



## Introduction

The increasing presence of plastic marine debris in the South Pacific Ocean is focusing attention on strengthening recycling policies and systems in the region. Unique challenges associated with shipping commodities of low value over long distances to recycling markets, however, reduce the economic viability to do so. This country profile includes the current technologies, material flow, logistics, public policies, institutional framework, financial mechanisms, and initiatives that are being designed or have been implemented to strengthen recycling systems in Fiji.

Fiji is an archipelago of more than 332 islands and 500 islets, of which 110 are permanently inhabited. Located in the Melanesian region of the Pacific, the country has a land area of 18,333 square kilometres, with a combined coastline of 1,129 km. The two main islands are Vanua Levu and Viti Levu; the capital of Suva is located on the latter.



Source: Google Maps

## Socioeconomic background

Fiji is a democratic republic with a complex administration of central, provincial, and local governments. Four electoral divisions represent 14 provinces, each with a council that is governed by the Fijian Affairs Board.

Each division consists of a combination of rural, city, and town councils. The Ministry for Local Government, Housing and Environment oversees 13 municipal councils that include two city councils and 11 town councils. The rural areas outside the municipal boundaries are governed by rural authorities.

The population of Fiji was estimated at 865,611 at the end of 2014 (FBS, 2015). Approximately half of Fiji's population lives in the coastal towns and cities of the major islands. The two major islands of Viti Levu and Vanua Levu account for approximately 87% of the country's population, of which 75% live on Viti Levu's coastline, either in Suva, Nadi, or Lautoka. Fiji's rural population is 398,181, or approximately 46% of the total (Knoema, 2015).

The table below sets out the Government of Fiji's structure and approximate population distribution.

### Fiji Central Division, including Lami, Nausori, Nasinu Town Councils and Suva City Council

Province	Urban	Rural
Naitasiri	146,079	27,593
Namosi		7,544
Rewa	90,535	12,720
Serua	7,023	12,379
Tailveu: 1 Rural Authority	19,593	42,172

### Fiji Northern Division, including Savusavu Town Council and Labasa City Council

Province	Urban	Rural
Bua		15,455
Cakaudrove	6,405	44,089
Macuata	26,678	39,317

### Fiji Eastern Division, including Levuka Town Council

Province	Urban	Rural
Kadavu: 1 Rural Authority		10,856
Lau		10,623
Lomaiviti: 1 Rural Authority; 1 Town Council	3,748	12,794

### Fiji Western Division, including Lautoka City Council and Nadi, Ba, Tavua, Sigatoka and Rakiraki Town Councils

Province	Urban	Rural
Ba	124,274	114,528
Nadroga-Navosa	9,608	48,629
Ra	4,372	26,162

### Outside Division

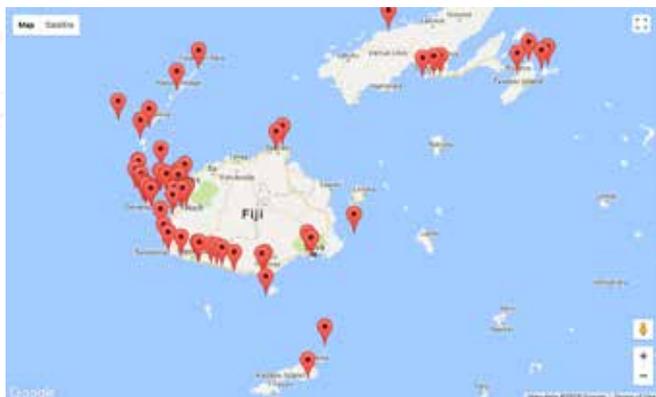
Province	Urban	Rural
Rotuma Island 1 Rural Authority		1,814

Source: "Population and Labour Force Estimates of 2014". Statistical News, Release No. 99. Suva: Fiji Bureau of Statistics.

Tourists to Fiji were 754,835 in 2015 (*RTRC, November 2016*), representing a 9% growth on the previous year and approximately 37% of gross domestic product (GDP) (*Colliers, 2014*).

