	FJ$/liter
3. Metal Work Fluids (Non-chlorine)		a	b	c	d	e	FJ$/liter	FJ$/liter

Handling methods:

a. *Hand over the collected item to the recycling companies*
b. *Hand over the collected item to the disposal company*
c. *Take the collected item to the landfill for disposal by yourself*
d. *Treat at your facility ((ex) Utilize the waste lubricant oil as fuel at your incinerator)*
e. *Others (Pls. specify _____)*

Please describe recycling company or disposal company related in above Table 3

Name of company	The company's business	Contact info, address

This is the end of questionnaire.

Thank you for kind cooperation!!

Japan International Cooperation Agency

B2-4: Recycling Survey Questionnaire for Manufacturers and importers of Plastic products

1. Company Profile

Name of Organization			
Type of Business			
Year of Incorporation	Year Website:		
Address	HQ: Phone: E-mail:		
Annual Sales (Turnover)		Number of Employees	
Please describe your business activities			

2. Import and Sales of Plastic Products in 2019

Q1: What is your business?

☐ Import & Sale:

⇨ Please indicate the number of units imported, sold and where to sales for each type of plastic in Table 1 (all columns).

☐ Sales:

⇨ Please indicate the number of units sold and where to sales for each type of plastic in Table 1 (column of Sales and Where to sales).

Table 1: Imports and destinations of plastic products

Handler / Type of plastic	Import		Sales		Where to sales	
	Amount of plastic imported in 2019 (tons)	Market share (%)	Amount of plastic sold in 2019 (tons)	Sales share (%)	Sales destination	Share (%)
1. PET pre-form					1: Consumers	
					2: Retailers	
					3: Exporting (abroad)	
2. Packaging plastic					1: Consumers	
					2: Retailers	
					3: Exporting (abroad)	
3. Plastic bags					1: Consumers	
					2: Retailers	
					3: Exporting (abroad)	
4. Plastic straws					1: Consumers	
					2: Retailers	
					3: Exporting (abroad)	
5. Plastic cutlery and cups					1: Consumers	
					2: Retailers	
					3: Exporting (abroad)	

Note:

- For market share in the import column, please indicate your company's imports as a percentage of Fiji's total imports.
- For the share of sales in the retail column, please indicate your company's sales as a percentage of total sales in Fiji.
- For the share in the Where to sales column, please enter the percentage of your company's total sales volume for each appliance.

3. Handling of Waste plastics

Q2: Does your company collect the waste plastics?

☐ Yes. ⇨ Go to Q3 and Q4.

☐ No. ⇨ Go to the End.

Q3: Please tick the appropriate box in the table below regarding the collection of the waste plastics.

Table 2: Collection of waste the waste plastics

Items	Quantity of waste plastic (tons/month)	Collection method (Please select from a to d)						
		Collection method					Cash flow (If you pay or paid when you collect the item)	
							You are *Paid*	You *Pay*
1. PET pre-form		a	b	c	d		FJ$/ton	FJ$/ton
2. Packaging plastic		a	b	c	d		FJ$/ton	FJ$/ton
3. Plastic bags		a	b	c	d		FJ$/ton	FJ$/ton
4. Plastic straws		a	b	c	d		FJ$/ton	FJ$/ton
5. Plastic cutlery and cups		a	b	c	d		FJ$/ton	FJ$/ton
		a	b	c	d		FJ$/ton	FJ$/ton
		a	b	c	d		FJ$/ton	FJ$/ton

Handling methods:

a. Door to door (Visit users' location (Offices / Households) and collect the item)

b. Pick up from collection point (Visit designated pick up point and collection the item)

c. Receive at the office (User brings the item to your office and receive the item)

d. Others (Pls. specify _____)

Q4: Please tick the appropriate box in the table below regarding the handling of the waste plastics.

Table 3: Handling of waste plastic

Items	Quantity of waste plastic (tons/month)	Handling method (Please select from a to e)	
			Cash flow (If you pay or paid

		Handling method					when you collect the item)	
							You are *Paid*	You *Pay*
1. PET pre-form		a	b	c	d	e	FJ$/ton	FJ$/ton
2. Packaging plastic		a	b	c	d	e	FJ$/ton	FJ$/ton
3. Plastic bags		a	b	c	d	e	FJ$/ton	FJ$/ton
4. Plastic straws		a	b	c	d	e	FJ$/ton	FJ$/ton
5. Plastic cutlery and cups		a	b	c	d	e	FJ$/ton	FJ$/ton
		a	b	c	d	e	FJ$/ton	FJ$/ton
		a	b	c	d	e	FJ$/ton	FJ$/ton

Handling methods:

a. *Hand over the collected item to the recycling companies*
b. *Hand over the collected item to the disposal company*
c. *Take the collected item to the landfill for disposal by yourself*
d. *Treat at your facility*
e. *Others (Pls. specify _____)*

Please describe recycling company or disposal company related in above Table 3

Name of company	The company's business	Contact info, address

This is the end of questionnaire.

Thank you for kind cooperation!!

Japan International Cooperation Agency

B2-5-1: Recycling Survey Questionnaire for beverage company (Importer)

Contact	

For _____ (company name)

Details	
(A):Your name	
(B):Your title	
(C):Address	
(D):Phone	Landline: Mobile:
(E):Email	
(A):Date	

General Information

Q1. How many percentage of share does your company have in beverage industry in your country?

_____ %

BEVERAGE IMPORTING

Q2. How many **bottles** you imported in year 2019? Please fill out the table with number of bottles you produced by category.

Import from _____

Category	Material	Product	Volume(ml) Category	Number of item imported in 2019
Bottle	PET bottle	Water	Less than 350	
			350	
			500	
			1500	
			More than 1500	
		Soft drink	Less than 500	
			500-750	
			1000-1250	
			1500	
			2000-2250	
			More than 2250	
	Glass bottle			
		Soft drink	Less than 300	
			300-400	
			500	
			750	
			1000	
			More than 1000	
		Beer	Less than 300	
			300-400	
			500	
			750	

			1000	
			More than 1000	
		Wine	Less than 300	
			300-400	
			500	
			750	
			1000	
			More than 1000	
		Other alchol	Less than 300	
			300-400	
			500	
			750	
			1000	
			More than 1000	

Q3. How many **cans** you imported in year 2019? Please fill out the table with number of bottles you produced by category.

Import from _____

	Material	Product	Volume(ml) Category	Number of item imported in 2019
Cans	Aluminum	Soft drink	Less than 330	
			330	
			500	
			750	
			More than 750	
		Beer	Less than 330	
			330	
			500	
			750	

			More than 750	
		Other alcohol	Less than 330	
			330	
			500	
			750	
			More than 750	

Export of the beverage

Q4. Do you export the product? If yes, which country to export?

YES / NO

Export to _____

Q5. What is the ratio of the product to be exported and the product to be sold domestically in total product you produce?
(It could be either ratio in weight or in sales)

Product to be exported: _____ % Product to be sold domestically _____ %

Collecting empty bottles and cans

Q11. Do you collect empty bottle by your own initiative?

YES / NO

Q12. If yes, please fill it in below table
(You can summarize your answer if you are not available to provide the information by category. E.g. in case you do not have the record in category of volume, you can include all together such as total kg of PET bottle in total regardless of size)

	Number of bottles or cans you collected in 2019	Collection rate (How much you pay per item for the people who return the bottle and cans)	How to dispose
PET bottle small (around 500ml)	bottles or kg	FJD/bottle or kg	1. Providing to dealer (FJD/kg) 2. Transport to landfill
PET bottle large (around 1.5L)	bottles or kg	FJD/bottle or kg	1. Providing to dealer (FJD/kg) 2. Transport to landfill
Aluminium cans small (around 300ml)	cans or kg	FJD/can or kg	1. Providing to dealer (FJD/kg) 2. Transport to landfill
Aluminium cans large (around 500ml or more)	cans or kg	FJD/can or kg	1. Providing to dealer (FJD/kg) 2. Transport to landfill
Glass bottles small (around 375ml)	bottles or kg	FJD/bottle or kg	1. Providing to dealer (FJD/kg) 2. Transport to landfill 3. Refill
Glass bottles large (around 500ml or more)	bottles or kg	FJD/bottle or kg	1. Providing to dealer (FJD/kg) 2. Transport to landfill 3. Refill
Other items ( ) Please specify	cans or kg	FJD/can or kg	1. Providing to dealer (FJD/kg) 2. Transport to landfill

Please describe recycling company or disposal company related in above Table in Q12

Name of company	The company's business	Contact info, address

Q13. What kind of waste is generated through your production and how do you deal with the waste?

Type of waste	How to deal with the waste	
	Method (Landfill / Recycle / other)	Place (Within country / Overseas)

Japan International Cooperation Agency

B.2 5-2 Recycling Survey Questionnaire for beverage company (Manufacturer)

Contact	

For _____ (company name)

Details	
(A):Your name	
(B):Your title	
(C):Address	
(D):Phone	Landline: Mobile:
(E):Email	
(A):Date	

General Information

Q1. How many percentage of share does your company have in beverage industry in your country?

_____ %

BEVERAGE PRODUCING

Q2. How many **bottles** you produced in year 2019? Please fill out the table with number of bottles you produced by category.

Category	Material	Product	Volume(ml) Category	Number of item produced in 2019
Bottle	PET bottle	Water	Less than 350	
			350	

			500	
			1500	
			More than 1500	
		Soft drink	Less than 500	
			500-750	
			1000-1250	
			1500	
			2000-2250	
			More than 2250	
	Glass bottle			
		Soft drink	Less than 300	
			300-400	
			500	
			750	
			1000	
			More than 1000	
		Beer	Less than 300	
			300-400	
			500	
			750	
			1000	
			More than 1000	
		Wine	Less than 300	
			300-400	
			500	
			750	
			1000	
			More than 1000	

		Other alcohol	Less than 300	
			300-400	
			500	
			750	
			1000	
			More than 1000	

Q3. How do you prepare PET bottle for filling with your product?

1. Blowing pre-form of PET bottle
2. Purchase the empty PET bottle as it is
3. Others _____

Q4. How do you prepare glass bottle for filling with your product?

1. Wash used bottle returned
   (if so how many circulations do you run one bottle on average?) _____
2. Purchase the empty bottle as it is
3. Others _____

Q5. How many **cans** you produced in year 2019? Please fill out the table with number of bottles you produced by category.

	Material	Product	Volume(ml) Category	Number of item produced in 2019
Cans	Aluminum	Soft drink	Less than 330	
			330	
			500	
			750	
			More than 750	
		Beer	Less than 330	
			330	
			500	

			750	
			More than 750	
		Other alcohol	Less than 330	
			330	
			500	
			750	
			More than 750	

Q6. How do you prepare Aluminum can for filling with your product?

1. Punch and form from aluminum sheet
2. Purchase the empty cans as it is
3. Others _____

BEVERAGE IMPORTING

Q7. How many **bottles** you imported in year 2019? Please fill out the table with number of bottles you produced by category.

Import from _____

Category	Material	Product	Volume(ml) Category	Number of item imported in 2019
Bottle	PET bottle	Water	Less than 350	
			350	
			500	
			1500	
			More than 1500	
		Soft drink	Less than 500	
			500-750	
			1000-1250	
			1500	
			2000-2250	
			More than 2250	
	Glass bottle	Soft drink	Less than 300	
			300-400	
			500	
			750	
			1000	
			More than 1000	
		Beer	Less than 300	
			300-400	
			500	
			750	

			1000	
			More than 1000	
		Wine	Less than 300	
			300-400	
			500	
			750	
			1000	
			More than 1000	
		Other alcohol	Less than 300	
			300-400	
			500	
			750	
			1000	
			More than 1000	

Q8. How many **cans** you imported in year 2019? Please fill out the table with number of bottles you produced by category.

Import from _____

	Material	Product	Volume(ml) Category	Number of item imported in 2019
Cans	Aluminum	Soft drink	Less than 330	
			330	
			500	
			750	
			More than 750	
		Beer	Less than 330	
			330	
			500	
			750	

			More than 750	
		Other alcohol	Less than 330	
			330	
			500	
			750	
			More than 750	

Export of the beverage

Q9. Do you export your product? If yes, which country to export?

YES / NO

Export to _____

Q10. What is the ratio of the product to be exported and the product to be sold domestically in total product you produce?
(It could be either ratio in weight or in sales)

Product to be exported: _____ % Product to be sold domestically _____ %

Collecting empty bottles and cans

Q11. Do you collect empty bottle by your own initiative?

YES / NO

Q12. If yes, please fill it in below table
(You can summarize your answer if you are not available to provide the information by category. E.g. in case you do not have the record in category of volume, you can include all together such as total kg of PET bottle in total regardless of size)

	Number of bottles or cans you collected in 2019	Collection rate (How much you pay per item for the people who return the bottle and cans)	How to dispose
e.g.PET bottle small (around 500ml)	300 bottles or kg	30 FJD/bottle or kg	1. Providing to dealer (40 FJD/kg) 2. Transport to landfill
PET bottle small (around 500ml)	bottles or kg	FJD/bottle or kg	1. Providing to dealer (FJD/kg) 2. Transport to landfill
PET bottle large (around 1.5L)	bottles or kg	FJD/bottle or kg	1. Providing to dealer (FJD/kg) 2. Transport to landfill
Aluminium cans small (around 300ml)	cans or kg	FJD/can or kg	1. Providing to dealer (FJD/kg) 2. Transport to landfill
Aluminium cans large (around 500ml or more)	cans or kg	FJD/can or kg	1. Providing to dealer (FJD/kg) 2. Transport to landfill
Glass bottles small (around 375ml)	bottles or kg	FJD/bottle or kg	1. Providing to dealer (FJD/kg) 2. Transport to landfill 3. Refill
Glass bottles large (around 500ml or more)	bottles or kg	FJD/bottle or kg	1. Providing to dealer (FJD/kg) 2. Transport to landfill 3. Refill

Other items ( ) Please specify	cans or kg	FJD/can or kg	1. Providing to dealer (FJD/kg) 2. Transport to landfill

Please describe recycling company or disposal company related in above Table in Q12

Name of company	The company's business	Contact info, address

Q13. What kind of waste generated through your production and how do you deal with the waste?

Type of waste	How to deal with the waste	
	Method (Landfill / Recycle / other)	Place (Within country / Overseas)

Japan International Cooperation Agency

Recycling Survey Questionnaire

Contact	

For _____ (company name)

Person who filled this form	
(A):Your name	
(B):Your title	
(C):Address	
(D):Phone	Landline: Mobile:
(E):Email	
(A):Date	

Company Profile	
(A):Name of President	
(B):Capital	
(C):Annual Sales	
(D):Number of employees	
(E):Site area	

Handling Waste (Please check the box of recyclables you handled)		
	Export	**You Sold domestically**
Scrap metals	**Ferrous** ☐ Vehicle scrap metal, ☐ Demolition site scrap metal, ☐ Metal offcuts from manufacturing industries, ☐ Tin cans ☐ other ferrous **Non-ferrous** ☐ Aluminium drink cans, ☐ Alminium, ☐ Copper, ☐ Brass&Lead, ☐ Stainless steel, ☐ Electrical cable, ☐ Other non-ferrous	**Ferrous** ☐ Vehicle scrap metal, ☐ Demolition site scrap metal, ☐ Metal offcuts from manufacturing industries, ☐ Tin cans ☐ other ferrous **Non-ferrous** ☐ Aluminium drink cans, ☐ Alminium, ☐ Copper, ☐ Brass&Lead, ☐ Stainless steel, ☐ Electrical cable, ☐ Other non-ferrous
Plastics	☐ PET drink bottles, ☐ Other PET, ☐ PE(Polyethylene), ☐ PP(Polypropylene), ☐ PVC(polyvinyl chloride), ☐ PS(polystyrene), ☐ Other plastics (including the case you are not sure about plastic materials)	☐ PET drink bottles, ☐ Other PET, ☐ PE(Polyethylene), ☐ PP(Polypropylene), ☐ PVC(polyvinyl chloride), ☐ PS(polystyrene), ☐ Other plastics (including the case you are not sure about plastic materials)
Paper& Cardboard	☐ Office paper, ☐ Newspaper, ☐ Cardboard, ☐ Drink package, ☐ other papers	☐ Office paper, ☐ Newspaper, ☐ Cardboard, ☐ Drink package, ☐ other papers
Glass	☐ Beer bottle imported, ☐ Domestic Beer bottle, ☐ Wine bottle imported, ☐ Other drink bottle	☐ Beer bottle imported, ☐ Beer bottle, ☐ Wine bottle imported, ☐ Other drink bottle
Auto mobile	☐ Used Lubricant Oil, ☐ Used Lead-acid battery, ☐ Used-Tire	☐ Used Lubricant Oil, ☐ Used Lead-acid battery, ☐ Used-Tire
E-waste	☐ Television set, ☐ Refrigerators, ☐ Washing machine, ☐ Air conditioner, ☐ Microwave, ☐ Personal computer, ☐ Mobile phone	☐ Television set, ☐ Refrigerators, ☐ Washing machine, ☐ Air conditioner, ☐ Microwave, ☐ Personal computer, ☐ Mobile phone

Q1. How many containers you shipped out for **export** in year 2019?

	40 feet container	20 feet container
Ferrous	_____containers Approximate Ratio inside container	_____containers Approximate Ratio inside container
	Vehicle scrap metal _____%	Vehicle scrap metal _____%
	Demolition site scrap metal _____%	Demolition site scrap metal _____%
	Metal offcuts from manufacturing industries, other ferrous _____%	Metal offcuts from manufacturing industries, other ferrous _____%
	Tin cans _____%	Tin cans _____%
	Other ferrous _____%	Other ferrous _____%
Non-Ferrous	_____containers Approximate Ratio inside container	_____containers Approximate Ratio inside container
	Aluminium drink cans _____%	Aluminium drink cans _____%
	Alminium _____%	Alminium _____%
	Copper _____%	Copper _____%
	Brass&Lead _____%	Brass&Lead _____%
	Stainless steel _____%	Stainless steel _____%
	Electrical cable _____%	Electrical cable _____%
	Other non-ferrous _____%	Other non-ferrous _____%

<table>
<tr><td>Plastics</td><td>_____containers
Approximate Ratio inside container<table><tr><td>PET drink bottles</td><td>_____%</td></tr><tr><td>Other PET</td><td>_____%</td></tr><tr><td>PE(Polyethylene)</td><td>_____%</td></tr><tr><td>PP(Polypropylene)</td><td>_____%</td></tr><tr><td>PVC(polyvinyl chloride)</td><td>_____%</td></tr><tr><td>PS(polystyrene)</td><td>_____%</td></tr><tr><td>Other plastics (including the case you are not sure about plastic materials)</td><td>_____%</td></tr></table></td><td>_____containers
Approximate Ratio inside container<table><tr><td>PET drink bottles</td><td>_____%</td></tr><tr><td>Other PET</td><td>_____%</td></tr><tr><td>PE(Polyethylene)</td><td>_____%</td></tr><tr><td>PP(Polypropylene)</td><td>_____%</td></tr><tr><td>PVC(polyvinyl chloride)</td><td>_____%</td></tr><tr><td>PS(polystyrene)</td><td>_____%</td></tr><tr><td>Other plastics (including the case you are not sure about plastic materials)</td><td>_____%</td></tr></table></td></tr>
<tr><td>Paper&Cardboards</td><td>_____containers
Approximate Ratio inside container<table><tr><td>Office paper</td><td>_____%</td></tr><tr><td>Newspaper</td><td>_____%</td></tr><tr><td>Cardboard</td><td>_____%</td></tr><tr><td>Drink package</td><td>_____%</td></tr></table></td><td>_____containers
Approximate Ratio inside container<table><tr><td>Office paper</td><td>_____%</td></tr><tr><td>Newspaper</td><td>_____%</td></tr><tr><td>Cardboard</td><td>_____%</td></tr><tr><td>Drink package</td><td>_____%</td></tr></table></td></tr>
<tr><td></td><td></td><td></td></tr>
</table>

Q2. How many kilograms you have sold **domestically** in 2019?

