



Environmentally responsible trade in waste plastics Report 3: Case studies on plastic waste management and trade in Asia Pacific

Prepared for the Department of Agriculture, Water and the
Environment by UTS Institute for Sustainable Futures and Asia
Pacific Waste Consultants

Report 3 of 3

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Report 3 of 3 of the *Environmentally responsible trade in waste plastics* project undertaken by UTS Institute for Sustainable Futures, Asia Pacific Waste Consultants and The Centre for International Economics.

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Glossary

APWC	Asia Pacific Waste Consultants
C&D	Construction and demolition
CDS	Container deposit scheme
CIE	The Centre for International Economics
DOC	Department of Construction [Vietnam]
DONRE	Department of Natural Resources and Environment [Vietnam]
DWMO	Designated Waste Management Operators [Vanuatu]
EPR	Extended Producer Responsibility
ERT	Environmentally responsible trade
JCPRA	Japan Containers and Packaging Recycling Association
ISF	Institute for Sustainable Futures
MARD	Ministry of Agriculture and Rural Development [Vietnam]
MOC	Ministry of Construction [Vietnam]
MOEJ	Ministry of Environment [Japan]
MOH	Ministry of Health [Vietnam]
MOIT	Ministry of Industry and Trade [Vietnam]
MONRE	Ministry of Natural Resources and Environment [Vietnam]
MOST	Ministry of Science and Technology [Vietnam]
MOT	Ministry of Transport [Vietnam]
MSW	Municipal solid waste
PPC	Provincial People's Committees [Vietnam]
URENCO	Vietnam Urban Environment Company
VEA	Vietnam Environment Administration
WEEE	Waste Electric and Electronic Equipment
J-PRISM	Japanese Technical Cooperation Project for Promotion of Regional Initiative on Solid Waste Management
PRIF	Pacific Region Infrastructure Facility
RDF	Refuse derived fuel
SPREP	South Pacific Regional Environment Programme
SUP	Single use plastics

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1. Project Background

The linkages between the plastic waste trade and leakage of plastic into the ocean are not well understood. The Australian Government Department of Agriculture, Water and Environment (DAWE) commissioned the Institute for Sustainable Futures (ISF), Asia Pacific Waste Consultants (APWC) and The Centre for International Economics (CIE) to undertake the project *Environmentally Responsible Trade in Waste Plastics*. The objective of this project is to understand:

- whether and how environmentally responsible trade in recycled plastics can reduce leakage of plastic into the ocean, without merely shifting the plastic waste burden from one country to another
- what the opportunities are to ensure that trade in recycled plastics in the Asia-Pacific region is environmentally responsible.

This report is the third in a series of three reports as part of the *Environmentally Responsible Trade in Waste Plastics* project. This third report will present three in-depth case studies on three countries/regions that are illustrative of the challenges and opportunities for environmentally responsible trade of waste plastics in the region. Report 1 investigated the links between the plastics waste trade and marine plastic pollution. Report 2 analyses capacity gaps and needs to manage plastics within the Asia-Pacific region and identifies key interventions, and the links to environmentally responsible trade.

The case studies in this report have been selected as they provide an indication of the range of challenges to managing plastic waste in the Asia Pacific region. Japan has been selected as it is a country with a large number of policies to manage plastic waste, and its waste management system has had to adapt to policy changes in importing countries which limit its ability to export plastics. Pacific Island Countries (PICs) have been included as they face unique challenges to waste management given their low population and remote locations. Lastly, Vietnam has been selected as a case study as it saw a large increase in imports of plastic waste since 2018, and plastic collection and recycling is predominantly undertaken by the informal sector.

Case Study 1: Vietnam

2.1 Plastic waste management in Vietnam

Vietnam, along with China, Indonesia, the Philippines and Thailand have been identified as key global contributors to the leakage of plastics into the ocean, from both domestic and imported sources.¹ An estimated 1.83 mega tonnes of plastic waste is discharged from Vietnam each year into the environment, including 0.28-0.73 mega tonnes/year that end up in the ocean.²

A number of factors have contributed to this situation. Vietnam's population has increased rapidly from around 78 million people in 2001 to 96.5 million in 2019, which has been coupled with strong economic growth and urbanisation. Interviewees also highlighted the fact that Vietnam has a very long coastline with large coastal populations. The amount of waste produced by Vietnam has doubled in under 15 years, making it difficult for waste management systems to adapt to meet demand.³

Rapid growth in certain sectors of Vietnam's economy are also exacerbating waste management problems. For example, the increase in manufacturing in 2017 by 14.4% is expected to generate an extra 30 to 40% of solid waste annually.⁴ The importation of plastic scrap to feed into the burgeoning plastic sector is also particularly problematic, as there is currently inadequate infrastructure and oversight to process these volumes in environmentally sound manner.⁵ Plastic scrap imports have also increased as a result of China banning their importation in 2017. As a result, Vietnam's imports increased from around 36,000 tonne/month in July 2017 to peak at 91,000 tonne/month in November 2017.⁶

In the sections below, we give an overview of the waste management system, detail some of the key challenges, their key drivers and their implications for plastic leakage into the ocean.

Waste generation, collection & recycling rates

Based on figures from 2018, Vietnam produces 24.5 mega tonnes of waste per year.⁷ Estimates of waste flows indicate that only 20% of waste collected in Vietnam is disposed of in sanitary landfills, 43% is disposed of at uncontrolled landfills, and the remainder is informally recycled (10%), composted (4%), or incinerated (14%) or illegally discharged into the environment (9%).⁸ These waste flows are represented in Figure 1.

Based on data from the Ministry of Construction (MOC), the production of municipal solid waste has increased by 11.7% each year since 2005.⁹ Data from the Ministry of Natural Resources and Environment (MONRE) indicates that plastic is the second largest stream in municipal solid waste after organic waste, making up 11-14%.¹⁰

¹ Ocean Conservancy (2015) Stemming the Tide: Land-based strategies for a plastic-free ocean.

<https://act.oceanconservancy.org/wp-content/uploads/2017/04/full-report-stemming-the.pdf>

² Jambeck, J., Geyer, R., Wilcox, C., Siegler, T., Perryman, M., Andrady, A., Narayan, R., and Law, K.L., 2015, Plastic waste inputs from land into the ocean, *Science*, 2015, Vol 347, Issue 6223.

³ <http://documents.worldbank.org/curated/en/352371563196189492/pdf/Solid-and-industrial-hazardous-waste-management-assessment-options-and-actions-areas.pdf>

⁴ Vietnam Chamber of Commerce and Industry (VCCI) & United States Business Council for Sustainable Development (2019) Vietnam Materials Marketplace Startup Project Report, accessible online at: <https://p4gpartnerships.org/sites/default/files/2019-07/materials%20marketplace%20final%20report.pdf>

⁵ Ibid

⁶ Greenpeace (2019) Data from the global plastics waste trade 2016-2018 and the offshore impact of China's foreign waste import ban: An analysis of import-export data from the top 21 exporters and 21 importers. accessible online at: https://www.greenpeace.de/sites/www.greenpeace.de/files/publications/gpea_plastic_waste_trade_-_research_briefing-v1.pdf

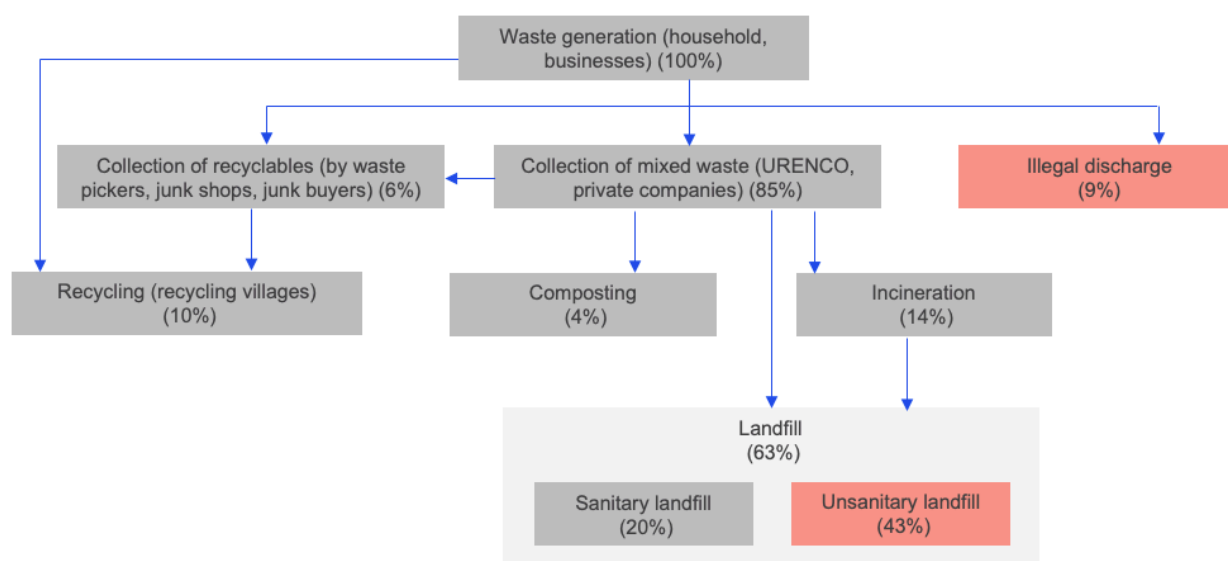
⁷ World Bank (2018) Solid and industrial hazardous waste management assessment: options and action areas, accessible online at: <http://documents1.worldbank.org/curated/en/352371563196189492/pdf/Solid-and-industrial-hazardous-waste-management-assessment-options-and-actions-areas.pdf> note: units have been converted from imperial to metric

⁸ Ibid

⁹ Vietnam Chamber of Commerce and Industry (VCCI) & United States Business Council for Sustainable Development (2019) Vietnam Materials Marketplace Startup Project Report, accessible online at: <https://p4gpartnerships.org/sites/default/files/2019-07/materials%20marketplace%20final%20report.pdf>

¹⁰ Ibid

Figure 1: World bank estimates of waste flows and treatment for urban areas in Vietnam¹¹



Waste collection

At present, only mixed solid waste is generally collected from households and businesses, as there has been limited capacity to manage the collection and processing of recyclables.¹² Hazardous wastes, such as batteries and light bulbs, are also collected in municipal solid waste, contributing to pollution and health hazards associated with landfill.

In urban areas waste collection is usually carried out by both state-owned company URENCO and private companies, which together collect around 85% of waste. In rural areas, the collection rate drops to 40-55% overall - some small towns may achieve 60-80% collection, while in remote areas this figure can fall to 10%.¹³ In rural areas, there is an environmental sanitation team for each hamlet responsible for collecting household solid waste, much of which ends up in unsanitary landfills. However, in some regions private companies are also contracted.

Primary waste collection is carried out by street cleaners with small carts who collect waste placed on the street by households in boxes or bags. The rubbish carts are then taken to trucks which compress the waste and take it to treatment areas or rubbish containers in residential areas or markets.¹⁴

Industrial hazardous waste and medical waste from commercial sources are collected separately, however, only a small amount of this waste ends up being safely incinerated, due to limited access to incinerators that meet emissions standards. In 2014 it was calculated that only 290,500 tonnes of the approximately 726,000

¹¹ World Bank (2018) Solid and industrial hazardous waste management assessment: options and action areas, accessible online at: <http://documents1.worldbank.org/curated/en/352371563196189492/pdf/Solid-and-industrial-hazardous-waste-management-assessment-options-and-actions-areas.pdf>

¹² Kiet, A. (2019) Vietnam strives to effectively manage solid waste, *Hanoi Times*, accessible online at: <http://hanoitimes.vn/vietnam-strives-to-effectively-manage-solid-waste-1055.html>

¹³ Thang, N. T. (2017) Country Chapter: State of the 3Rs in Asia and the Pacific: The Socialist Republic of Vietnam, *United Nations Centre for Regional Development*, accessible online at: <https://www.unrcd.or.jp/content/documents/5696%5bNov%202017%5d%20Vietnam.pdf> quoting data from: Tien N. H., 2014, Report on integrated solid waste management in Viet Nam, (2014). MOC, JICA, Workshop on Integrated Solid Waste Management in Viet Nam, Aug 2014.

¹⁴ Vietnam Chamber of Commerce and Industry (VCCI) & United States Business Council for Sustainable Development (2019) Vietnam Materials Marketplace Startup Project Report, accessible online at: <https://p4gpartnerships.org/sites/default/files/2019-07/materials%20marketplace%20final%20report.pdf>

tonnes of hazardous waste collected was treated in a licenced facility (40%).¹⁵ The remainder is sent to landfill.¹⁶

There is no source separation, and instead recyclables are also collected directly from households by informal workers known as 'waste pickers', who collect approximately 6% of the total waste stream.¹⁷

Key challenges for waste management in Vietnam

Waste management in Vietnam faces a number of challenges, these include a legacy of fragmented responsibility for waste management; a lack of infrastructure and systems, including sanitary landfills and collection systems; and illegal dumping and leakage into the environment. The informal nature of the recycling sector also poses significant issues, as interviewees explained the unsafe conditions for workers and the lack of environmental controls. The lack of waste infrastructure and collection systems is hampered by a lack of investment in municipal solid waste management and the very low waste management fees paid by residents. With regards to trade, and the import of plastics for recycling, there is a lack of capacity and funding for customs to check imports and for local authorities to carry out monitoring of plastic recycling operations. More details of some of the key challenges are provided below.

Lack of landfill management facilities

At present, only 30% of Vietnam's 660 landfill sites (not including small commune level landfills) are registered as engineered sanitary landfills, which require waste to be covered daily with protective material to prevent leakage. Around 36% have a bottom lining and only 9% have weighing scales. Seventy per cent (70%) are classified as unsanitary and contribute to significant land and water pollution.¹⁸ These landfills do not have compactors, leachate treatment, gas collection capacity, or means of environmental monitoring.¹⁹ Nguyen Thuong Hien, head of the Vietnam Environment Administration's waste management department, stated in the media that there were no solid waste treatment facilities in Vietnam that met all the necessary technical, economic, social, and environmental requirements for proper management.²⁰ The landfills are managed and owned by the state-owned company URENCO and third party waste companies are required to pay gate fees.²¹

Many of the largest landfills near major cities such as Hanoi, Ho Chi Minh City and Da Nang are over capacity and are having a significant effect on the health of the surrounding population. Residents of Da Nang and Hanoi held protests in 2019 over the state of the landfills and the government's failure to relocate and compensate them for their lost agricultural lands.²²

¹⁵ Thang, N. T., (2017) Country Chapter: State of the 3Rs in Asia and the Pacific: The Socialist Republic of Vietnam, *United Nations Centre for Regional Development*, accessible online at:

<https://www.uncrd.or.jp/content/documents/5696%5bNov%202017%5d%20Vietnam.pdf> quoting data from:

Hien N.T., Yen N.T., Doan D.T., Lam N.T., Thuan L.T.M., Giang P.T., Lam L.N, (2015) Assessment of application of hazardous waste treatment and domestic solid waste in Viet Nam. (Proceedings of the IV National Environment Conference, 2015).

¹⁶ Thanh N.P, Matsui Y. (2011) Municipal solid waste management in Vietnam: Status and the strategic actions. *International Journal of Environmental Research*. 5:285-296.

¹⁷ World Bank (2018) Solid and industrial hazardous waste management assessment: options and action areas, accessible online at: <http://documents1.worldbank.org/curated/en/352371563196189492/pdf/Solid-and-industrial-hazardous-waste-management-assessment-options-and-actions-areas.pdf>

¹⁸ Vietnam Chamber of Commerce and Industry (VCCI) & United States Business Council for Sustainable Development (2019) Vietnam Materials Marketplace Startup Project Report, accessible online at: <https://p4gpartnerships.org/sites/default/files/2019-07/materials%20marketplace%20final%20report.pdf>

¹⁹ World Bank (2018) Solid and industrial hazardous waste management assessment: options and action areas, accessible online at: <http://documents1.worldbank.org/curated/en/352371563196189492/pdf/Solid-and-industrial-hazardous-waste-management-assessment-options-and-actions-areas.pdf>

²⁰ Nga, M (2019) Major cities grapple with garbage problem, *VN Express*, accessible online at: <https://e.vnexpress.net/news/news/major-cities-grapple-with-garbage-problem-3952863.html>

²¹ World Bank (2018) Solid and industrial hazardous waste management assessment: options and action areas, accessible online at: <http://documents1.worldbank.org/curated/en/352371563196189492/pdf/Solid-and-industrial-hazardous-waste-management-assessment-options-and-actions-areas.pdf>

²² Nga, M (2019) Major cities grapple with garbage problem, *VN Express*, accessible online at: <https://e.vnexpress.net/news/news/major-cities-grapple-with-garbage-problem-3952863.html>

In each of the five largest cities in Vietnam, audits have shown that the largest waste fraction in landfill is organic waste, ranging from 56-77% of the waste stream. This highlights the potential for source separation, and large-scale composting schemes to reduce waste management volumes.

Uncollected waste, illegal dumping and waste leakage

As mentioned above, in rural areas of Vietnam, on average only half of municipal waste is collected. This means that the remainder is informally dumped or disposed of in unsanitary landfills. Informal waste management and illegal dumping results in substantial amounts of plastic and other waste leaking into the environment, including into rice fields, canals and rivers which end up in the ocean. While the exact figures regarding leakage are not known or available, the World Bank estimates that 9% of urban waste ends up as leakage from dumped and mismanaged waste.²³ Data on leakage from rural areas is unavailable. Plastic bags are particularly problematic, as the average household is expected to use around 35 per week. Addressing this issue is challenging as these bags are also currently essential for the delivery of waste to collection trucks, as containers are not available in many places.²⁴

Leakage also occurs as a result of informal recycling activities, in which the majority of processing for local and imported recyclables takes place. Informal recycling typically takes place in what are known as “craft villages” outside the major cities. Craft villages are a common feature of Vietnamese handicraft production, where each household in the village is dedicated to the same industry, for example pottery, weaving, or furniture making. This same village structure applies to the recycling industry, where whole villages are dedicated to plastic reprocessing. This means that each household has their own small-scale sorting, washing and processing systems, which are typically very old and low-tech.

Interviewees explained that informal recycling processes cause leakage of both micro and macro plastic through cleaning and direct dumping of low value material. Residuals from the recycling process are often burned at open landfills, however, some recycling operators seek to avoid landfill fees, and have been found to dump residual plastics in the local environment.

Even in cases where waste reaches managed treatment facilities, many operations are running over capacity with highly degraded equipment, a lack of required surface water collection and splitting systems, and inefficient leachate treatment, all of which contribute to environmental pollution.²⁵ Other methods for treating waste such as incineration reduce the likelihood of leakage into the environment, but contribute to poor air quality. Vietnam has around 69 small-scale waste incineration plants, mostly in rural areas.²⁶

Insufficient funding

Citizens pay a fee for the collection of municipal solid waste, but the fees are insufficient to support proper waste management. The fee depends on the conditions of the residential area, and is decided on by the community members. In 2017 the fees varied between 16,000 VND (0.7 USD) – 21,000 VND (0.9 USD) a month per household.²⁷ The municipality also has to pay transportation and disposal costs.