Vanua Levu has three resorts in Savusavu, while Viti Levu has 22 located along the Coral Coast, around Pacific Harbour, and in Suva, Nadi and on the remainder of the island. The country's 15 single resort islands include Toberua, Matangi, Vatulele, Kadavu, Mana, Matamanoa, Vomo, Bekana, Bounty, Viwa and Yasawa, as well as the islands named after the resorts of Royal Davui, Castaway, Treasure and Beachcomber,

Some of the outer islands have various resorts, including Taveuni (3), Tokoriki (2), Malolo (3), Malolo Lailai (3), Denarau (7).



Source: Map of Resort Locations in Fiji from *Tourismfiji.com* (2017), available at [www.tourismfiji.com/fiji-map-resorts.html](http://www.tourismfiji.com/fiji-map-resorts.html).

Fiji's GDP for 2015 was US\$4.43 billion, at US\$9,300 per capita (*OECD, 2017*). The balance of trade in 2015 has a shortfall of US\$1.39 billion, with exports at US\$957 million (+0.8% annualised) and imports at US\$2.35 billion (+5% since 2010).

The primary export market destinations in 2015 were Australia, the People's Republic of China, Japan, New Zealand, and the United States. The main import origins in the same year were Australia, the People's Republic of China, France, New Zealand, and Singapore. (*OECD, 2017*).

The services sector is a major contributor to Fiji's GDP at 71%. Manufacturing as a value adding activity is responsible for 12.94% of the country's economy, the highest in the Pacific region (*GlobalEDGE, 2017*).

## Solid waste management

Waste composition studies, conducted in 2007, found a household waste generation rate of 0.403kg per day. This comprises nearly 60% organic waste, followed by approximately 12% plastic and over 11% paper.

The regional study coordinated by PRIF models the potential recovery of 15 materials types. A defined set of recovery rates was applied to the urban, rural, and outer island population distribution to calculate Fiji's potential recovery tonnage. The PRIF study compares various data to establish the context for the 15 waste materials.

The material flow chart below is based on an analysis of Fiji's imports of the 15 material categories studied, averaged over a seven-year period to 2016, compared with exports of those recovered recyclable materials, averaged over a two-year period 2015-2016, presented as a percentage of the total of the 15 categories. (*UN Comtrade, 2017*).

The number of beverage containers imported into Fiji during the seven years either increased steadily or held steady, depending on the material type of the containers. Interestingly, the polymers of polyethylene terephthalate (PET) that are used for the on-shore manufacture of plastic bottles decreased progressively from 2009 to 2012, with an upward trend from 2012 to 2016. Plastic bag imports rose sharply from 2009 to 2012 and have since shown a variable, but downward, trend.

In 2003, the annual inflow of PET into Fiji was 44 million containers, comprising 1.7 million imported and 42 million PET bottles produced locally from imported pellets.