<table>
<tr><td></td><td></td></tr>
<tr><td>Ferrous</td><td><table><tr><td>Vehicle scrap metal</td><td>_____kg</td></tr><tr><td>Demolition site scrap metal</td><td>_____kg</td></tr><tr><td>Metal offcuts from manufacturing industries, other ferrous</td><td>_____kg</td></tr><tr><td>Tin cans</td><td>_____kg</td></tr><tr><td>Other ferrous</td><td>_____kg</td></tr></table></td></tr>
</table>

Non-Ferrous	Aluminium drink cans	_____kg
	Alminium	_____kg
	Copper	_____kg
	Brass&Lead	_____kg
	Stainless steel	_____kg
	Electrical cable	_____kg
	Other non-ferrous	_____kg
Plastics	PET drink bottles	_____kg
	Other PET	_____kg
	PE(Polyethylene)	_____kg
	PP(Polypropylene)	_____kg
	PVC(polyvinyl chloride)	_____kg
	PS(polystyrene)	_____kg
	Other plastics (including the case you are not sure about plastic materials)	_____kg
Paper&Cardboards	Office paper	_____kg
	Newspaper	_____kg
	Cardboard	_____kg
	Drink package	_____kg
Glass	Beer bottle imported	_____kg
	Fiji Beer bottle	_____kg
	Wine bottle imported	_____kg
	Other drink bottle	_____kg

Q3. How do you process the recyclables in your facility?

Please provide processes applied for respective recyclables

Recyclables	Process (Ex: Washing, Compressing, Baling and etc.)

Q4. How much waste generated after processing recyclables?

ton/year

Q5. Please provide the capacity of your facility for respective recyclables per day

Recyclables	Capacity (ton/day)

Q6. How do you collect recyclables?

Recyclables	Collect for free or buy from whom, If Buy, buying price/kg

Q7. How do you sell recyclables?

Recyclables	Sell to whom, selling price/unit for respective recyclables

Q8. What kind and how many of equipment (machinery) that you operate for processing recyclables and how do you procured them?

Equipment type	No.	Procurement Price	How to procure and the price
Ex) Compressor	1	XXXUSD	Buy from X Company in New Zealand

Q9. How do you see recent international market with regards to recycling industry and the trend of market price of recyclables?

Legal Aspect Questionnaire for Waste Management

*Please ask an officer who in charge in related Ministry/Agency/Institution for single use plastic and/or marine plastic waste in your Country to fill in this questionnaire.

Date:	
Name of Respondent:	
Affiliation	
Post of Respondent	
Email Address:	
Phone Number:	

1. Please answer the following questions regarding waste management.

1.1 If your country has laws/policies/guidelines/plans for waste management, please indicate the name of such laws/policies/guidelines/plans, if any, and the year of their formulation.

	Name	Year of formulation (year of most recent revision)
Laws		
Policies		
Strategies		
Guidelines, Plans		

1.2 Please provide detail description for each of laws/policies/guidelines/plans for waste management that are listed in 1.1.

1.3 Are there any plans for formulating new laws/policies/guidelines/etc. for waste management? If so, please provide a brief description of the contents of those laws/policies/guidelines/plans.

	Name(Year of Formulation)	Detail
Laws		
Policies		
Strategies		

Guidelines, Plans		

1.4 In this survey, a survey on the promotion of recycling is conducted for the items shown in the table below. If you have any laws/policies/strategies/guidelines/plans/recycling targets for recycling of these items, please indicate the name of such laws/policies/strategies/guidelines/plans/recycling targets, if any, and the year they were formulated. (Single-use plastics are also target to this survey, but this is omitted here as a separate questionnaire will be used).

Table：Items Targeted in this Survey

PET bottles
Aluminum cans
Glass
Paper and cardboard
Metal scrap (ferrous and non-ferrous metals)
End-of-life vehicles (vehicles, batteries and tires)
Waste home appliances (white goods, etc.)
Waste lubricant

Classification	Targeted Items	Name（Year of Formulation）
Laws		
National Policies, Strategies		
Guidelines, Plans		
Recycling Targets e.g. Achieve XX% recycling rate of PET bottles by 2030		

1.5 Do you currently operate or plan to operate a cost collection system (e.g. CDL) for the above-mentioned items? If so, please answer below.

Targeted Items	Cost Collection System
PET bottles	
Aluminum cans	
Glass	
Paper and cardboard	
Metal scrap (ferrous and non-ferrous metals)	

End-of-life vehicles (vehicles, batteries and tires)	
Waste home appliances (white goods, etc.)	
Waste lubricant	

1.6 If you answered in 1.5 above that you already have or plan to introduce a cost collection system, please provide details on operational mechanism and current operation (revenue/debt) and any challenges to operation/to introduce the system.

2. Please answer whether or not there is a registration or licensing system for each of the following items in waste management.

2.1 Please answer whether there is a registration/ licensing system for each of the following waste management activities. If so, please provide information on the operation of the system and the number of registered vendors.

Activities	Detail of Registration / Licensing System
Waste Collection	
Treatment (Recycling)	
Final Disposal	

Legal Aspect Questionnaire for Single Use Plastic Management and/or Marine Plastic Waste

*Please ask an officer who in charge in related Ministry/Agency/Institution for single use plastic and/or marine plastic waste in your Country to fill in this questionnaire.

Date:	
Name of Respondent:	
Affiliation	
Post of Respondent	
Email Address:	
Phone Number:	

1. Please answer the following questions about single-use plastics.

1.1 Do you have any laws/policies/guidelines that are already endorsed in your country that would reduce or prohibit the use of single-use plastics? If yes, please provide the name below.

Classification	Name
Laws and Regulations	
Policies and Strategies	
Guidelines	

1.2 Do you have any plan to develop laws/policies/guidelines in your country that would reduce or prohibit the use of single-use plastics in future? If yes, please provide the name below.

Classification	Name
Laws and Regulations	
Policies and Strategies	
Guidelines	

1.3 If Yes to 1.1, does the legislation/policy/guidelines already endorsed specify which single-use plastic items are subject to the laws/policies/guidelines? Please answer Yes or No.

Yes / No

1.4 If Yes to 1.3, please check the box below for the item(s) subject to the regulation. (In other cases, please provide the specific name of the product.

Plastic bags / Trash bags / Styrofoam food containers / Disposable straws / Disposable Containers (cutlery, plates, cups, etc.) / Others ( ) *Please specify.

1.5 If Yes to 1.3, please provide details of the regulated items in the table below.

Items Subject to Regulations	Detail	Alternative Products
Carry or transport bags made with polyethylene or PET		

1.6 If Yes to 1.1, please state any specific reduction or prohibition targets or indicators you have set in the above laws/policies/guidelines. e.g.: "Reduce the use of single-use plastics by 80% by 2030".

2. Please answer the following questions regarding the use of biodegradable plastics.

2.1 Are biodegradable plastics used as a product in your country? If so, please provide information on specific products.

Use of Biodegradable Plastics	Items in which biodegradable plastic is used:
Yes / No	

2.2 If you have any current or future plans to promote the use of biodegradable plastics in your country, please describe in detail the products to be used and the details of the measures.

Policy Name	Detail
Subject Items	
Policy Content	

2.3 If there are already biodegradable plastic products used in your country, please answer the international standards used for the products, or standards or certification system established independently in your country, if any.

Standards and Certification System	Detail

3. Please answer about your country's marine plastic waste policy.

3.1 Please list the main ministries and organizations that currently have (or will have) jurisdiction over marine plastic waste management, as well as any relevant ministries and organizations. If there is any particular department, please give the name of that department.

	Agency/Organization	Department
Ministry in charge		
Organizations in charge		
Related Ministry		
Related Organization		

3.2 For the aforementioned ministries and agencies, please describe their role in combating marine plastic waste.

Name of Ministry and Organization	Role

3.3 Please provide the following answers to the laws, regulations, strategies, and policies that have already been formulated for marine plastic waste management.

3.3.1 If there are existing laws and regulations governing marine plastic waste management, please provide a brief description of the name, year of formulation, and content of these laws and regulations.

	Name(Year of Formulation)	Detail
Laws/ Regulations		

3.3.2 If you have a national strategy or basic policy on marine plastic waste management, please provide the name of the strategy or basic policy, the year it was formulated, and brief details.

	Name(Year of Formulation)	Detail
Strategies/ Policies		
Guidelines/ Plans		

3.3.3 Please list below any new laws, regulations, national strategies, or basic policies related to marine plastic waste management that are planned or expected to be developed in the future.

3.4 Please describe any specific activities or initiatives that have been undertaken in your country to combat marine plastic waste.

Questionnaire on import and export of recyclables

*Please ask an officer who in charge in related Ministry/Agency/Institution for single use plastic and/or marine plastic waste in your Country to fill in this questionnaire.

Date:	
Name of Respondent:	
Affiliation	
Post of Respondent	
Email Address:	
Phone Number:	

1. Please answer the following questions regarding import and export of recyclables

1.1 Do you see any issue or challenge in current situation on export of recyclables and waste?
If yes, please provide detail description of issues or challenges.

1.2 Do you collect any data or keep the record with regards to recyclables/waste exported from your country such as type of waste/recyclable, exported amount, country to export?
If yes, please provide the information of Year 2019 or latest available.
For your information, our survey target items are as follows:

- Single-use plastics
- PET bottle
- Aluminum cans
- Glass
- Paper and cardboard
- Scrap metal (ferrous and non-ferrous metals)
- End-of-life vehicles (bodies, batteries and tires)
- Waste home appliances (white goods, etc.)
- Waste lubricant

Type of recyclables and waste exported	Exported Amount/year	Country to export (Destination)

1.3 Please indicate whether your country has ratified the following international treaties. If your country has ratified them, please provide details of any legislation that has been or will be developed in accordance with these treaties.

Conventions/Treaties	Ratification	Related Laws and Regulations
Basel Convention		
Waigani Convention		
Noumea Convention		

1.4 In your country, is there any criteria for following recyclables/wastes to distinguish whether certain item should be considered as item regulated under Basel Convention and Waigani Convention? If Yes, Please provide the criteria and related laws and regulations which set the criteria (if any)

Type of recyclable and waste	Criteria	Related Laws and Regulations
Lead acid battery		
Waste Oil		
Scrap metal (ferrous)		
Scrap metal (Non-ferrous)		
Plastic		
PET bottles		
Other ( )		

1.5 In your country, is there any financial incentives for recyclers to export recyclables (For example: Reducing the tax for export)? If yes, please provide detail description on the incentives.

1.6 In your country, is there any special procedure to be taken when recyclers export recyclables? If yes, please provide detail description of the procedure?

1.7 From the government's point of view, do you have any priority in exporting specific recyclables?

Attachment
2. Detail Tables of Import and Export Statistical Data

List of HS code adopted for the survey

HS code for IMPORT

Category	Item	Code	Description
Beverage Container	**PET preform**	392330	Plastics: carboys, bottles, flasks and similar articles, for the conveyance or packing of goods
	Drinking water	220110	Waters: mineral and aerated, including natural or artificial, (not containing added sugar or other sweetening matter nor flavoured)
	Drinking water	220190	Waters: other than mineral and aerated, (not containing added sugar or other sweetening matter nor flavoured), ice and snow
	Soft drink	220210	Waters: including mineral and aerated, containing added sugar or other sweetening matter or flavoured
	Wine	220410	Wine: sparkling
	Wine	220421	Wine: still, in containers holding 2 litres or less
	Glass bottle for filling	701090	Glass: carboys, bottles, flasks, jars, pots, phials and other containers of glass, (not ampoules), used for the conveyance or packing of goods
	Beer	220300	Beer: made from malt
Paper, Cardboard	**Printing paper (others)**	480257	Uncoated paper and paperboard (not 4801 or 4803): printing, writing or graphic, 10% or less by weight of mechanical or chemi-mechanical processed fibre, weight 40-150g/m2, n.e.c. in item no. 4802.55 or 4802.56
	Printing paper mostly less than A3 (unfolded)	480256	Uncoated paper and paperboard (not 4801 or 4803): printing, writing or graphic, 10% or less by weight of mechanical or chemi-mechanical processed fibre, weight 40-150g/m2, in sheets 435mm or less by 297mm or
	Printing paper in rolls	480255	Uncoated paper and paperboard (not 4801 or 4803): printing, writing or graphic, 10% or less by weight of mechanical or chemi-mechanical processed fibre, weighing 40g/m2 to 150g/m2, in rolls
	Cardboard	481910	Paper and paperboard: cartons, boxes and cases, of corrugated paper or paperboard
Automobile	**Bus**	870290	Vehicles: public transport type (carries 10 or more passengers), other than compression-ignition internal combustion piston engine (diesel or semi-diesel)
	Bus	870210	Vehicles: public transport type (carries 10 or more passengers), compression-ignition internal combustion piston engine (diesel or semi-diesel)
	Automobile	870321	Vehicles: spark-ignition internal combustion reciprocating piston engine, cylinder capacity not exceeding
	Automobile	870322	Vehicles: spark-ignition internal combustion reciprocating piston engine, cylinder capacity exceeding 1000cc but not exceeding 1500cc
	Automobile	870331	Vehicles: compression-ignition internal combustion piston engine (diesel or semi-diesel), cylinder capacity not exceeding 1500cc
	Automobile	870324	Vehicles: spark-ignition internal combustion reciprocating piston engine, cylinder capacity exceeding 3000cc
	Automobile	870333	Vehicles: compression-ignition internal combustion piston engine (diesel or semi-diesel), cylinder capacity exceeding 2500cc
	Automobile	870323	Vehicles: spark-ignition internal combustion reciprocating piston engine, cylinder capacity exceeding 1500cc but not exceeding 3000cc
	Automobile	870332	Vehicles: compression-ignition internal combustion piston engine (diesel or semi-diesel), cylinder capacity exceeding 1500cc but not exceeding 2500cc
Tyre	**Retreated bus tyres**	401212	Retreaded tyres: of a kind used on motor buses or lorries
	Retreated tyres	401211	Retreaded tyres : of a kind used on motor cars (including station wagons and racing cars)
	New motorcycle tyres	401140	Rubber: new pneumatic tyres, of a kind used on motorcycles
	New bus tyres	401120	Rubber: new pneumatic tyres, of a kind used on buses or lorries
	New tyres	401110	Rubber: new pneumatic tyres, of a kind used on motor cars (including station wagons and racing cars)
	Used tyres	401220	Rubber: used pneumatic tyres
Lead Acid Battery	**Lead Acid Battery**	850710	Electric accumulators: lead-acid, of a kind used for starting piston engines, including separators, whether or not rectangular (including square)
Home appliance	**Air conditoner**	841510	Air conditioning machines: comprising a motor-driven fan and elements for changing the temperature and humidity, window or wall types, self-contained or split-system
	Washing machine	845019	Washing machines: household or laundry-type, not fully-automatic, without built-in centrifugal drier, of a dry linen capacity not exceeding 10kg
	Washing machine	845012	Washing machines: household or laundry-type, with built-in centrifugal drier, (not fully-automatic), of a dry linen capacity not exceeding 10kg
	Computer	847141	Automatic data processing machines: comprising in the same housing at least a central processing unit and an input and output unit, whether or not combined, n.e.c. in item no. 8471.30
	TV set	852872	Reception apparatus for television, whether or not incorporating radio-broadcast receivers or sound or video recording or reproducing apparatus: incorporating a colour video display or screen
	TV set	852873	Reception apparatus for television, whether or not incorporating radio-broadcast receivers or sound or video recording or reproducing apparatus: incorporating a monochrome video display or screen
	Computer	847130	Automatic data processing machines: portable, weighing not more than 10kg, consisting of at least a central processing unit, a keyboard and a display
	Refrigerators	841821	Refrigerators: for household use, compression-type, electric or other
	Refrigerators	841829	Refrigerators: household, electric or not, other than compression-type
	Mobile phone	851712	Telephones for cellular networks or for other wireless networks
	Washing machine	845020	Washing machines: household or laundry-type, of a dry linen capacity exceeding 10kg
	Washing machine	845011	Washing machines: household or laundry-type, fully-automatic, (of a dry linen capacity not exceeding 10kg)
	Microwave oven	851650	Ovens: microwave, of a kind used for domestic purposes
Single use plastic	**Styrofoam**	392310	Plastics: boxes, cases, crates and similar articles for the conveyance or packing of goods
	Drinking straw	391732	Plastics: tubes, pipes and hoses thereof, other than those of item no. 3917.31, not reinforced or otherwise combined with other materials, without fittings
	Plastic bag	392321	Ethylene polymers: sacks and bags (including cones), for the conveyance or packing of goods

List of HS code adopted for the survey

HS code for EXPORT

Category	Item	Code	Description
Paper, cardboard	**Used paper**	470710	Paper or paperboard: waste and scrap, of unbleached kraft paper or paperboard or corrugated paper or paperboard
	Used paper	470720	Paper or paperboard: waste and scrap, paper or paperboard made mainly of bleached chemical pulp, not coloured in the mass
	Used paper	470730	Paper or paperboard: waste and scrap, paper or paperboard made mainly of mechanical pulp (e.g. newspapers, journals and similar printed matter)
	Used paper	470790	Paper or paperboard: waste and scrap, of paper or paperboard n.e.c. in heading no. 4707 and of unsorted waste and scrap
Scrap metal (ferrous)	**Waste of tinned iron or steel**	720430	Ferrous waste and scrap: of tinned iron or steel
	Waste of stainless steel	720421	Ferrous waste and scrap: of stainless steel
	Waste of other iron	720449	Ferrous waste and scrap: n.e.c. in heading no. 7204
	Waste of alloy steel	720429	Ferrous waste and scrap: of alloy steel (excluding stainless)
	Ferrous waste from milling or sawd	720441	Ferrous waste and scrap: turnings, shavings, chips, milling waste, sawdust, fillings, trimmings and stampings, whether or not in bundles
	Waste of cast iron	720410	Ferrous waste and scrap: of cast iron
Scrap metal (non ferrous)	**Waste of aluminium**	760200	Aluminium: waste and scrap
	Waste of tungsten	810197	Tungsten (wolfram): waste and scrap
	Waste of tantalum	810330	Tantalum: waste and scrap
	Waste of titanium	810830	Titanium: waste and scrap
	Waste of nickel	750300	Nickel: waste and scrap
	Waste of tallium	811252	Thallium: waste and scrap
	Waste of Magnesium	810420	Magnesium: waste and scrap
	Manganese (including waste)	811100	Manganese: articles thereof, including waste and scrap
	Waste of zinc	790200	Zinc: waste and scrap
	Waste of lead	780200	Lead: waste and scrap
	Waste of tin	800200	Tin: waste and scrap
	Waste of copper	740400	Copper: waste and scrap
Used Tyre	**Used tyres**	401220	Rubber: used pneumatic tyres
Waste Battery	**Waste Battery**	854810	Waste and scrap of primary cells, primary batteries and electric accumulators: spent primary cells, spent primary batteries and spent electric accumulators
Waste Plastic	**Waste of Ethylene polymers**	391510	Ethylene polymers: waste, parings and scrap
	Waste of Styrene polymers	391520	Styrene polymers: waste, parings and scrap
	Other waste of plastics	391590	Plastics n.e.c. in heading no. 3915: waste, parings and scrap
	Waste of Vinyl chloride polymers	391530	Vinyl chloride polymers: waste, parings and scrap

* only 391590 is assumpted as used PET bottle for exporting in recyclable material stream