Lack of formal recycling and source separation

There is currently no nationally coordinated system for collecting, sorting and cleaning municipal recyclables. The policy and regulatory system in Vietnam also lacks a strong framework to support recycling activities or

²³ World Bank (2018) Solid and industrial hazardous waste management assessment: options and action areas, accessible online at: <http://documents1.worldbank.org/curated/en/352371563196189492/pdf/Solid-and-industrial-hazardous-waste-management-assessment-options-and-actions-areas.pdf>

²⁴ World Bank (2018) Solid and industrial hazardous waste management assessment: options and action areas, accessible online at: <http://documents1.worldbank.org/curated/en/352371563196189492/pdf/Solid-and-industrial-hazardous-waste-management-assessment-options-and-actions-areas.pdf>

²⁵ Ibid

²⁶ Ibid

²⁷ Thang, N. T. (2017) Country Chapter: State of the 3Rs in Asia and the Pacific: The Socialist Republic of Vietnam, *United Nations Centre for Regional Development*, accessible online at: <https://www.uncrd.or.jp/content/documents/5696%5bNov%202017%5d%20Vietnam.pdf> quoting data from: Tien N.H., T. A. Tuan, D.A.Thu, N. K. Long, T. K. Anh, (2016), Overview of household solid waste management in Vietnam

promote source separation.²⁸ Currently, where there is formal waste collection, municipal solid waste is collected in a single stream. However, informal waste pickers play an important role in collecting recyclable material. Waste pickers collect the majority of domestic recyclables directly from individual households or businesses prior to the waste entering collection channels. In addition, waste pickers work at landfill sites to collect sort recyclables. It is estimated that the informal sector collects and separates around 6% of the total waste generated.²⁹

Aggregators then purchase recyclable material from informal and formal waste collectors and directly from industries. These intermediaries then further separate, bale and sell the material on to processors in villages. In the case of plastics, this processing is low-tech and involves turning plastic waste into granulate, pellets, and resins.

Plastic recyclers primarily deal with imported waste for future export

Plastic reprocessing facilities in Vietnam are predominantly informal household scale businesses operating in “craft villages”. Interviewees indicated that informal facilities may represent up to 90% of the recycling industry. These informal facilities primarily process imported plastics – according to one interviewee approximately 60% of their plastic scrap feedstock is imported.

An interviewee with knowledge of plastics processing indicated that informal processors predominantly produce granulate/pellet and sell 90% of the recycled resin to China, with only 10% being used for domestic manufacturing. According to one interviewee, from 2025 onwards, plastic will only be allowed to be imported if it is to be manufactured into new products in Vietnam. Plastic scrap will no longer be able to be imported for processing and re-exporting as a resin.

These unofficial and unregulated activities have led to substantial air, water and land pollution and serious health hazards for the people who work as waste pickers, aggregators or small-scale recyclers and the surrounding communities.³⁰ Imports of plastic also have an indirect impact on leakage by inhibiting domestic collection of recyclables by reducing the price that waste pickers can receive from collecting and separating plastic waste.³¹

One interviewee estimated that the informal plastic recycling industry in Vietnam may employ up to a million people. Imported material is currently required to sustain villager livelihoods that depend on this form of processing. It was estimated in 2018 approximately 1.2 million metric tonnes of plastic are imported per year, and 1.3 million metric tonnes of paper, most of which go to craft villages for recycling. Around 90,700 metric tonnes of waste electric and electronic equipment (WEEE) are also dismantled and sorted in craft villages each year.³²

Fragmented responsibility for waste management

The responsibility for the waste management system in Vietnam is divided across six ministries dependent on the type of waste and location, and the responsibility for specific waste management tasks and services is often fragmented and unclear.³³ At the national level, the Ministry of Natural Resources and Environment (MONRE) has overall responsibility for waste management and direct management of hazardous waste. The Ministry of Construction (MOC) is responsible for the management of municipal solid waste including

²⁸ Vietnam Chamber of Commerce and Industry (VCCI) & United States Business Council for Sustainable Development (2019) Vietnam Materials Marketplace Startup Project Report, accessible online at:

<https://p4gpartnerships.org/sites/default/files/2019-07/materials%20marketplace%20final%20report.pdf>

²⁹ World Bank (2018) Solid and industrial hazardous waste management assessment: options and action areas, accessible online at: <http://documents1.worldbank.org/curated/en/352371563196189492/pdf/Solid-and-industrial-hazardous-waste-management-assessment-options-and-actions-areas.pdf>

³⁰ Vietnam Chamber of Commerce and Industry (VCCI) & United States Business Council for Sustainable Development (2019) Vietnam Materials Marketplace Startup Project Report, accessible online at: <https://p4gpartnerships.org/sites/default/files/2019-07/materials%20marketplace%20final%20report.pdf>

³¹ For further details, see Environmentally responsible trade in waste plastics Part 1: Investigating the links between trade and marine plastic pollution

³² World Bank (2018) Solid and industrial hazardous waste management assessment: options and action areas, accessible online at: <http://documents1.worldbank.org/curated/en/352371563196189492/pdf/Solid-and-industrial-hazardous-waste-management-assessment-options-and-actions-areas.pdf>

³³ Ibid

construction and demolition (C&D) waste and some non-hazardous industrial and medical waste. The Ministry of Agriculture and Rural Development (MARD) is responsible for management of solid waste in rural areas and agricultural waste. The Ministry of Health (MOH) is responsible for management of medical waste and the Ministry of Industry and Trade (MOIT) is responsible for the management of industrial waste and the development of the waste industry.

At the local and provincial level, the Department of Natural Resources and Environment (DONRE), Department of Construction (DOC) and Provincial People's Committees (PPCs) (the executive agency of the city/province parliament) all have responsibility for waste management depending on the type of city or province.³⁴

Table 1 shows the current division of responsibility for managing different waste streams, across six ministries. This fragmentation of authority means it is difficult to record data on waste flows, determine who is responsible for pollution and coordinate tasks to create greater efficiency and accountability. In 2019, the government announced that MONRE would be put in charge of all solid waste management, however this is likely to take a long time to come into effect.³⁵ Uncertainty regarding responsibility is also an issue in relation to plastic scrap imported for recycling, as MONRE and MOIT have overlapping responsibilities, authorities and priorities in dealing with scrap and waste that are not always aligned.

Table 1: Institutional arrangement of solid waste management in Vietnam³⁶

	Waste management institutional responsibilities in Vietnam					
Waste type	General waste, industrial waste, hazardous waste, and environmental protection	Municipal domestic waste and construction waste	Ship-generated waste in seaport waters	Rural domestic waste, agriculture, aquaculture waste, post-use pesticide packaging	Waste from hospitals and medical facilities	Radioactive waste
National level responsibility (primary ministry)	Ministry of Natural Resources and Environment (MONRE)	Ministry of Construction (MOC)	Ministry of Transport (MOT)	Ministry of Agriculture and Rural Development (MARD)	Ministry of Health (MOH)	Ministry of Science and Technology (MOST)
Local authorities' responsibility	Province, District and Commune authorities receive guidance from these six ministries to manage all waste types					

³⁴ Thang, N. T., (2017) Country Chapter: State of the 3Rs in Asia and the Pacific: The Socialist Republic of Vietnam, *United Nations Centre for Regional Development*, accessible online at: <https://www.uncrd.or.jp/content/documents/5696%5bNov%202017%5d%20Vietnam.pdf> quoting data from: Hien N.T., Yen N.T., Doan D.T., Lam N.T., Thuan L.T.M., Giang P.T., Lam L.N, (2015) Assessment of application of hazardous waste treatment and domestic solid waste in Viet Nam. (Proceedings of the IV National Environment Conference, 2015).

³⁵ Vietnam Chamber of Commerce and Industry (VCCI) & United States Business Council for Sustainable Development (2019) Vietnam Materials Marketplace Startup Project Report, accessible online at: <https://p4gpartnerships.org/sites/default/files/2019-07/materials%20marketplace%20final%20report.pdf>

³⁶ Nguyen Hoang, P. (2020), Independent legal consultant, pers. comm.

Trade patterns

Vietnam was one of the earliest countries to rapidly increase imports of recyclable plastic waste (referred to as plastic scrap in Vietnam) following China's announcement on the restrictions on imports.³⁷ The volume of imports steadily increased throughout 2016 and 2017, peaking at approximately 80,000 tonnes per month in late 2017 and again in mid-2018, as shown in Figure 2.



Figure 2: Total imports of plastic waste into Vietnam (Data source: Comtrade³⁸)

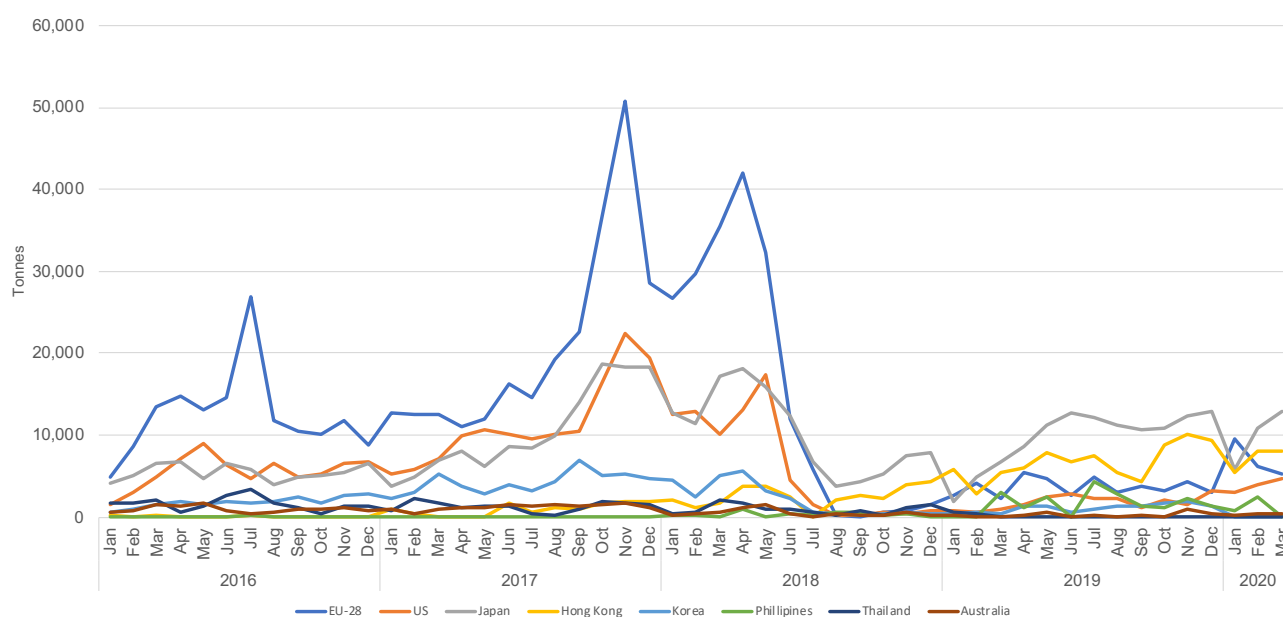


Figure 3: Imports of plastic waste into Vietnam from top 8 trading countries (Data source: Comtrade³⁹)

³⁷ Global Alliance for Incinerator Alternatives, (2019). *Discarded: Communities on the Frontlines of the Global Plastics Crisis* Available at: <https://www.no-burn.org/wp-content/uploads/PlasticsExposed-3.pdf>

³⁸ United Nations Statistics Division, n.d. *UN Comtrade Monthly Trade Database* [online] Available at: <https://comtrade.un.org/data> [Accessed 16 July 2020]

Note data is for HS Code 3915. As Vietnam does not report to Comtrade, data is from all trading partners.

³⁹ United Nations Statistics Division, n.d. *UN Comtrade Monthly Trade Database* [online] Available at: <https://comtrade.un.org/data> [Accessed 16 July 2020]

Driven by the environmental impacts of the plastic recycling industry, Vietnam implemented a range of new measures to restrict imports in 2018, including halting the issue of new licences. Following this, the volume of imports sharply fell in the second half of 2018 before slightly rising again in early 2019. Imports have remained reasonably steady in 2019 and 2020 at approximately 25,000 tonnes per month. The breakdown of imports by major trading partner countries is displayed in Figure 3.

Vietnam is now the third largest importer of plastic scrap after Malaysia and Hong Kong, importing almost 290,000 tonnes in 2019. Up until mid-2018, the largest share of imports was from the European Union (approximately 40%), followed by Japan and the US, as shown in Table 2. The share from Hong Kong has grown from almost nothing in 2016 to 26% of imports in 2019, suggesting plastics are being imported into Hong Kong before being exported into Vietnam. Japan is now responsible for the largest share of imports into Vietnam.

Table 2: Share of imports into Vietnam from top 8 trading countries (Data source: Comtrade⁴⁰)

	2016	2017	2018	2019
Australia	2%	2%	1%	1%
European Union	42%	39%	39%	14%
Japan	18%	20%	26%	38%
Hong Kong	0%	2%	6%	26%
Korea	6%	8%	5%	4%
Philippines	0%	0%	1%	7%
Thailand	5%	2%	2%	0%
United States of America	19%	22%	16%	7%

Waste and trade governance

Vietnam has a complex governance framework to manage waste, and responsibilities for waste are split across six different ministries. The key legal instruments are presented in Table 7 – these address the management of key waste types, such as municipal, industrial, and hazardous waste, and include a national strategy to 2050, as well as product stewardship legislation.

The *Law on Environmental Protection No. 55/2014/QH13* is the overarching environmental protection instrument, which includes waste management among other environmental protection activities. This law states that the Ministry of Natural Resources and Environment (MONRE) has overall responsibility on waste management, and gives responsibility for construction, industrial, medical and agricultural waste to various other government bodies. *Decree No. 38/2015/ND-CP on the management of wastes and scraps* defines waste types and environmental protection in facilities that process imported scraps. While the Vietnamese government has banned the import of waste, the importation of clean recyclables is still allowed, which is classified as “scraps” rather than “waste” in Vietnamese law.

The *National strategy for integrated management of solid waste up to 2025, with a vision to 2050* sets out the vision for an integrated waste management system and targets for waste collection and recycling rates. In addition to these, there are specific laws on medical and e-waste, and several pieces of legislation that set out master plans for solid waste management in various regions of the country. Waste management is also included in policies related to climate change, the environmental protection strategy and the green growth strategy.⁴¹ The types of waste and waste management processes, including waste reuse, recycling, energy

⁴⁰ United Nations Statistics Division, n.d. *UN Comtrade Monthly Trade Database* [online] Available at: <https://comtrade.un.org/data> [Accessed 16 July 2020]

Note data is for HS Code 3915. As Vietnam does not report to Comtrade, data is from all trading partners.

⁴¹ This includes Party Resolution 24/NQ-TW dated 03 June 2013 on Proactive Responses to Climate Change, Enhanced Natural Resource Management and Environmental Protection, National Strategy for Environment Protection Until 2020 and Vision Toward 2030 (Decision No. 1216/QĐ-TTg dated 05 Sep 2012), National Strategy for Green Growth (Decision

recovery and treatment are clearly defined in *Decree No. 38/2015/ND-CP on the management of wastes and scraps*. However, this policy does not define or address waste prevention and reduction strategies.

Regulations regarding the import of plastic scraps are quite comprehensive, however, there have been challenges in implementation. Interviewees explained challenges such as: fragmentation of responsibilities across institutions; a lack of investment/funding for waste management; a significant informal sector; and a lack of technical capacity and human resources for monitoring and enforcement.

Policies for marine plastic pollution

The Vietnamese government has taken significant steps to address marine plastic pollution in recent years. The first major commitment was *Resolution No. 36-NQ/TW on the strategy for sustainable development of Vietnam's marine economy to 2030, with a vision to 2045*, in 2018. The goal of this resolution is “Preventing, controlling, and significantly reducing pollution of the marine environment; and becoming a regional leader in minimizing ocean plastic waste.” This is implemented by *Resolution No. 01 / NQ-CP on the main tasks and solutions to implement the Socio-Economic Development Plan and State Budget estimate in 2019* issued in January 2019. From this the *National Action Plan for Management of Marine Plastic Litter by 2030* was drafted, and approved by the Prime Minister in December 2019.⁴² The Action Plan includes the following specific goals to:

- Reduce marine plastic litter by 50% by 2025, and 75% by 2030
- Collect 50% of abandoned, lost or discarded fishing gear by 2025, and 100% by 2030
- Prevent the use of single-use plastics in 80% of coastal tourism areas by 2025, and 100% by 2030
- Aim for 80% of marine protected areas to be free of plastic litter by 2025, and 100% by 2030
- Monitor marine plastic litter each year and undertake an assessment at major river basins every 5 years

Details of regulations for importing plastic waste

*Decree No. 38/2015/ND-CP on the management of wastes and scraps*⁴³ provides details on environmental protection at recycling facilities, including the requirement to treat wastewater (Article 56). It also outlines the process for payment of deposits that “ensure that scrap importers take responsibility for handling environmental risks and pollution which may arise from the imported scrap lots.” Importers of paper and plastic are required to pay a deposit of 15% of the total value if the imported volume is less than 100 tonnes, 18% if between 100 and 500 tonnes and 20% if more than 500 tonnes (Article 58). If scraps are not able to be imported or re-exported, the deposit is used to cover the cost of disposal.

*Circular No. 41/2015/TT-BTNMT on environmental protection in the import of scraps for use as production materials*⁴⁴ details the process for importers to apply for certification, including the requirement for reports on environmental protection conditions, business registration certificate, a document to provide evidence of environmental impact assessment, environmental standards or environmental protection commitment/scheme, a contract for delivery and disposal of waste, a report on environmental monitoring and a written commitment to re-export or dispose of imported scraps (Article 4). Importers need to prepare a dossier and submit to the Vietnam Environmental Administration (VEA) within the Ministry of Natural Resources and Environment (MONRE) (Article 5). The certificate must specify types of scraps, HS codes and quantity permitted for import, and the environmental production conditions for scrap importers (Article 6). Before importing plastic scrap, importers need to send a copy of the certification, written notice of the shipment for inspection and customs clearance, a certification of the payment of deposit and a document to demonstrate conformity with environment-related technical regulations (Article 10).

1393/QĐ-TTg, dated September 25, 2012) and National Action Plan for Green Growth 2014-2020 (Decision 403/QĐ-TTg dated March 20, 2014).

⁴² See: <https://www.vn.undp.org/content/dam/vietnam/docs/Publications/Quyet%20dinh%20rac%20thai%20nhua.pdf>

⁴³ See: <http://extwprlegs1.fao.org/docs/pdf/vie168524.pdf>

⁴⁴ See: <http://extwprlegs1.fao.org/docs/pdf/vie168559.pdf>

Table 3: Waste, environmental and trade instruments

Legal instruments	Section of waste value chain	Purpose
Law on Environmental Protection No. 55/2014/QH13 ⁴⁵	Overarching law on environmental protection activities and the obligations of regulatory bodies, agencies, organizations and households	Defines waste and hazardous waste, scrap materials. Gives overall responsibility on waste management to the Ministry of Natural Resources and Environment (MONRE), and gives responsibility for construction, industrial, medical and agricultural waste to various other government bodies.
Decree No. 38/2015/ND-CP on the management of wastes and scraps ⁴⁶	All waste types including household and industrial solid waste, hazardous waste, liquid waste, wastewater and gas Import of scraps	Defines waste types including solid waste, non-hazardous waste, household and industrial solid waste For the import of scraps, it provides details on environmental protection in facilities and outlines the process for payment of deposits (see further detail in boxed section).
Circular No. 36/2015/TT-BTNMT on management of hazardous wastes ⁴⁷	Hazardous waste	Implements <i>Decree No. 38/2015/ND-CP</i> . This circular lists hazardous waste and their technical requirements and management processes.
Circular No. 41/2015/TT-BTNMT on environmental protection in the import of scraps for use as production materials ⁴⁸	Import of scraps	Implements <i>Decree No. 38/2015/ND-CP</i> . This circular details the process for importers to apply for certification and import plastic scrap (see further detail in boxed section).
Decision No. 2149/QD-TTg approving the national strategy for integrated management of solid waste up to 2025, with a vision to 2050 ⁴⁹	All waste types	Sets out the aim to build a system of integrated management of waste in which waste is sorted at source, collected, reused, recycling and treated to minimise land use and environmental pollution. Sets specific targets, including 100% collection of municipal waste and 95% recycling of municipal waste by 2025
Decision 16/2015/QD-TTg on take-back and treatment of discarded products ⁵⁰	Batteries, electric and electronic equipment, lubricant oils, tyres and end-of-life vehicles	Defines discarded products and the responsibility of manufacturers to manage the collection and treatment or recycling of discarded products sold in Vietnam. This applies to batteries, electric and electronic equipment, lubricant oils and tyres from July 2016 and to end-of-life vehicles from January 2018.