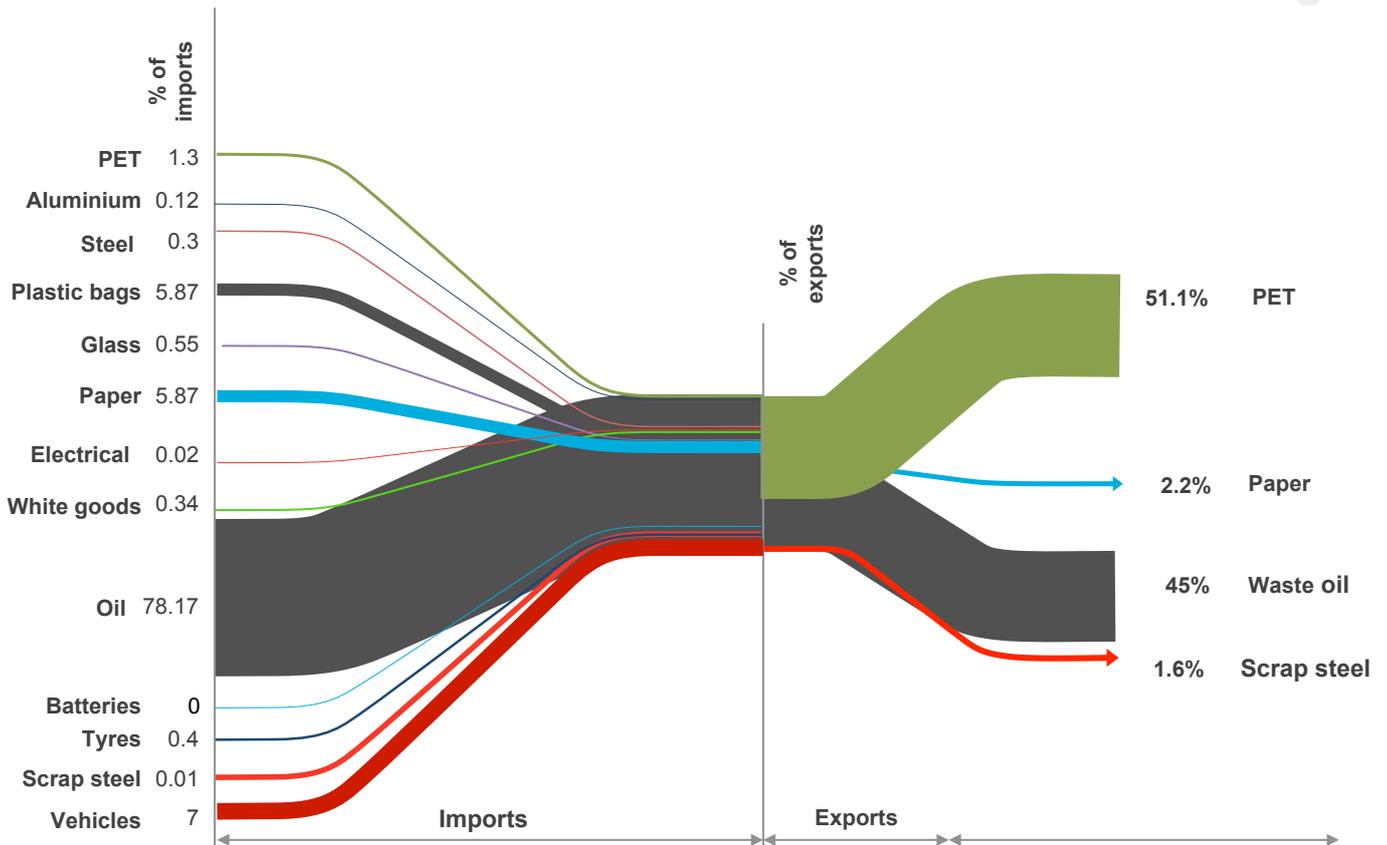
Import data indicates a major shift in policy or other trade-related factors in 2012 that impacted material use/import in Fiji. Paper, electronic items and whitegoods imports have held steady, as has that of petroleum oil. Motor vehicle imports rose sharply from 2009 to 2012.

Fiji is one of the largest exporters of the materials included in this report. In the two financial years, 2014/15 and 2015/16, Fiji exported more than 5,000 tonnes (t) of paper and cardboard and in excess of 116,000 t of PET beverage containers, on average. Scrap steel, tyres and end-of-life vehicles were other major exports.

Modelling of potential recovery of recyclable materials, presented in the table below, is based on an estimated average daily per capita municipal solid waste generation of 2.1kg (*World Bank, 2012*). It also applies a range of location-specific estimated recovery rates that are based on a set of assumptions of existing or introduced incentive-based policies and programs, such as container-deposit schemes and import levies. The resulting ratios were used to estimate average annual tonnages that could be recovered for recycling. (*JICA, 2013; SPREP 2016; Mobile Muster, 2013; DOEE, 2017; Jambeck et al., 2015; MFAT, 2016; UNIDO/ICSHP, 2013*).



## Material flow - Fiji



Source: Anne Prince Consulting, July 2017

Note: The percentage of imports and exports displayed relate only to the proportion of the 15 materials categories studied, not total imports/exports

Fiji	
Recyclable Material	Estimated Metric Tonnes
Polyethylene terephthalate (PET) beverage containers	1,588
Aluminium cans	4,318
Glass beverage containers	3,048
Steel cans	3,429
Plastic shopping bags	1,029
End-of-life (EOL) renewable energy equipment	-
Paper/cardboard	14,351
E-waste	125
Whitegoods	640
Used motor/cooking oil	3,332
Used lead acid batteries	649
Used lithium batteries	929
Scrap steel/nonferrous metals	5,144
EOL tyres	647
EOL vehicles	9,454
<b>Total</b>	<b>48,683</b>

## Future waste management

Significant importation of second-hand hybrid motor vehicles into Fiji in recent years is likely to result in a corresponding increase in nickel-metal hybrid batteries in the waste stream. The average age of the imported vehicles is around eight years, coinciding with a common battery-pack warranty period.