Palau

Trade amount calculated by survey team based on BACI statistic information

IMPORT **quantity (metric ton)**

	2012	2013	2014	2015	2016	2017	2018	2019
PET bottle	16	24	148	89	1,879	125	103	67
Aluminum can	44	46	67	62	69	63	58	35
Glass bottle	730	741	1,097	913	1,134	1,101	927	505
Paper, cardboard	42	131	168	146	167	228	280	290
Automobile	237	251	498	610	504	427	430	296
Tyre	121	156	268	554	353	673	580	196
Lead acid battery	14	37	70	51	64	47	43	7
Television set	1	3	5	4	7	9	4	1
Refrigerator	2	3	18	33	35	19	40	5
Washing machine	8	5	53	43	35	43	42	32
Air conditioner	4	26	33	92	78	86	145	77
Microwave oven	0	0	6	4	4	5	14	1
Computer	0	0	2	3	2	3	10	2
Cell phone	0	0	0	1	1	2	1	2
Single use plastic	30	17	29	74	45	43	82	40

EXPORT **quantity (metric ton)**

	2012	2013	2014	2015	2016	2017	2018	2019
Ferrous scrap	44	1,116	388	588	1,153	3,426	2,695	1,157
Non-ferrous scrap	6	161	157	167	176	324	271	199
Used lead acid battery	0	0	0	0	0	137	96	160
Used paper	0	0	0	0	0	0	0	0
Waste glass	0	0	0	0	0	0	0	0
Used tyre	0	0	0	0	0	0	0	0
Waste plastic	0	76	85	56	117	93	88	95

IMPORT **value (thousand USD)**

	2012	2013	2014	2015	2016	2017	2018	2019
Products with beverage container	1,911	1,999	4,671	5,110	4,994	4,426	4,628	1,598
Paper, cardboard	37	108	154	133	151	174	215	339
Automobile	2,376	2,626	4,812	6,391	6,743	5,526	5,402	4,183
Tyre	269	323	847	826	871	944	1,006	340
Lead acid battery	30	97	229	169	242	231	236	21
Television set	31	78	101	142	196	259	146	45
Refrigerator	21	21	81	177	172	92	128	42
Washing machine	28	56	267	250	236	263	268	140
Air conditioner	54	373	448	994	629	1,053	1,024	530
Microwave oven	0	0	30	23	18	26	27	4
Computer	32	23	681	841	436	326	499	210
Cell phone	0	8	236	346	433	648	453	353
Single use plastic	198	113	169	200	187	189	233	206

EXPORT **value (thousand USD)**

	2012	2013	2014	2015	2016	2017	2018	2019
Ferrous scrap	13	277	301	98	92	309	330	197
Non-ferrous scrap	21	176	208	159	130	329	262	241
Used lead acid battery	0	0	0	0	0	109	82	120
Used paper	0	0	0	0	0	0	0	0
Waste glass	0	0	0	0	0	0	0	0
Used tyre	0	0	0	0	0	0	0	0
Waste plastic	0	24	30	13	16	11	11	17

Federated States of Micronesia

Trade amount calculated by survey team based on BACI statistic information

IMPORT **quantity (metric ton)**

	2012	2013	2014	2015	2016	2017	2018	2019
PET bottle	49	69	53	94	67	81	97	183
Aluminum can	43	58	61	66	62	75	72	72
Glass bottle	470	483	709	633	690	802	745	797
Paper, cardboard	66	149	10	27	23	68	75	202
Automobile	253	187	292	438	304	346	366	279
Tyre	269	339	288	275	273	243	258	254
Lead acid battery	28	46	82	35	45	62	53	62
Television set	1	0	1	2	3	1	4	4
Refrigerator	1	3	2	0	1	2	3	3
Washing machine	44	16	56	21	48	29	40	47
Air conditioner	18	7	8	3	9	12	51	24
Microwave oven	0	1	0	0	0	0	1	0
Computer	2	0	1	12	26	1	1	0
Cell phone	1	0	1	1	2	2	1	1
Single use plastic	25	18	34	43	33	47	61	52

EXPORT **quantity (metric ton)**

	2012	2013	2014	2015	2016	2017	2018	2019
Ferrous scrap	169	1,461	361	327	90	70	89	828
Non-ferrous scrap	100	172	352	169	162	111	124	94
Used lead acid battery	0	24	15	0	83	35	26	97
Used paper	0	0	0	0	0	0	0	0
Waste glass	0	0	0	0	0	0	0	0
Used tyre	0	0	0	0	0	0	0	0
Waste plastic	0	20	0	0	15	0	0	0

IMPORT **value (thousand USD)**

	2012	2013	2014	2015	2016	2017	2018	2019
Products with beverage container	1,544	2,102	2,471	2,680	2,485	2,850	2,738	2,655
Paper, cardboard	67	175	15	31	25	90	98	354
Automobile	2,564	1,748	2,781	2,763	2,703	3,749	3,380	3,107
Tyre	1,076	1,182	947	804	752	555	585	596
Lead acid battery	73	165	264	186	227	241	252	220
Television set	29	13	24	52	51	43	87	78
Refrigerator	5	10	7	0	7	9	16	19
Washing machine	80	108	80	109	181	153	201	176
Air conditioner	184	100	101	49	111	102	352	157
Microwave oven	0	5	0	0	0	3	6	0
Computer	185	50	219	999	1,483	256	302	190
Cell phone	280	221	444	298	438	883	450	628
Single use plastic	108	78	117	183	187	212	270	244

EXPORT **value (thousand USD)**

	2012	2013	2014	2015	2016	2017	2018	2019
Ferrous scrap	75	425	808	66	14	11	23	185
Non-ferrous scrap	107	369	553	221	163	133	151	107
Used lead acid battery	0	21	12	0	58	31	25	80
Used paper	0	0	0	0	0	0	0	0
Waste glass	0	0	0	0	0	0	0	0
Used tyre	0	0	0	0	0	0	0	0
Waste plastic	0	5	0	0	2	0	0	0

Marshall Islands

Trade amount calculated by survey team based on BACI statistic information

IMPORT **quantity (metric ton)**

	2012	2013	2014	2015	2016	2017	2018	2019
PET bottle	80	942	940	885	1,071	1,085	1,455	1,271
Aluminum can	41	23	14	22	28	25	37	36
Glass bottle	140	138	97	78	62	90	294	220
Paper, cardboard	864	269	315	1,685	216	224	245	313
Automobile	424	377	397	517	696	600	534	666
Tyre	22	56	55	79	66	84	55	65
Lead acid battery	25	12	11	9	8	9	14	21
Television set	0	0	1	1	2	0	1	1
Refrigerator	5	8	3	3	26	22	12	7
Washing machine	58	11	37	21	16	12	9	28
Air conditioner	38	29	33	34	29	54	76	74
Microwave oven	0	0	0	0	1	0	1	0
Computer	3	2	1	1	1	2	0	15
Cell phone	1	0	0	0	1	0	0	0
Single use plastic	149	66	25	103	45	104	129	65

EXPORT **quantity (metric ton)**

	2012	2013	2014	2015	2016	2017	2018	2019
Ferrous scrap	315	4,478	2,294	1,142	1,097	899	2,800	5,967
Non-ferrous scrap	89	202	67	79	29	190	66	116
Used lead acid battery	0	106	39	33	29	19	39	43
Used paper	0	0	0	0	0	0	0	0
Waste glass	0	0	0	0	0	0	0	0
Used tyre	0	0	0	0	0	0	0	0
Waste plastic	0	0	0	34	30,148	70,945	92,722	43,293

IMPORT **value (thousand USD)**

	2012	2013	2014	2015	2016	2017	2018	2019
Products with beverage container	1,433	1,086	1,038	1,121	1,455	1,427	1,825	2,388
Paper, cardboard	1,104	439	513	1,860	327	508	474	616
Automobile	1,657	1,823	1,714	2,530	3,765	2,339	2,443	3,264
Tyre	72	126	160	261	195	305	214	292
Lead acid battery	86	48	54	42	37	58	73	106
Television set	15	12	21	31	84	8	31	40
Refrigerator	24	31	37	16	99	64	54	45
Washing machine	111	86	70	124	96	80	62	101
Air conditioner	435	423	446	513	359	441	507	510
Microwave oven	0	0	0	0	8	0	5	2
Computer	188	416	177	127	142	593	193	1,999
Cell phone	174	187	1,010	79	112	163	74	181
Single use plastic	338	146	125	346	147	276	347	214

EXPORT **value (thousand USD)**

	2012	2013	2014	2015	2016	2017	2018	2019
Ferrous scrap	72	786	401	291	251	179	386	1,395
Non-ferrous scrap	152	516	268	294	25	505	604	141
Used lead acid battery	0	68	4	3	14	18	36	38
Used paper	0	0	0	0	0	0	0	0
Waste glass	0	0	0	0	0	0	0	0
Used tyre	0	0	0	0	0	0	0	0
Waste plastic	0	0	0	16	8,677	27,793	31,233	10,520

Papua New Guinea

Trade amount calculated by survey team based on BACI statistic information

IMPORT **quantity (metric ton)**

	2012	2013	2014	2015	2016	2017	2018	2019
PET bottle	2,165	4,492	6,247	6,620	5,760	4,066	2,495	1,970
Aluminum can	534	808	907	1,275	2,005	1,713	112	100
Glass bottle	1,824	2,362	1,535	6,280	5,734	6,037	1,435	2,366
Paper, cardboard	3,751	3,742	3,898	3,916	3,630	3,584	4,665	6,087
Automobile	18,103	11,210	8,693	7,367	5,694	6,616	6,642	5,872
Tyre	10,198	9,001	8,655	9,486	9,503	11,498	10,019	10,172
Lead acid battery	1,656	1,399	1,889	2,064	1,574	2,227	2,316	2,164
Television set	573	129	149	156	106	88	122	122
Refrigerator	5,639	381	240	203	246	308	165	138
Washing machine	1,547	355	710	264	404	298	214	550
Air conditioner	661	413	392	341	370	770	877	857
Microwave oven	52	23	47	22	22	9	32	10
Computer	410	144	182	223	196	91	76	100
Cell phone	407	66	96	267	293	143	47	20
Single use plastic	1,202	2,653	1,991	2,310	2,907	2,631	2,529	3,396

EXPORT **quantity (metric ton)**

	2012	2013	2014	2015	2016	2017	2018	2019
Ferrous scrap	606,711	39,449	43,416	16,977	9,724	19,142	20,244	15,538
Non-ferrous scrap	4,713	5,358	6,565	8,488	7,943	6,905	7,820	8,720
Used lead acid battery	667	756	1,333	349	701	750	1,002	999
Used paper	1,255	1,078	193	371	144	377	488	559
Waste glass	0	0	0	0	0	0	0	0
Used tyre	1	0	0	0	8	0	0	0
Waste plastic	21	352	63	47	89	35	15	0

IMPORT **value (thousand USD)**

	2012	2013	2014	2015	2016	2017	2018	2019
Products with beverage container	51,197	62,352	76,248	76,741	81,185	70,334	19,973	20,400
Paper, cardboard	2,566	4,365	4,686	4,484	4,272	4,512	5,570	6,216
Automobile	196,051	117,965	85,853	79,522	61,923	79,295	87,800	70,464
Tyre	62,841	44,877	31,801	30,001	26,565	33,832	28,744	27,995
Lead acid battery	4,818	3,850	5,051	5,667	4,206	6,124	6,753	5,686
Television set	6,000	4,045	5,509	5,491	3,515	2,933	4,375	3,291
Refrigerator	8,611	1,874	1,282	1,005	1,134	1,273	785	665
Washing machine	4,988	2,060	2,259	1,479	2,505	1,734	1,363	2,154
Air conditioner	14,333	6,388	4,995	4,974	4,796	4,983	5,938	5,429
Microwave oven	428	189	413	183	147	75	257	82
Computer	18,776	13,531	18,139	15,073	14,448	14,631	16,052	19,683
Cell phone	12,882	46,368	69,069	39,883	52,652	99,245	35,810	26,425
Single use plastic	5,262	8,068	5,687	5,703	7,228	6,418	6,558	8,541

EXPORT **value (thousand USD)**

	2012	2013	2014	2015	2016	2017	2018	2019
Ferrous scrap	104,786	13,352	15,163	4,399	2,262	5,290	5,551	3,429
Non-ferrous scrap	9,896	10,752	11,768	12,524	9,278	11,048	14,170	12,105
Used lead acid battery	439	481	669	169	292	290	666	699
Used paper	292	233	43	77	27	81	104	105
Waste glass	0	0	0	0	0	0	0	0
Used tyre	102	0	0	0	8	0	0	0
Waste plastic	23	184	82	43	43	17	7	0

Solomon Islands

Trade amount calculated by survey team based on BACI statistic information

IMPORT	quantity (metric ton)							
	2012	2013	2014	2015	2016	2017	2018	2019
PET bottle	41	129	151	273	334	311	513	704
Aluminum can	11	16	13	128	123	190	84	115
Glass bottle	112	141	97	2,375	1,795	3,251	378	71
Paper, cardboard	615	448	486	1,158	736	841	883	801
Automobile	1,031	615	703	932	1,122	911	774	616
Tyre	390	382	720	713	1,125	1,313	1,005	1,070
Lead acid battery	165	173	160	167	254	253	253	218
Television set	5	5	6	8	8	3	11	6
Refrigerator	33	30	32	53	68	42	22	13
Washing machine	18	19	33	32	24	22	27	29
Air conditioner	46	30	28	55	68	93	80	99
Microwave oven	2	2	2	3	3	1	3	3
Computer	7	9	12	13	11	8	10	4
Cell phone	18	1	3	4	4	4	4	3
Single use plastic	207	276	271	321	485	465	685	486

EXPORT	quantity (metric ton)							
	2012	2013	2014	2015	2016	2017	2018	2019
Ferrous scrap	2,813	614	498	836	376	90	227	3,926
Non-ferrous scrap	382	346	332	397	194	465	492	413
Used lead acid battery	18	36	5	0	88	0	0	0
Used paper	0	0	0	0	0	0	0	0
Waste glass	0	0	0	0	0	0	0	0
Used tyre	0	0	0	0	3	1	2	0
Waste plastic	24	31	0	63	14	6	3	0

IMPORT	value (thousand USD)							
	2012	2013	2014	2015	2016	2017	2018	2019
Products with beverage container	1,973	1,742	1,789	14,522	5,546	12,398	4,304	4,664
Paper, cardboard	906	630	721	1,467	1,426	1,523	1,937	1,067
Automobile	9,562	6,575	6,732	10,439	15,646	14,733	17,476	8,103
Tyre	1,339	1,003	1,211	1,802	1,966	2,072	2,738	2,656
Lead acid battery	631	530	499	277	459	386	450	581
Television set	151	156	214	138	264	123	299	149
Refrigerator	220	185	196	210	396	297	150	58
Washing machine	133	91	98	69	108	95	125	104
Air conditioner	645	386	421	622	954	1,117	929	908
Microwave oven	11	13	15	21	19	18	21	21
Computer	601	798	1,116	906	997	1,229	1,224	1,080
Cell phone	1,286	1,032	2,175	1,816	2,589	2,561	2,423	2,026
Single use plastic	786	902	980	666	904	628	1,164	1,407

EXPORT	value (thousand USD)							
	2012	2013	2014	2015	2016	2017	2018	2019
Ferrous scrap	998	267	167	292	118	22	77	188
Non-ferrous scrap	249	314	389	274	149	441	475	376
Used lead acid battery	11	23	1	0	41	0	0	0
Used paper	0	0	0	0	0	0	0	0
Waste glass	0	0	0	0	0	0	0	0
Used tyre	0	0	0	0	8	6	2	0
Waste plastic	6	18	0	35	10	9	2	0

Vanuatu

Trade amount calculated by survey team based on BACI statistic information

IMPORT **quantity (metric ton)**

	2012	2013	2014	2015	2016	2017	2018	2019
PET bottle	94	118	73	163	89	126	153	85
Aluminum can	18	29	29	45	30	39	41	22
Glass bottle	232	275	318	354	395	306	249	406
Paper, cardboard	335	565	552	354	549	467	383	616
Automobile	809	772	760	734	1,068	1,262	1,138	937
Tyre	279	291	265	399	578	378	444	436
Lead acid battery	70	101	95	52	100	171	164	146
Television set	4	5	6	12	11	9	24	27
Refrigerator	23	37	16	12	18	21	18	25
Washing machine	20	36	30	25	13	48	33	39
Air conditioner	16	39	20	31	38	50	34	45
Microwave oven	1	3	2	1	2	3	1	2
Computer	3	5	6	19	16	8	7	8
Cell phone	10	2	5	19	30	8	5	8
Single use plastic	181	105	211	112	179	201	133	98

EXPORT **quantity (metric ton)**

	2012	2013	2014	2015	2016	2017	2018	2019
Ferrous scrap	4,109	1,114	1,380	207	393	557	693	814
Non-ferrous scrap	172	168	107	108	153	169	194	123
Used lead acid battery	104	66	0	0	0	0	0	220
Used paper	0	0	0	0	0	0	0	0
Waste glass	0	0	0	0	0	0	0	0
Used tyre	0	0	0	0	0	0	0	0
Waste plastic	149	0	0	0	67	0	0	0

IMPORT **value (thousand USD)**

	2012	2013	2014	2015	2016	2017	2018	2019
Products with beverage container	4,027	4,933	4,504	4,512	3,850	3,934	3,758	2,876
Paper, cardboard	513	704	681	444	622	541	551	792
Automobile	5,363	4,309	4,923	5,075	6,489	9,936	10,176	7,909
Tyre	992	1,041	895	1,292	1,656	1,148	1,305	1,260
Lead acid battery	259	267	270	145	298	691	512	400
Television set	127	153	196	338	368	281	701	740
Refrigerator	96	263	91	82	107	143	77	118
Washing machine	97	166	206	123	65	243	141	164
Air conditioner	214	600	366	458	479	420	386	441
Microwave oven	8	25	21	12	14	24	12	18
Computer	486	756	996	1,464	1,133	1,474	1,320	2,223
Cell phone	1,619	1,586	3,719	2,699	2,714	4,365	3,946	5,111
Single use plastic	487	433	703	465	536	625	467	379

EXPORT **value (thousand USD)**

	2012	2013	2014	2015	2016	2017	2018	2019
Ferrous scrap	982	280	258	45	109	135	210	205
Non-ferrous scrap	414	283	267	207	143	272	944	250
Used lead acid battery	58	35	0	0	0	0	0	172
Used paper	0	0	0	0	0	0	0	0
Waste glass	0	0	0	0	0	0	0	0
Used tyre	0	0	0	0	0	0	0	0
Waste plastic	88	0	0	0	27	0	0	0

Fiji

Trade amount calculated by survey team based on BACI statistic information

IMPORT	quantity (metric ton)							
	2012	2013	2014	2015	2016	2017	2018	2019
PET bottle	1,337	1,387	1,435	1,291	2,260	1,516	1,492	1,804
Aluminum can	14	22	17	30	29	25	39	29
Glass bottle	1,119	1,221	1,055	1,390	1,285	982	1,061	1,140
Paper, cardboard	4,892	5,768	6,980	6,915	9,299	4,070	6,513	4,292
Automobile	2,561	5,164	5,549	6,157	11,373	4,935	5,948	3,352
Tyre	3,136	3,979	3,317	2,377	3,432	4,353	5,058	4,434
Lead acid battery	41	138	114	119	122	92	158	479
Television set	118	167	189	183	225	159	252	183
Refrigerator	129	489	450	249	451	631	502	309
Washing machine	126	576	753	803	834	875	1,017	1,071
Air conditioner	27	372	528	490	622	512	605	627
Microwave oven	14	74	71	61	83	75	99	56
Computer	54	103	114	93	119	58	53	53
Cell phone	3	21	26	29	46	50	47	52
Single use plastic	400	487	664	480	815	419	502	546