⁴⁵ See: <http://extwprlegs1.fao.org/docs/pdf/vie168513.pdf>

⁴⁶ See: <http://extwprlegs1.fao.org/docs/pdf/vie168524.pdf>

⁴⁷ See: <http://extwprlegs1.fao.org/docs/pdf/vie168554.pdf>

⁴⁸ See: <http://extwprlegs1.fao.org/docs/pdf/vie168559.pdf>

⁴⁹ See: <http://extwprlegs1.fao.org/docs/pdf/vie95277.pdf>

⁵⁰ See: <https://vanbanphapluat.co/decision-no-16-2015-qd-ttg-egulations-on-recall-and-treatment-of-discarded-products>

2.2 Potential interventions to improve management of waste

The following table presents a summary of the main waste management and plastic recycling challenges encountered in Vietnam, for which further initiatives are needed. Certain issues that are currently being addressed have not been included here, for example, the fragmentation of responsibility for Vietnam's waste across six institutions is being addressed by the Vietnamese government with recent efforts to centralise responsibility with Ministry of Natural Resources and Environment (MONRE). Interviewees also described a roadmap which is being developed to address the environmental problems posed by the plastic recycling industry. According to interviewees, the roadmap aims to phase out plastic recycling industries that only conduct pre-processing of plastic wastes by 2025. The intention is to ensure more value adding of plastic recycling activities within Vietnam, so that recycled plastics are used in manufacturing in Vietnam. This is to avoid the situation where Vietnam absorbs the environmental burdens of plastic pre-processing and then simply exports the recycled resin.

Table 4: Waste management challenges in Vietnam and suggested interventions. Interventions that relate to Environmentally Responsible Trade practices, identified in Report 1 are in italics.

Main challenges	Suggested Interventions	Status
Lack of facilities and investment in solid waste management	Increase collection capacity, increase waste management fees Investment in developing sanitary landfills The Vietnam Environment Administration (VEA) has proposed the trial of a “pay as you throw” scheme, with residents paying per bag collected. Residents purchase coloured bags according to type of waste to enable source separation. ⁵⁴	Proposed by VEA
Lack of source segregation/ lack of waste collection	Implement source separation, particularly for recyclables and organics – for example, such as efforts in Vietnam to increase source separation of organic and inorganic waste ⁵⁵ Support the development of social enterprises that increase waste collection and diversion rates, such as that proposed by the Grameen Creative Lab ⁵⁶	Pilot planned for HCMC Feasibility study for one city
Lack of environmental controls and safe conditions in informal recycling sector	Support improved technology and wastewater treatment for plastics recyclers. For example, a wastewater settling tank is the simplest form of wastewater treatment and enables the suspended solids to settle in the tank before the water is discharged. Set up a recycling environment fund levied on scrap recycling businesses. The fund can be used to construct wastewater treatment plants and support other initiatives to prevent pollution during plastic reprocessing. ⁵⁷	
Lack of funds and capacity for monitoring at customs and during processing	Support environmental monitoring with human, technical and financial resources <i>Collect levy from plastic importers through licensing system, where the levy contributes to funds required for environmental monitoring and enforcement (ERT ref 3)</i> <i>Support local governments, enforcement agencies and municipalities in the form of training for personnel, greater number of staff (ERT ref 5)</i>	

⁵⁴ Nga, M (2020) Pay-as-you-throw model proposed for garbage collection, *VN Express*, accessible online at: <https://e.vnexpress.net/news/news/pay-as-you-throw-model-proposed-for-garbage-collection-4064189.html>

⁵⁵ Nga, M (2020), HCMC gets serious about sorting its trash, *VN Express*, accessible online at: <https://e.vnexpress.net/news/news/hcmc-gets-serious-about-sorting-its-trash-3840869.html>

⁵⁶ Jager, C., Munchau, K., (2020), Viet Nam is creating its first zero plastic waste city. Here's how. *World Economic Forum*, accessible online at: <https://www.weforum.org/agenda/2020/01/viet-nam-is-building-its-first-zero-plastic-waste-city-heres-how/>

⁵⁷ Vietnam Chamber of Commerce and Industry (VCCI) & United States Business Council for Sustainable Development (2019) Vietnam Materials Marketplace Startup Project Report, accessible online at: <https://p4gpartnerships.org/sites/default/files/2019-07/materials%20marketplace%20final%20report.pdf>

Unrecyclable residuals	<p>Re-design packaging to eliminate plastics that are unrecyclable or have no value when recycled, including multi-layer laminates</p> <p>Implement product stewardship schemes, including for packaging, to ensure manufacturers take back unrecyclable materials, with potential to aggregate them and develop new products</p> <p>Support use of technologies to process residual plastics into other products such as bricks or pavers.</p> <p><i>Limit trade to single clean streams e.g. PET, HDPE or PP (ERT ref 2)</i></p> <p><i>Increase capacity of customs to check shipments and contamination levels (ERT ref 6)</i></p>	<p>Regulated but not implemented</p> <p>Small pilot projects underway</p>
Lack of transparency/accountability	<p>Introduce international mandatory data-reporting mechanisms for recycled, post-consumer plastics</p> <p><i>Develop a national data collection/information source within Vietnam regarding the flows of recycled plastics, including for customs and internal trading of plastics (ERT ref 7, 8)</i></p>	
Limited markets for recycled materials	<p>Finance schemes to drive circular economy innovation and the development of markets for secondary materials, such as that provided by Circulate Capital⁵⁸</p> <p>Circular economy pilot projects, such as one supported by Dow Chemical for road making in Hai Phong⁵⁹</p>	Pilot project

Potential for ERT practices

The practices of environmentally responsible trade (ERT) are defined in Report 1 and reproduced in Table 5, and align with several of the interventions suggested in Table 4 (in italics). However, many of the interventions required to improve waste management in Vietnam relate to more fundamental needs, such as: improving domestic waste collection; separating waste streams; investing in solid waste management; and improving environmental controls on waste management and recycling facilities.

While the more fundamental interventions require significant funding and system change, several of the interventions relating to trade can start more quickly. For example, funding and capacity building to support enforcement of environmental controls can begin relatively quickly, including with international assistance from exporting countries. Increasing the capacity for customs officials and conducting more checks on the exporters side can also begin soon with adequate funding. Developing better data collection systems is challenging in Vietnam due to the very informal nature of waste and recycling systems. While this will take longer to develop, it is still very important for establishing accountability and understanding and controlling plastic leakage. In Table 5 below, we have outlined the barriers and enablers to implementing environmentally responsible trade practices in Vietnam.

⁵⁸ Vietnam Chamber of Commerce and Industry (VCCI) & United States Business Council for Sustainable Development (2019) Vietnam Materials Marketplace Startup Project Report, accessible online at: <https://p4gpartnerships.org/sites/default/files/2019-07/materials%20marketplace%20final%20report.pdf>

⁵⁹ Ibid

Table 5: Barriers and enablers to environmentally responsible trade in Vietnam

ERT practices	Barriers for ERT in Vietnam	Enablers for ERT in Vietnam
1. Improve collection and sorting in export countries to significantly decrease or eliminate unrecyclable plastics from traded bales	N/A	Improved quality of imported bales would greatly reduce residuals and the negative environmental impacts of recycling in Vietnam.
2. Trading of uncontaminated, pre-sorted, recyclable plastics that do not contain any non-recyclable material and have been prepared for immediate recycling (Basel Convention conditions)	N/A	As per #1 above.
3. Implementing environmental controls in import countries, including import licences, inspection of imports and facilities, quality standards for bales and/or deposits or levies to provide insurance for the management of bales that don't meet standards	Environmental controls exist, including import licences, quotas, deposits on imports, and environmental standards on discharges from recycling facilities. However, there is a lack of funding and capacity to enforce these. In addition, local authorities may be unwilling to enforce if it negatively impacts on livelihoods and municipal income.	Increased funding and capacity building for environmental monitoring, and staff to carry out enforcement. International funds may be needed to boost limited domestic funds.
4. Ensuring the importing country has adequate processing facilities to process plastic waste in an environmentally responsible way	Vietnam lacks adequate infrastructure to safely process plastic scraps. Equipment used by informal recyclers, which represent 90% of the industry is typically very old, inefficient and unsafe for workers. These processes also lack wastewater treatment.	Investment in improved recycling infrastructure, basic wastewater treatment, and management of residuals.
5. Checking that the importing country has the institutional capacity to monitor and enforce environmental regulations	Vietnam's environmental agencies lack funding, human and technical resources to undertake monitoring and enforcement of recycling facilities.	As per #3 above, Increased funding and capacity building for environmental monitoring, and staff to carry out enforcement.
6. Checking shipments and contamination levels at point of export and import and ensure accurate labelling of bales	As above in #5, Vietnam lacks capacity to check every shipment, and in some cases it is difficult for customs officials to determine whether shipments are contaminated.	As per #3 above, increased funding and capacity building programmes to provide more staff and training to check shipments.
7. Increasing transparency of traded volumes, enabling traceability and accountability for both export and import countries	The Vietnamese government has implemented quotas on imports, however, licensed importers typically on-sell part of their quota to informal recyclers and there, traceability and accountability is significantly reduced.	This is the most challenging part to address, but Vietnam will need to formalise its recycling sector to ensure accountability for flows of wastes and environmental performance.
8. Improve national and regional oversight to minimise shifting of waste over borders	Vietnam has some data on national imports through shipping, however, there is a lack of information regarding illegal trading over land borders.	Develop an Asia Pacific waste trade monitoring facility that aggregates data on flows of wastes, particularly seeking information on land border trading.

Box section: Implementing international controls on trade

Vietnam has various regulations in place to meet current Basel Convention obligations on hazardous waste which provide a legal basis for the Basel Convention amendments for plastics. This includes the *Law on Environmental Protection No. 55/2014/QH13* and *Circular No. 36/2015/TT-BTNMT on management of hazardous wastes* which state that transport of hazardous waste must comply with the Basel Convention.⁶⁰ The Ministry of Natural Resources and Environment (MONRE) is the authority responsible for the Basel Convention in Vietnam (as stated in *Decree No. 38/2015/ND-CP*).⁶¹

Many of the processes for importing such as the certification and customs approvals (set out in *Circular No. 41/2015/TT-BTNMT*) will enable Vietnam to put into place processes required for plastic imports within the Basel Convention. However, this will require increased resources for enforcement, as Vietnam still faces illegal imports of other waste types already covered by the Convention, such as e-waste.

⁶⁰ Vietnam Environment Administration (VEA), Ministry of Natural Resources and Environment (MONRE), (2018), Implementation Basel Convention and regulations of plastic waste management in Vietnam, accessible online at: http://www.env.go.jp/en/recycle/asian_net/Annual_Workshops/2018_PDF/Day1_Session1/9Day1_S1_03_Vietnam_ANW_S2018.pdf

⁶¹ Ibid

2.3 Mitigating potential perverse outcomes

Potential for perverse social, economic or environmental outcomes as a result of interventions

The following examples are drawn from interviewees unless otherwise noted as from the literature.

Table 6: Potential perverse outcomes and mitigation measures

Intervention	Potential perverse outcome	Mitigation measures
Improving monitoring and enforcement of environmental regulations for plastic imports	Increased environmental regulations may create a higher barrier for informal businesses to meet standards. This may lead to only larger industrial facilities operating or the potential for increased illegal activity by informal businesses.	Investment in recycling villages to improve environmental standards.
	Plastic waste could end up being imported into other countries in the region with poorer environmental controls at recycling facilities, less stringent environmental regulations and less resources for enforcement.	Development of harmonized standards for plastic scrap within the Asia Pacific region.
Allowing imports only for processing for domestic manufacturing rather than processing to resin for export (as noted to be implemented by 2025)	Lack of plastic supply for recycling facilities (most facilities currently process imported plastic waste as it is cleaner than domestic).	Investment in domestic collection systems to provide a clean stream of plastic waste.
	Lack of demand for processed resin domestically (most recycled plastic resin is exported particularly to China).	Policy incentives to drive demand for recycled resin (currently 80% of plastic products are made from virgin resin). For example, the Australian Packaging Covenant Organisation has set a target of 50% of average recycled content included in packaging by 2025. ⁶²
	As above, plastic waste could end up being imported into other countries in the region.	Development of harmonized standards for plastic scrap within the Asia Pacific region.
Increasing the fees for waste management and/or implementing pay as you throw (as proposed in Table 3)	Could lead to illegal dumping in order to avoid increased costs.	Setting waste management fees or pay as you throw schemes at a rate that citizens feel will be willing to pay, and increasing enforcement for illegal dumping.
Implement source separation, particularly for recyclables and organics (as proposed in Table 3)	Loss of livelihoods for waste pickers dependent on collection of recyclables from households and sorting at landfills.	Integration of waste pickers into formal waste management system. For example, in Bangalore, India, waste pickers were officially recognised and registered by the municipal council. ⁶³

⁶² Australian Packaging Covenant Organisation (APCO), n.d. Australia's 2025 National Packaging Targets, accessible online at: <https://www.packagingcovenant.org.au/who-we-are/australias-2025-national-packaging-targets>

⁶³ Chengappa, C., (2013), Organizing Informal Waste Pickers, A Case Study of Bengaluru, India, accessible online at: <https://www.wiego.org/sites/default/files/resources/files/Chengappa-Organizing-Informal-Waste-Pickers-India.pdf>

Assessment of risks and benefits of interventions to improve plastic waste management

Potential interventions to improve waste management and recycling in Vietnam include: increasing collection capacity and waste management fees; implementing source separation of waste streams; investing in more sanitary landfills; improving technology and environmental controls in the recycling sector; increasing support and funds for monitoring trade; removing unrecyclable residuals from traded bales and from domestic products; improving data collection and transparency; and driving markets for recycled materials.

Even the most fundamental interventions, such as increasing collection and sanitary landfill capacity would have major benefits for the environment and natural resources, including reducing plastic leakage to the ocean. Improving domestic waste management and implementing environmentally responsible trade practices would have significant benefits for Vietnam, by improving air and water quality, visual amenity, protecting natural resources and tourism values, and creating safer jobs for waste industry workers. The key risks to manage are: ensuring an inclusive transition for the informal waste sector; and in terms of trade, ensuring that plastic recycling operations do not move to other countries in the region with poor environmental controls.

Given that such a significant proportion of Vietnam's recycling sector is informal and consists of small businesses, the risk is that greater monitoring and enforcement with greater administrative requirements will exclude small businesses and result in a loss of livelihoods. Increasing enforcement of environmental regulations needs to be paired with increased investment in the sector, to improve technology and capacity. Effective formalisation of the waste sector needs to happen in an inclusive way to maintain livelihoods and regional income. In order to reduce the risk of plastic waste being shifted across borders to countries with weaker environmental controls, trade experts have recommended regional standards on the quality of recyclables that are traded.

Environmentally responsible trade (ERT) practices implemented by exporting countries would have significant benefits for Vietnam, and would prevent many of the downstream impacts. For example, if exporting countries improve plastics sorting to eliminate unrecyclable plastics from bales and trade only in uncontaminated, pre-sorted plastics, then the environmental problems associated with managing residual plastics from traded plastics are removed. Improving the quality of exports is the simplest way to mitigate potential downstream problems, and will reduce the burden on the Vietnamese government to monitor and enforce shipments.

Improving domestic collection, recycling and disposal and adopting environmentally responsible trade practices have a clear benefit for reducing plastic leakage into the ocean. Although there are potential environmental and social risks, these can be mitigated through an inclusive approach to the informal waste sector within Vietnam and a regional approach to developing environmental standards for trading of recyclable plastics.

Case Study 2: Pacific Island Countries

3.1 Plastic waste management in Pacific Island Countries

Countries around the world are facing crucial challenges in managing increased and more diverse waste issues emerging from changing lifestyles and a continued concentration of populations in urban centres. While the basic issues are considered universal, Pacific Island countries (PICs) have unique and somewhat magnified issues to confront when trying to achieve integrated and efficient waste management systems. PICs also have waste streams that are evolving into pervasive environmental problems, such as used packaging, plastics, e-waste, end-of-life vehicles, batteries and end-of-life renewable energy equipment. Plastic becomes marine debris, adversely affecting natural environments, including coral reefs, beaches and mangroves, threatening the growing tourism sector and jeopardising the existence of local fisheries, seabirds and marine mammals.

The margin of profitability for recyclers exporting materials to international markets is highly variable given the market volatility for globally traded commodities. Geographic isolation, high export shipping costs, changing end markets, pricing and quality specifications all create uncertainty for recycling enterprises.

China's ban on several import materials has had a significant and immediate impact on the global trade of commodities. As a result, PICs already suffering difficulties in accessing export markets have increased their stockpiling activities and completely ceased offshore recycling activities for most countries. The quantities of recyclable materials shipped out of the Pacific have been low historically. However, there were no reported instances of recyclable plastics export from Vanuatu, Solomon Islands and Samoa in 2019. Palau continues to export the beverage containers collected through its Container Deposit Scheme (CDS) as per private arrangements between recyclers and importers in Taiwan.

A number of policy and legislative solutions are being proposed across the Pacific region to address the growing problem of marine plastic pollution and to reduce the impact of volatile international markets on the recycling of plastics like PET.

A 2017 study funded by ADB through the Pacific Region Infrastructure Facility (PRIF) found an increasing move toward the development of specific solid waste management legislation (now adopted in 40% of the PICs). According to the study, in 2017, marine pollution control and prevention legislation was adopted by six PICs, and 10 PICs had either proposed, drafted or adopted legislation to tax, regulate or ban the imports of plastic bags and other plastic products.⁶⁴ This trend continued between 2018 and 2020 with a number of countries legislating comprehensive waste levy systems like the Tuvalu Waste Management Deposit Regulation of 2019 that imposes a waste management levy on a range of imported goods like beverages, diapers, end of life vehicles and white goods.⁶⁵

This case study provides an overview of the waste management system and explores some of the key challenges, drivers and implications for plastic leakage into the ocean in PICs using examples from four countries: Palau, Solomon Islands, Vanuatu and Samoa.

⁶⁴ Pacific Region Infrastructure Facility (PRIF) (2018) Pacific Region Solid Waste Management and Recycling: Pacific Country & Territory Profiles. Available at: <https://www.theprif.org/documents/regional/urban-development-waste-management/pacific-region-solid-waste-management-and>

⁶⁵ Tuvalu Environment Data Portal (2019). *Tuvalu Waste Management (Levy Deposit) Regulation 2019: Built Environment*. [Online] Department of Environment, Tuvalu. Available at: <https://tuvalu-data.sprep.org/dataset/tuvalu-waste-management-levy-deposit-regulation-2019>

Waste generation, collection and recycling rates

Populations living within 50 kilometres of the coastlines within PICs generate an estimated 311,090 tonnes of waste plastic each year, of which 227,880 tonnes may potentially become marine debris as it ends up being littered, dumped in inland waterways or windblown into the ocean from uncontained disposal sites⁶⁶. Studies undertaken from 2018 to 2020 by APWC^{67,68,69&70} and data from J-PRISM II^{71&72} shows that reliable waste collection services are primarily available to communities living in the capital cities in Vanuatu, Solomon Islands and Samoa, with collection rates between 35–60% (Up to 90% in capital cities and none to 20% in rural areas and outer islands). Palau, on the other hand, provides waste collection services to almost 90% of its population.