Future increases in material recovery are expected from the PacWaste (2014-17) programme, which is in the process of being implemented by the Secretariat of the Pacific Regional Environment Programme for the improved management of e-waste. Activities under this programme include the establishment of an e-waste pilot project for safe dismantling of e-waste, a community awareness campaign, and assistance in developing a national e-waste strategy (SPREP, 2017).

The second phase of the Promotion of Regional Initiative Solid Waste Management (J-PRISM II) project, implemented by JICA in early December 2016, supports capacity building in waste management. Target initiatives include improved governance and human resource development, which is expected to generate increased volumes of recoverable materials.

The Government of Fiji has set a target of 90% renewable energy generation by 2030 and a 100% access to electricity by 2020. 65% Renewable energy electricity will be achieved on completion of current hydroelectricity projects that are supported by the Asian Development Bank, as well as the governments of the People's Republic of China, Japan and the United Arab Emirates. These initiatives are expected to result in an increased presence of household electrical items, computers, and communication equipment in the waste stream.

## Plastic marine debris

Mismanaged plastic waste eventually enters the marine environment by way of inland rivers and waste water outfalls or is transported by wind and tide. Rigid and lightweight, plastic material from products that are consumed or used on a daily basis become marine debris if not managed appropriately.

An estimated 9% of Fiji's waste stream is made up of plastic. Evidence from a litter survey, conducted in 2007, shows that snack packs, followed by PET bottles and plastic bags, as predominant items (GoF, 2007).

Fiji's islands have a combined coastline of 6,112km, and a recent study (Jenna *et al.*, 2015) indicates a daily plastic waste generation of approximately 168.4t. An estimated 135t are mismanaged on a daily basis, entering the marine environment through the release from uncontained disposal sites or by direct littering. As indicative, an estimated 49,257t of plastic waste became marine debris in the waters around Fiji in 2010. If this is not addressed, the amount is expected to rise to 70,995t by 2025.

Of the 168.4t of plastic generated each day, approximately 18.6t may derive from PET or high-density polyethylene (HDPE) bottles eligible for recycling under a container deposit scheme (CDS). Based on an average reduction rate of 40% in mismanaged waste with a CDS in place, approximately 5.97t of PET and HDPE plastic could be recycled each day. This could increase to an 80% or above reduction rate, depending on access to recycling collection services and viable markets, among others. Nonetheless, a 40% reduction in mismanaged PET and HDPE would result in approximately 47,077t of plastic becoming marine debris each year.

The outcome of mismanaged plastic is split into three groups: plastic that remains on the surface of the sea as floating debris, plastic that sinks to the ocean floor, and plastic that washes up on the beach. A CDS that recovers 40% of HDPE and PET plastic bottles in the Fiji may achieve the following reductions in marine debris each year:

- 327t in floating plastic
- 1,526t in sunken plastic
- 327t in beach plastic

Further benefits attributed to a CDS are a potential reduction in annual damage costs for Fiji's 373 local fishing vessels (approximately US\$2,901). If beaches were to be cleaned, over US\$553,000 would be saved, of particular relevance to the amenities of coastal communities and the tourism sector.

## Infrastructure and services

Information relating to the solid waste and recycling infrastructure and services in Fiji are sourced from *Solid Waste Management in the Pacific: Fiji Country Snapshot*. Manila: Asian Development Bank 2014. Other information is drawn from "Data Collection Survey on Reverse Logistics in the Pacific Islands". Final Report 2013. Japan International Cooperation Agency (JICA) and from the Fiji National Solid Waste Management Strategy 2011 – 2014.