EXPORT	quantity (metric ton)							
	2012	2013	2014	2015	2016	2017	2018	2019
Ferrous scrap	30,833	20,061	13,079	5,937	4,679	7,301	14,003	13,546
Non-ferrous scrap	1,162	209	3,195	819	562	470	429	939
Used lead acid battery	0	0	0	0	0	27	22	0
Used paper	2,528	1,592	1,232	2,856	2,760	2,962	2,621	2,474
Waste glass	0	0	125	0	148	150	155	73
Used tyre	0	0	11	2	3	7	8	9
Waste plastic	641	744	744	575	1,051	1,048	1,512	1,250

IMPORT	value (thousand USD)							
	2012	2013	2014	2015	2016	2017	2018	2019
Products with beverage container	11,767	14,266	16,289	12,977	16,496	15,384	17,766	14,199
Paper, cardboard	3,633	5,986	5,201	4,064	5,935	2,611	4,330	3,440
Automobile	30,590	60,280	76,775	79,966	125,171	52,888	64,971	42,923
Tyre	9,559	13,737	16,550	11,390	15,166	12,875	15,567	13,359
Lead acid battery	107	302	427	303	333	249	623	2,175
Television set	1,178	3,380	5,390	5,315	6,313	4,685	7,424	4,477
Refrigerator	1,462	3,141	2,576	2,300	2,401	4,614	4,615	2,538
Washing machine	942	3,445	4,028	3,910	4,085	3,872	5,188	3,528
Air conditioner	931	4,976	7,103	6,892	6,569	6,362	7,698	6,138
Microwave oven	184	498	510	447	503	506	854	491
Computer	4,627	15,580	14,689	11,406	13,663	13,295	13,698	13,170
Cell phone	2,273	14,477	20,539	17,530	23,716	29,476	33,361	34,442
Single use plastic	1,456	1,521	1,695	1,533	1,642	1,873	1,237	1,244

EXPORT	value (thousand USD)							
	2012	2013	2014	2015	2016	2017	2018	2019
Ferrous scrap	13,959	5,432	5,271	2,068	1,088	1,904	3,659	3,846
Non-ferrous scrap	2,571	472	1,770	1,258	1,211	1,815	2,088	2,558
Used lead acid battery	0	0	0	0	0	26	23	0
Used paper	377	238	335	432	360	505	424	257
Waste glass	0	0	2	0	2	2	2	11
Used tyre	0	0	12	2	3	8	8	7
Waste plastic	262	399	360	327	288	190	348	297

Tonga

Trade amount calculated by survey team based on BACI statistic information

IMPORT **quantity (metric ton)**

	2012	2013	2014	2015	2016	2017	2018	2019
PET bottle	55	120	151	143	184	159	331	139
Aluminum can	24	39	62	68	91	35	76	49
Glass bottle	120	147	321	154	112	206	158	461
Paper, cardboard	166	135	207	244	486	255	315	313
Automobile	741	692	333	1,175	1,645	1,499	1,149	1,212
Tyre	264	298	129	179	249	249	187	153
Lead acid battery	121	130	236	154	194	34	131	166
Television set	2	3	26	5	5	2	1	6
Refrigerator	22	24	30	15	18	56	20	11
Washing machine	120	48	60	48	67	52	53	207
Air conditioner	6	9	18	48	19	15	19	26
Microwave oven	1	1	5	10	3	0	1	2
Computer	0	2	4	2	2	0	0	2
Cell phone	5	1	2	9	8	1	1	3
Single use plastic	40	34	82	370	44	32	41	30

EXPORT **quantity (metric ton)**

	2012	2013	2014	2015	2016	2017	2018	2019
Ferrous scrap	2,535	3,253	1,754	473	97	228	239	249
Non-ferrous scrap	194	143	103	94	93	59	38	90
Used lead acid battery	94	62	110	247	163	132	262	173
Used paper	0	55	0	0	0	0	0	0
Waste glass	0	0	0	0	0	0	0	0
Used tyre	0	0	0	0	0	0	2	0
Waste plastic	0	0	0	0	0	21	0	0

IMPORT **value (thousand USD)**

	2012	2013	2014	2015	2016	2017	2018	2019
Products with beverage container	2,341	2,887	4,591	3,153	2,981	2,741	3,445	2,752
Paper, cardboard	345	395	278	340	547	326	347	413
Automobile	3,198	2,662	6,679	5,651	5,321	4,873	4,579	4,019
Tyre	293	409	493	196	232	260	219	119
Lead acid battery	398	369	529	389	510	114	364	403
Television set	52	82	718	194	158	77	53	234
Refrigerator	183	178	255	102	99	323	104	76
Washing machine	212	328	509	323	459	327	381	601
Air conditioner	121	164	239	764	319	264	362	339
Microwave oven	8	14	27	48	13	3	10	12
Computer	58	467	560	158	206	86	80	440
Cell phone	252	417	1,698	1,171	704	326	878	632
Single use plastic	134	152	206	389	207	208	176	179

EXPORT **value (thousand USD)**

	2012	2013	2014	2015	2016	2017	2018	2019
Ferrous scrap	730	893	459	95	16	65	74	91
Non-ferrous scrap	432	267	204	149	104	66	86	208
Used lead acid battery	57	40	77	178	100	113	210	137
Used paper	0	5	0	0	0	0	0	0
Waste glass	0	0	0	0	0	0	0	0
Used tyre	0	0	0	5	0	0	1	0
Waste plastic	0	0	0	0	0	14	0	0

Samoa

Trade amount calculated by survey team based on BACI statistic information

IMPORT	quantity (metric ton)							
	2012	2013	2014	2015	2016	2017	2018	2019
PET bottle	177	354	243	311	386	354	372	509
Aluminum can	46	81	49	43	66	57	39	34
Glass bottle	234	215	225	221	184	105	138	76
Paper, cardboard	751	1,184	1,392	955	1,260	1,110	962	981
Automobile	1,062	637	1,143	797	1,159	1,018	1,003	2,096
Tyre	569	593	1,796	671	604	785	621	723
Lead acid battery	218	233	264	207	288	294	264	439
Television set	8	10	12	18	17	15	14	29
Refrigerator	47	50	57	32	51	39	26	34
Washing machine	74	38	69	64	93	111	103	158
Air conditioner	49	213	89	112	109	139	111	153
Microwave oven	3	6	5	6	10	9	11	13
Computer	3	4	7	3	3	2	3	7
Cell phone	10	5	2	2	3	2	2	7
Single use plastic	318	591	585	788	815	989	1,252	837

EXPORT	quantity (metric ton)							
	2012	2013	2014	2015	2016	2017	2018	2019
Ferrous scrap	1,926	3,112	2,476	1,513	504	1,273	2,073	2,582
Non-ferrous scrap	279	442	2,239	346	373	270	234	290
Used lead acid battery	43	9	104	338	85	77	173	195
Used paper	0	0	0	0	0	0	0	0
Waste glass	0	0	0	0	0	0	0	0
Used tyre	0	0	0	0	0	0	0	0
Waste plastic	23	103	0	0	0	0	0	0

IMPORT	value (thousand USD)							
	2012	2013	2014	2015	2016	2017	2018	2019
Products with beverage container	3,454	4,897	4,214	4,089	4,964	4,461	3,691	3,578
Paper, cardboard	724	939	1,158	1,071	1,339	1,135	1,391	1,311
Automobile	6,930	8,065	13,349	10,568	14,768	12,812	13,586	21,941
Tyre	2,126	2,378	3,582	1,801	1,790	2,093	1,892	1,668
Lead acid battery	596	563	541	712	734	859	818	938
Television set	230	324	436	347	388	390	351	747
Refrigerator	356	264	271	192	443	243	137	152
Washing machine	234	197	295	271	409	416	440	579
Air conditioner	570	2,966	922	1,058	810	1,399	862	1,173
Microwave oven	25	38	41	41	44	45	54	62
Computer	522	539	1,086	530	654	653	641	1,197
Cell phone	2,591	2,798	2,483	2,309	3,876	1,899	4,134	4,623
Single use plastic	1,079	1,632	2,536	3,653	2,474	1,761	4,632	1,647

EXPORT	value (thousand USD)							
	2012	2013	2014	2015	2016	2017	2018	2019
Ferrous scrap	709	892	781	275	175	346	613	647
Non-ferrous scrap	665	1,312	3,662	472	300	621	561	444
Used lead acid battery	25	9	62	253	20	75	189	177
Used paper	0	0	0	0	0	0	0	0
Waste glass	0	0	0	0	0	0	0	0
Used tyre	0	0	0	0	0	0	0	0
Waste plastic	4	69	0	0	0	0	0	0

Cook Islands

Trade amount calculated by survey team based on BACI statistic information

IMPORT	quantity (metric ton)							
	2012	2013	2014	2015	2016	2017	2018	2019
PET bottle	55	51	43	50	23	57	83	88
Aluminum can	44	41	37	36	20	44	45	38
Glass bottle	55	87	121	151	184	215	98	113
Paper, cardboard	31	84	19	27	52	26	24	25
Automobile	261	360	328	413	467	638	593	534
Tyre	60	101	98	99	93	91	112	87
Lead acid battery	48	29	47	48	51	69	68	36
Television set	7	7	8	9	13	9	15	10
Refrigerator	14	21	31	22	24	30	14	12
Washing machine	58	32	31	24	36	36	42	58
Air conditioner	10	8	13	4	7	26	13	19
Microwave oven	13	6	7	4	4	7	6	7
Computer	0	0	0	1	0	0	0	0
Cell phone	0	1	0	0	1	0	1	1
Single use plastic	37	2	25	24	26	40	15	7

EXPORT	quantity (metric ton)							
	2012	2013	2014	2015	2016	2017	2018	2019
Ferrous scrap	2,608	278	514	275	277	1	628	493
Non-ferrous scrap	17	10	18	38	0	0	0	14
Used lead acid battery	0	0	0	4	0	0	0	0
Used paper	0	0	0	0	0	0	0	0
Waste glass	0	0	0	0	0	0	0	0
Used tyre	0	0	0	0	0	0	0	0
Waste plastic	48	0	0	0	0	0	0	0

IMPORT	value (thousand USD)							
	2012	2013	2014	2015	2016	2017	2018	2019
Products with beverage container	2,112	2,436	2,456	2,266	1,683	5,694	3,124	6,017
Paper, cardboard	66	85	66	52	62	34	39	43
Automobile	1,782	2,664	2,173	3,042	3,151	4,259	4,897	3,826
Tyre	351	485	506	417	367	477	541	359
Lead acid battery	153	110	121	162	157	207	160	137
Television set	257	216	243	261	291	286	382	289
Refrigerator	122	171	336	253	227	204	115	98
Washing machine	177	223	150	153	176	267	265	273
Air conditioner	112	103	206	61	104	329	154	173
Microwave oven	34	46	35	26	30	55	45	59
Computer	53	19	25	49	33	50	23	861
Cell phone	150	270	225	280	271	216	419	882
Single use plastic	0	0	0	6	0	0	0	0

EXPORT	value (thousand USD)							
	2012	2013	2014	2015	2016	2017	2018	2019
Ferrous scrap	334	57	62	46	43	61	93	64
Non-ferrous scrap	3	12	3	7	0	0	0	4
Used lead acid battery	0	0	0	3	0	0	0	0
Used paper	0	0	0	0	0	0	0	0
Waste glass	0	0	0	0	0	0	0	0
Used tyre	0	0	0	0	0	0	0	0
Waste plastic	18	0	0	0	0	0	0	0

Kiribati

Trade amount calculated by survey team based on BACI statistic information

IMPORT **quantity (metric ton)**

	2012	2013	2014	2015	2016	2017	2018	2019
PET bottle	20	96	62	59	42	48	40	45
Aluminum can	6	6	24	33	40	20	25	25
Glass bottle	41	53	376	484	631	281	345	372
Paper, cardboard	7	39	67	92	113	81	132	57
Automobile	147	217	272	266	321	229	168	183
Tyre	100	132	148	154	162	109	114	142
Lead acid battery	10	24	42	46	53	8	4	19
Television set	14	4	2	5	2	5	8	5
Refrigerator	3	13	10	7	18	13	32	9
Washing machine	41	9	12	10	16	17	25	22
Air conditioner	10	7	35	16	14	25	18	21
Microwave oven	1	0	1	0	1	1	1	0
Computer	2	2	2	1	1	2	2	1
Cell phone	0	0	0	4	0	0	0	1
Single use plastic	14	46	40	53	48	48	177	85

EXPORT **quantity (metric ton)**

	2012	2013	2014	2015	2016	2017	2018	2019
Ferrous scrap	78	30	55	15	15	44	0	0
Non-ferrous scrap	38	41	58	33	116	30	29	71
Used lead acid battery	0	0	0	0	0	23	0	0
Used paper	0	0	0	0	1	0	0	0
Waste glass	0	0	0	0	0	0	0	0
Used tyre	0	0	0	0	0	0	0	0
Waste plastic	0	0	20	0	0	57	0	0

IMPORT **value (thousand USD)**

	2012	2013	2014	2015	2016	2017	2018	2019
Products with beverage container	577	593	2,161	2,040	4,918	1,203	1,679	1,507
Paper, cardboard	1	41	7	66	65	22	79	22
Automobile	1,307	2,209	3,800	3,064	4,011	2,644	2,115	2,355
Tyre	417	410	505	445	519	376	389	451
Lead acid battery	33	74	125	104	150	28	13	48
Television set	78	92	21	85	48	34	226	144
Refrigerator	20	114	51	35	90	63	83	54
Washing machine	69	68	37	51	66	41	89	113
Air conditioner	91	97	361	164	184	179	146	250
Microwave oven	3	2	4	0	5	2	4	1
Computer	162	146	223	148	123	205	225	360
Cell phone	45	31	53	540	26	141	220	981
Single use plastic	2	22	0	0	0	0	0	0

EXPORT **value (thousand USD)**

	2012	2013	2014	2015	2016	2017	2018	2019
Ferrous scrap	29	8	15	5	4	15	0	0
Non-ferrous scrap	32	98	84	34	102	24	35	147
Used lead acid battery	0	0	0	0	0	20	0	0
Used paper	0	0	0	0	20	0	0	0
Waste glass	0	0	0	0	0	0	0	0
Used tyre	0	0	0	0	0	0	0	0
Waste plastic	0	0	11	0	0	16	0	0

Nauru

Trade amount calculated by survey team based on BACI statistic information

IMPORT **quantity (metric ton)**

	2012	2013	2014	2015	2016	2017	2018	2019
PET bottle	23	155	226	82	113	117	144	59
Aluminum can	2	9	13	4	11	11	13	7
Glass bottle	17	38	90	17	32	3	3	4
Paper, cardboard	0	0	0	0	11	4	2	19
Automobile	89	534	1,381	547	211	46	117	68
Tyre	7	12	30	23	29	21	16	10
Lead acid battery	3	6	5	7	3	7	7	8
Television set	1	2	1	1	1	0	0	1
Refrigerator	3	34	13	2	8	3	2	2
Washing machine	5	7	15	1	4	8	24	12
Air conditioner	13	14	15	11	25	15	38	20
Microwave oven	0	1	0	1	1	1	1	0
Computer	0	2	1	1	0	0	0	0
Cell phone	0	0	0	0	0	0	0	0
Single use plastic	6	6	15	7	6	13	15	12

EXPORT **quantity (metric ton)**

	2012	2013	2014	2015	2016	2017	2018	2019
Ferrous scrap	848	0	0	0	38	49	123	72
Non-ferrous scrap	12	0	0	18	62	11	0	17
Used lead acid battery	0	0	0	0	0	0	0	0
Used paper	0	0	0	0	0	0	0	0
Waste glass	0	0	0	0	0	0	0	0
Used tyre	0	0	0	0	0	0	0	0
Waste plastic	0	0	0	0	0	38	137	0

IMPORT **value (thousand USD)**

	2012	2013	2014	2015	2016	2017	2018	2019
Products with beverage container	525	2,108	3,505	956	1,208	1,275	1,728	878
Paper, cardboard	0	0	0	0	2	3	0	18
Automobile	746	4,016	5,180	2,715	1,685	588	2,096	1,142
Tyre	59	168	230	75	163	80	93	46
Lead acid battery	13	30	20	35	10	21	22	22
Television set	14	54	50	40	40	16	7	19
Refrigerator	9	66	71	6	55	17	14	17
Washing machine	21	31	60	9	14	24	85	47
Air conditioner	145	156	136	153	244	151	375	263
Microwave oven	0	7	4	8	6	3	8	2
Computer	33	191	103	80	59	96	80	84
Cell phone	21	51	56	35	221	40	365	332
Single use plastic	0	0	6	0	0	0	0	0

EXPORT **value (thousand USD)**

	2012	2013	2014	2015	2016	2017	2018	2019
Ferrous scrap	204	0	0	0	17	27	21	17
Non-ferrous scrap	52	0	0	1	13	23	0	8
Used lead acid battery	0	0	0	0	0	0	0	0
Used paper	0	0	0	0	0	0	0	0
Waste glass	0	0	0	0	0	0	0	0
Used tyre	0	0	0	0	0	0	0	0
Waste plastic	0	0	0	0	0	91	113	0

Niue

Trade amount calculated by survey team based on BACI statistic information

IMPORT **quantity (metric ton)**

	2012	2013	2014	2015	2016	2017	2018	2019
PET bottle	3	5	5	4	4	5	5	5
Aluminum can	4	2	3	2	2	3	2	2
Glass bottle	55	7	6	8	8	14	7	11
Paper, cardboard	3	5	3	2	13	1	1	0
Automobile	70	105	68	89	92	75	113	146
Tyre	13	21	19	9	16	12	15	14
Lead acid battery	7	10	7	4	8	8	4	4
Television set	1	0	0	1	1	0	0	0
Refrigerator	1	2	1	3	1	1	2	0
Washing machine	6	30	6	5	2	6	2	4
Air conditioner	0	0	0	0	0	0	0	0
Microwave oven	0	0	0	0	1	0	1	0
Computer	0	0	0	0	0	0	0	2
Cell phone	0	0	0	0	0	0	0	0
Single use plastic	2	5	5	0	1	0	2	1

EXPORT **quantity (metric ton)**

	2012	2013	2014	2015	2016	2017	2018	2019
Ferrous scrap	0	0	12	123	0	0	0	0
Non-ferrous scrap	9	0	0	0	0	0	72	0
Used lead acid battery	0	0	0	5	0	0	0	0
Used paper	0	0	0	0	0	0	0	0
Waste glass	0	0	0	0	0	0	0	0
Used tyre	0	0	0	0	0	0	0	0
Waste plastic	0	0	0	0	0	0	0	0

IMPORT **value (thousand USD)**

	2012	2013	2014	2015	2016	2017	2018	2019
Products with beverage container	344	346	419	350	369	700	464	659
Paper, cardboard	6	9	4	3	4	3	2	2
Automobile	255	484	320	349	370	501	436	564
Tyre	77	78	103	48	65	47	57	67
Lead acid battery	18	54	35	18	36	38	20	19
Television set	31	6	7	21	22	15	12	9
Refrigerator	16	29	35	28	8	16	56	3
Washing machine	49	82	40	32	14	52	17	33
Air conditioner	9	5	1	1	4	3	8	0
Microwave oven	1	3	3	3	7	3	4	4
Computer	0	0	0	5	0	2	14	295
Cell phone	8	3	0	12	0	0	11	32
Single use plastic	0	0	0	0	0	0	0	0

EXPORT **value (thousand USD)**

	2012	2013	2014	2015	2016	2017	2018	2019
Ferrous scrap	0	0	6	5	0	0	0	0
Non-ferrous scrap	8	0	0	0	0	0	108	0
Used lead acid battery	0	0	0	4	0	0	0	0
Used paper	0	0	0	0	0	0	0	0
Waste glass	0	0	0	0	0	0	0	0
Used tyre	0	0	0	0	0	0	0	0
Waste plastic	0	0	0	0	0	0	0	0