Currently, waste in all countries is being disposed of in non-sanitary landfills. These uncontrolled open dumps have no soil cover, leachate collection and/or control or drainage, and as a result uncontained waste leaks in the terrestrial and marine environments causing harm to these ecosystems and to human health.

Uncollected waste is buried, burned or dumped on land and in the ocean. A summary of waste collection and disposal services is presented in Figure 4. Plastic is the second largest stream after organic waste in municipal solid waste, comprising 7–17% of overall waste generated. Organics make up between 35–70% of the overall waste generated in PICs.



Image 1: Waste-pickers at (left) Bouffa landfill, Port Vila and (right) Ranadi dumpsite, Honiara (Image credit: APWC)

⁶⁶ Pacific Region Infrastructure Facility (PRIF) (2018) *Pacific Region Solid Waste Management and Recycling: Pacific Country & Territory Profiles*. Available at: <https://www.theprif.org/documents/regional/urban-development-waste-management/pacific-region-solid-waste-management-and>

⁶⁷ Asia Pacific Waste Consultants. (2018). Solomon Islands – *Waste Data Report: Analysis of waste generation and disposal data collection in November 2018*

⁶⁸ Asia Pacific Waste Consultants. (2018). Vanuatu – *Waste Data Report: Analysis of waste generation and disposal data collection in November 2018*

⁶⁹ Asia Pacific Waste Consultants (2020). Palau – *Waste Audit Report. UN Environment Program: Analysis of waste generation, recycling and disposal data collected in November 2019*

⁷⁰ Asia Pacific Waste Consultants. (2020). World Bank – *Samoa Waste Audit Report: Analysis of waste generation and disposal data collection in Samoa*

⁷¹ JICA (2011). *Solid Waste Characterization and Generation Study 2001*. Vaitele.

⁷² Sagapolutele, F., & Rasch, K. (2011) *The Domestic Solid Waste Generation & Characterization Study of Upolu & Savaii Islands*

Key challenges for waste management and recycling in PICs

PICs face significant challenges in providing sustainable management systems for an increasing and diversifying range of waste materials, driven mainly by changing urbanisation patterns, globalised markets, wealth redistribution and the resultant lifestyle changes. The most pressing challenges for PICs include:

- geographical isolation leading to lack of access to markets for recyclables;
- relative financial disadvantage, where eight of the 15 countries are in the lower to middle gross national income bracket;
- limited availability of environmentally suitable land for the construction of waste-management infrastructure;
- high costs of servicing small and largely dispersed populations, including collection and disposal infrastructure;
- an inability to achieve critical mass due to a relatively small consumer base;
- lack of resources, including financial, technical and human, at the municipal level to implement education and compliance activities.

Additionally, PICs are heavily reliant on imported goods, international development assistance and are often remote from international recycling markets. These countries are also extremely vulnerable to the impacts of climate change and severe weather events, which can generate excessive disaster-recovery loads to the normal or predicted waste levels. More details of some of the key challenges are provided below.

Figure 4: Summary of collection, recycling, disposal and legislative situation in Palau, Samoa, Vanuatu and Solomon Islands^{73,74,75&76}

Average Waste collection rate of 77%	<div>CDL containers brought to depots by community members</div> <div>Unmanaged waste ~27-50%</div>	<ul style="list-style-type: none"> • 7 recyclers currently operational • Currently recycling metals, aluminium, e-waste, PET and batteries 	<ul style="list-style-type: none"> - CDL in place - New sanitary landfill being completed in 2020 - Plastic bag ban in place - Signatory to Basel 	Palau
Average Waste collection rate of 38-60%	<div>No sorting of waste</div> <div>Unmanaged waste ~58%</div>	<ul style="list-style-type: none"> • 3 recyclers currently operational • Currently recycling metals, aluminium, e-waste and batteries. • No known recycling of plastics although some is collected 	<ul style="list-style-type: none"> - Tafiagata landfill is non-sanitary. - National plastics ban 2019 partly implemented - A comprehensive waste levy being implemented - Signatory to Basel 	Samoa
Average Waste collection rate of 40%	<div>SUP ban highly successful</div> <div>Unmanaged waste ~50%</div>	<ul style="list-style-type: none"> • 1 recycler currently operational • Recycling metals, aluminium and batteries • No known recycling of plastic 	<ul style="list-style-type: none"> - Bouffa landfill is non-sanitary. - A comprehensive SUP ban in place - Signatory to Basel since 2019 	Vanuatu
Average Waste collection rate of 35%	<div>No sorting of waste</div> <div>Unmanaged waste ~60%</div>	<ul style="list-style-type: none"> • Approx. 5 recyclers currently operational • Known recycling of aluminium cans and batteries • No known recycling of plastic 	<ul style="list-style-type: none"> - Ranadi dumpsite is non-sanitary. Currently exceeds capacity - Currently no legislation or policy in relation to plastics in place. - A comprehensive waste levy being discussed with SPREP - Not a signatory to Basel. 	Solomon Islands

⁷³ Asia Pacific Waste Consultants. (2018). *Solomon Islands* (n)

⁷⁴ Asia Pacific Waste Consultants. (2018). *Vanuatu* (n)

⁷⁵ Asia Pacific Waste Consultants. (2020). *Palau* (n)

⁷⁶ Asia Pacific Waste Consultants. (2020). *Samoa* (n)

Lack of collection services and infrastructure, illegal dumping and unmanaged waste

In most PICs, collection services are provided in capital cities and major urban centres. Peri-urban, regional, rural communities and outer islands remain un-serviced. A study conducted by APWC in Vanuatu and Solomon Islands in 2018 for Cefas found that ~ 90% of the households in Port Vila and Santo were serviced through a pre-paid bag system whereby only a government issued bag can be used to dispose of household waste and the fee paid for the bag delivers funding for the provision of waste collection services. However, the island communities remain largely un-serviced, with no collection services available. In Solomon Islands, only 35% of households have a collection service⁷⁷ while the collection service coverage is between 38% and 60% in Samoa⁷⁸.

In many instances, the municipalities lack appropriate equipment such as trucks to access households for servicing. The collection vehicles in most countries are often second-hand vehicles from Japan which are unable to access the majority of households due to the narrow, unpaved roads in most regional and rural communities.

In areas with no collection services, large amounts of municipal and commercial waste is unmanaged and ends up in the ocean. The municipal authorities have extremely low or limited capacity to undertake community education and compliance activities. Often, where community education can take place, there are no managed dump sites for residents to safely dispose of their waste. Rates of unmanaged waste in the PICs are anywhere between 27–60%^{79,80,81&82} (see Figure 4).



Image 2: Waste dump in Auki, Malaita province, Solomon Islands (left); and (right) waste burning in Lelepa, Vanuatu (Image credit: APWC)

Lack of landfill management facilities

Unsanitary and mismanaged landfills, in addition to waste that is dumped by households and commercial operations in villages, are resulting in substantial amounts of plastic and other waste leaking into the environment, which in most cases ends up in the ocean.

Currently, none of the landfills in Palau, Samoa, Solomon Islands or Vanuatu are registered as engineered sanitary landfills. These landfills do not have compactors, leachate treatment, gas collection capacity, or means for environmental monitoring.

⁷⁷ Asia Pacific Waste Consultants. (2018). Solomon Islands (n)

⁷⁸ Asia Pacific Waste Consultants. (2020). Samoa (n)

⁷⁹ Ibid.

⁸⁰ Asia Pacific Waste Consultants. (2018). Solomon Islands (n)

⁸¹ Asia Pacific Waste Consultants. (2018). Vanuatu (n)

⁸² Asia Pacific Waste Consultants. (2019). Palau (n)

Landfills in Palau and Solomon Islands are adjacent to the ocean and have reached capacity. Palau has identified an alternative site and an engineered sanitary landfill is under construction by a Japanese contractor. However, the landfill in Honiara is still in use and any future landfill space is under contention. Landfills in Samoa and Vanuatu are inland and have approximately 10 to 15 years of landfill space available. Only the Tafiagata landfill in Samoa boasts a weighbridge for recording the amount of waste entering the landfill. Lack of access to electricity and other amenities is the greatest challenge in installation of infrastructure including weigh-bridges in landfills across PICs.

Samoa and Palau charge tipping fees for commercial premises, whereas no tipping fee is charged at landfills in Vanuatu and Solomon Islands.



Image 3: Landfill site in Funafuti, Tuvalu. Image credit: APWC

Landfills in all countries – Palau, Samoa, Vanuatu and Solomon Islands – are host to waste-pickers collecting commercially valuable materials such as aluminium cans, scrap metal and e-waste. With the exception of Palau, none of the countries investigated for this case study have a source-separation system in place for plastics and other materials.

Lack of formal recycling and source separation

With the exception of Palau, there is currently no nationally coordinated system for collecting, sorting and cleaning up municipal recyclable material in the four PICs studied. Waste-pickers at landfills are the only mechanism by which materials from the municipal waste streams make it to existing recycling facilities. However, due to the volatile international markets, there is no financial mechanism for extraction of plastics from these waste streams. Materials collected by waste-pickers include aluminium and scrap metals which continually sustain a higher value in export markets.

Palau's beverage container recycling program commenced operation in 2011. Over 123.1 million containers have been processed through the CDL system to date. A fee of \$0.10 is placed on imported beverage containers, \$0.05 per container is returned to the customer as redemption. The national Government and Koror State Government each receive \$0.025 to cover administrative costs. The recycling programme is purely financed through self-sustainable recycling fund.

Palau has a container deposit levy (CDL) which provides an incentive to community members to return beverage containers to designated collection points. This successful CDL scheme has a collection rate of 85–95% over the past 10 years. Samoa is currently considering a comprehensive waste levy system that will allow for the collection of beverage containers as well as a range of other problem wastes such as end-of-life vehicles, batteries and e-waste.

During 2018–19 Vanuatu implemented a successful single-use plastic ban, which was supported by community and private-sector stakeholders and has resulted in a reduction of SUPs in both landfill and litter. With the exception of Palau, none of the countries studied for this case study have a plastics recycling system in place.

Vanuatu's single use plastic bag ban came into effect in 2018, banning non-biodegradable plastic, including bags and polystyrene containers. From December 2019, the ban was extended to include a further 8 items such as plastic mesh bags and plastic cutlery. After extensive consultations, a ban on single use diapers was amended to a phase out period of 1 year and will be revisited to ascertain if a ban or other regulatory controls are the most suitable option for addressing this problem waste stream.

Insufficient resources

PICs often lack sustainable financial models for collection, management, and disposal of waste. Samoa, Solomon Islands and Palau charge little or nominal fees for the collection of household waste. Vanuatu has implemented a pre-paid bag system (pay as you throw) that has led to a successful waste collection system

In Vanuatu, a pre-paid bag system implemented in Port Vila and Luganville provides households the option to pre-purchase different size waste disposal bags at local supermarkets. The money collected by the supermarkets for the bags is used to fund collections, disposal, and ongoing operational solid waste management costs. Waste is collected only if it is placed in the pre-paid bags.

in Port Vila. Palau does not collect disposal fees for households – part of the beverage-container deposit is used to fund the collection system. Funds are therefore often unavailable to purchase equipment such as collection vehicles or for operational and maintenance purposes. The high cost of electricity for baling, labour, as well as lack of markets and export tariffs are the most cited reasons for inability to collect and recycle plastic waste in the countries included in this case study.

Furthermore, PICs often lack human resources and technical knowledge for implementation of effective and comprehensive waste management systems. Some examples highlighted during the interviews that formed part of this study include the lack of technical knowledge to implement in-country systems to ensure compliance with Basel, as well as to initiate single-use plastic bans and deposit legislation.

Trade patterns

- In the PICs studied, supermarkets, breweries and beverage companies are the main importers of consumable goods and products, including plastic items.
- Water is the most bottled item locally in Vanuatu, Solomon Islands and Palau whereas Samoa bottles additional items such as noni juice and coconut oil, which is exported to Australia, New Zealand and other PICs.
- Palau is the only country studied with an existing plastics recycling system through the beverage container levy. Most materials collected are exported to Taiwan. Taiwan is not a signatory to Basel and therefore the inclusion of plastics in Basel will not affect this trade relationship.
- Samoa, Vanuatu and Solomon Islands have not exported plastics for recycling since 2017.
- There is no export tariff on recyclable material in Vanuatu, Samoa and Palau whereas an export tariff is levied on all exported materials in Solomon Islands.
- J-PRISM II is currently proposing to trial a number of projects in Samoa, Solomon Islands and Palau to further process materials in country to 'add value' and create products that have a market value.

Waste and trade regulations

Many PICs have identified or adopted policy mechanisms to finance improved waste management systems and equitably distribute the costs of managing end-of-life materials. Mechanisms including extended producer responsibility (EPR), container deposit schemes (CDS), advance disposal fees (ADF) like in Tuvalu, environmental taxes and levies, user-pays or pay-as-you-go fees, product bans or a combination of

measures to stimulate the Reduce, Reuse, Recycle, Recover and Return philosophy that is key to developing a 'circular economy' are already in use across Samoa, Solomon Islands, Palau and Vanuatu (see Table 7)

The research found an increasing move toward the development of specific solid waste management legislation, that is, comprehensive waste levies and deposit legislation, in the four countries studied.

Marine pollution control and prevention legislation has been adopted by Vanuatu, Samoa and Palau in the form of regulations or bans on imports of plastic bags and SUPs. All four PICs are considering CDL and comprehensive waste-levy systems. The key current and future policies are presented in Table 7.

Table 7: Waste, environmental and trade regulations

Section of waste value chain	Country	Regulation	Purpose
Overarching law on environmental protection activities and the obligations of regulatory bodies, agencies, organisations, households and individuals	Palau	The Republic of Palau Public Law – RPPL No. 7–24 Chapter 2401-31: Solid Waste Management Regulations (effective May 26 1996)	Covers authority, purpose, storage requirements, solid waste collection, solid waste management responsibility and facility standards, solid waste permit system, variances, solid waste management plans required and miscellaneous provisions.
	Samoa	<i>Waste Management Act 2010</i>	Covers the collection and disposal of solid wastes and the management of all wastes in Samoa, especially hazardous wastes.
		National Waste Management Strategy (NWMS) 2019–2023	Governs solid waste management from households and businesses, and chemical and hazardous waste.
		<i>Water Resources Management Act 2008</i>	Covers pollution of water supplies such as rivers, lakes and boreholes.
		<i>National Chemical Management Strategy 2007–2017</i>	Provides a framework for sustainable management of all chemicals. It includes the activities of procurement, transportation, storage, distribution, use and disposal.
		<i>Land Surveys and Environment Act 1989</i>	Covers littering on land as well as pollution of marine environments. Division 6 and 8 of Part VIII. Division 8 applies to the control of litter on land. It is an offence to deposit litter (widely defined to include refuse, rubbish and animal remains) in a public place and the offender may be ordered to clear up and remove the litter.
		<i>Marine Pollution Prevention Act 2008</i>	Covers pollution of the marine environment including disposal or incineration of wastes at sea, and discharging of ballast water.
		<i>Land Surveys and Environment Act 1989</i>	Covers littering on land as well as pollution of marine environments. Division 6 and 8 of Part VIII; Division 6 makes it an offence to throw, discharge or deposit into Samoan waters (broadly defined) any refuse matter of any kind, from any place or vessel, or to deposit material in a place from where it may be washed into Samoan waters with polluting effect.
		<i>Quarantine (Biosecurity) Act 2005</i>	Discharge of ballast water from vessels. Also regulates soil, garbage, litter, animals, animal products including the discharge of ballast water.
	Solomon Islands	<i>The Environment Act 1998</i>	The Act is the most comprehensive legislation. It seeks to address waste and pollution at the national level. It defines wastes as liquid, solid, gaseous or radioactive materials, whether toxic or not, which are discharged into the environment or prescribed by regulation to be waste.
		<i>The Environmental Health Act 1990</i>	This Act made provisions for securing and maintaining health infrastructures in compliance with sanitary, drainage and sewage specifications. The Act is administered by the Ministry of Health and Medical Services. It

			provides the backbone for formulation of national health policies, by-laws and provincial ordinances. Generally, the Act gives more focus on organisational powers vested on the Ministry than on substantive issues.
		<i>Shipping Act 1998</i>	Part IV mentions the responsibility to respect the safety of all equipment, off- and onboard the vessel, including human beings, which applies to safe disposal of wastes (pollutants) to the ocean that could cause danger or be hazardous to the marine environment and habitat.
		Shipping (Marine Pollution) Regulation 2011	This regulation was added to the Shipping Act, which has special emphasis on pollution of the marine environment. The regulation implements international conventions related to marine pollution and shipping such as MARPOL and the IMO standards for safety and security of shipping and prevention of marine pollution by ships.
		<i>Ports Act 1990</i>	Section VI of the Act makes provision for discharge of waste and other pollution of the port.
		<i>The Provincial Government Act 1997</i>	Schedule 3 provides a list of activities for which the provinces have responsibility and have the power to pass ordinances: <ul style="list-style-type: none"> Local matters – waste disposal; Rivers and water – control and use of river waters, pollution of water.
		The Honiara (Refuse Disposal) By-law 1994	This by-law is concerned with the management of waste in Honiara and enforcing the management of waste within the city boundary.
		Honiara Litter Ordinance 2004	The Litter Ordinance was formulated to keep Honiara clean: local business, households or individuals have to provide litter receptacles for waste collection, while the council distributes receptacles in the public areas.
	Vanuatu	<i>Waste Management Act No. 24 of 2014</i>	The Act deals with all kinds of waste from litter, household refuse and scraps to electronic, trade, industrial, hazardous and ozone-depleting waste and persistent organic pollutants. The Act defines the designated waste management operators (DWMO). Under the Act, DWMOs are the Provincial councils and the Municipal councils. The functions of the designated waste management operators are defined in sections 19, 20, 21 and 22. See Appendix 3.
		<i>Pollution Control Act No. 10 of 2013</i>	Under the <i>Pollution Control Act</i> pollutants discharge from occupants of premises (including treatment plants) are required to take a permit before discharging pollutants into the environment. The Director of DEPC is mandated under the Act to develop and enforce prescribed guidelines and standards for premises, vehicles, vessels or aircrafts to discharge pollutants.
		National Waste Management and Pollution Control Strategy and Investment Plan 2016–2020 (NWMPCSIP).	Collecting waste outside the normal collection services where there is a need for additional technical and operational capacity to meet international obligations regarding the management of hazardous waste.
Ban of targeted single-use	Palau	<i>Plastic Bag Use Reduction Act (RPPL No. 10-14), 2017</i>	An Act to amend Title 11 of the Palau National Code to: prohibit businesses from importing or distributing plastic bags to customers; authorise a plastics education program to educate the public on the destructive effects of plastic use; and for other related purposes.