The Naboro Landfill in Suva is the sole sanitary landfill in Fiji. Operated by private contractors, it was constructed in 2005 at a cost of over US\$7 million with funding from the European Union. The landfill is owned by the Government of Fiji and comes under the responsibility of the Department of Environment (ADB, 2014). The landfill has a remaining life span of approximately 60 years.

Four authorised, open disposal sites are located at Savusavu, Rakiraki, Tavua, and Ba, while three controlled disposal sites with restricted access are located at Lautoka, Sigatoka, and Vunato. With support from JICA, the Vunato site was upgraded to include composting operations, a weighbridge, a data collection system, heavy equipment for the placement and compaction of waste, and the development of a site operational plan. A dedicated and controlled disposal site for disaster waste is located within the Labasa Town Council area.

The first phase of the Promotion of Regional Initiative Solid Waste Management (J-PRISM I) project provided garbage compactor vehicles to Suva City Council, Nausori Town Council, Lami Town Council, and Rabi Island. The project also supplied a backhoe to the Sigatoka Town Council, as well as promoted recycling and offered solid waste management (SWM) training programmes.

Approximately US\$540,000 was allocated in the 2014 national preliminary works budget to establish a waste transfer station able to receive waste from councils in the greater Suva area. The intention is for recoverable material to be segregated prior to final disposal at the Naboro Landfill.

Suva City Council provides residential solid waste and commercial collection services three and six times a week, respectively. Waste is placed in 60 litre bins and bags on the roadside curb or on raised platforms (i.e., to prevent dog access) for collection.

The Council operates its own waste vehicle fleet, with six compactors and two covered trucks. Private contractors are hired by the Council to collect green waste. Five private companies offer commercial and residential waste collection services, some directly contracted by the Council.

Fiji's remaining 12 councils are responsible for waste collection services in each municipality. In Labasa, for example, a waste collection service is provided to the entire city by a private company three times a week. This company also operates the city's landfill site where waste pickers collect recyclables and other materials of value.

A number of previous projects and pilot studies have established segregated recycling systems in Suva and Lautoka, although it is uncertain whether or not these



services remain in place. Fifteen recycling companies operate in Fiji, only one of which appears to operate on the island of Vanua Levu.

Scrap metal is transferred from Vanua Levu to the Port of Suva, using large trucks for roll-on/roll-off vessels. At least one recycling company has a shredder that processes the scrap metal for containerisation prior to export. Fifteen registered recycling companies export scrap metal, primarily to Australia, Indonesia, the Republic of Korea, and New Zealand. PET and paper are exported mainly to Australia and Hong Kong (China).

Progressive initiatives for waste minimisation are being undertaken on the resort island of Malolo Lailai, where the local supermarket charges for single-use plastic bags. It appears that recovered plastic and glass are shipped to the mainland from the island each week.

There is some in-country remanufacturing that takes place, with one company producing toilet paper from waste paper. Another entity produces new lead-acid batteries from used ones.

## Logistics

The international ports of Fiji are operated by the Fiji Port Corporation Ltd. These are located in Suva and Latouka on the island of Viti Levu and Savusavu on the island of Vanua Levu. Two privately owned ports are located at Malau (Fiji Sugar Corporation) and Wairiki (Tropik Wood Industries Ltd.) (Ports.com, 2017).

## Fiji Islands



Source: Google Maps.

Suva is a busy trans-shipment port, not only for Fiji but also within the Pacific, with approximately 850 ships visiting annually. The terminal is approximately 3 hectares, with average standard facilities. These include a main quay of 492m long by approximately 12m deep and a warehouse. Shore cranes and private stevedore services are available.

Recent capital works have strengthened a large section (140m) of Kings Wharf, the main quay that previously had been useless for container operations, given a failing wharf structure. Heavy cranes and forklifts are now able to use this section.

Plans are in place to address congestion at the port terminal entry (north) and exit (south) gates, as well as light and on-site heavy vehicle movements. Adjacent road networks will be upgraded and an additional entry lane will be constructed to direct heavy vehicles away from the high-traffic town centre and market areas, so that they enter and exit the site at the northern gate. Remaining vehicles will use the entry/exit southern gate.