Tuvalu

Trade amount calculated by survey team based on BACI statistic information

IMPORT	quantity (metric ton)							
	2012	2013	2014	2015	2016	2017	2018	2019
PET bottle	7	192	83	68	115	106	129	67
Aluminum can	1	1	2	4	7	6	5	4
Glass bottle	26	35	41	60	59	70	37	56
Paper, cardboard	0	0	0	0	0	0	0	0
Automobile	7	13	13	8	13	5	24	48
Tyre	2	3	7	32	4	10	9	5
Lead acid battery	1	10	2	3	3	3	1	0
Television set	0	0	1	0	0	0	0	1
Refrigerator	0	1	4	0	2	3	3	5
Washing machine	2	2	6	8	7	5	3	4
Air conditioner	3	3	2	2	4	5	11	7
Microwave oven	0	0	0	0	0	0	0	0
Computer	0	0	1	0	0	0	0	0
Cell phone	0	0	0	0	0	0	0	0
Single use plastic	10	31	6	7	4	10	2	5

EXPORT	quantity (metric ton)							
	2012	2013	2014	2015	2016	2017	2018	2019
Ferrous scrap	21	24	0	0	0	29	32	0
Non-ferrous scrap	0	7	15	0	0	0	0	0
Used lead acid battery	0	0	0	0	0	0	0	0
Used paper	0	0	0	0	0	0	0	0
Waste glass	0	0	0	0	0	0	0	0
Used tyre	0	0	0	0	0	0	0	0
Waste plastic	0	0	0	0	0	0	0	0

IMPORT	value (thousand USD)							
	2012	2013	2014	2015	2016	2017	2018	2019
Products with beverage container	322	347	342	278	386	279	280	255
Paper, cardboard	0	0	14	0	12	6	0	0
Automobile	65	103	108	77	128	46	288	603
Tyre	11	15	28	47	19	64	30	19
Lead acid battery	10	27	6	7	7	9	5	0
Television set	0	7	17	14	6	18	1	43
Refrigerator	0	6	21	5	7	19	14	54
Washing machine	4	6	21	34	21	18	11	51
Air conditioner	30	41	25	25	51	61	95	119
Microwave oven	0	0	0	0	0	0	0	3
Computer	37	67	122	35	62	35	35	160
Cell phone	0	0	0	0	7	0	4	33
Single use plastic	3	0	0	0	0	0	0	0

EXPORT	value (thousand USD)							
	2012	2013	2014	2015	2016	2017	2018	2019
Ferrous scrap	7	8	0	0	0	6	6	0
Non-ferrous scrap	0	17	16	0	0	0	0	0
Used lead acid battery	0	0	0	0	0	0	0	0
Used paper	0	0	0	0	0	0	0	0
Waste glass	0	0	0	0	0	0	0	0
Used tyre	0	0	0	0	0	0	0	0
Waste plastic	0	0	0	0	0	0	0	0

Assumptions and Parameters for Conversion

- It is assumed that 80% of drinking water importatioin is in PET bottle and 20% of them is in the bulk. The container for bulk importation is not covered in the survey.
- Importation of soft drink is composed of PET bottles and alminium cans in 50:50
- 75% of 500ml bottles and 25% of 2L bottles are defined as ratio in number of PET bottles
- 70% of 350ml cans and 30% of 500ml cans are defined as ratio in number of alminium can of soft drink
- Importation of beer is composed of glass bottle and alminium cans in 50:50
- 75% of 500ml bottles and 25% of 355 bottles are defined as ratio in number of beer glass bottles
- 80% of 720ml bottles and 20% of 355 bottles are defined as ratio in number of beer glass bottles
- It is assumed that 80% of wine importation is in 720ml glass bottle and 20% of them is in the bulk. The container for bulk importation is not covered in the survey.
- Quantity(metric ton) identified in trade statistics for beverage product is converted to 1,000 litre per metric ton.

Pre-form unit weight per litre	45	g/litre
500ml bottle (water, soft drink)	30	g/bottle
2l bottle (water, soft drink)	60	g/bottle
350ml can (beer, soft drink)	16	g/can
500ml can (beer, soft drink)	19	g/can
Beer returnable bottle	1	kg/litre equivalent bottle
Wine bottle 720ml	500	g/bottle

HS code:220110&220190

Conversion01: Calculation from amount of drinking water to amount of PET bottle

(Q x 1000) x 0.8 x 0.75 / 0.5 x 30 / 1,000,000

+

(Q x 1000) x 0.8 x 0.25 / 2 * 60 / 1,000,000

= PET bottle (metric ton)

HS code:220210

Conversion02: Calculation from amount of soft drink to amount of PET bottle and alminum can

(Q x 1000) x 0.5 x 0.75 / 0.5 x 30 / 1,000,000

+

(Q x 1000) x 0.5 x 0.25 / 2 * 60 / 1,000,000

= PET bottle (metric ton)

(Q x 1000) x 0.5 x 0.70 / 0.35 x 16 / 1,000,000

+

(Q x 1000) x 0.5 x 0.30 / 0.5 * 19 / 1,000,000

= Alminum can (metric ton)

HS code:220300

Conversion03: Calculation from amount of beer to amount of alminum can and glass bottle

(Q x 1000) x 0.5 x 1.0 / 1,000

= Glass bottle (metric ton)

(Q x 1000) x 0.5 x 0.70 / 0.35 x 16 / 1,000,000

+

(Q x 1000) x 0.5 x 0.30 / 0.5 * 19 / 1,000,000

= Alminum can (metric ton)

HS code:220410&220421

Conversion04: Calculation from amount of wine to amount of glass bottle

(Q x 1000) x 0.8 / 0.72 * 500 / 1,000,000

= glass bottle (metric ton)

Attachment
3. Calculation Sheets of Material Flow

Population projections

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Palau	18,001	18,092	18,174	18,227	18,281	18,322	18,357	18,396	18,418	18,448	18,462	18,468
FSM	113,811	115,021	116,255	117,486	118,708	119,921	121,113	122,295	123,440	124,565	125,644	126,699
RMI	58,791	59,194	59,618	60,051	60,520	61,041	61,597	62,226	62,895	63,583	64,299	64,998
PNG	8,776,119	8,947,027	9,119,005	9,292,172	9,466,431	9,641,706	9,817,917	9,994,969	10,172,751	10,351,151	10,530,056	10,709,351
Solomon	669,821	686,878	703,995	721,164	738,416	755,823	773,422	791,210	809,198	827,409	845,872	864,603
Vanuatu	299,882	307,150	314,464	321,834	329,249	336,739	344,300	351,945	359,678	367,500	375,389	383,377
Fiji	889,955	896,444	902,899	909,457	916,131	922,955	929,977	937,162	944,456	951,763	958,971	966,019
Samoa	197,093	198,410	200,144	202,241	204,568	206,972	209,323	211,573	213,790	215,968	218,152	220,368
Tonga	104,497	105,697	106,759	107,748	108,663	109,594	110,555	111,551	112,555	113,571	114,591	115,616

Source: UN, World Population Prospects 2019

Future projections of the number of households

	HH size	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Palau	3.75	4,803	4,828	4,850	4,864	4,878	4,889	4,899	4,909	4,915	4,923	4,927	4,928
FSM	6.13	18,586	18,752	18,954	19,154	19,354	19,551	19,746	19,938	20,125	20,308	20,484	20,656
RMI	6.80	8,676	8,705	8,767	8,831	8,900	8,977	9,058	9,151	9,249	9,350	9,456	9,559
PNG	5.29	1,658,191	1,690,506	1,723,000	1,755,720	1,788,645	1,821,763	1,855,057	1,888,510	1,922,101	1,955,809	1,989,613	2,023,490
Solomon	5.50	121,818	124,887	127,999	131,121	134,257	137,422	140,622	143,856	147,127	150,438	153,795	157,201
Vanuatu	4.91	61,140	62,597	64,088	65,590	67,101	68,627	70,168	71,726	73,302	74,896	76,504	78,132
Fiji*	4.69	189,636	191,010	192,385	193,782	195,204	196,658	198,155	199,686	201,240	202,797	204,332	205,834
Samoa	6.66	29,559	29,771	30,031	30,346	30,695	31,056	31,408	31,746	32,079	32,406	32,733	33,066
Tonga	5.59	18,602	18,906	19,096	19,272	19,436	19,603	19,774	19,953	20,132	20,314	20,496	20,680

*: The Fiji value is a weighted average of household size 5.7 for the poor and Household size 4.3 for the non-poor (5.7 * 237405 + 4.3 * (845309-237405)) / 845309).

Source: The study team calculated the number of households from the average number of people per household based on the Population Census of each country and the future population estimated in UN World Population Prospects 2019.

GDP growth rate

		2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Palau		-4.2%	-10.0%	-4.0%	12.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%
FSM		1.2%	-1.5%	-3.5%	2.5%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
RMI		6.6%	-4.5%	-1.0%	3.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
PNG		5.9%	-3.9%	3.5%	4.2%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%
Solomon		1.2%	-5.0%	2.0%	4.5%	4.3%	4.3%	4.3%	4.3%	4.3%	4.3%	4.3%	4.3%
Vanuatu		3.0%	-10.0%	4.0%	3.9%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%
Fiji		-0.4%	-19.0%	2.6%	8.2%	6.9%	6.9%	6.9%	6.9%	6.9%	6.9%	6.9%	6.9%
Samoa		3.5%	-3.5%	-7.7%	5.6%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%
Tonga		0.7%	-1.5%	-3.0%	2.3%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%

Source: WB Global Economic Prospects June 2021 (2019-2023)

For 2024-2030, it is assumed that the 2023 value will continue until 2030.

Estimation of the number of vehicles owned

Estimated number of registered vehicles in 2019

	Population (2019)	Data year	Number of registered vehicles	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Palau	18	2019	8,140										8,140
FSM	114	2019	11,807										11,807
RMI	59	2013	2,116				2,116	2,201	2,180	2,215	2,238	2,314	2,391
PNG	8,776	2016	100,993							100,993	106,537	110,303	109,995
Solomon	670	2010	16,798	16,798	16,799	16,800	16,801	16,802	16,803	16,804	16,805	16,806	16,807
Vanuatu	300	2013	14,000				14,000	14,066	14,505	14,559	15,242	16,204	16,674
Fiji	890	2018	119,960									119,960	124,534
Samoa	197	2018	25,793									25,793	25,261
Tonga	104	2016	16,029							16,029	17,082	17,650	17,703

Estimation of the number of vehicles owned (= the number of registered vehicles)

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Palau	8,140	7,798	7,018	6,738	7,546	7,999	8,479	8,988	9,527	10,098	10,704	11,347
FSM	11,807	11,949	11,769	11,358	11,641	11,758	11,875	11,994	12,114	12,235	12,358	12,481
RMI	2,391	2,549	2,434	2,410	2,482	2,532	2,583	2,634	2,687	2,741	2,795	2,851
PNG	109,995	116,484	111,942	115,859	120,726	123,623	126,590	129,628	132,739	135,925	139,187	142,528
Solomon	16,807	17,009	16,159	16,482	17,223	17,964	18,737	19,542	20,383	21,259	22,173	23,127
Vanuatu	16,674	17,175	15,457	16,076	16,702	17,254	17,823	18,411	19,019	19,646	20,295	20,964
Fiji	124,534	124,036	100,469	103,081	111,534	119,229	127,456	136,251	145,652	155,702	166,445	177,930
Samoa	25,261	26,145	25,230	23,287	24,591	25,796	27,060	28,386	29,777	31,236	32,767	34,372
Tonga	17,703	17,827	17,559	17,033	17,424	17,912	18,414	18,929	19,459	20,004	20,564	21,140

Source

Palau	2020 Statustical Yearbook
FSM	FSM Statistics Office https://www.fsmstatistics.fm/other-statistics/transportation-statistics/
RMI	WHO, Number of Registered vehicles
PNG	WHO, Number of Registered vehicles
Solomon	WHO, Number of Registered vehicles
Vanuatu	WHO, Number of Registered vehicles
Fiji	Fiji Bureau of Statistics, Distribution of Vehicles Registered in Fiji (2018)
Samoa	Land Transport Authority "Annual Report 2018-2019"
Tonga	Tonga Statistics Department, "Social-statistics-bulletin-2019-update-May-2021"

Based on "WB Global Economic Prospects June 2021", the number of vehicles owned from the data year to 2030 was estimated considering the GDP growth rate.

List of collected data on the number of home appliances owned and ownership rate

	Palau	FSM	RMI	PNG	Solomon	Vanuatu	Fiji	Samoa	Tonga
Year of data	2015	2010	2011			2009	2019	2016	2016
Data classification	Number of units owned	Number of units owned	Ownership rate			Ownership rate	Ownership rate	Ownership rate	Number of units owned
TV set	2,536	8,444	0.600			0.37	0.88	0.82	14,858
Refragerator	2,847	5,603	0.517			0.13	0.96	0.51	9,502
Washing machine		5,236					0.88	0.23	14,374
Air conditioner	1,655	1,203	0.345				0.18	0.05	481
Microwave oven	1,244	1,068	0.170				0.53	0.37	
Computer	1,620	1,666	0.120			0.08	0.57	0.28	8,887
Mobile phone	2,809	6,770	0.579			0.76	0.93	1.21	41,082

Source:

Palau	Number of vehicles owned in the 2015 Census Report
Micronesia	Number of vehicles owned publised by the Statistics Bureau based on the 2010 census
Marshall	Ownership rates as shown in the 2011 Census Report
Vanuatu	Ownership rates shown in the 2016 Census Report
Fiji	Apply the ownership rate of home appliances based on the results of the "Survey on consumers' behavior in dealing with recyclablese". (Since the surveyed areas are Suva and Lautoka, which have relatively high living standards in Fiji, the value obtained by multiplying the obtained ownership rate by the correction value (0.8) was applied nationwide.)
Samoa	Ownership rate shown in the "Energy Labeling and Minimum Energy Performance Standards for Appliances and Lighting" by the Aus AID Funding Program
Tonga	Number of units owned from 2016 census report

List of home appliance ownership rates based on collected data

	Palau	FSM	RMI	PNG	Solomon	Vanuatu	Fiji	Samoa	Tonga
Year of data	2015	2010	2011	2009	2009	2009	2019	2016	2016
Number of HHs	4,714	16,779	8,312	1,349,977	93,669	46,924	189,636	29,190	18,091
TV set	0.54	0.50	0.60	0.37	0.37	0.37	0.88	0.82	0.82
Refragerator	0.60	0.33	0.52	0.13	0.13	0.13	0.96	0.51	0.53
Washing machine	0.79	0.31	0.31	0.31	0.31	0.31	0.88	0.23	0.79
Air conditioner	0.35	0.07	0.35	0.07	0.07	0.07	0.18	0.05	0.03
Microwave oven	0.26	0.06	0.17	0.06	0.06	0.06	0.53	0.37	0.37
Computer	0.34	0.10	0.12	0.08	0.08	0.08	0.57	0.28	0.49
Mobile phone	0.60	0.40	0.58	0.76	0.76	0.76	0.93	1.21	2.27
Source of applied value	FIJI*		FSM	Vanuatu	Vanuatu	FSM			Samoa

In case of the collected data is the number of units owned, it was converted into the ownership rate by the number of households.
For those for which the ownership rate is unknown (highlighted part), data from neighboring countries (see the Source of applied value) was used for supplementatio
* Palau's applied value is converted to the value of the data year (as of 2015) from the Fiji's ownership rates by considering GDP change in 2019 and 2015.

Setting of base year (2019) data

1. Palau

Year of data	2015	2016	2017	2018	2019
Number of HHs	4,714	4,728	4,752	4,780	4,803
TV set	0.54	0.56	0.54	0.52	0.50
Refragerator	0.60	0.63	0.61	0.59	0.56
Washing machine	0.79	0.82	0.79	0.76	0.72
Air conditioner	0.35	0.37	0.35	0.34	0.32
Microwave oven	0.26	0.28	0.26	0.26	0.24
Computer	0.34	0.36	0.34	0.33	0.32
Mobile phone	0.60	0.62	0.60	0.58	0.55

2. FSM

Year of data	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Number of HHs	16,779	16,866	17,038	17,269	17,517	17,752	17,969	18,172	18,364	18,586
TV set	0.50	0.52	0.54	0.51	0.50	0.48	0.49	0.53	0.57	0.56
Refragerator	0.33	0.35	0.36	0.34	0.33	0.32	0.33	0.35	0.38	0.37
Washing machine	0.31	0.32	0.33	0.31	0.31	0.30	0.30	0.33	0.35	0.35
Air conditioner	0.07	0.07	0.08	0.07	0.07	0.07	0.07	0.08	0.08	0.08
Microwave oven	0.06	0.07	0.07	0.06	0.06	0.06	0.06	0.07	0.07	0.07
Computer	0.10	0.10	0.11	0.10	0.10	0.09	0.10	0.10	0.11	0.11
Mobile phone	0.40	0.42	0.43	0.41	0.40	0.38	0.39	0.42	0.46	0.45

3. RMI

Year of data	2011	2012	2013	2014	2015	2016	2017	2018	2019
Number of HHs	8,312	8,340	8,373	8,409	8,448	8,489	8,537	8,590	8,676
TV set	0.60	0.62	0.63	0.62	0.62	0.67	0.70	0.72	0.77
Refragerator	0.52	0.54	0.55	0.53	0.53	0.58	0.61	0.62	0.66
Washing machine	0.31	0.32	0.33	0.32	0.32	0.35	0.37	0.38	0.40
Air conditioner	0.35	0.36	0.37	0.36	0.36	0.39	0.40	0.42	0.44
Microwave oven	0.17	0.18	0.18	0.18	0.18	0.19	0.20	0.20	0.22
Computer	0.12	0.12	0.13	0.12	0.12	0.13	0.14	0.14	0.15
Mobile phone	0.58	0.60	0.61	0.60	0.60	0.65	0.68	0.70	0.74

4. PNG

Year of data	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Number of HHs	1,349,977	1,381,293	1,411,842	1,441,848	1,471,585	1,501,504	1,531,932	1,562,918	1,594,334	1,626,131	1,658,191
TV set	0.37	0.43	0.52	0.59	0.57	0.60	0.54	0.49	0.52	0.53	0.52
Refragerator	0.13	0.15	0.18	0.21	0.20	0.21	0.19	0.17	0.18	0.19	0.18
Washing machine	0.31	0.37	0.44	0.50	0.48	0.50	0.45	0.42	0.44	0.45	0.44
Air conditioner	0.07	0.08	0.10	0.12	0.11	0.12	0.10	0.10	0.10	0.10	0.10
Microwave oven	0.06	0.07	0.09	0.10	0.10	0.10	0.09	0.08	0.09	0.09	0.09
Computer	0.08	0.09	0.11	0.13	0.12	0.13	0.12	0.11	0.11	0.11	0.11
Mobile phone	0.76	0.89	1.08	1.22	1.17	1.23	1.10	1.01	1.07	1.09	1.08

5. Solomon

Year of data	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Number of HHs	93,669	95,975	98,459	101,103	103,878	106,742	109,661	112,625	115,642	118,701	121,818
TV set	0.37	0.41	0.48	0.51	0.53	0.52	0.48	0.48	0.49	0.49	0.47
Refragerator	0.13	0.14	0.17	0.18	0.18	0.18	0.17	0.17	0.17	0.17	0.16
Washing machine	0.31	0.34	0.40	0.43	0.44	0.44	0.40	0.40	0.41	0.42	0.39
Air conditioner	0.07	0.08	0.09	0.10	0.10	0.10	0.09	0.09	0.09	0.10	0.09
Microwave oven	0.06	0.07	0.08	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.08
Computer	0.08	0.09	0.10	0.11	0.11	0.11	0.10	0.10	0.11	0.11	0.10
Mobile phone	0.76	0.83	0.98	1.06	1.08	1.06	0.98	0.98	1.01	1.01	0.96