plastic (SUP) items			Within two years following the effective date of this Act, retail establishments shall not provide plastic bags that are not biodegradable or compostable to their customers at the point of sale or prior to exit for the purpose of transporting groceries, food products, and other merchandise. No individual or business may import plastic products prohibited for distribution.
	Samoa	<i>National Plastics Ban 2019</i>	Prohibits the import, manufacturing or sale of plastic shopping bags, plastic packing bags and straws (from June 2019), and styrofoam food containers and cups (from June 2020). Other plastic materials will subsequently follow in the ban year to year (in a staged process) to give businesses and members of the public adequate time to prepare. Exemptions to the ban are currently granted for food-safety packing for frozen meat, ice cubes, locally produced chips, kekesaina, kava, local biscuits and repacked coffee, tea, sugar, flour and cocoa. Planned items for 2020 have been delayed due to the COVID-19 pandemic impact to businesses, which affect the use of their remaining stockpiles.
	Vanuatu	Imports – National Plastic Ban Regulation 2018. ⁸³⁸⁴	Ban the importation of targeted plastics since 2018. Items include single-use plastic bags, polystyrene takeaway boxes, straws, fruit-packaging materials such as nylon mesh nets and styrofoam trays, single-use disposable plastic cutlery (knives, forks and spoons), single-use disposable plastic plates, disposable plastic stirrers for coffee and tea, single-use plastic (polyethylene) cups and single-use plastic (polystyrene) cups, plastic (polyethylene) egg cartons, plastic flowers.
Container deposit legislation or EPR (existing and proposed)	Palau	The Republic of Palau Public Law – RPPL No. 7–24	Establishing a recycling program for the Republic of Palau; establishing a beverage container deposit fee; creating a recycling fund; and for other related purposes. To place responsibility for differing aspects of national beverage container recycling program on two ministries of the National Government, the MPIIC and the MoF.
	Samoa	Under development	Currently tendering for technical support through SPREP ⁸⁵ to undertake a feasibility study for the introduction of a waste deposit regulation and develop a Technical Guidance Note for the drafting of a legal framework on a waste deposit regulation in Samoa.
	Solomon Islands	Under development	An official from the Solomon Islands government interviewed for this project noted that a Waste Deposit Regulation is currently planned and supported by PacWaste Plus (SPREP), which will cover all beverage containers, including water bottles and soft drinks. However, the status of this project is unknown
	Vanuatu	Under development	A Waste Deposit Regulation is currently planned and supported by J-PRISM II, which will cover all beverage containers, including water bottles and soft drinks

⁸³ *Waste Management Act No. 24 of 2014 Regulations Order No.15 of 2018 - Republic of Vanuatu*. [Online] Available at: <https://environment.gov.vu/images/Environmental.Protection/Official-Gazette-No.-10-of-2018-dated-2-February-2018.pdf>

⁸⁴ Department of Environmental Protection & Conservation (2020) Second phase of the ban on single-use plastics. [Online] Available at: <https://environment.gov.vu/index.php/news-events/187-second-phase-of-the-ban-on-single-use-plastics>

⁸⁵ SPREP (2020) Request for Tenders: Technical assistance to support the development of a waste deposit levy for Samoa. Available at: https://www.sprep.org/sites/default/files/documents/tenders/SamoaWaste_Deposit_Reg.pdf

3.2 Potential interventions to improve management of waste

The objective of all potential interventions is to stimulate progressive shifts in managing solid waste in PICs at a local, national and regional level. Resource recovery and recycling are dynamic activities and require constant management and oversight. International and regional organisations and governments must commit to prioritise a transition from a linear to a circular economy. Successful and sustained behavioural change relies on consistent support and adequate resourcing.

Decreasing the presence of plastic debris in the South Pacific Ocean requires strengthening collection and disposal infrastructure, developing recycling policies, programs and systems in the region. A number of programs are underway to assess the potential to recover waste material within a regional context, including the infrastructure required, to achieve a sustained recycling economy and ensure country-level challenges in waste management are met. These include the J-PRISM II program funded by JICA, the PacWaste Plus Program funded by the European Union and the Regional Resource Circulation and Recycling Network project funded jointly by PRIF⁸⁶ and the World Bank.

A coordinated regional approach circumvents the challenges associated with volatile commodity prices and prohibitive freight costs traditionally associated with access to international recycling markets. With the lack of viable alternatives, import restrictions on a range of recyclable materials in developing economies in Asia, including plastics, is causing a global glut in many commodities. These circumstances demand an approach which adds value to recovered waste materials and reduces the reliance on international markets. Effective waste-management approaches rely on enforcing environmental laws and adequate resources for administrative, financial and technical services throughout the region and working alongside the private sector that can better sustain profitable long-term recycling and remanufacturing enterprises. The table below lists the challenges faced by the PICs studied and suggests interventions at national, regional and international levels as well as connecting the suggested interventions to the Environmentally Responsible Trade Practices (ERT 1-8) listed in Report 1.

⁸⁶ ADB Consultant Management System (2020). *Waste Audit, Sanitation, Team Leadership Terms of Reference* [Online] Available at: https://selfservice.adb.org/OA_HTML/OA.jsp?OAFunc=XXCRS_CSRN_PROFILE_PAGE&selNo=158769

Table 8: Waste management challenges in PICs and suggested interventions

Main challenges	Suggested interventions at the national level	Suggested interventions at the regional/international level	Key support mechanism for PICs
Lack of collection services and infrastructure, illegal dumping and unmanaged waste	Increase collection capacity, funding through waste levies, EPR schemes and pre-paid collection systems as per the Port Vila model. (ERT #1)	Provide technical support for policy development and implementation	Support for formulation of national waste management strategies.
Lack of landfill management facilities	National-level capacity development for maintenance and operation of landfill as well as landfill operations. National-level capacity development for maintenance of equipment and vehicles as well as data collection at landfills.	Implement accurate data collection on a country-by-country basis; generation rates by sector; consumption patterns and detailed plastic typology in the waste stream Technical support for land acquisition/ negotiations and development of sanitary landfills with appropriate environmental controls.	Develop capacity analysis of landfill sites, business and maintenance of operations
Lack of source separation, formal recycling and export markets for recyclable materials	Use existing and tested EPR schemes such as deposit legislation and waste levies to incentivise source separation and support the private recycling sector. Legislation to be tailored to country situation to ensure success (ERT#2) Finance schemes to drive circular economy innovation and local reprocessing to create secondary products which have a potential market. Circular economy pilot projects, such as ones currently being proposed by J-PRISM II in Samoa, Solomon Islands and Palau. (ERT#2) Governments to recognise the importance of the role of local recyclers with institutional, financial and social support programs. Further develop public-private partnership potential like in Palau	Conduct plastic recycling business model analysis. International and regional organisations, to continue to examine feasibility of regional recycling systems with a viable transport network to suitable MRF at regional centre(s). Assist PICs to ratify Basel Convention, and examine need for national or regional exemptions. Work at the regional level to improve cooperation among PICs to rationalise production of recycled plastic products. Support PICs to identify biodegradable products to substitute for banned single-use plastics.	Support PICs to aggregate materials in regional centres, e.g. Palau's proposal to aggregate plastics from RMI and FSM, to achieve scale and operational efficiency. Support PICs to seek special exemptions on Basel Convention requirements when required. Examine potential to support transboundary movement of recycled material by subsidising shipping, biosecurity treatments. Stimulate markets in developed countries for biodegradable material products produced in PICs.
Lack of resources – financial, human and technological	Implement training for staff at national and local levels to ensure understanding of the requirements for compliance with new legislation (e.g. Plastic bag	Provide technical support to implement training for all in-country solid waste management and education staff at all levels.	Support PICs by providing long-term funding for training and technical assistance.

	<p>bans) and MEAs (e.g. changes to Basel). (ERT # 3,6,7,8)</p> <p>Ensure there is access to and training for the use of technology that allows for improved compliance with existing laws as well as implementation of new and improved waste management systems</p>	<p>Implement training for staff at national levels to ensure there are systems in place for compliance with national and international laws and legislation.</p>	
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Potential for ERT practices

The waste management challenges faced by PICs require addressing fundamental needs i.e. domestic waste collection services, appropriate disposal services, access to human, technical, and financial resources as well as source separation of recyclable materials. The suggested interventions align with the practices of environmentally responsible trade (ERT), as defined in Report 1 and where possible, have been referenced in this case study.

As a result of the challenges of scale, capacity and distance to markets in the Pacific region, ERT practices are of even greater importance. Opportunities to create viable local markets for recycled plastics are extremely low and domestic plastic manufacturing risks further leakage of surplus material through secondary waste streams in highly vulnerable environmental conditions.

Aggregation and processing (washing, flaking and pelletising) of material as much as possible is therefore recommended to prepare and process material for export to suitable regulated markets. Representatives of regional organisations contributed a number of recommendations for regional policies and market mechanisms which will require cooperation and coordination led by the appropriate regional organisations, such as Secretariat of the Pacific Regional Environment Programme (SPREP), Pacific Islands Forum Secretariat (PIFS), Japanese Technical Cooperation Project for Promotion of Regional Initiative on Solid Waste Management in Pacific Island Countries (J-PRISM), The Pacific Ocean Litter Program (POLP), etc. Some examples to stimulate local and regional markets for recycled plastic products were suggested, as follows:

- Make a plastic material display label common to the Pacific region and take measures to prohibit the import, sale, or use of products other than those with the regional logo clearly indicating the plastic material to ensure regional level end of life options can be explored through economies of scale;
- Develop suitable legislation to promote procurement of eco-friendly goods by governments and other entities in the Pacific. Ensure corresponding end-of-life disposal options are investigated when such goods are being promoted;
- Introduce subsidies for recyclers to build facilities for processing plastics or introduce financial mechanisms that provide a consistent source of income that allows the private sector to invest in local reprocessing facilities like washing, flaking and pelletising;
- Undertake small-scale projects to determine cost analysis for undertaking recycling activities in the Pacific to understand local constraints.

3.3 Mitigating potential perverse outcomes

This section identifies potential perverse outcomes, mitigation measures and discusses overall risks and benefits.

Potential for perverse social, economic or environmental outcomes as a result of interventions

The following examples are drawn from interviewees, unless otherwise noted. as from the literature.

Table 9: Potential perverse outcomes and mitigation measures

Intervention	Potential perverse outcome	Mitigation measures	Institutions involved
Implement source separation, particularly for recyclables and organics	Loss of livelihoods for waste-pickers dependent on collection of recyclables from households and sorting at landfills	Integration of waste-pickers into formal waste management system ⁸⁷	National governments, recycling associations
Invest in domestic plastic upcycling and remanufacture facilities / Domestic reprocessing	Reduced volumes of processed and unprocessed plastic available for overseas (higher value) markets Limits of type of material used as feedstock, leaving other recyclable material to landfill as no alternative Complex technologies, requiring rigorous maintenance regimes increasing in-country costs leading to failure of these projects in the long term.	Limit volumes of waste plastic for domestic upcycling and remanufacturing opportunities to prioritise business model of regional cooperation (where available) Coordinate and cooperate across the region to prevent uneconomical and competing businesses.	Recycling associations; regulatory bodies; government legislation; donor agencies
Ensure all countries in the Pacific are signatories to, and ratify, the Basel Convention	Barrier created to transboundary movement of plastic, to aggregate material and feed regional recycling hubs	Special exemptions required, increasing transaction costs, bureaucracy, etc. An interviewee from Palau noted that there is potential for plastic collected through CDS schemes to be brought into Palau, aggregation and transport through existing channels to Taiwan. However, the new regulation that includes recyclable plastic under the Basel Convention would require special permissions or exemptions for a regional project like this to be successful.	Government departments; Regional organisations, e.g. SPREP
Introduction of container deposit legislation	Increased domestic challenges and burden to ensure funds from levies are	Consumer education programs; facilitate redemption process via retail outlets; 'formalise' the informal waste-picker sector.	Recycling associations; regulatory bodies; government legislation; donor agencies

⁸⁷ Asia Pacific Waste Consultants (2019) South Africa – Waste Classification Report: Summary and analysis of waste generation and disposal data collected in eThekweni and the City of Cape Town South Africa

	ring-fenced for recycling operations		
Regional processing / recycling hubs, regional MRF facility with waste streams aggregated from several PICs	Transfer of material from one jurisdiction to another, with leakage rate increased at destination due to mis-management or failure to identify ultimate market destination	Subsidise cost of transport, which is main barrier. Assist with Basel requirements and exemptions. Combine lower value plastic shipments with higher value materials e.g. e-waste, aluminium, scrap metals to ease transport and licencing costs similar to Palau.	Recycling associations; regulatory bodies; government legislation; donor agencies
Add value to collected recyclables with primary processing and treatment and to reduce shipping cost and reduce contamination and risk of rejection.	Increase domestic costs of collection, processing and preparation for export with no guarantee of export to market.	Identify 'benevolent' shipping companies, and not-for-profit partnerships, e.g. Moana Taka Partnership ⁸⁸ . In Palau, for example, JICA is bearing cost of flaking and pelletising plant, while the government will be responsible for operations and maintenance. The shipping company Ocean Freight has agreed to ship materials for no cost.	Recycling associations; regulatory bodies; government legislation; private recyclers.
Stimulate export of clean PET to established Asian markets, e.g. Taiwan	Destination market is the textile industry, which reduces manufacturers' costs, leading to increased micro-fibre pollution in the environment (another form of leakage).	Restrict export of recycled plastic to responsible and traceable end markets. Seek to prevent dumping of plastic that is exported when only to accompany higher value shipments of aluminium, e-waste, etc. through ERT practices.	Regulatory bodies, national government

Assessment of risks and benefits of interventions to improve plastic waste management

The development of a Pacific recycling sector and a subsequent reduction in marine plastic pollution cannot be separated from much needed improvements to basic solid waste management services like collection and disposal systems. A very small number of countries have well-resourced collection and treatment systems in place, however for the overwhelming majority the existing in-country solid waste management systems are rudimentary. Appropriate infrastructure, fit-for-purpose technologies and government policies able to sustain the segregation and recovery of recyclable waste materials like plastics from the general waste stream will provide a strong basis for increasing value-added technologies over time.

There are numerous opportunities for public–private partnerships in establishing and operating recycling infrastructure and collection services, however the success of these relationships are fundamentally reliant on good governance. A coordinated approach to improving these foundations will bring a greater likelihood of achieving a sustainable regional recycling system.

⁸⁸ Sustainable Island Platform (2019) SPREP – Moana Taka Partnership: Addressing critical waste management issues in the Pacific Islands: Secretariat of the Pacific Regional Environment Programme (SPREP) Moana Taka Partnership. [Online] Available at: <https://www.sustainableislandsplatform.org/innovation/sprep-moana-taka-partnership/>

However, lessons can be learnt from countries that currently do have successful systems in place. For example: the Palau CDL has continually evolved since 2011, with the type of containers that are accepted in the system increasing as markets and in-country administrative processes become more established. Vanuatu's yellow bag pre-paid system took six years to establish after several false starts as the local authorities coped with increased administrative demands on how best to manage collected funds. The plastic bag ban in Vanuatu that was established in 2018, led to the introduction of new plastic products into the market like plastic mesh bag as vegetable coverings. The ban had to be extended to include new materials introduced into the markets as a result of the initial ban. The establishment of successful and sustainable systems in the Pacific, as well as in any other region, is reliant on local conditions as well as the appropriate resourcing of administrative, financial and technical services which are currently seen as the key weaknesses throughout the region.

Resource recovery is not a static environment and is constantly evolving in response to changing legislative, political, market and social dimensions; something the Pacific region will need to overcome through a regionally - coordinated approach to recycling.

Case Study 3: Japan

4.1 Plastic waste management in Japan

Marine plastic litter issues have recently garnered growing global interest, and particularly in the Asia-Pacific. Japan's Prime Minister Shinzo Abe took the issue to the G20 Summit held in Osaka in June 2019 where the "Osaka Blue Ocean Vision" presented a new implementation framework of actions to tackle the issue of marine plastic waste on a global scale. Under the new framework, G20 members will promote a comprehensive life-cycle approach to prevent and reduce plastic litter discharge to the oceans through various measures and international cooperation.

Japan has been building a domestic framework for resource circulation, to promote trade of recyclable materials and make efforts to quantifiably reduce marine litter. This has been implemented by the Japanese government as the *Resource Recycling Strategy for Plastics*, which was endorsed by the Cabinet on May 31, 2019.⁸⁹ This strategy aligns with the 2018 *Fourth Fundamental Plan for Establishing a Sound Material-Cycle Society*.⁹⁰

Japan has a high collection rate for plastics, and until China's restrictions on plastic scrap imports, approximately 15% of plastics were exported for recycling. Since 2018 the recycling routes for plastic scrap generated in Japan have shifted from China to Southeast and East Asian countries.

This case study provides an overview of the waste management system in Japan and explores some of the key successes, challenges, and opportunities for waste management and recycling in Japan, and implications for environmentally responsible trade.

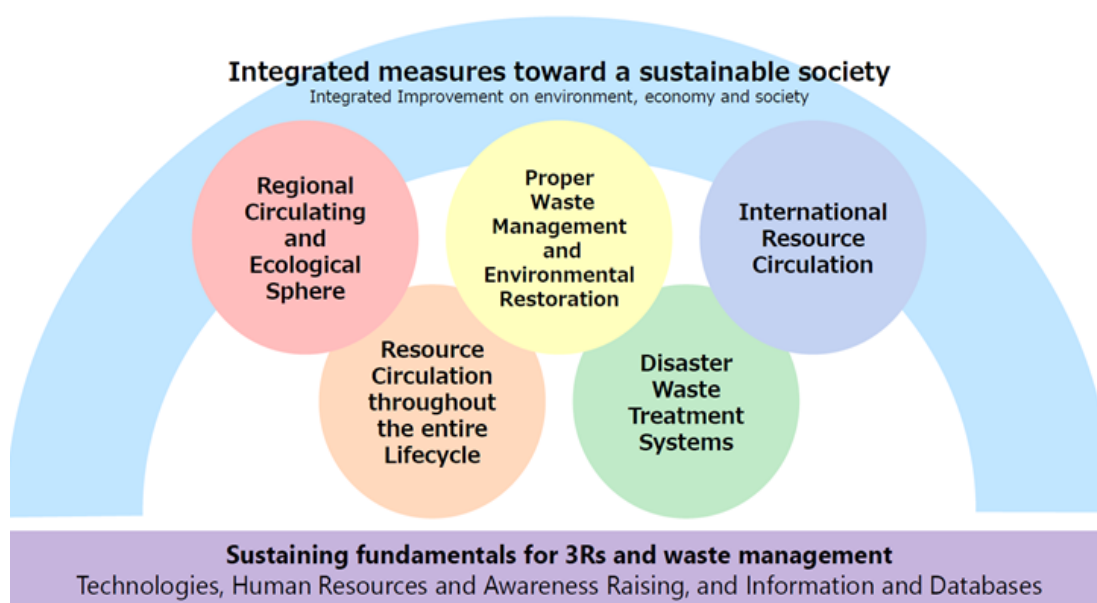


Figure 5: The pillars of the 4th Fundamental Plan for a Sound Material Cycle Society (Source: Ministry of the Environment 2018⁹¹)

⁸⁹ Ministry for the Environment Government of Japan (2019). *Press release material. About formulation of "plastic resources circulation strategy"*. Ministry of Environment [Online] Available at: <https://www.env.go.jp/press/106866.html>

⁹⁰ *Fundamental Plan for Establishing a Sound Material-Cycle Society* (2018). [Online] Available at: https://www.env.go.jp/en/recycle/smcs/4th-f_Plan.pdf

⁹¹ Ibid

Waste generation, collection and recycling rates

“Municipal solid waste” (MSW) is defined as household waste, excluding human waste, and business-related garbage generated from offices and restaurants. “Industrial waste” is divided into 20 types or categories of waste. The disposal of MSW is responsibility of the Municipal government, while industrial waste disposal is the responsibility of business operators. Japan provides 100% collection coverage to households and all town centres have recycling facilities.⁹²

Approximately 45 million tonnes of MSW was generated from households and businesses in 2013 – equivalent to approximately 0.97 kg of waste per capita per day. The total volume of waste generated has decreased from a peak of 55 million tonnes or 1.2 kg per capita per day in 2000. The majority of MSW is managed by municipalities (42.4 million tonnes) and a small portion is collected by voluntary groups directly for recycling (2.6 million tonnes). 71% of MSW is generated by households and the remainder is generated by businesses.