Suva has an annual handling capacity of 80,000 twenty-foot equivalent units (TEU) and manages a yearly throughput of approximately 34,210 import and 18,144 export containers, with 5,234 for transshipment. Approximately 16,066 containers return empty with a potential for significant backlog.

The Port of Suva is serviced by multiple international shipping lines. Estimated TEU shipping container rates, presented below, are based on the cargo of non-hazardous goods, inclusive of un/loading and a bunker adjustment factor. They do not account, however, for customs clearance, duties, and quarantine inspection.

Fiji: Shipping Lines		
Swire Shipping; Neptune Pacific Line, Kyowa Shipping Co. Ltd.; Auspac Consortium; Polynesia Line; Matson Inc.; NZ-Fiji Consortium		
Destination	Schedule	Est. USD per TEU
Australia	14-day	2,050 to 4,600
Noumea	14-day	1,950 to 4,400
South East Asia	14-day	2,500 to 3,230
Papua New Guinea	14-day	Not provided
New Zealand	14-day	1,900 to 4,600
North Asia	21-day	2,400 to 5,050
United States, West Coast	30-day	Not provided

Source: AMSTEC Pty Ltd

Notes: USD = U.S. dollar; TEU = twenty-foot equivalent unit.

A 2015 review of the ports' waste reception facilities identifies essential improvements to reach the standards of the International Convention for the Prevention of Pollution from Ships (MARPOL), of which Fiji is a signatory (SPREP, 2015).

The study recommends the development of a port waste management plan to address the operation of waste generated by ships and ports; managing waste data with regard to vessels; communicating MARPOL requirements and the availability of disposal services to shipping agents and crew; ensuring greater use of the Naboro Landfill for compliant waste; providing resources to enforce regulations and restrict port access to licensed waste handlers; appropriating on-shore storage and signage for quarantine waste and possible garbage; and offering a waste oil collection service to anchored ships. The Government of Fiji has expressed a commitment to achieve MARPOL compliance.

The Ministry of Infrastructure and Transport is responsible for policy and the regulatory and administrative functions of the Department of Government Shipping Services. It provides a number of cargo and passenger vessels that service the main and outer islands.

Fiji also has a number of privately owned inter-island shipping facilities. The Fiji Commerce Commission regulates fares and freight rates, based on the 2014 Control of Freight Rates and Passenger Fares Order.

The Fiji Searoad Service provides regular roll-on/roll-off passenger ferry services between the main islands of Viti Levu and Vanua Levu and the outer islands of Koro and Ovalau. This company's multi-modal service includes road transport around both main islands. Patterson Brothers Shipping provides regular ferry services on the Suva/Levuka/Suva and Suva/Natovi/Nabouwalu/Labasa routes on a daily basis.

Other ferry services include Goundar Shipping Ltd, which departs from Suva with a regular passenger and cargo service to Savusavu, Taveuni, Kadavu, Vunisea and Kavala, Koro, Gau, Lau, Vanuabalavu, Cicia, Rotuma, Yasayasa and Moala. South Sea Cruises concentrates on the resort islands of Malolo and Denarau three days a week, while Awesome Adventures services the islands of Malolo, Denarau, Nacula and Waya.

An indication of an inter-island domestic freight rate for a TEU between the Port of Labasa and the Port of Suva is approximately US\$950. This includes the cost of road transport (*JICA, 2013*).

## Institutional framework

Data relating to the institutional framework of Fiji have been gathered from the database of the Pacific Islands Legal Information Institute (*PacILII, 2017*). ECOLEX is also an information service that relates to environmental law (*ECOLEX, 2017*), from which various data also have been collected.

The Department of Environment (DoE) is responsible for protecting the environment, while other agencies primarily focus on the health and welfare aspects of SWM. The DoE is the primary authority for implementation, monitoring, and enforcement of the following acts, regulations, and policies that relate to waste management.

Environmental Management Act 2005 established a waste management and pollution control unit in the DoE to administer Part 5 of the Act and develop management plans for the minimization of solid waste. It also provides guidelines for solid waste disposal infrastructure and the implementation of a national chemical management plan.