Setting of base year (2019) data

6. Vanuatu

Year of data	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Number of HHs	46,924	48,141	49,454	50,849	52,302	53,780	55,256	56,723	58,185	59,647	61,140
TV set	0.37	0.40	0.43	0.40	0.38	0.37	0.33	0.33	0.36	0.35	0.34
Refragerator	0.13	0.14	0.15	0.14	0.13	0.13	0.12	0.12	0.13	0.12	0.12
Washing machine	0.31	0.34	0.37	0.34	0.32	0.31	0.28	0.28	0.30	0.30	0.29
Air conditioner	0.07	0.08	0.08	0.08	0.07	0.07	0.06	0.06	0.07	0.07	0.07
Microwave oven	0.06	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.06
Computer	0.08	0.09	0.09	0.09	0.08	0.08	0.07	0.07	0.08	0.08	0.07
Mobile phone	0.76	0.82	0.89	0.82	0.78	0.75	0.68	0.69	0.73	0.73	0.70

7. Fiji

Year of data	2019
Number of HHs	189,636
TV set	0.88
Refragerator	0.96
Washing machine	0.88
Air conditioner	0.18
Microwave oven	0.53
Computer	0.64
Mobile phone	2.71

8. Samoa

Year of data	2016	2017	2018	2019
Number of HHs	29,190	29,313	29,429	29,559
TV set	0.82	0.85	0.83	0.85
Refragerator	0.51	0.53	0.52	0.53
Washing machine	0.23	0.24	0.23	0.24
Air conditioner	0.05	0.05	0.05	0.05
Microwave oven	0.37	0.38	0.37	0.38
Computer	0.28	0.29	0.28	0.29
Mobile phone	1.21	1.25	1.22	1.26

9. Tonga

Year of data	2016	2017	2018	2019
Number of HHs	18,091	18,245	18,459	18,602
TV set	0.82	0.88	0.92	0.94
Refragerator	0.53	0.57	0.59	0.60
Washing machine	0.79	0.86	0.89	0.91
Air conditioner	0.03	0.03	0.03	0.03
Microwave oven	0.37	0.40	0.41	0.42
Computer	0.49	0.53	0.55	0.56
Mobile phone	2.27	2.44	2.54	2.60

The change in the ownership rate was set by multiplying the GDP growth rate of each year by the ownership rate of year of the collected data

Estimated number of household appliances owned

1. Palau	2019		2020		2021		2022		2023		2024		2025		2026		2027		2028		2029		2030	
Households	4,803		4,828		4,850		4,864		4,878		4,889		4,899		4,909		4,915		4,923		4,927		4,928	
GDP growth	-0.042		-0.100		-0.040		0.120		0.060		0.060		0.060		0.060		0.060		0.060		0.060		0.060	
	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number
TV set	0.50	2,381	0.50	2,393	0.50	2,404	0.56	2,701	0.59	2,871	0.62	3,050	0.66	3,239	0.70	3,441	0.74	3,652	0.79	3,877	0.83	4,113	0.88	4,361
Refragerator	0.56	2,673	0.56	2,687	0.56	2,699	0.62	3,032	0.66	3,223	0.70	3,424	0.74	3,637	0.79	3,863	0.83	4,100	0.88	4,353	0.94	4,618	0.99	4,896
Washing machine	0.72	3,475	0.72	3,493	0.72	3,508	0.81	3,941	0.86	4,190	0.91	4,451	0.96	4,727	1.02	5,021	1.08	5,329	1.15	5,658	1.22	6,002	1.29	6,364
Air conditioner	0.32	1,554	0.32	1,562	0.32	1,569	0.36	1,762	0.38	1,874	0.41	1,991	0.43	2,114	0.46	2,246	0.48	2,383	0.51	2,530	0.54	2,684	0.58	2,846
Microwave oven	0.24	1,168	0.24	1,174	0.24	1,179	0.27	1,325	0.29	1,408	0.31	1,496	0.32	1,589	0.34	1,688	0.36	1,791	0.39	1,902	0.41	2,018	0.43	2,139
Computer	0.32	1,521	0.32	1,529	0.32	1,536	0.35	1,725	0.38	1,834	0.40	1,949	0.42	2,069	0.45	2,198	0.47	2,333	0.50	2,477	0.53	2,627	0.57	2,786
Mobile phone	0.55	2,638	0.55	2,651	0.55	2,663	0.61	2,991	0.65	3,180	0.69	3,379	0.73	3,588	0.78	3,812	0.82	4,045	0.87	4,295	0.92	4,556	0.98	4,831

2. FSM	2019		2020		2021		2022		2023		2024		2025		2026		2027		2028		2029		2030	
Households	18,586		18,752		18,954		19,154		19,354		19,551		19,746		19,938		20,125		20,308		20,484		20,656	
GDP growth	0.012		-0.015		-0.035		0.025		0.010		0.010		0.010		0.010		0.010		0.010		0.010		0.010	
	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number
TV set	0.56	10,493	0.56	10,587	0.56	10,700	0.58	11,084	0.58	11,311	0.59	11,541	0.60	11,773	0.60	12,006	0.61	12,240	0.61	12,475	0.62	12,709	0.63	12,944
Refragerator	0.37	6,963	0.37	7,025	0.37	7,100	0.38	7,355	0.39	7,506	0.39	7,658	0.40	7,812	0.40	7,967	0.40	8,122	0.41	8,278	0.41	8,433	0.42	8,589
Washing machine	0.35	6,507	0.35	6,565	0.35	6,635	0.36	6,873	0.36	7,014	0.37	7,157	0.37	7,300	0.37	7,445	0.38	7,590	0.38	7,736	0.38	7,881	0.39	8,026
Air conditioner	0.08	1,495	0.08	1,508	0.08	1,524	0.08	1,579	0.08	1,612	0.08	1,644	0.08	1,677	0.09	1,711	0.09	1,744	0.09	1,777	0.09	1,811	0.09	1,844
Microwave oven	0.07	1,327	0.07	1,339	0.07	1,353	0.07	1,402	0.07	1,431	0.07	1,460	0.08	1,489	0.08	1,519	0.08	1,548	0.08	1,578	0.08	1,607	0.08	1,637
Computer	0.11	2,070	0.11	2,089	0.11	2,111	0.11	2,187	0.12	2,232	0.12	2,277	0.12	2,323	0.12	2,369	0.12	2,415	0.12	2,461	0.12	2,507	0.12	2,554
Mobile phone	0.45	8,413	0.45	8,488	0.45	8,579	0.46	8,887	0.47	9,069	0.47	9,253	0.48	9,439	0.48	9,626	0.49	9,813	0.49	10,002	0.50	10,189	0.50	10,378

3. RMI	2019		2020		2021		2022		2023		2024		2025		2026		2027		2028		2029		2030	
Households	8,676		8,705		8,767		8,831		8,900		8,977		9,058		9,151		9,249		9,350		9,456		9,559	
GDP growth	0.066		-0.045		-0.010		0.030		0.020		0.020		0.020		0.020		0.020		0.020		0.020		0.020	
	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number
TV set	0.77	6,669	0.77	6,690	0.77	6,738	0.79	6,991	0.81	7,186	0.82	7,393	0.84	7,610	0.86	7,841	0.87	8,084	0.89	8,336	0.91	8,598	0.93	8,866
Refragerator	0.66	5,746	0.66	5,765	0.66	5,806	0.68	6,024	0.70	6,192	0.71	6,371	0.72	6,557	0.74	6,757	0.75	6,966	0.77	7,183	0.78	7,409	0.80	7,639
Washing machine	0.40	3,468	0.40	3,480	0.40	3,505	0.41	3,636	0.42	3,738	0.43	3,845	0.44	3,958	0.45	4,078	0.45	4,205	0.46	4,336	0.47	4,472	0.48	4,611
Air conditioner	0.44	3,834	0.44	3,847	0.44	3,875	0.46	4,020	0.46	4,132	0.47	4,251	0.48	4,376	0.49	4,509	0.50	4,648	0.51	4,793	0.52	4,944	0.53	5,098
Microwave oven	0.22	1,889	0.22	1,896	0.22	1,909	0.22	1,981	0.23	2,036	0.23	2,095	0.24	2,156	0.24	2,222	0.25	2,290	0.25	2,362	0.26	2,436	0.26	2,512
Computer	0.15	1,334	0.15	1,338	0.15	1,348	0.16	1,398	0.16	1,437	0.16	1,479	0.17	1,522	0.17	1,568	0.17	1,617	0.18	1,667	0.18	1,720	0.19	1,773
Mobile phone	0.74	6,435	0.74	6,456	0.74	6,503	0.76	6,746	0.78	6,935	0.79	7,135	0.81	7,343	0.83	7,567	0.84	7,801	0.86	8,044	0.88	8,298	0.90	8,555

4. PNG	2019		2020		2021		2022		2023		2024		2025		2026		2027		2028		2029		2030	
Households	1,658,191		1,690,506		1,723,000		1,755,720		1,788,645		1,821,763		1,855,057		1,888,510		1,922,101		1,955,809		1,989,613		2,023,490	
GDP growth	0.059		-0.039		0.035		0.042		0.024		0.024		0.024		0.024		0.024		0.024		0.024		0.024	
	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number
TV set	0.52	868,926	0.52	885,859	0.54	934,488	0.57	992,228	0.58	1,035,095	0.59	1,079,563	0.61	1,125,676	0.62	1,173,479	0.64	1,223,016	0.65	1,274,332	0.67	1,327,469	0.68	1,382,474
Refragerator	0.18	305,298	0.18	311,248	0.19	328,334	0.20	348,621	0.20	363,682	0.21	379,306	0.21	395,508	0.22	412,303	0.22	429,708	0.23	447,738	0.23	466,408	0.24	485,734
Washing machine	0.44	732,853	0.44	747,135	0.46	788,149	0.48	836,846	0.49	873,001	0.50	910,505	0.51	949,397	0.52	989,714	0.54	1,031,494	0.55	1,074,773	0.56	1,119,590	0.58	1,165,980
Air conditioner	0.10	168,377	0.10	171,658	0.11	181,082	0.11	192,270	0.11	200,577	0.11	209,194	0.12	218,129	0.12	227,392	0.12	236,991	0.13	246,935	0.13	257,232	0.13	267,890
Microwave oven	0.09	149,482	0.09	152,395	0.09	160,761	0.10	170,694	0.10	178,068	0.10	185,718	0.10	193,651	0.11	201,874	0.11	210,396	0.11	219,224	0.11	228,365	0.12	237,828
Computer	0.11	187,876	0.11	191,537	0.12	202,051	0.12	214,536	0.13	223,804	0.13	233,419	0.13	243,389	0.13	253,725	0.14	264,436	0.14	275,531	0.14	287,020	0.15	298,913
Mobile phone	1.08	1,784,820	1.08	1,819,603	1.11	1,919,489	1.16	2,038,089	1.19	2,126,142	1.22	2,217,480	1.25	2,312,199	1.28	2,410,389	1.31	2,512,142	1.34	2,617,546	1.37	2,726,694	1.40	2,839,676

5. Solomon	2019		2020		2021		2022		2023		2024		2025		2026		2027		2028		2029		2030	
Households	121,818		124,887		127,999		131,121		134,257		137,422		140,622		143,856		147,127		150,438		153,795		157,201	
GDP growth	0.012		-0.050		0.020		0.045		0.043		0.043		0.043		0.043		0.043		0.043		0.043		0.043	
	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number
TV set	0.47	56,875	0.47	58,307	0.48	60,956	0.50	65,252	0.52	69,686	0.54	74,396	0.56	79,402	0.59	84,721	0.61	90,372	0.64	96,380	0.67	102,767	0.70	109,560
Refragerator	0.16	19,983	0.16	20,486	0.17	21,417	0.17	22,926	0.18	24,484	0.19	26,139	0.20	27,898	0.21	29,767	0.22	31,752	0.23	33,863	0.23	36,107	0.24	38,494
Washing machine	0.39	47,968	0.39	49,176	0.40	51,410	0.42	55,034	0.44	58,773	0.46	62,746	0.48	66,967	0.50	71,453	0.52	76,220	0.54	81,287	0.56	86,674	0.59	92,403
Air conditioner	0.09	11,021	0.09	11,299	0.09	11,812	0.10	12,644	0.10	13,503	0.10	14,416	0.11	15,386	0.11	16,417	0.12	17,512	0.12	18,676	0.13	19,914	0.14	21,230
Microwave oven	0.08	9,784	0.08	10,031	0.08	10,486	0.09	11,225	0.09	11,988	0.09	12,798	0.10	13,660	0.10	14,575	0.11	15,547	0.11	16,580	0.11	17,679	0.12	18,848
Computer	0.10	12,297	0.10	12,607	0.10	13,180	0.11	14,109	0.11	15,067	0.12	16,086	0.12	17,168	0.13	18,318	0.13	19,540	0.14	20,839	0.14	22,220	0.15	23,689
Mobile phone	0.96	116,823	0.96	119,766	0.98	125,206	1.02	134,031	1.07	143,139	1.11	152,813	1.16	163,095	1.21	174,021	1.26	185,630	1.32	197,969	1.37	211,089	1.43	225,042

Estimated number of household appliances owned

6. Vanuatu	2019		2020		2021		2022		2023		2024		2025		2026		2027		2028		2029		2030	
Households	61,140		62,597		64,088		65,590		67,101		68,627		70,168		71,726		73,302		74,896		76,504		78,132	
GDP growth	0.030		-0.100		0.040		0.039		0.033		0.033		0.033		0.033		0.033		0.033		0.033		0.033	
	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number
TV set	0.34	20,926	0.34	21,425	0.36	22,813	0.37	24,258	0.38	25,636	0.39	27,084	0.41	28,606	0.42	30,206	0.44	31,889	0.45	33,657	0.46	35,514	0.48	37,467
Refragerator	0.12	7,353	0.12	7,528	0.13	8,015	0.13	8,523	0.13	9,007	0.14	9,516	0.14	10,051	0.15	10,613	0.15	11,204	0.16	11,826	0.16	12,478	0.17	13,164
Washing machine	0.29	17,649	0.29	18,070	0.30	19,240	0.31	20,459	0.32	21,621	0.33	22,843	0.34	24,126	0.36	25,476	0.37	26,895	0.38	28,387	0.39	29,953	0.40	31,600
Air conditioner	0.07	4,055	0.07	4,152	0.07	4,421	0.07	4,701	0.07	4,968	0.08	5,248	0.08	5,543	0.08	5,853	0.08	6,179	0.09	6,522	0.09	6,882	0.09	7,260
Microwave oven	0.06	3,600	0.06	3,686	0.06	3,924	0.06	4,173	0.07	4,410	0.07	4,659	0.07	4,921	0.07	5,196	0.07	5,486	0.08	5,790	0.08	6,110	0.08	6,445
Computer	0.07	4,525	0.07	4,632	0.08	4,932	0.08	5,245	0.08	5,543	0.09	5,856	0.09	6,185	0.09	6,531	0.09	6,895	0.10	7,277	0.10	7,679	0.10	8,101
Mobile phone	0.70	42,984	0.70	44,008	0.73	46,859	0.76	49,827	0.78	52,657	0.81	55,632	0.84	58,759	0.87	62,045	0.89	65,501	0.92	69,134	0.95	72,949	0.98	76,959

7. Fiji	2019		2020		2021		2022		2023		2024		2025		2026		2027		2028		2029		2030	
Households	189,636		191,010		192,385		193,782		195,204		196,658		198,155		199,686		201,240		202,797		204,332		205,834	
GDP growth	-0.004		-0.190		0.026		0.082		0.069		0.069		0.069		0.069		0.069		0.069		0.069		0.069	
	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number
TV set	0.88	167,512	0.88	168,725	0.91	174,358	0.98	190,026	1.05	204,629	1.12	220,377	1.20	237,376	1.28	255,715	1.37	275,487	1.46	296,774	1.56	319,654	1.67	344,222
Refragerator	0.96	181,419	0.96	182,732	0.98	188,834	1.06	205,802	1.14	221,617	1.21	238,673	1.30	257,082	1.39	276,944	1.48	298,358	1.58	321,412	1.69	346,192	1.81	372,799
Washing machine	0.88	166,880	0.88	168,088	0.90	173,701	0.98	189,309	1.04	203,856	1.12	219,546	1.19	236,480	1.28	254,750	1.36	274,448	1.46	295,654	1.56	318,448	1.67	342,923
Air conditioner	0.18	34,135	0.18	34,382	0.18	35,530	0.20	38,722	0.21	41,698	0.23	44,907	0.24	48,371	0.26	52,108	0.28	56,137	0.30	60,475	0.32	65,137	0.34	70,143
Microwave oven	0.53	100,507	0.53	101,235	0.54	104,615	0.59	114,016	0.63	122,777	0.67	132,226	0.72	142,425	0.77	153,429	0.82	165,292	0.88	178,065	0.94	191,793	1.00	206,533
Computer	0.64	120,862	0.64	121,737	0.65	125,801	0.71	137,106	0.76	147,641	0.81	159,004	0.86	171,269	0.92	184,501	0.99	198,767	1.06	214,125	1.13	230,634	1.21	248,359
Mobile phone	2.71	514,484	2.71	518,209	2.78	535,511	3.01	583,631	3.22	628,480	3.44	676,850	3.68	729,057	3.93	785,384	4.20	846,109	4.49	911,489	4.80	981,761	5.14	1,057,216

8. Samoa	2019		2020		2021		2022		2023		2024		2025		2026		2027		2028		2029		2030	
Households	29,559		29,771		30,031		30,346		30,695		31,056		31,408		31,746		32,079		32,406		32,733		33,066	
GDP growth	0.035		-0.035		-0.077		0.056		0.049		0.049		0.049		0.049		0.049		0.049		0.049		0.049	
	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number
TV set	0.85	25,189	0.85	25,369	0.85	25,591	0.90	27,307	0.94	28,975	0.99	30,752	1.04	32,625	1.09	34,591	1.14	36,666	1.20	38,855	1.26	41,171	1.32	43,627
Refragerator	0.53	15,666	0.53	15,778	0.53	15,916	0.56	16,984	0.59	18,021	0.62	19,126	0.65	20,291	0.68	21,514	0.71	22,805	0.75	24,166	0.78	25,606	0.82	27,134
Washing machine	0.24	7,065	0.24	7,116	0.24	7,178	0.25	7,659	0.26	8,127	0.28	8,625	0.29	9,151	0.31	9,702	0.32	10,284	0.34	10,898	0.35	11,548	0.37	12,237
Air conditioner	0.05	1,536	0.05	1,547	0.05	1,560	0.05	1,665	0.06	1,767	0.06	1,875	0.06	1,989	0.07	2,109	0.07	2,236	0.07	2,369	0.08	2,510	0.08	2,660
Microwave oven	0.38	11,366	0.38	11,447	0.38	11,547	0.41	12,321	0.43	13,074	0.45	13,876	0.47	14,721	0.49	15,608	0.52	16,545	0.54	17,532	0.57	18,577	0.60	19,685
Computer	0.29	8,601	0.29	8,663	0.29	8,738	0.31	9,324	0.32	9,894	0.34	10,501	0.35	11,140	0.37	11,812	0.39	12,520	0.41	13,268	0.43	14,058	0.45	14,897
Mobile phone	1.26	37,169	1.26	37,435	1.26	37,762	1.33	40,294	1.39	42,755	1.46	45,377	1.53	48,141	1.61	51,043	1.69	54,105	1.77	57,335	1.86	60,752	1.95	64,377

9. Tonga	2019		2020		2021		2022		2023		2024		2025		2026		2027		2028		2029		2030	
Households	18,602		18,906		19,096		19,272		19,436		19,603		19,774		19,953		20,132		20,314		20,496		20,680	
GDP growth	0.007		-0.015		-0.030		0.023		0.028		0.028		0.028		0.028		0.028		0.028		0.028		0.028	
	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number	rate	Number
TV set	0.94	17,521	0.94	17,807	0.94	17,986	0.96	18,570	0.99	19,252	1.02	19,960	1.05	20,699	1.08	21,470	1.11	22,270	1.14	23,100	1.17	23,961	1.20	24,852
Refragerator	0.60	11,205	0.60	11,388	0.60	11,502	0.62	11,876	0.63	12,312	0.65	12,765	0.67	13,238	0.69	13,731	0.71	14,242	0.73	14,773	0.75	15,323	0.77	15,893
Washing machine	0.91	16,950	0.91	17,227	0.91	17,400	0.93	17,965	0.96	18,625	0.99	19,310	1.01	20,025	1.04	20,771	1.07	21,545	1.10	22,348	1.13	23,180	1.16	24,042
Air conditioner	0.03	567	0.03	576	0.03	582	0.03	601	0.03	623	0.03	646	0.03	670	0.03	695	0.04	721	0.04	748	0.04	776	0.04	805
Microwave oven	0.42	7,893	0.42	8,022	0.42	8,103	0.43	8,366	0.45	8,673	0.46	8,992	0.47	9,325	0.48	9,673	0.50	10,033	0.51	10,407	0.53	10,794	0.54	11,196
Computer	0.56	10,480	0.56	10,651	0.56	10,758	0.58	11,107	0.59	11,515	0.61	11,939	0.63	12,381	0.64	12,842	0.66	13,320	0.68	13,817	0.70	14,331	0.72	14,865
Mobile phone	2.60	48,444	2.60	49,235	2.60	49,729	2.66	51,345	2.74	53,230	2.82	55,190	2.89	57,233	2.98	59,365	3.06	61,577	3.14	63,872	3.23	66,250	3.32	68,714

The number of units owned is calculated by multiplying the ownership rate in each year by the number of households.
Ownership rates are based on 2019 ownership rates, which are assumed to increase in line with GDP growth for years when GDP growth increases, and to remain at the previous year's level when GDP decreases.