As of 2013, approximately 21% of total MSW was recycled, a significant increase from 5.3% in 1990. Around 10.7% was disposed of in landfill, with the remainder mostly managed through incineration.⁹³

The Fourth Fundamental Plan for a Sound Material Cycle Society aims to reduce the per capita generation of municipal waste generation to 850g per capita per day by 2025. It also sets a target to reduce overall waste (municipal and industrial) sent for final disposal in landfill to 13 million tonnes, a 77% reduction from 2000 (see Figure 6). In addition, the plan sets a target for the “cyclical use rate” (i.e. the amount of reused material divided by the generation of waste) for 47% by 2025, an increase of 30% since 2000.⁹⁴

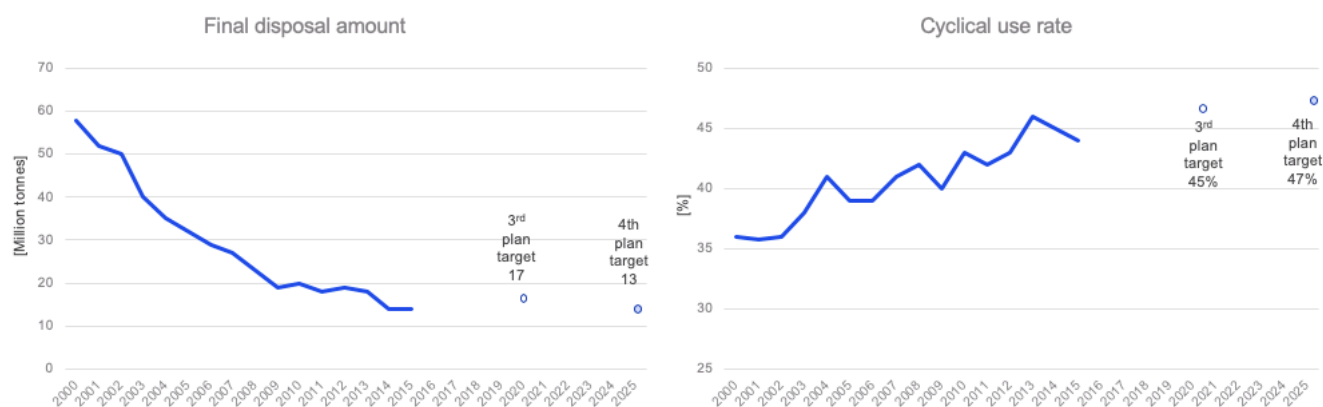


Figure 6: Changes over time in final disposal amounts and cyclical use rates and future targets (Source: Ministry of the Environment, 2018⁹⁵)

Recycling rates

Currently, Japan has Extended Producer Responsibility (EPR) based legislation for the collection and recycling of packaging and containers, end-of-life vehicles, e-waste, white goods and construction waste. The recycling rates of various items as a result of these legislations is presented in Table 10 below.

⁹² Japan Waste Management & 3Rs Research Foundation (2017). *Country Chapter: State of the 3Rs in Asia and the Pacific. Japan*. United Nations Centre for Regional Development

⁹³ Ibid

⁹⁴ *Fundamental Plan for Establishing a Sound Material-Cycle Society* (2018). [Online] Available at: https://www.env.go.jp/en/recycle/smcs/4th-f_Plan.pdf

⁹⁵ Ibid

Table 10: Recycling rate of containers in Japan (Source: Japan Waste Management & 3Rs Research Foundation, 2017⁹⁶)

Material	Recycling Rate	Year	Source
Steel Cans	Cyclical use rate of 92.0%.	FY2014	Steel Can Recycling Association
Aluminium cans	Cyclical use rate of aluminium cans of 87.4%. In addition, there was a 63.4% rate of "CAN TO CAN" recycling meaning recycling aluminium cans into new aluminium cans.	FY2014	Aluminium Can Recycling Association
Paper packs	From 0.202 million tonnes of paper packs, 34.9% were collected through takeback by community collection, store collection and group collection.	FY2012	National Milk Container Environment Council
Cardboard	Collection rate for cardboard was 96.7%.	FY2014	Japan Corrugated Case Association
Plastics	The utilization rate was 79% for plastics in general waste and 85% from industrial waste.	FY2013	Plastic Waste Management Institute
Cars	About 20-30% of the weight of each car is recovered (reusable parts) by dismantlers and 50~55% is recycled as an element (material recycling).	Yearly	Annual report on Environment 2015
Tyres	From 1.052 million tonnes of waste tyres: <ul style="list-style-type: none"> - 29% was exported in the original/processed form, - 58% was used for smelting or cement firing, and for power generation. 	FY2013 and FY2014	Japan Car Tyre Association
Home Electronics Appliances	Recycling rates for home air-conditioners (92%), televisions (75%), refrigerators & freezers (80%), washing machines & clothes dryers (88%).	FY2014	Japan Waste Management & 3Rs Research Foundation, 2017
Personal computers and related items	Recycling rates for desktop computers (78.4%), notebook computers (59.3%), Braun tube display devices (70.9%), LCD type display devices (74.3%).	FY2013	Japan Waste Management & 3Rs Research Foundation, 2017

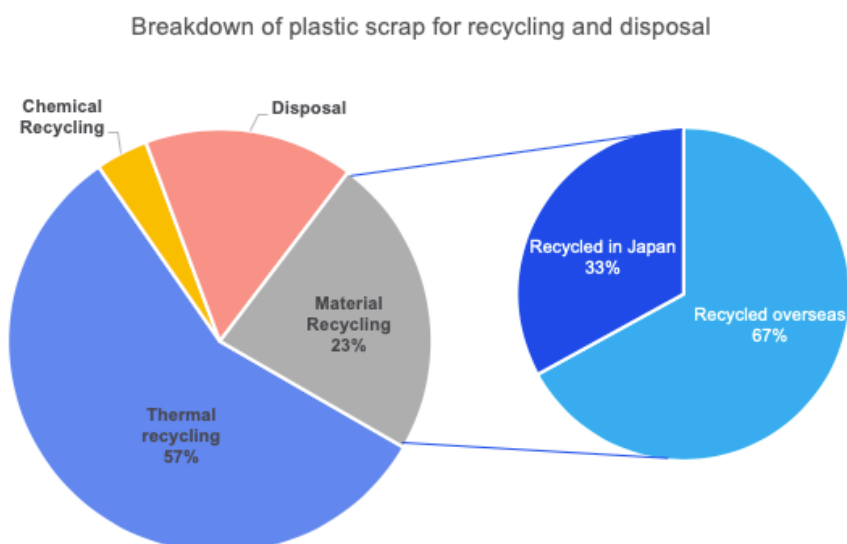
Plastics recycling in Japan

Approximately 23% of the plastic waste generated in Japan was recovered through material recycling in 2016. Of the remaining plastics, approximately 57% was used for thermal recycling, either for use in the cement manufacturing process, incineration with power generation or for refuse derived fuel (RDF) and 4% for chemical recycling (see Figure 7).⁹⁷ Of the plastic collected for material recycling, around one-third was recycled in Japan and the remaining two-thirds was exported for processing in China and Hong Kong and then recycled in China.⁹⁸

⁹⁶ Japan Waste Management & 3Rs Research Foundation (2017). *Country Chapter: State of the 3Rs in Asia and the Pacific. Japan*. United Nations Centre for Regional Development

⁹⁷ Japan Waste Management & 3Rs Research Foundation (2017). *Country Chapter: State of the 3Rs in Asia and the Pacific. Japan*. United Nations Centre for Regional Development

⁹⁸ Morita, Y., Hayashi, S., 2018, *Policy brief. Proposals to Strengthen Japan's Domestic Measures and Regional Cooperation on Stable and Environmentally Sound Plastic Scrap Recycling: Response to China's Ban on Imports of Plastic Scrap*. Institute for Global Environmental Strategies. Available online at: <https://www.iges.or.jp/en/pub/proposals-strengthen-japan's-domestic-measures/en>



Plastic recycling method in Japan:

Thermal Recycling: Cement manufacturing process, incineration with power generation, production of RDF

Chemical Recycling: monomerization, liquefaction and gasification processes, blast furnace

Disposal: Incineration without power generation, landfilling

Figure 7: Breakdown of Plastic Scrap for recycling and disposal (Source: Morita & Hayashi, 2018⁹⁹)

Plastic packaging and containers used by households are collected and recycled through the EPR system. The *Containers and Packaging Recycling Act, 1995*, gave responsibility for recycling packaging and containers to importers, manufacturers, retailers and wholesalers who use or sell containers. Packaging and containers are sorted by households and municipalities are responsible for collection. Businesses have responsibility for the recycling of a set amount of packaging collected by municipalities based on the volumes of packaging they manufacture or sell. Most businesses outsource the recycling by paying a fee to the Japan Containers and Packaging Recycling Association (JCPRA), although they can instead choose to collect or recycle them independently.¹⁰⁰ The JCPRA goes through a tendering process to entrust the recycling of the packaging to recycling businesses.

This EPR system has led to a high rate of recycling for plastic containers and packaging.¹⁰¹ Containers and packaging materials collected through the municipal collection stream are mostly recycled within Japan, although one interviewee noted that a small fraction may go to international markets.

PET bottles when recycled in Japan through the EPR system have a 100% material recycling output, according to JCPRA. 44% of PET bottle are recycled into sheet material, 34% is converted to fibre for textiles and 21% is recycled into PET bottles as shown in Figure 8.

⁹⁹ Morita, Y., Hayashi, S., 2018, *Policy brief. Proposals to Strengthen Japan's Domestic Measures and Regional Cooperation on Stable and Environmentally Sound Plastic Scrap Recycling: Response to China's Ban on Imports of Plastic Scrap*. Institute for Global Environmental Strategies. Available online at: <https://www.iges.or.jp/en/pub/proposals-strengthen-japan's-domestic-measures/en>

¹⁰⁰ Yamakawa, H. The Packaging Recycling Act: The Application of EPR to Packaging Policies in Japan, accessible online at: http://www.oecd.org/environment/waste/EPR_Japan_packagingFinal%20corrected0502.pdf

¹⁰¹ OECD (2016). *Extended Producer Responsibility: Updated Guidance for Efficient Waste Management*, OECD Publishing, Paris. [Online] Available at: <https://www.oecd-ilibrary.org/sites/9789264256385-18-en/index.html?itemId=/content/component/9789264256385-18-en>

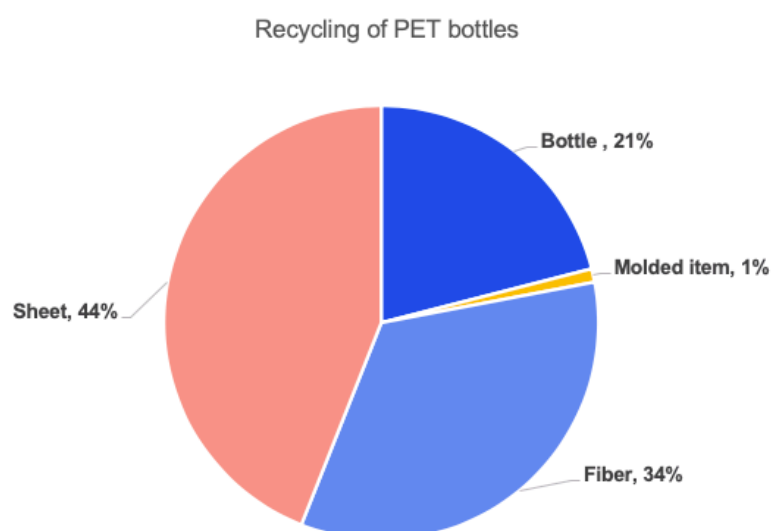


Figure 8: Recycling of PET bottles in Japan (Source: the Japan Containers and Packaging Recycling Association, 2017¹⁰²)

Successful initiatives for waste management

Japan has undertaken a number of initiatives, at the legislative, industry and community level that have allowed it to successfully collect, sort and recycle plastics both domestically and through the international market. These are outlined in Table 11.

Table 11: Successful interventions for waste management

Sector	Interventions
Extended producer responsibility	<p>The <i>Law for the Promotion of Sorted Collection and Recycling of Containers and Packaging</i> is Japan's extended producer responsibility (EPR) system for household plastic, glass and paper containers and packaging. This program encourages recycling of plastic back into the production of new products in Japan, rather than being exported for other uses. It also has an added benefit of encouraging producers to reduce materials used for packaging because of the financial burden of the scheme.¹⁰³</p> <p>Since the introduction of the Act in 1995 until 2010, the collection of PET bottles for recycling increased from 3.5% to 76.7%.¹⁰⁴ Japan also has EPR policies for vehicles, home appliances, batteries and electronic and electrical items.</p>
Design	<p>Japan has a voluntary standard on PET bottles which is based on the principle of "design for recycling". These standards include prohibiting the use of coloured PET and making it easier to remove labels and sort caps. The standards were developed after the <i>Law for the Promotion of Sorted Collection and Recycling of Containers and Packaging (Container and Packaging Recycling Act)</i> was enacted and were adopted collectively by producers.</p> <p>This has led to a 7.6% reduction in the average weight of PET bottles, in addition to facilitating recycling.¹⁰⁵</p>
Waste reduction	<p>Japan has a number of community level initiatives that allow the collection of plastic packaging and bottles as well as the reduction in use of plastics. One such successful</p>

¹⁰² Inoue, Y. (2018). *Japan's Resource Circulation Policy for Plastics*. Ministry of the Environment Japan [Online] Available at: https://ec.europa.eu/environment/international_issues/pdf/S2-02-Yusuke%20Inoue.pdf

¹⁰³ Environmentally responsible trade in waste plastics Part 3: Case studies interviewee

¹⁰⁴ OECD (2016). *Extended Producer Responsibility: Updated Guidance for Efficient Waste Management*, OECD Publishing, Paris. [Online] Available at: <https://www.oecd-ilibrary.org/sites/9789264256385-18-en/index.html?itemId=/content/component/9789264256385-18-en>

¹⁰⁵ Yamakawa, H. The Packaging Recycling Act: The Application of EPR to Packaging Policies in Japan, accessible online at: http://www.oecd.org/environment/waste/EPR_Japan_packagingFinal%20corrected0502.pdf

	<p>initiative is the reduction in the use of single use plastic bags that brought the community, government, and the private sector together. In 2016, nine industries started charging for plastic bags (incl. supermarkets, laundry services, drug stores, DIY stores). Combined with a community education campaign, the stores saw 95% of customers bringing their own plastic bags up from 10% in the Toyama Prefecture.¹⁰⁶</p> <p>Further, according to the Japan Chain Store Association, the refusal rate of plastic bags at supermarkets increased from 8% in 2002 to almost 48% in 2013.¹⁰⁷</p>
Procurement	<p>National and local government expenditures account for more than 20% of the GDP and have significant effects on the market. In view of these circumstances, the <i>Act on the Promotion of Procurement of Eco-friendly Goods and Services by the State and Other Entities</i> was enacted in May 2000. The Act defines practices required to switch demand to environmentally friendly products, including promotion of the purchase of such products by national and local governments and provision of relevant information with governments playing a leading role in developing green markets. Details of the targets are provided in Table 7.</p>
Collection	<p>Japan has a high level of source segregation with separate collection boxes set up for PET bottles, food trays, milk cartons and newspaper.¹⁰⁸</p> <p>Households in Japan separate their waste to between 10-20 categories depending on the Prefecture (district), and plastics are separated into four main categories: packaging, Polystyrene, PET bottles and plastic goods. Businesses segregate plastics into bottles, caps, egg trays and polystyrene trays. Commercial recyclers collect containers and packaging waste directly from businesses.</p>
Transport	<p>Japan is one of the leading countries for recycling of expanded polystyrene (EPS) or Styrofoam. This is enabled by technology to compress the EPS to 2% of its volume, which allows the efficient transport of these wastes to recycling plants.¹⁰⁹</p>
Processing	<p>Japan has advanced recycling processes that include the ability to recycle PET back into new PET bottles made from 100% recycled resin. It is estimated that 21% of PET goes back into PET bottles, 44% to plastic sheet (e.g. PET trays for food) and 34% to fibre.¹¹⁰</p>

Key challenges for waste management and recycling in Japan

Single use plastic use remains high

Although the Government of Japan is making great progress in appropriate management of waste and continually improving recycling outcomes, Japan continues to consume large volumes of single use plastics, with ~745 kilo tonnes of packaging collected from households in 2015.¹¹¹ One of the targets in the Plastic Resource Circulation Strategy endorsed in May 2019, is a cumulative 25% reduction in single-use plastics by 2030. The strategy also proposes the use of 2 million tonnes of biomass plastics by 2030.

Lack of collection and recycling for all plastics

Although the EPR system in Japan is highly effective at collecting plastic packaging and containers, this does not extend to all plastic goods used at the household level like toys. Not all municipalities collect these plastic goods and these plastics are currently being incinerated. According to official figures, in 2017, there was 1.73 million tonnes of plastic that was not collected for recycling and was therefore incinerated.

¹⁰⁶ Inoue, Y. (2018). *Japan's Resource Circulation Policy for Plastics*. Ministry of the Environment Japan [Online] Available at: https://ec.europa.eu/environment/international_issues/pdf/S2-02-Yusuke%20Inoue.pdf

¹⁰⁷ Ibid

¹⁰⁸ Ministry of the Environment (2012). *Solid Waste Management and Recycling Technology of Japan: Toward a Sustainable Society*. [Online] Available at: <https://www.env.go.jp/en/recycle/smcs/attach/swmrt.pdf>

¹⁰⁹ Environmentally responsible trade in waste plastics Part 3: Case studies interviewee

¹¹⁰ Inoue, Y. (2018). *Japan's Resource Circulation Policy for Plastics*. Ministry of the Environment Japan. [Online] Available at: https://ec.europa.eu/environment/international_issues/pdf/S2-02-Yusuke%20Inoue.pdf

¹¹¹ Ibid

Further, there are a number of plastics including multi-layer plastics and bio-plastics that do not have effective technologies available for recycling. As the international markets tighten and Japan looks to increase its domestic recycling capability, it faces the challenge of ensuring that it invests in technology that allows it to effectively recycle plastics that cannot be exported. For PET, even though a large proportion of it is being recycled, further investment needs to be made to increase the amount of bottle to bottle recycling rather than conversion to textiles and other goods.

Inefficiency of the current recycling systems

The EPR system only applies to plastic packaging and containers used by households, and does not include the same products for the commercial sector. Furthermore, industrial plastics collection and recycling is segmented through separate EPR laws for white goods, e-waste, packaging and beverage containers. This leads to a loss of economies of scale for plastics by material type in Japan. Interviewees explained that it will be a challenge for Japan to integrate recycling for these sectors, either for export or for effective private sector investment.