Fiji Environmental Management Regulations 2007 call for the development of environmental impact assessments to include potential environmental and resource management impacts of proposed activities. In addition, Environment Management (Waste Disposal and Recycling) (Amendment) Regulations 2011 control the discharge and disposal of solid, liquid, and hazardous waste. The regulations also prescribe permit conditions for waste transport, disposal, and recycling activities.

Support for recycling in the tourist sector is evident from the incorporation of waste minimisation principles in the waste disposal permit system. Tourist entities and hotels also must comply with specific permit conditions.

Environment Management Regulations 2011 Part 7 provides the legal framework for a container deposit legislation and refund system for beverage containers. This includes plastic, glass, and aluminium, as well as the administration of a revolving fund.

Environment Management (Waste Disposal and Recycling) (Container Deposit) Regulations 2011 call for the establishment of a nonprofit entity that is responsible for administering the container deposit system. Financial accounting and accountability for system entities will be key responsibilities of the entity. At the time of writing, these regulations have yet to come into force.

The Litter (Amendment) Decree prohibits littering, as well as its discharge from vehicles or in public places. The amendment decree also calls for the placement and maintenance of litter receptacles. Likewise, it appoints public officials (e.g., police officers, health inspectors, and land transport officials) as Litter Prevention Officers, enabling them to authorise immediately a community service in and around the offensive littering area and to impose spot fines. The decree redefines a waste receptacle and provides for the transfer of monies from paid fines to the governing public authority.

Previous surveys identified the need for a specific waste management/recycling act or regulation. The Environment and Climate Change Adaption Levy on Prescribed Services, Items and Income, 2017, amends the previous Environmental Levy Act 2015. The Amended Act established the Environment and Climate Adaption Fund and introduced a 10% import levy on non-biodegradable plastic shopping bags and a 10 cent per plastic bag levy payable by the person who is provided with a plastic bag from retail outlets. The Act is designed to reduce single-use plastic shopping bags by ensuring that manufactured or imported bags are biodegradable, with the name of the manufacturer or importer clearly visible. The amended Act was passed by Parliament in July 2017 and the introduction of a 10c per bag levy was in force by August 2017. While there has been no revision to Fiji's National Solid Waste Management Strategy 2010-2014 to date, the strategy does provide the framework for continual improvements.

The Ministry of Local Government, Housing and Environment administers the Local Government Act and empowers local governments to establish by-laws for the collection and disposal of waste. Continental Shelf Act 1970, Marine (Pollution Levy) Regulations 2014 and Maritime (Fiji Small Craft Code) Regulations 2014 provide protection for the marine environment.

The Ministry of Health monitors waste management under the Public Health Act (Cap 111), as do public sector health officials at the provincial level who report to the Ministry. This act allows local authorities to issue permits for waste transport, formulate by-laws for the collection and disposal of waste, prescribe fees for the removal of waste, and regulate waste disposal infrastructure.



Fijian Affairs Act (Cap 12) is administered by the Ministry of Fijian Affairs. This act ensures that councils at the provincial level monitor the management of solid waste, enact necessary by-laws, impose rates or fees for SWM, and restrict the fines that may be charged for breach of law.

The Biosecurity Authority of Fiji administers Biosecurity Promulgation 2008 which, in terms of waste management, provides border controls for imports and exports. Quarantine (Amendment) Decree 2010 and Plant Quarantine Act 1982 monitor and restrict the importation of plants, plant material, and plant cultures, among others. Permits are issued by the responsible minister.

Fiji is a party to the following multilateral environmental agreements and conventions. Fiji is not, however, a signatory to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal.

Fiji	
Multilateral Environmental Agreements and Conventions	Status
Stockholm Convention on Persistent Organic Pollutants	Ratified
1995 Waigani Convention	Ratified
Montreal Protocol on Substances that Deplete the Ozone Layer	Ratified
International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties (Intervention 1969)	Ratified
International Convention on Civil Liability for Oil Pollution Damage 1969 (renewed 1992)	Ratified
International Convention on the Protocol of 1992 to Amend the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971	Ratified
Noumea Convention:	Ratified
Protocol on Dumping	Ratified
Protocol on Combatting Pollution Emergencies Protocol	Ratified
Protocol on Oil Pollution Preparedness, Response and Cooperation	Signed
Protocol on Hazardous and Noxious Substances Pollution, Preparedness, Response and Cooperation	Signed

Source: SPREP, 2016.