Estimation of the Unit generation rate of PET bottle, Paper / Cardboard, Aluminum can

Population

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Palau	18,001	18,092	18,174	18,227	18,281	18,322	18,357	18,396	18,418	18,448	18,462	18,468
Micronesia	113,811	115,021	116,255	117,486	118,708	119,921	121,113	122,295	123,440	124,565	125,644	126,699
Marshall	58,791	59,194	59,618	60,051	60,520	61,041	61,597	62,226	62,895	63,583	64,299	64,998
Papua New Guinea	8,776,119	8,947,027	9,119,005	9,292,172	9,466,431	9,641,706	9,817,917	9,994,969	10,172,751	10,351,151	10,530,056	10,709,351
Solomon	669,821	686,878	703,995	721,164	738,416	755,823	773,422	791,210	809,198	827,409	845,872	864,603
Vanuatu	299,882	307,150	314,464	321,834	329,249	336,739	344,300	351,945	359,678	367,500	375,389	383,377
Fiji	889,955	896,444	902,899	909,457	916,131	922,955	929,977	937,162	944,456	951,763	958,971	966,019
Samoa	197,093	198,410	200,144	202,241	204,568	206,972	209,323	211,573	213,790	215,968	218,152	220,368
Tonga	104,497	105,697	106,759	107,748	108,663	109,594	110,555	111,551	112,555	113,571	114,591	115,616
Total	11,127,970	11,333,913	11,541,313	11,750,380	11,960,967	12,173,073	12,386,561	12,601,327	12,817,181	13,033,958	13,251,436	13,469,499

PET bottle

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Palau	169	170	171	171	172	172	172	172	172	172	172	172
Micronesia	97	98	99	100	101	102	103	104	105	106	107	108
Marshall	246	248	250	252	254	256	258	261	264	267	270	273
Papua New Guinea	4,530	4,618	4,707	4,796	4,886	4,976	5,067	5,158	5,250	5,342	5,434	5,527
Solomon	704	722	740	758	776	794	812	831	850	869	888	908
Vanuatu	85	87	89	91	93	95	97	99	101	103	105	107
Fiji	2,524	2,542	2,560	2,579	2,598	2,617	2,637	2,657	2,678	2,699	2,719	2,739
Samoa	507	511	515	520	526	532	538	544	550	556	562	568
Tonga	139	141	142	143	144	145	146	147	148	149	150	151
Total	9,001	9,137	9,273	9,410	9,550	9,689	9,830	9,973	10,118	10,263	10,407	10,553
Generation rate (kg/capita/year)	0.809	0.806	0.803	0.801	0.798	0.796	0.794	0.791	0.789	0.787	0.785	0.783

Aluminum can

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Palau	164	165	166	166	166	166	166	166	166	166	166	166
Micronesia	309	312	315	318	321	324	327	330	333	336	339	342
Marshall	178	179	180	181	182	184	186	188	190	192	194	196
Papua New Guinea	5,792	5,905	6,019	6,133	6,248	6,364	6,480	6,597	6,714	6,832	6,950	7,068
Solomon	115	118	121	124	127	130	133	136	139	142	145	148
Vanuatu	22	23	24	25	26	27	28	29	30	31	32	33
Fiji	346	349	352	355	358	361	364	367	370	373	376	379
Samoa	34	34	34	34	34	34	34	34	34	34	34	34
Tonga	49	50	51	51	51	51	51	51	51	51	51	51
Total	7,009	7,135	7,262	7,387	7,513	7,641	7,769	7,898	8,027	8,157	8,287	8,417
Generation rate (kg/capita/year)	0.630	0.630	0.629	0.629	0.628	0.628	0.627	0.627	0.626	0.626	0.625	0.625

Paper / cardboard

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Palau	163	147	141	158	167	177	188	199	211	224	237	251
Micronesia	88	87	84	86	87	88	89	90	91	92	93	94
Marshall	267	255	252	260	265	270	275	281	287	293	299	305
Papua New Guinea	4,697	4,514	4,672	4,868	4,985	5,105	5,228	5,353	5,481	5,613	5,748	5,886
Solomon	534	507	517	540	563	587	612	638	665	694	724	755
Vanuatu	276	248	258	268	277	286	295	305	315	325	336	347
Fiji	4,112	3,331	3,418	3,698	3,953	4,226	4,518	4,830	5,163	5,519	5,900	6,307
Samoa	558	538	497	525	551	578	606	636	667	700	734	770
Tonga	220	217	210	215	221	227	233	240	247	254	261	268
Total	10,914	9,844	10,049	10,618	11,069	11,544	12,044	12,572	13,127	13,714	14,332	14,983
Generation rate (kg/capita/year)	0.981	0.869	0.871	0.904	0.925	0.948	0.972	0.998	1.024	1.052	1.082	1.112

Source: Estimation based on Amount used/expired and UN world Population Prospects 2019.

Basis for setting base year (2019) data (Amount used / expired)

<Conditions commonly applied to each country>

Items	Basis for setting
Automobile	Following are the basis for setting. (1) Number of vehicles owned in 2019 in each country (based on number of registered vehicles and ownership rate data, converted to 2019 values by GDP growth) (2) Average years of use of vehicle: 7 years (taking into account the results of the "Survey on Consumers' Behavior in Dealing with Recyclables" and etc.). (3) Unit weight of automobile: 1,100kg/vehicle (estimated by the survey team from Reference Material 8 a-3-4 Appendix 2 of public comment on the draft report of the joint meeting of the Industrial Structure Council's Automobile Recycling WG and other groups.)
Television set	Following are the basis for setting. (1) Number of television sets owned in 2019 in each country (based on ownership and ownership rate data, converted to 2019 values by GDP growth) (2) Average years of use of television set: 5.6 years (taking into account the results of the "Survey on Consumers' Behavior in Dealing with Recyclables" and other factors) (3) Unit weight of television set: 20 kg/unit (estimated by the survey team from "The Association for Electric Home Appliances" 2015 Annual Report on Home Appliance Recycling.)
Refrigerator	Following are the basis for setting. (1) Number of refrigerators owned in 2019 (based on the owned number and ownership rate data, corrected for GDP growth to 2019 values) (2) Average years of use of refrigerator: 5.9 years (applied the results of "Survey on Consumers' Behavior in Dealing with Recyclables".) (3) Unit weight of refrigerator: 62 kg/unit (estimated by the survey team from "The Association for Electric Home Appliances" 2015 Annual Report on Home Appliance Recycling.)
Washing machine	It was set on the basis of the following. (1) Number of washing machine owned in 2019 (based on the owned number and ownership rate data, corrected for GDP growth to 2019 values) (2) Average years of use of washing machine: 5.5 years (applied the results of "Survey on Consumers' Behavior in Dealing with Recyclables".) (3) Unit weight of washing machine: 38 kg/unit (estimated by the survey team from "The Association for Electric Home Appliances" 2015 Annual Report on Home Appliance Recycling.)
Air conditioner	It was set on the basis of the following. (1) Number of air conditioner owned in 2019 (based on the owned number and ownership rate data, corrected for GDP growth to 2019 values) (2) Average years of use of air conditioner: 5.9 years (applied the results of "Survey on Consumers' Behavior in Dealing with Recyclables".) (3) Unit weight of air conditioner: 41 kg/unit (estimated by the survey team from "The Association for Electric Home Appliances" 2015 Annual Report on Home Appliance Recycling.)
Microwave oven	Following are the basis for setting. (1) Number of microwave oven owned in 2019 (based on the owned number and ownership rate data, corrected for GDP growth to 2019 values) (2) Average years of use of microwave oven: 5.6 years (applied the results of "Survey on Consumers' Behavior in Dealing with Recyclables".) (3) Unit weight of microwave oven: 20 kg/unit (estimated by the survey team from "The Association for Electric Home Appliances" 2015 Annual Report on Home Appliance Recycling.)
Computer	Following are the basis for setting. (1) Number of computer owned in 2019 (based on the owned number and ownership rate data, corrected for GDP growth to 2019 values) (2) Average years of use of computer: 4.6 years (applied the results of "Survey on Consumers' Behavior in Dealing with Recyclables".) (3) Unit weight of computer: 5.1 kg/unit (estimated by the survey team from "The Association for Electric Home Appliances" 2015 Annual Report on Home Appliance Recycling.)
Cell phone	Following are the basis for setting. (1) Number of cell phone owned in 2019 (based on the owned number and ownership rate data, corrected for GDP growth to 2019 values) (2) Average years of use of cell phone: 5.0 years (applied the results of "Survey on Consumers' Behavior in Dealing with Recyclables".) (3) Unit weight of computer: 0.12 kg/unit (estimated by the survey team from "The Association for Electric Home Appliances" 2015 Annual Report on Home Appliance Recycling.)
Waste lubricant oil	Following are the basis for setting. (1) 2014 waste lubricant oil generation in each country (in liter, D.Haynes et al. "REPORT ONE: DESKTOP REVIEW OF USED OIL MANAGEMENT DATA") (2) Specific gravity of waste lubricant oil: 0.9 kg/liter(assumed by the survey team)
Used tyre	Export and import statistics data for 2019 (BACI)
Paper / cardboard	Export and import statistics data for 2019 (BACI)
Single use plastic	Export and import statistics data for 2019 (BACI)

Basis for setting base year (2019) data (Amount used / expired)

<Conditions different from country to country>

1. Palau

Recyclable material	Basis for setting
PET bottle	Data on the number of PET bottles in Palau's CDS (Beverage Container Recycling Program Annual Report FY2018 (Oct2017-Sep2018)) for 2018. The data was converted to weight using a unit weight of 30g.
Aluminum can	Data on the number of aluminum cans in Palau's CDS (Beverage Container Recycling Program Annual Report FY2018 (Oct2017-Sep2018)) for 2018. The data was converted to weight using a unit weight of 15g.
Glass	Data on the number of glass bottles in Palau's CDS (Beverage Container Recycling Program Annual Report FY2018 (Oct2017-Sep2018)) for 2018. The data was converted to weight using a unit weight of 400g.
Used LA battery	Corrected the amount used lead-acid batteries in Micronesia based on the GDP tatio in 2019 for Palau and Micronesia.

2. Micronesia

Recyclable material	Basis for setting
PET bottle	Data on the number of PET bottles obtained from EPA in Yap (2018) and KIRMA in Kosrae (2016); as there is no CDL system in place for Pohnpei and Chuuk State, estimates were based on data from other State by using the population ratio. The data were converted to weight using a unit weight of 30g.
Aluminum can	Data on the number of aluminium cans obtained from Yap State EPA (2018), Pohnpei State EPA (2017) and Kosrae State KIRMA (2016). As Chuuk State does not have a CDL system, the data was estimated based on data from other states by using the population ratio. The data were converted to weight using a unit weight of 15g.
Glass	Data on the number of glass bottles obtained from Yap EPA (2018) and Kosrae KIRMA (2016); as there is no CDL system in place for Pohnpei and Chuuk states, estimates were based on data from other states by using the population ratio. The data were converted to weight using a unit weight of 400 g.
Used LA battery	Data on the number of used lead-acid batteries obtained from Kosrae KIRMA (2016); as there is no CDL system in place for Yap, Pohnpei and Chuuk states, estimates were based on data from other stayes by using the population ratio. The data were converted to weight using a unit weight of 16 kg.

3. Marshall

Recyclable material	Basis for setting
PET bottle	Data on the number of PET bottles obtained from the "Annual Report to the Nitijela for the CDL Recycling System for Year 2019" by RMI EPA. The data was converted to weight using a unit weight of 30g.
Aluminum can	Data on the number of aluminium cans obtained from "Annual Report to the Nitijela for the CDL Recycling System for Year 2019" by RMI EPA. The data was converted to weight using a unit weight of 15g.
Glass	Data on the number of glass bottles obtained from "Annual Report to the Nitijela for the CDL Recycling System for Year 2019" by RMI EPA. The data was converted to weight using a unit weight of 400g.
Used LA battery	Corrected from the amount of used lead-acid batteries generated in Micronesia by using a ratio of GDP in 2019 for the Marshall and Micronesia.

4. Papua New Guinea

Recyclable material	Basis for setting
PET bottle	The data on the number of PET bottles in Solomon Islands in the Pre-Feasibility Study to Introduce a Container Deposit Scheme Into the Solomon Islands (April 2019) was corrected using the population ratio between PNG and Solomon and other factors, and converted to weight using 30g unit weight.
Aluminum can	The data on the number of aluminium cans in Solomon Islands in the Pre-Feasibility Study to Introduce a Container Deposit Scheme Into the Solomon Islands (April 2019) was corrected using the population ratio between PNG and Solomon and other factors, and converted to weight using a unit weight of 16g.
Glass	Export and import statistics data for 2019 (BACI)
Used LA battery	Export and import statistics data for 2019 (BACI)

5. Solomon

Recyclable material	Basis for setting
PET bottle	Export and import statistics data for 2019 (BACI)
Aluminum can	Export and import statistics data for 2019 (BACI)
Glass	Export and import statistics data for 2019 (BACI)
Used LA battery	Export and import statistics data for 2019 (BACI)

6. Vanuatu

Recyclable material	Basis for setting
PET bottle	Export and import statistics data for 2019 (BACI)
Aluminum can	Export and import statistics data for 2019 (BACI)
Glass	Export and import statistics data for 2019 (BACI)
Used LA battery	Export and import statistics data for 2019 (BACI)

7. Fiji

Recyclable material	Basis for setting
PET bottle	Results of the survey on distribution and retail industries (PET bottle: domestic production + imports)
Aluminum can	Results of the survey on distribution and retail industries (aluminium can: production for domestic use + imports)
Glass	Export and import statistics data for 2019 (BACI)
Used LA battery	Export and import statistics data for 2019 (BACI)

8. Samoa

Recyclable material	Basis for setting
PET bottle	Export and import statistics data for 2019 (BACI)
Aluminum can	Export and import statistics data for 2019 (BACI)
Glass	Export and import statistics data for 2019 (BACI)
Used LA battery	Export and import statistics data for 2019 (BACI)

9. Tonga

Recyclable material	Basis for setting
PET bottle	Export and import statistics data for 2019 (BACI)
Aluminum can	Export and import statistics data for 2019 (BACI)
Glass	Export and import statistics data for 2019 (BACI)
Used LA battery	Export and import statistics data for 2019 (BACI)

Basis for setting base year (2019) data (Amount of generation of recyclable material)

<Conditions commonly applied to each country>

Recyclable material	Basis for setting
Ferrous scrap	It was set on the basis of the following; (1) Amount of target items generated in 2019 in each country (Automobile, television set, refrigerator, washing machine, air conditioner, microwave oven, computer, cell phone) (2) Persentage of ferrous scrap contained in automobile: 36% (estimated by the survey team from Reference Material 8 a-3-4 Appendix 2 of public comment on the draft report of the joint meeting of the Industrial Structure Council's Automobile Recycling WG and other groups.) (3) Percentage of ferrous scrap contained in home appliances: Television set (approx. 48%), refrigerator (approx. 57%), washing machine (approx. 55%), air conditioner (approx. 48%), microwave oven (approx. 81%), computer (approx. 81%), cell phone (approx. 81%) (estimated by the survey team from "The Association for Electric Home Appliances" 2015 Annual Report on Home Appliance Recycling.)
Non-ferrous scrap	It was set on the basis of the following; (1) Amount of target items generated in 2019 in each country (Autoboble, television set, refrigerator, washing machine, air conditioner, microwave oven, computer, cell phone, Aluminum can) (2) Persentage of non-ferrous scrap contained in automobile: 1% (estimated by the survey team from Reference Material 8 a-3-4 Appendix 2 of public comment on the draft report of the joint meeting of the Industrial Structure Council's Automobile Recycling WG and other groups.) (3) Percentage of non-ferrous scrap contained in home appliance: Television set (approx. 6%), refrigerator (approx. 10%), washing machine (approx. 10%), air conditioner (approx. 34%), microwave oven (approx. 11%), computer (approx. 11%), cell phone (approx. 11%) (estimated by the survey team from "The Association for Electric Home Appliances" 2015 Annual Report on Home Appliance Recycling.)
Used LA battery	It was set on the bases of the following; (1) Amount of target items generated in each country in 2019 (automobile, used lead acid batteries) (2) Percentage of used lead acid batteries contained in the automobile: 1% (estimated by the survey team from Reference Material 8 a-3-4 Appendix 2 of public comment on the draft report of the joint meeting of the Industrial Structure Council's Automobile Recycling WG and other groups.)
Used tyre	It was set on the bases of the following; (1) Amount of target items generated in each country in 2019 (automobile, used tyre) (2) Percentage of used tyre contained in the automobile: 3% (estimated by the survey team from Reference Material 8 a-3-4 Appendix 2 of public comment on the draft report of the joint meeting of the Industrial Structure Council's Automobile Recycling WG and other groups.)
Waste lubricant oil	It was set on the bases of the following; (1) Amount of target items generated in each country in 2019 (automobile, waste lubricant oil) (2) Percentage of waste lubricant oil contained in the automobile: 1.5% (estimated by the survey team from Reference Material 8 a-3-4 Appendix 2 of public comment on the draft report of the joint meeting of the Industrial Structure Council's Automobile Recycling WG and other groups.)
PET bottle	Amount of target items generated in each country in 2019 (PET bottle)
Glass	Amount of target items generated in each country in 2019 (Glass)
Paper / cardboard	Amount of target items generated in each country in 2019 (Paper / cardboard)
Single use plastic	Amount of target items generated in each country in 2019 (Single use plastic)

Basis for setting base year (2019) data (Recycled in the country)