Higher standards required with changes to the Basel convention

In 2016, Japan exported 88% of its recyclable plastic waste to China and Hong Kong¹¹². This changed to 85% of its recyclable plastic waste going to South East Asia in 2018. The addition of recyclable plastics to the Basel Convention in 2019 means that new standards of cleanliness will need to be applied to materials that are exported by Japan to overseas destinations. As a result of this change, Japan is currently in the process of drafting legislation that would allow for the environmentally responsible trade of recycled plastics and compliance with the newer restrictions under the Basel Convention. Table 12 sets out the various categories of trade restrictions under Basel.

Table 12: Basel categories for trade of recycled plastics

Basel category	Requirements
No control, import freely	If plastic waste is homogenous and there is no contamination, or, there are different types of plastics that are easy to sort then there are no controls
Import licencing and prior notice and consent required	If plastics are mixed or contaminated, then they can only be exported to recyclers with adequate pollution control. In addition, exporters to give notice to importing country authorities to check their capacity to receive and process shipments. Export is only allowed when the receiving country gives their consent.
Prohibit import/export	If there is no facility to treat wastes properly in the importing country, or if facilities lack capacity to process, shipments will be prohibited.

¹¹² Morita, Y., Hayashi, S., 2018, *Policy brief. Proposals to Strengthen Japan's Domestic Measures and Regional Cooperation on Stable and Environmentally Sound Plastic Scrap Recycling: Response to China's Ban on Imports of Plastic Scrap*. Institute for Global Environmental Strategies. Available online at: <https://www.iges.or.jp/en/pub/proposals-strengthen-japan's-domestic-measures/en>

Waste and trade regulations

In an effort to cope with waste problems that have evolved over the years, the Japanese government has enacted legislation, revised its approach and always worked in cooperation with local governments, private business operators, and residents in order to promote proper waste management, the effective use of resources as well as the steady development of a sound material cycle society. Japan has a well-established legislative environment underpinned by the *Basic Environment Act No. 91 of 1993* that allows for a high level of resource recovery in almost all sectors. Japan's legal system for establishing a sound material-cycle society is underpinned by the *Basic Environment Act* which frames the overarching *Basic Act for Establishing a Sound Material Cycle Society*. The legal framework for management of waste is presented in Figure 9 below and each of the acts presented in this figure are described in Table 13.

■ Legal system for Establishing a "Sound Material-Cycle Society"

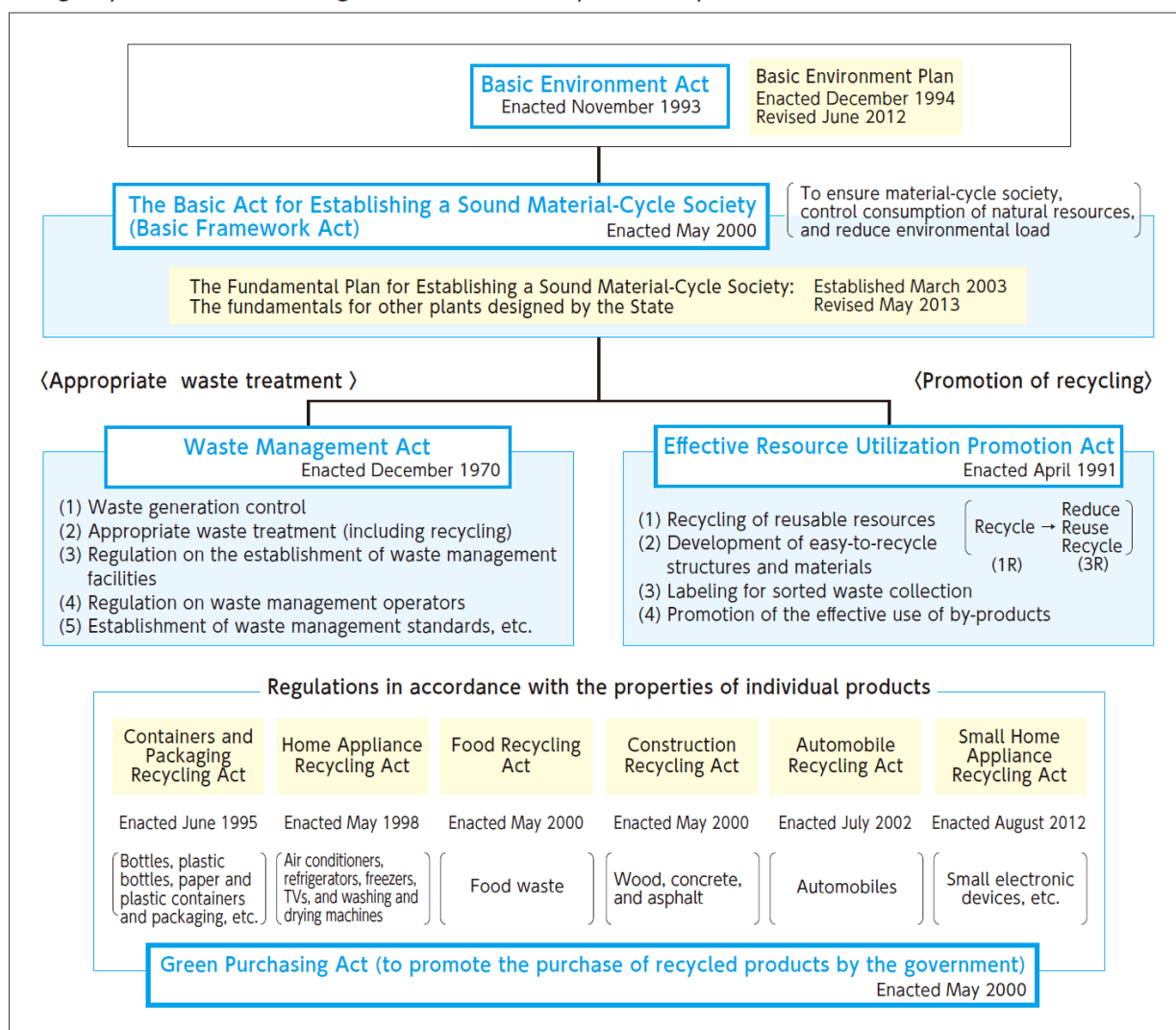


Figure 9: Japan's legal system for establishing a sound material cycle society (source: Ministry of the Environment (2014))¹¹³

¹¹³ Ministry of the Environment. (2014). History and Current State of Waste Management in Japan [Online] Available at: <https://www.env.go.jp/en/recycle/smcs/attach/hcswm.pdf>

Table 13: Waste, environmental and trade regulations

Regulation	Year	Purpose
Basic Environment Act. Act No. 91 of 1993	Est. 1993	<i>Basic Environment Act in 1993</i> provides the overall framework for environmental policy including waste management and recycling. With enactment of this law, the emphasis of Japan's environmental policy shifted from environmental pollution prevention to global environmental issues and sustainability issues. Some of the key principles of waste management such as Extended Producer Responsibility as well as Polluter Pays Principle are mentioned in the Basic Act as a responsibility of producers and businesses. <i>Basic Environment Plan 1994</i> shows the basic direction of environmental policy and is revised every six years. The current plan is its 5th plan and developed in 2018. It emphasizes a Regional Circular and Ecological Sphere (Regional CES) integrated approach toward resource circulation, low carbon, and harmony with nature.
Basic Environment Plan	Enacted 1994 5 th plan 2018	
Basic Act on Establishing a Sound Material-Cycle Society - based on Waste Management Law	Est. 2000	<p>This act establishes the basis for the comprehensive and systemic promotion of measures for waste management and recycling, and aims to promote effective efforts for a sound material-cycle society. This law states the sequence for disposal priorities 1) reduce, 2) reuse, 3) recycle, 4) heat recovery and 5) appropriate disposal. It also encourages national policy for 'discharger responsibility' and 'extended producer responsibility':</p> <ul style="list-style-type: none"> • Ensure a material-cycle society • Control consumption of natural resources • Reduce the environmental burden
Fundamental Plan for Establishing a Sound Material-Cycle Society	Enacted in 2013 4 th plan 2018	<p>Based on the <i>Basic Law for Establishing a Sound Material-Cycle Society</i>, the Government formulated the '<i>Fundamental Plan for Establishing a Sound Material-Cycle Society</i>'. This plan began in 2013. the following are considered as the new pillars of policy.</p> <ul style="list-style-type: none"> • Strengthening efforts to reduce/reuse that have been delayed as compared to recycling • Recovery of useful metals • Strengthening efforts for recovery/safety • Promotion of 3R international co-operation <p>This plan set the fundamentals for other plans designed by the state</p>
Waste Management and Public Cleansing Act	Est. 1970 Revised 2018	<ul style="list-style-type: none"> • General purpose: proper waste treatment • Waste generation control • Proper waste treatment, including recycling • Regulation on the establishment of waste management facilities • Regulation on the waste management operators • Establishment of waste management standards, etc.
Act on the Promotion of Effective Utilization of Resources	Est. 1991 Revised 2013	<p>The Law for Promotion of Effective Utilization of Resources has been established based on manufacturers' decisions about the obligations and initiatives for reduce, reuse, recycle at each stage from the design and manufacturing stages of the product to recovering and recycling.</p> <p>The manufacturers and importers of personal computers and compact rechargeable batteries are required to address voluntary recovery and recycling</p>

Basic Plan for Promotion of Utilization of Biomass	Est. in September 2016	This is a plan to consider organic substances derived from plants and animals (not fossils) as resources.
The Food Recycling Act 2001	Established in May 2001, and revised twice in 2008 and in 2015	This act focuses mainly on food waste generated by food related industries and businesses and aims to; <ul style="list-style-type: none"> • Reduce food waste generation • Promote recycling of food waste for animal feed or organic fertilizers.
Containers and Packaging Recycling Act	Established 1995 Revised in 1997 and 2000	Promotes the effective utilization of resources as well as planning for the reduction of waste concerning 20~30% of the weight of the general waste disposed from homes, and containers and packaging waste which account for about 60% by volume.
Home Appliance Recycling Law (No legal category for E-Waste)	Est. 1998 2001 (2004 for freezers, 2009 for LCD and Plasma TVs, clothes dryers)	This act requires manufacturers to recycle home appliances. It aims to promote the recycling of metals used in compact electronic devices
Automobile Recycling Act	Enacted 2002 Came into effect in January 2005	<i>The Automobile Recycling Act</i> defines the responsibility of automobile makers to accept the three most difficult to handle automotive items that are often illegally discarded (shredder residues, CFCs and airbags) and to recycle them in order to actively promote the recycling and proper disposal of end-of-life vehicles.
Small Home Appliances Recycling Act	Enacted in April 2001	Includes aims: <ul style="list-style-type: none"> • Recycling of reusable resources • Development of easy-to-recycle structures and materials • Labelling for sorted waste collection • Promotion of the effective use of by-products • To promote the recycling of metals used in compact electronic devices
Act on the Promotion of Procurement of Eco-friendly Goods and Services (Green Purchasing Act)	Enacted in May 2000	In this act: <ul style="list-style-type: none"> • Retail business are charged with reduction of plastic bags and reduction of packaging waste • Cafeteria businesses are to use reusable tableware • Specific targets for recycled content in products: <ul style="list-style-type: none"> ○ Stationary to have >40% recycled plastic and >20% as post-consumer paper ○ Office furniture to have >10% as recycled plastic or >25% as bio plastic ○ Computers to have >40% as recycled plastic ○ Uniforms and interior fixtures to have >25% as recycled bio-plastic
Plastic Resource Circulation Strategy	Enacted May 2019	This strategy includes targets for: <ul style="list-style-type: none"> • Cumulative 25% reduction in single-use plastics emissions by 2030

		<ul style="list-style-type: none"> • Reusable/recyclable design by 2025 • 60% rate of recycling/reusing for containers and packaging by 2030 • 100% effective utilization of used plastics by 2035 • Doubled use of recycled material by 2030 • Introduction of approximately 2 million tonnes of biomass plastics by 2030
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Trade patterns

Japan is one of the largest global exporters of plastic waste. In 2016, Japan exported more than 1.5 million tonnes of plastic waste, 88% of which was exported to China and Hong Kong.¹¹⁴ From January 2018, exports shifted to Southeast Asian countries and dropped by more than 30% from 2016 levels. Since then exports have continued to decline as Southeast Asian countries increased their restrictions on imports, as shown in Figure 10. Malaysia is now the top importer of plastic waste from Japan, followed by Vietnam, Korea and Thailand, as presented in Figure 11.

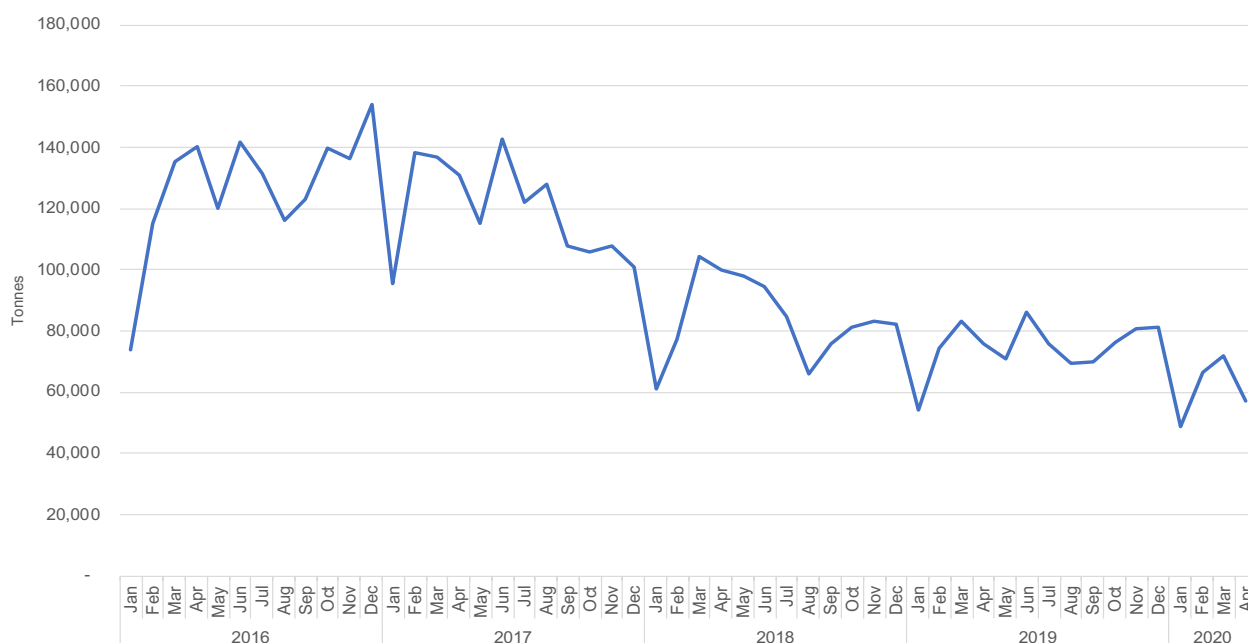


Figure 10: Total exports of plastic waste from Japan (Data source: Comtrade¹¹⁵)

Typically, high-quality plastics have been recycled domestically but low value plastics have been exported. PET and plastic packaging collected through the EPR scheme is typically processed in Japan and therefore the recycling of these streams has not been affected by the reduction in export markets. In 2016, the majority of Japan's exported plastic consisted of PET and containers and packaging not collected through the EPR system and plastic from household goods. Since 2018, the export of PET bottles has not been significantly affected by the policy changes in other countries and continue to be exported, along with plastic from home electrical appliances. Due to the ease of separation of materials through manual disassembly, Japan has managed to secure new sales channels domestically and overseas for scrap from home appliances, see Figure 11.¹¹⁶

Mixed plastic scrap that was previously exported, as well as low grade plastic materials, particularly from vehicles, construction, electronics and agriculture, have flooded the Japanese domestic market. They are currently being used for RDF and cement using thermal recycling or they are incinerated.

¹¹⁴ Morita, Y., Hayashi, S., 2018, *Policy brief. Proposals to Strengthen Japan's Domestic Measures and Regional Cooperation on Stable and Environmentally Sound Plastic Scrap Recycling: Response to China's Ban on Imports of Plastic Scrap*. Institute for Global Environmental Strategies. Available online at: <https://www.iges.or.jp/en/pub/proposals-strengthen-japan's-domestic-measures/en>

¹¹⁵ United Nations Statistics Division, n.d. *UN Comtrade Monthly Trade Database* [online] Available at: <https://comtrade.un.org/data> [Accessed 16 July 2020]

Note data is for HS Code 3915 as reported by Japan.

¹¹⁶ Morita, Y., Hayashi, S., 2018, *Policy brief. Proposals to Strengthen Japan's Domestic Measures and Regional Cooperation on Stable and Environmentally Sound Plastic Scrap Recycling: Response to China's Ban on Imports of Plastic Scrap*. Institute for Global Environmental Strategies. Available online at: <https://www.iges.or.jp/en/pub/proposals-strengthen-japan's-domestic-measures/en>

Japan is undertaking significant policy reform to ensure not only compliance with changed Basel conditions, but also to secure appropriate recycling destinations for all of its plastic scrap. These measures are discussed in detail in with regard to environmentally responsible trade (ERT) practices in Section 1.2.