## Financial mechanisms

Currency: Fiji dollar (F\$)

The DoE has a total annual waste management budget of US\$230,000, including for solid waste, e-waste, and hazardous waste. The DoE has allocated US\$1.2 million to the Naboro Landfill from external aid funding. Landfill disposal charges are based on weight and levied to all users (i.e., commercial and industrial) at approximately US\$14/t for general and green wastes and US\$25/t for special

(regulated) waste. Landfill gate fees and household rates do not fully recover operating costs; thus, annual government subsidies of approximately US\$650,000 are essential.

The Ministry of Health has a total annual waste and pollution management budget of US\$50,000. City and town councils levy waste collection and disposal fees within the general household rate at approximately F\$1.7 per household each week; however, in many instances, the rate charge usually goes unpaid. The Suva City Council, under Garbage Disposal By-Law 2009, levies households with an annual fee of approximately US\$15 per bin to cover collection and disposal costs.

A joint partnership between Coca Cola-Amatil (Fiji) Ltd. and Fiji Water operates a stewardship programme, whereby 60kg sacks are provided for the collection of plastic bottles and aluminium cans. The returned recyclables are purchased by Coca Cola-Amatil for US\$0.41/kg if the company collects, or US\$0.54/kg if delivered to the factory. The recyclables are exported to New Zealand.

House-to-house beer bottle collections for locally produced beer are offered by private operators. The bottles are subsequently returned to the local brewery for reuse.

Lautoka City Council offers informal waste pickers of non-sanitary landfills an annual fee of approximately US\$20. A private recycling company produces toilet paper from waste paper, purchasing the paper feedstock for approximately F\$0.5/kg.

## Conclusions

Fiji's commitment to financial mechanisms to support recycling is evident from its proposed container deposit legislation and refund system under the Environment Management (Waste Disposal and Recycling) (Container Deposit) Regulations 2011. National Solid Waste Management Strategy 2011-2014 identifies the importance of improving financing mechanisms such as a polluter-pays principle in value addition tax (i.e., nonessential basic items), an environment tax on specific imported goods, a fuel tax and a climate change levy on industrial energy usage.

Fiji has the strongest manufacturing base of all Pacific island countries featured in this study. This suggests that its utilities and services support increasing industry development in association with domestic recycling activities, enterprise, and relevant programmes. Fiji also has the highest export rate of recyclable material in the Pacific, with the potential to increase it and include material recovered from e-waste dismantling - an initiative yet to be established under the PacWaste programme.

The Port of Suva is a trans-shipment port that is located on a route that is cost-efficient and is serviced by multiple shipping companies that transfer to a large number of market destinations. While the port requires the capacity to increase the number of TEU's, it does provide significant opportunity for reverse logistics or the back-loading of exports.

The international destinations for the movement of hazardous wastes to recycling markets or treatment facilities are limited to countries that are a signatory to the Waigani Convention, as Fiji has not yet ratified the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal.

## Abbreviations

ADB	Asian Development Bank	km <sup>2</sup>	square kilometre
AMSTEC	Supply chain and transport consultancy firm	m	metre
CDS	Container deposit scheme	MARPOL	International Convention for the Prevention of Pollution from Ships
DoE	Department of Environment (Fiji)	MFAT	New Zealand Ministry of Foreign Affairs and Trade
DOEE	Department of Environment and Energy (AUS)	OEC	Observatory of Economic Complexity
ECOLEX	Environmental Law Database	PET	polyethylene terephthalate
EOL	End of life	PRIF	Pacific Region Infrastructure Facility
GDP	Gross domestic product	RTRC	Regional Tourism Resource Centre
HDPE	High-density polyethylene	SPREP	Secretariat of the Pacific Regional Environment Program
ICSHP	International Centre on Small Hydro Power	SWM	Solid waste management
J-PRISM	Promotion of Regional Initiative Solid Waste Management	T	tonne
JICA	Japan International Cooperation Agency	TEU	Twenty-foot equivalent unit
Kg	kilogram	UNIDO	United Nations Industrial Development Organisation
Km	kilometre		

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