<Conditions commonly applied to each country>

Recyclable material	Basis for setting
Ferrous scrap	Results of Survey on recycling activities by the private sector (private recycling companies) Results of Survey on recycling activities by the public sector (central and local governments) Reuse and repair are not included in on-site recycling. If recyclable material is not recycled locally, the amount recycled in the country is assumed to be zero.
Non-ferrous scrap	
PET bottle	
Glass	
Paper / cardboard	
Used LA battery	
Used tyre	
Waste lubricant oil	
Single use plastic	

Basis for setting base year (2019) data (Exported recyclable material)

<Conditions commonly applied to each country>

Recyclable material	Basis for setting
Ferrous scrap	Export and import statistics data for 2019 (BACI)
Non-ferrous scrap	
Glass	
Paper / cardboard	
Used tyre	
Waste Lubricant oil	It was condered as 0 based on the results of Survey on recycling activities by the private sector (private recycling companies) and Survey on recycling activities by the public sector (central and local governments).
Single use plastic	

<Conditions different from country to country>

1. Palau

Recyclable material	Basis for setting
PET bottle	Export and import statistics data for 2019 (BACI)
Used LA battery	Average of 2012-2019 Import and Export Statistical Data (BACI)

2. Micronesia

Recyclable material	Basis for setting
PET bottle	Export and import statistics data for 2019 (BACI)
Used LA battery	Export and import statistics data for 2019 (BACI)

3. Marshall

Recyclable material	Basis for setting
PET bottle	Based on the fact that PET is not exported, it was set to 0.
Used LA battery	Export and import statistics data for 2019 (BACI)

4. Papua New Guinea

Recyclable material	Basis for setting
PET bottle	Export and import statistics data for 2019 (BACI)
Used LA battery	Export and import statistics data for 2019 (BACI)

5. Solomon

Recyclable material	Basis for setting
PET bottle	Export and import statistics data for 2019 (BACI)
Used LA battery	Export and import statistics data for 2019 (BACI)

6. Vanuatu

Recyclable material	Basis for setting
PET bottle	Export and import statistics data for 2019 (BACI)
Used LA battery	Average of 2012-2019 Import and Export Statistical Data (BACI)

7. Fiji

Recyclable material	Basis for setting
PET bottle	Results of the Survey on distribution and retail industries (PET bottle: Export volume)
Used LA battery	Export and import statistics data for 2019 (BACI)

8. Samoa

Recyclable material	Basis for setting
PET bottle	Export and import statistics data for 2019 (BACI)
Used LA battery	Export and import statistics data for 2019 (BACI)

9. Tonga

Recyclable material	Basis for setting
PET bottle	Export and import statistics data for 2019 (BACI)
Used LA battery	Results of the Survey on recycling activities by the private sector (private recycling companies) (Used lead acid battery: Export volume)

Basis for setting base year (2019) data (Unmanaged or disposed)

<Conditions commonly applied to each country>

Recyclable material	Basis for setting
Ferrous scrap	Since exported recyclable material derived only from the target items is unknown, no value was given.
Non-ferrous scrap	
PET bottle	Recycled in the country and exported recyclable material have been subtracted from amount of generation of recyclable material.
Glass	
Paper / cardboard	
Used LA battery	
Used tyre	
Waste lubricant oil	
Single use plastic	

Basis for estimation from 2020 to 2030 (Amount used/expired)

<Conditions commonly applied to each country>

Items	Basis for estimation
PET bottle	Amount used/expired in the base year (2019) was multiplied by the ratio of the population of each year (2020-2030) to the population of 2019 of Word Population Prospects 2019.
Alumunum can	
Glass	
Single use plastic	
Automobile	2020-2023: Amount used/expired in the base year (2019) was multiplied by the GDP growth rate of each year (2020-2022) of WB Global Economic Prospects June 2021. 2023-2030: Amount used/expired in the base year (2019) was multiplied by 2023 GDP growth in WB Global Economic Prospects June 2021. (Assuming that GDP growth after 2023 will keep the level of 2023).
Used LA battery	
Used tyre	
Television set	
Refrigerator	
Washing machine	
Air conditioner	
Microwave oven	
Computer	
Cell phone	
Waste lubricant oil	
Paper / cardboard	

Basis for estimation in 2020 and 2030 (Amount of generation of recyclable material)

<Conditions commonly applied to each country>

Recyclable material	Basis for estimation
Ferrous scrap	Based on the estimated amount used/expired in each year, the same calculation method for setting the amount of generation of recyclable material in setting the base year data was used for the estimation. (For details, refer to "Basis for setting base year (2019) data (Amount of generation of recyclable material)")
Non-ferrous scrap	
PET bottle	
Glass	
Paper / cardboard	
Used LA battery	
Used tyre	
Waste lubricant oil	
Single use plastic	

Basis for estimation in 2020 and 2030 (Recycled in the country)

<Conditions commonly applied to each country>

Recyclable material	Basis for estimation
Ferrous scrap	The ratio of recycled in the country in amount of generation of recyclable material in 2019 (base year) was multiplied by the estimated amount of generation of recyclable material in each year.
Non-ferrous scrap	
PET bottle	
Glass	
Paper / cardboard	
Used LA battery	
Used tyre	
Waste lubricant oil	
Single use plastic	

Basis for estimation in 2020 and 2030 (Exported recyclable material)

<Conditions commonly applied to each country>

Recyclable material	Basis for estimation
Ferrous scrap	The ratio of exported recyclable material to amount of generation of recyclable material in 2019 (base year) was multiplied by the estimated amount of generation of recyclable material in each year.
Non-ferrous scrap	
PET bottle	
Glass	
Paper / cardboard	
Used LA battery	
Used tyre	
Waste lubricant oil	
Single use plastic	

Basis for estimation in 2020 and 2030 (Unmanaged or disposed)

<Conditions commonly applied to each country>

Recyclable material	Basis for estimation
Ferrous scrap	Since exported recyclable material derived only from the target items is unknown, no value was given.
Non-ferrous scrap	
PET bottle	Recycled in the country and exported recyclable material have been subtracted from amount of generation of recyclable material.
Glass	
Paper / cardboard	
Used LA battery	
Used tyre	
Waste lubricant oil	
Single use plastic	

Result of estimation from 2020 to 2030 (Amount used/expired)

1. Palau

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
PET bottle	169	170	171	171	172	172	172	172	172	172	172	172
Aluminum can	164	165	166	166	166	166	166	166	166	166	166	166
Glass	197	198	199	200	201	201	201	201	201	201	201	201
End of Life vehicle	1,498	1,348	1,294	1,450	1,537	1,630	1,727	1,830	1,940	2,056	2,179	2,311
Automobile	1,279	1,151	1,105	1,238	1,312	1,391	1,474	1,562	1,656	1,755	1,860	1,972
Used LA battery	98	88	84	94	100	106	112	119	126	134	142	151
Used tyre	121	109	105	118	125	133	141	149	158	167	177	188
Waste home appliance	77	70	68	76	80	85	90	95	100	105	110	115
Television set	8	7	7	8	8	8	8	8	8	8	8	8
Refrigerator	28	25	24	27	29	31	33	35	37	39	41	43
Washing machine	24	22	21	24	25	27	29	31	33	35	37	39
Air conditioner	11	10	10	11	12	13	14	15	16	17	18	19
Microwave oven	4	4	4	4	4	4	4	4	4	4	4	4
Computer	2	2	2	2	2	2	2	2	2	2	2	2
Cell phone	0	0	0	0	0	0	0	0	0	0	0	0
Waste lubricant oil	198	178	171	192	204	216	229	243	258	273	289	306
Paper, cardboard	163	147	141	158	167	177	188	199	211	224	237	251
Single use plastic	40	40	40	40	40	40	40	0	0	0	0	0

2. Micronesia

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
PET bottle	97	98	99	100	101	102	103	104	105	106	107	108
Aluminum can	309	312	315	318	321	324	327	330	333	336	339	342
Glass	1,218	1231	1244	1257	1270	1283	1296	1309	1321	1333	1345	1356
End of Life vehicle	2,273	2239	2161	2215	2237	2259	2281	2304	2328	2352	2376	2400
Automobile	1,855	1827	1763	1807	1825	1843	1861	1880	1899	1918	1937	1956
Used LA battery	149	147	142	146	147	148	149	150	152	154	156	158
Used tyre	269	265	256	262	265	268	271	274	277	280	283	286
Waste home appliance	172	169	163	167	168	169	170	171	172	173	174	175
Television set	37	36	35	36	36	36	36	36	36	36	36	36
Refrigerator	73	72	69	71	72	73	74	75	76	77	78	79
Washing machine	45	44	42	43	43	43	43	43	43	43	43	43
Air conditioner	10	10	10	10	10	10	10	10	10	10	10	10
Microwave oven	5	5	5	5	5	5	5	5	5	5	5	5
Computer	2	2	2	2	2	2	2	2	2	2	2	2
Cell phone	0	0	0	0	0	0	0	0	0	0	0	0
Waste lubricant oil	283	278	268	275	278	281	284	287	290	293	296	299
Paper, cardboard	88	87	84	86	87	88	89	90	91	92	93	94
Single use plastic	52	53	54	55	56	57	58	0	0	0	0	0

3. Marshall

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
PET bottle	246	248	250	252	254	256	258	261	264	267	270	273
Aluminum can	178	179	180	181	182	184	186	188	190	192	194	196
Glass	73	74	75	76	77	78	79	80	81	82	83	84
End of Life vehicle	485	463	458	472	481	490	500	510	520	530	540	550
Automobile	376	359	355	366	373	380	388	396	404	412	420	428
Used LA battery	87	83	82	84	86	88	90	92	94	96	98	100
Used tyre	22	21	21	22	22	22	22	22	22	22	22	22
Waste home appliance	143	137	136	141	143	145	147	149	151	153	155	157
Television set	24	23	23	24	24	24	24	24	24	24	24	24
Refrigerator	60	57	56	58	59	60	61	62	63	64	65	66
Washing machine	24	23	23	24	24	24	24	24	24	24	24	24
Air conditioner	27	26	26	27	28	29	30	31	32	33	34	35
Microwave oven	7	7	7	7	7	7	7	7	7	7	7	7
Computer	1	1	1	1	1	1	1	1	1	1	1	1
Cell phone	0	0	0	0	0	0	0	0	0	0	0	0
Waste lubricant oil	177	169	167	172	175	179	183	187	191	195	199	203
Paper, cardboard	267	255	252	260	265	270	275	281	287	293	299	305
Single use plastic	63	63	63	63	63	64	65	0	0	0	0	0

Result of estimation from 2020 to 2030 (Amount used/expired)

4. Papua New Guinea

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
PET bottle	4,530	4618	4707	4796	4886	4976	5067	5158	5250	5342	5434	5527
Aluminum can	5,792	5905	6019	6133	6248	6364	6480	6597	6714	6832	6950	7068
Glass	13,549	13813	14079	14346	14615	14886	15158	15431	15705	15980	16256	16533
End of Life vehicle	29,139	28002	28982	30199	30924	31666	32426	33204	34001	34817	35652	36508
Automobile	17,285	16611	17192	17914	18344	18784	19235	19697	20170	20654	21150	21658
Used LA battery	1,656	1591	1647	1716	1757	1799	1842	1886	1931	1977	2024	2073
Used tyre	10,198	9800	10143	10569	10823	11083	11349	11621	11900	12186	12478	12777
Waste home appliance	13,283	12764	13210	13766	14096	14434	14779	15133	15497	15869	16248	16637
Television set	3,079	2959	3063	3192	3269	3347	3427	3509	3593	3679	3767	3857
Refrigerator	3,184	3060	3167	3300	3379	3460	3543	3628	3715	3804	3895	3988
Washing machine	5,067	4869	5039	5251	5377	5506	5638	5773	5912	6054	6199	6348
Air conditioner	1,167	1121	1160	1209	1238	1268	1298	1329	1361	1394	1427	1461
Microwave oven	535	514	532	554	567	581	595	609	624	639	654	670
Computer	208	200	207	216	221	226	231	237	243	249	255	261
Cell phone	43	41	42	44	45	46	47	48	49	50	51	52
Waste lubricant oil	4,320	4152	4297	4477	4584	4694	4807	4922	5040	5161	5285	5412
Paper, cardboard	4,697	4514	4672	4868	4985	5105	5228	5353	5481	5613	5748	5886
Single use plastic	3,386	3452	3518	3585	3652	3720	3788	0	0	0	0	0

5. Solomon

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
PET bottle	704	722	740	758	776	794	812	831	850	869	888	908
Aluminum can	115	118	121	124	127	130	133	136	139	142	145	148
Glass	106	109	112	115	118	121	124	127	130	133	136	139
End of Life vehicle	3,196	3037	3097	3236	3375	3520	3671	3828	3992	4164	4343	4530
Automobile	2,641	2509	2559	2674	2789	2909	3034	3164	3300	3442	3590	3744
Used LA battery	165	157	160	167	174	181	189	197	205	214	223	233
Used tyre	390	371	378	395	412	430	448	467	487	508	530	553
Waste home appliance	870	826	842	880	918	957	1000	1043	1088	1135	1184	1234
Television set	202	192	196	205	214	223	233	243	253	264	275	287
Refrigerator	208	198	202	211	220	229	239	249	260	271	283	295
Washing machine	332	315	321	335	349	364	380	396	413	431	450	469
Air conditioner	76	72	73	76	79	82	86	90	94	98	102	106
Microwave oven	35	33	34	36	38	40	42	44	46	48	50	52
Computer	14	13	13	14	15	16	17	18	19	20	21	22
Cell phone	3	3	3	3	3	3	3	3	3	3	3	3
Waste lubricant oil	720	684	698	729	760	793	827	863	900	939	979	1021
Paper, cardboard	534	507	517	540	563	587	612	638	665	694	724	755
Single use plastic	486	498	510	522	534	547	560	0	0	0	0	0

6. Vanuatu

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
PET bottle	85	87	89	91	93	95	97	99	101	103	105	107
Aluminum can	22	23	24	25	26	27	28	29	30	31	32	33
Glass	645	661	677	693	709	725	741	757	774	791	808	825
End of Life vehicle	2,969	2672	2779	2888	2983	3081	3183	3288	3397	3510	3626	3746
Automobile	2,620	2358	2452	2548	2632	2719	2809	2902	2998	3097	3199	3305
Used LA battery	70	63	66	69	71	73	75	77	80	83	86	89
Used tyre	279	251	261	271	280	289	299	309	319	330	341	352
Waste home appliance	320	289	300	311	320	330	341	352	363	375	387	399
Television set	74	67	70	73	75	77	80	83	86	89	92	95
Refrigerator	77	69	72	75	77	80	83	86	89	92	95	98
Washing machine	122	110	114	118	122	126	130	134	138	143	148	153
Air conditioner	28	25	26	27	28	29	30	31	32	33	34	35
Microwave oven	13	12	12	12	12	12	12	12	12	12	12	12
Computer	5	5	5	5	5	5	5	5	5	5	5	5
Cell phone	1	1	1	1	1	1	1	1	1	1	1	1
Waste lubricant oil	225	203	211	219	226	233	241	249	257	265	274	283
Paper, cardboard	276	248	258	268	277	286	295	305	315	325	336	347
Single use plastic	98	100	102	104	106	108	110	0	0	0	0	0

Result of estimation from 2020 to 2030 (Amount used/expired)

7. Fiji

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
PET bottle	2,524	2542	2560	2579	2598	2617	2637	2657	2678	2699	2719	2739
Aluminum can	346	349	352	355	358	361	364	367	370	373	376	379
Glass	3,931	3960	3989	4018	4047	4077	4108	4140	4172	4204	4236	4267
End of Life vehicle	23,628	19139	19636	21247	22713	24280	25955	27746	29661	31708	33895	36233
Automobile	19,570	15852	16264	17598	18812	20110	21498	22981	24567	26262	28074	30011
Used LA battery	922	747	766	829	886	947	1012	1082	1157	1237	1322	1413
Used tyre	3,136	2540	2606	2820	3015	3223	3445	3683	3937	4209	4499	4809
Waste home appliance	4,382	3551	3643	3942	4214	4506	4818	5150	5505	5885	6290	6724
Television set	593	480	492	532	569	608	650	695	743	794	849	908
Refrigerator	1,892	1533	1573	1702	1819	1945	2079	2222	2375	2539	2714	2901
Washing machine	1,154	935	959	1038	1110	1187	1269	1357	1451	1551	1658	1772
Air conditioner	237	192	197	213	228	244	261	279	298	319	341	365
Microwave oven	360	292	300	325	347	371	397	424	453	484	517	553
Computer	134	109	112	121	129	138	148	158	169	181	193	206
Cell phone	12	10	10	11	12	13	14	15	16	17	18	19
Waste lubricant oil	2,700	2187	2244	2428	2596	2775	2966	3171	3390	3624	3874	4141
Paper, cardboard	4,112	3331	3418	3698	3953	4226	4518	4830	5163	5519	5900	6307
Single use plastic	337	339	341	343	346	349	352	0	0	0	0	0

8. Samoa

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
PET bottle	507	511	515	520	526	532	538	544	550	556	562	568
Aluminum can	34	34	34	34	34	34	34	34	34	34	34	34
Glass	795	800	807	815	824	834	843	852	861	870	879	888
End of Life vehicle	4,757	4590	4237	4474	4693	4923	5164	5417	5683	5961	6253	6560
Automobile	3,970	3831	3536	3734	3917	4109	4310	4521	4743	4975	5219	5475
Used LA battery	218	210	194	205	215	226	237	249	261	274	287	301
Used tyre	569	549	507	535	561	588	617	647	679	712	747	784
Waste home appliance	364	352	324	342	358	375	392	411	431	452	473	496
Television set	89	86	79	83	87	91	95	100	105	110	115	121
Refrigerator	163	157	145	153	160	168	176	185	194	204	214	224
Washing machine	49	47	43	45	47	49	51	53	56	59	62	65
Air conditioner	11	11	10	11	12	13	14	15	16	17	18	19
Microwave oven	41	40	37	39	41	43	45	47	49	51	53	56
Computer	10	10	9	10	10	10	10	10	10	10	10	10
Cell phone	1	1	1	1	1	1	1	1	1	1	1	1
Waste lubricant oil	297	287	265	280	294	308	323	339	356	373	391	410
Paper, cardboard	558	538	497	525	551	578	606	636	667	700	734	770
Single use plastic	837	843	850	859	869	879	889	0	0	0	0	0

9. Tonga

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
PET bottle	139	141	142	143	144	145	146	147	148	149	150	151
Aluminum can	49	50	51	51	51	51	51	51	51	51	51	51
Glass	464	469	474	478	482	486	490	494	498	502	507	512
End of Life vehicle	3,167	3119	3025	3095	3181	3269	3360	3455	3552	3651	3754	3859
Automobile	2,782	2740	2658	2719	2795	2873	2953	3036	3121	3208	3298	3390
Used LA battery	121	119	115	118	121	124	127	131	135	139	143	147
Used tyre	264	260	252	258	265	272	280	288	296	304	313	322
Waste home appliance	341	336	327	335	344	353	362	371	382	393	404	415
Television set	62	61	59	60	62	64	66	68	70	72	74	76
Refrigerator	117	115	112	115	118	121	124	127	131	135	139	143
Washing machine	117	115	112	115	118	121	124	127	131	135	139	143
Air conditioner	4	4	4	4	4	4	4	4	4	4	4	4
Microwave oven	28	28	27	28	29	30	31	32	33	34	35	36
Computer	12	12	12	12	12	12	12	12	12	12	12	12
Cell phone	1	1	1	1	1	1	1	1	1	1	1	1
Waste lubricant oil	203	199	193	197	203	209	215	221	227	233	240	247
Paper , cardboard	220	217	210	215	221	227	233	240	247	254	261	268
Single use plastic	30	30	30	30	30	30	30	0	0	0	0	0