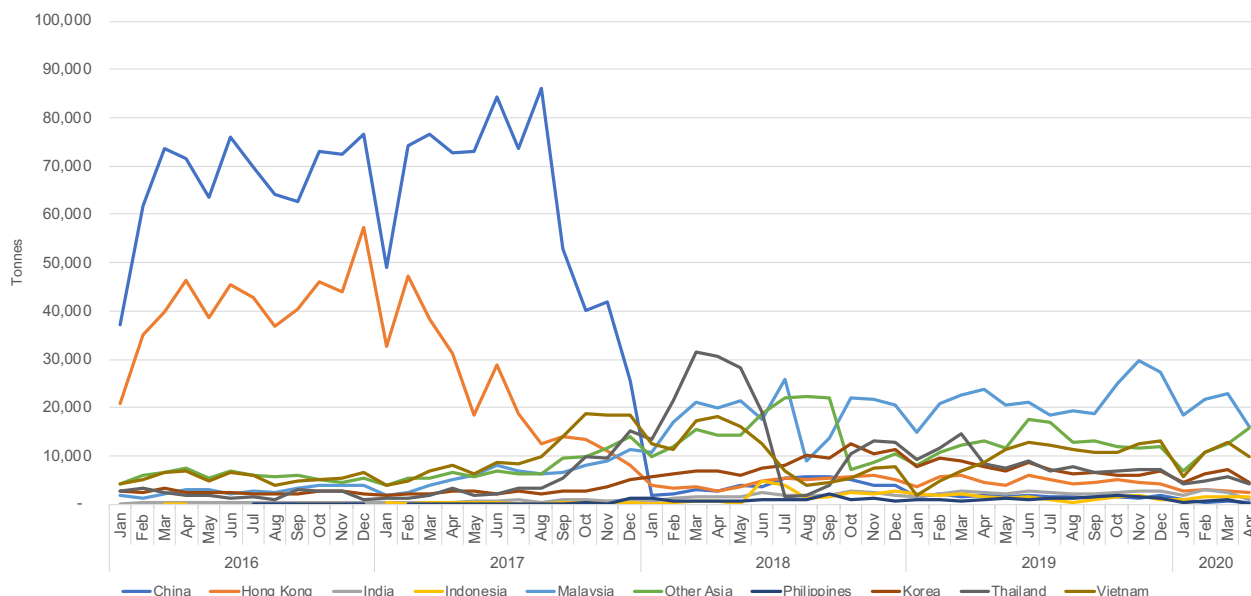


Figure 11: Exports of plastic waste from Japan from top 10 trading countries (Data source: Comtrade¹¹⁷)

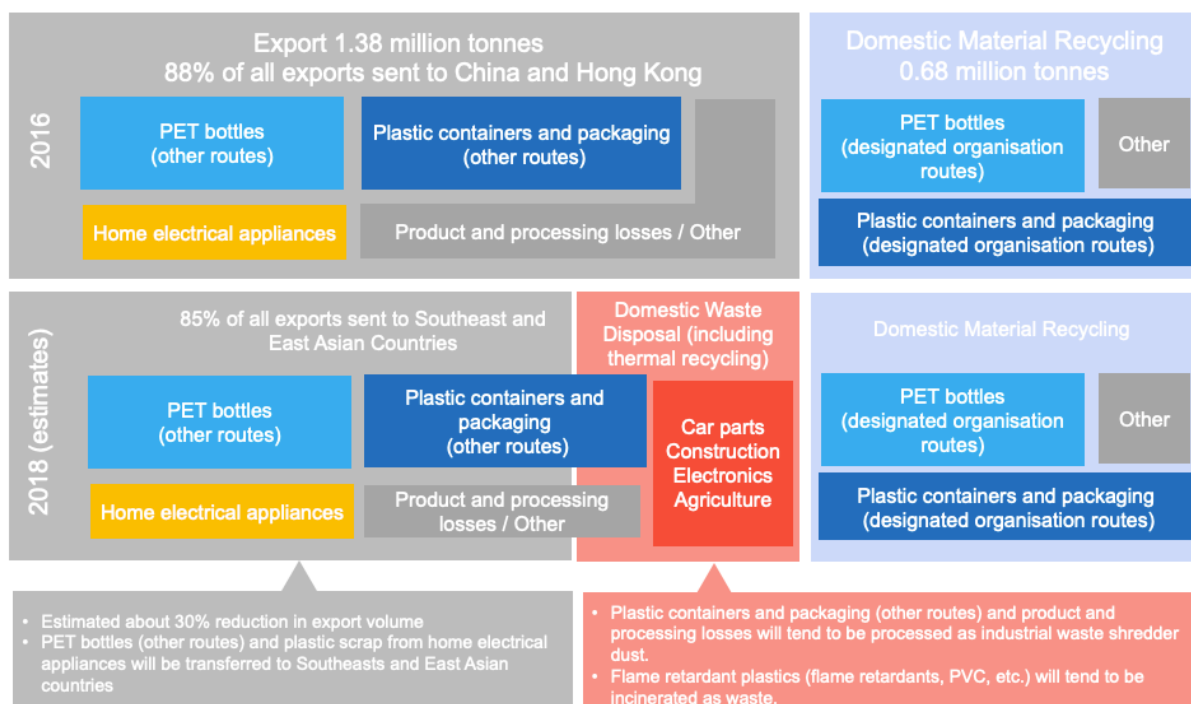


Figure 12: Comparison of processing destinations for material recycling of plastic scrap (classified in three processing destinations for export, domestic waste disposal, and domestic material recycling) (Source: IGES, 2018¹¹⁸)

¹¹⁷ United Nations Statistics Division, n.d. *UN Comtrade Monthly Trade Database* [online] Available at: <https://comtrade.un.org/data> [Accessed 16 July 2020] Note data is for HS Code 3915 as reported by Japan.

¹¹⁸ Morita, Y., Hayashi, S., 2018, *Policy brief. Proposals to Strengthen Japan's Domestic Measures and Regional Cooperation on Stable and Environmentally Sound Plastic Scrap Recycling: Response to China's Ban on Imports of Plastic Scrap*. Institute for Global Environmental Strategies. Available online at: <https://www.iges.or.jp/en/pub/proposals-strengthen-japan's-domestic-measures/en>

4.2 Potential interventions to improve management of waste

The following table presents a summary of the main waste management and plastic recycling challenges encountered in Japan, for which further initiatives are needed. One of the largest challenges for Japan is adapting to the loss of international markets for waste plastics. Since China's restriction on imports, Japan has begun significant reforms focused on updating regulations for exports while at the same time increasing investment in domestic recycling capacity. The Environment Minister, Yoshiaki Harada announced in February 2019 that Japan would prohibit the exports of plastic waste that cannot be recycled,¹¹⁹ and commented in May 2019 that Japan would need to phase out the exports of waste overseas.¹²⁰

Table 14: Waste management challenges in Japan and suggested interventions

Main challenges	Suggested Interventions	Status
Ensuring plastic scraps can meet new import standards of Southeast Asian countries and not contribute to pollution ¹²¹	For plastics to continue to be exported, investment in separation and sorting will be needed to ensure that plastic scraps meet the standards of importing countries. ¹²² (ERT #1)	Japan's Ministry of Environment (MOEJ) is providing financial support for new recycling facilities or upgrades (budget of \$15 million in 2018) ¹²³
	Assist in the development of regional harmonized standards for plastic scrap quality (e.g. contamination levels) alongside other countries. ¹²⁴ (ERT #1)	The Japanese government has invited other countries in Asia to discuss regulations for Basel amendments.
Plastics that were previously exported are currently not being recycled and are going to waste-to-energy or landfill ¹²⁵	Policy incentives to increase the use of recycled plastics in products manufactured in Japan, such as setting a target for recycled content, to drive demand for recycled plastics. ¹²⁶	Recycled content incentives exist for certain products (stationary, office furniture, computers, uniforms). These targets and incentives could be extended to other products.
	Establish a data collection system on plastic generation, collection, processing and exports to	

¹¹⁹ Mainichi Japan (2019) Japan to ban exports of nonrecyclable dirty plastic waste. Available online: <https://mainichi.jp/english/articles/20190227/p2a/00m/0na/015000c#:~:text=TOKYO%20%2D%2D%20Environment%20Minister%20Yoshiaki,recycled%20as%20a%20general%20rule.&text=%22Basically%20we%20should%20stop%20it,Harada%20at%20a%20press%20conference.&text=Japan%20exported%20about%201.5%20million%20tons%20of%20plastic%20waste%20in%202017>.

¹²⁰ The Japan Times, (2019). Redouble efforts to reduce plastic waste. Available online:

<https://www.japantimes.co.jp/opinion/2019/05/16/editorials/redouble-efforts-reduce-plastic-waste/#.XxeZaPgZUQ>

¹²¹ Morita, Y., Hayashi, S., 2018, *Policy brief. Proposals to Strengthen Japan's Domestic Measures and Regional Cooperation on Stable and Environmentally Sound Plastic Scrap Recycling: Response to China's Ban on Imports of Plastic Scrap*. Institute for Global Environmental Strategies. Available online at: <https://www.iges.or.jp/en/pub/proposals-strengthen-japan's-domestic-measures/en>

¹²² Ibid

¹²³ Inoue, Y. (2018), Japan's Resource Circulation Policy for Plastics. Ministry of the Environment Japan, accessible online at: https://ec.europa.eu/environment/international_issues/pdf/S2-02-Yusuke%20Inoue.pdf

¹²⁴ Morita, Y., Hayashi, S., 2018, *Policy brief. Proposals to Strengthen Japan's Domestic Measures and Regional Cooperation on Stable and Environmentally Sound Plastic Scrap Recycling: Response to China's Ban on Imports of Plastic Scrap*. Institute for Global Environmental Strategies. Available online at: <https://www.iges.or.jp/en/pub/proposals-strengthen-japan's-domestic-measures/en>

¹²⁵ Ibid

¹²⁶ Ibid

	understand how to improve recycling rates and set appropriate targets. ¹²⁷	
	Invest in sorting and reprocessing facilities for plastics that are no longer easily exported.	The MOEJ is providing financial support for new recycling facilities or upgrades (budget of \$15 million in 2018) ¹²⁸
Limited demand for recycled plastics (other than PET) due to a lack of domestic manufacturing	Investment in reprocessing facilities could enable export of recycled resin to countries which have demand for recycled content, including China (Japan lacks manufacturing for many plastic products, such as textiles and toys, and therefore does not have a domestic market for recycled resin).	
Increased price competition between recycling onshore and exporting to Southeast Asian countries	Southeast Asian countries have lower labour and energy costs; therefore, Japan needs to invest in increasing the size and automation of Japanese processing facilities to increase cost competitiveness compared to exports. ¹²⁹	
Complex source separation is difficult for households to understand (particularly in large cities)¹³⁰	Improve communication strategies regarding sorting, particularly for high density and more mobile populations in larger cities.	
No recycling scheme for plastic products that are not considered packaging or containers (e.g. plastic spoons, straws)¹³¹	Introduce recycling for a broader range of plastic products.	Proposed in Plastic Resource Circulation Strategy ¹³²
High use of single use plastics (second highest globally)¹³³	Reduce and eliminate single use plastics, and replace those with reusable goods or other alternatives.	Target for cumulative 25% reduction in single-use plastics emissions by 2030 ¹³⁴
	Establish fees for single use plastics	Fees introduced for plastic bags
Not all incineration facilities produce energy	Transition simple incineration to waste-to-energy facilities	Japan has a target to shift all simple incineration facilities to waste-to-energy facilities

¹²⁷ Ibid

¹²⁸ Inoue, Y. (2018), Japan's Resource Circulation Policy for Plastics. Ministry of the Environment Japan, accessible online at: https://ec.europa.eu/environment/international_issues/pdf/S2-02-Yusuke%20Inoue.pdf

¹²⁹ Morita, Y., Hayashi, S., 2018, *Policy brief. Proposals to Strengthen Japan's Domestic Measures and Regional Cooperation on Stable and Environmentally Sound Plastic Scrap Recycling: Response to China's Ban on Imports of Plastic Scrap*. Institute for Global Environmental Strategies. Available online at: <https://www.iges.or.jp/en/pub/proposals-strengthen-japan's-domestic-measures/en>

¹³⁰ N.d. Containers and Packaging Recycling System in Japan. Available online: <https://www.seisakukikaku.metro.tokyo.lg.jp/en/diplomacy/pdf/1602-04-shigen-e.pdf>

¹³¹ N.d. Containers and Packaging Recycling System in Japan. Available online: <https://www.seisakukikaku.metro.tokyo.lg.jp/en/diplomacy/pdf/1602-04-shigen-e.pdf>

¹³² Inoue, Y. (2018), Japan's Resource Circulation Policy for Plastics. Ministry of the Environment Japan, accessible online at: https://ec.europa.eu/environment/international_issues/pdf/S2-02-Yusuke%20Inoue.pdf

¹³³ The Japan Times, (2019). Redouble efforts to reduce plastic waste. Available online: <https://www.japantimes.co.jp/opinion/2019/05/16/editorials/redouble-efforts-reduce-plastic-waste/#.XxeZaPgZUQ>

¹³⁴ Ministry of the Environment, (2019). Japan Environment Quarterly. Available online: <https://www.env.go.jp/en/focus/jeq/issue/pdf/Volume20January2018.pdf>

Potential for ERT practices

The practices of environmentally responsible trade (ERT) align with several of the interventions suggested in Table 8. However, many of the interventions required to address the challenges for waste management in Japan are domestically focused; in particular, minimising waste generation and increasing the capacity of domestic recycling systems for plastics that are no longer able to easily be exported. The government established an emergency fund to develop more domestic plastic recycling and processing facilities, as since 2018, previously exported plastic waste is stockpiled or being incinerated. Japan intends to establish an efficient plastic scrap recovery industry, processing plastic scrap into flake and pellets within Japan for trade to suitable domestic and international markets.

Japan has also introduced policies for waste minimisation through the Plastic Resource Circulation Strategy proposed in early 2019, which has a target for a cumulative 25% reduction in single-use plastics by 2030 and mandates that retailers must charge a fee for plastic shopping bags.¹³⁵

For challenges related to trade, Japan is well placed to adopt environmentally responsible practices. Japan has begun the process of updating regulations for plastic waste exports in order to ensure any exports of plastic waste are done in an environmentally responsible way. Japan, along with Norway, proposed the amendments to the Basel Convention that requires that exports of plastic waste are subject to extensive controls for trade, unless plastics are clean and homogenous.¹³⁶ As of July 2020, Japan is currently in the process of revising the national export controls on plastic waste in response to the Basel Convention amendments. These revisions are currently in the drafting stage and will soon be shared for public consultation. A major part of these revisions is classifying plastics as either not requiring any control under Basel (i.e. plastic waste is homogenous with no contamination or is easy to sort) and plastics that will be subject to Basel processes. These include sending prior notice from Japan to the importing country and receiving consent for the shipment, and ensuring environmentally sound management of the shipments in the importing country.

The Japanese government has also invited representatives from other countries in Asia to share their regulations and find a common understanding of the new amendments, and to create harmonised standards for the classification of plastic waste. In Table 15 below, we have outlined the barriers and enablers to implementing environmentally responsible trade practices in Japan.

Table 15: Barriers and enablers to environmentally responsible trade in Japan

ERT practices	Barriers for ERT in Japan	Enablers for ERT in Japan
1. Improve collection and sorting in export countries to significantly decrease or eliminate unrecyclable plastics from traded bales	Plastics that were usually exported include plastic containers and packaging outside of the EPR system, and plastics from vehicles, construction, electrical and electronic appliances and agriculture. Improving sorting for these plastics would require an investment in recycling infrastructure. In the case of plastic containers and packaging, the EPR and non-EPR systems are strictly separate, so sorting could also be improved by the integration of systems and flexibility to share recycling facilities.	Japan is providing financial support for upgrading recycling facilities - \$15 million in 2018 ¹³⁷ – however more investment may be needed. Japan implemented design standards for PET in the 90s which have improved recyclability of products, these design standards could be extended to other plastic products.

¹³⁵ The Japan Times, (2019). Redouble efforts to reduce plastic waste. Available online: <https://www.japantimes.co.jp/opinion/2019/05/16/editorials/redouble-efforts-reduce-plastic-waste/#.XxeZaPqzZUQ>

¹³⁶ The Jiji Press, Ltd, (2019). Int'l Pact Amended to Regulate Dirty Plastic Waste Exports. Available online: <https://www.nippon.com/en/news/yji2019051100381/int'l-pact-amended-to-regulate-dirty-plastic-waste-exports.html>

¹³⁷ Inoue, Y. (2018), Japan's Resource Circulation Policy for Plastics. Ministry of the Environment Japan, accessible online at: https://ec.europa.eu/environment/international_issues/pdf/S2-02-Yusuke%20Inoue.pdf

2. Trading of uncontaminated, pre-sorted, recyclable plastics that do not contain any non-recyclable material and have been prepared for immediate recycling (Basel Convention conditions)	As above for #1, investment mechanisms need to be established for plastic wastes that are generated outside of the EPR system. Japan is currently preparing national standards to classify different categories of plastic waste exports under Basel.	As above for #1
3. Implementing environmental controls in import countries, including import licences, inspection of imports and facilities, quality standards for bales and/or deposits or levies to provide insurance for the management of bales that don't meet standards	N/A	N/A
4. Ensuring the importing country has adequate processing facilities to process plastic waste in an environmentally responsible way	No significant barriers identified; Japan is well placed to conduct these checks	Japan is already discussing the potential to introduce prior notice and consent mechanisms. Assessing processing facilities and environmental controls in each receiving country should be the foundation for this mechanism. Co-operation is needed between trading countries in the region.
5. Checking that the importing country has the institutional capacity to monitor and enforce environmental regulations	No significant barriers identified; Japan is well placed to conduct these checks	As per #4 above, developing a prior notice and consent mechanism could be preceded by a review of monitoring and enforcement capacity.
6. Checking shipments and contamination levels at point of export and import and ensure accurate labelling of bales	No significant barriers identified; there are existing mechanisms to undertake inspections in Japanese ports.	Currently, there is a collaboration between regional offices of Japan's MOEJ and customs officers to inspect imports and exports. Through this arrangement, Japan is well placed to continue and expand this practice.
7. Increasing transparency of traded volumes, enabling traceability and accountability for both export and import countries	Japan intends to lead a regional dialogue to improve traceability and accountability	Japan has comparatively good data on waste imports and exports, and could support other countries in the region with data management systems.
8. Improve national and regional oversight to minimise shifting of waste over borders	Challenge to co-ordinate discussions between many countries in the region	Japan is already inviting other Asian countries to participate in a discussions to develop harmonized standards on traded plastic scraps. This collaboration can facilitate discussions on improving regional oversight (and traceability as above) Regional dialogue between countries is needed, which can be coordinated with above for #7

4.3 Mitigating potential perverse outcomes

Potential for perverse social, economic or environmental outcomes as a result of interventions

The following examples are drawn from interviewees unless otherwise noted as from the literature.

Table 16: Potential perverse outcomes and mitigation measures

Intervention	Perverse outcome	Mitigation measures
EPR system for containers and packaging	The EPR system only applies to household waste, and commercial and industrial container and packaging waste is managed outside of the system. This had led to high costs and inefficiencies. Even though the materials from both streams are similar, recycling plants are only able to process plastics from one collection stream.	Modify regulation to integrate the management container and packaging waste from households (currently within the EPR system) and outside the system (such as industrial waste) ¹³⁸ Update licence system to allow recycling plants to be able to process plastics from both the EPR and non-EPR systems.
Investment in improving sorting systems for plastic waste that was previously exported	If improving sorting is not cost competitive with incineration, incineration or waste-to-energy may become more widely used.	Reducing consumption of difficult to recycle items will help reduce the costs of sorting. Also, developing sustainable funding mechanisms such as EPR will help to support further domestic material recycling.
Investing in new reprocessing facilities and new sorting facilities for export	The focus on improving recycling has potential to dominate, and potentially sideline other initiatives, such as eliminating problematic waste streams from the market and reducing waste generation overall.	Following the waste hierarchy will help to keep prioritising the reduction of waste overall, and reducing the use of unrecyclable and single use items.

Assessment of risks and benefits of interventions to improve plastic waste management

Japan has a number of distinctive waste management laws and systems that have been successful in achieving high rates of material and energy recovery. These include a well-established Extended Producer Responsibility framework; voluntary design standards to improve recyclability of products; green public procurement law; high levels of source separation; and advanced recycling processes.

Potential interventions to improve waste management in Japan include: improving sorting for plastic waste that was previously exported; investing in more recycling facilities within Japan; implementing incentives to increase recycled content in products in Japan; improving data collection; reducing single use plastics and packaging, and; enabling flexibility of recycling of packaging and containers between the EPR and non-EPR collection systems.

In light of restrictions on plastic scrap quality in Southeast Asia, and the environmental impacts of exporting poorly sorted or contaminated plastic scraps, these interventions would have positive impacts by enabling cleaner exports, and reducing environmental risks in receiving countries. They would also enable higher material recycling rates and a reduction in litter and plastic leakage to the ocean.

A key risk to manage is that with the focus on maintaining exports and improving recycling, other equally important initiatives are not lost, such as reducing the use of problematic and unrecyclable plastics and reducing consumption and waste overall. Similarly, if improving sorting or developing reprocessing facilities

¹³⁸ Inoue, Y. (2018). Japan's Resource Circulation Policy for Plastics. Ministry of the Environment Japan, accessible online at: https://ec.europa.eu/environment/international_issues/pdf/S2-02-Yusuke%20Inoue.pdf

in Japan is not cost competitive, there is a risk of increasing use of waste-to-energy, and a reliance on this rather than waste reduction and material recycling.

With regards to environmentally responsible trade, Japan is playing a leadership role in the Asia-Pacific region for a number of initiatives, including proposing the Basel Convention amendment for waste plastics and establishing a regional dialogue to harmonise standards for plastic scrap export quality. Collectively, these initiatives have significant potential to reduce the environmental impacts of plastic scraps trade in the Asia-Pacific. However, for most countries, domestic waste management practices have a greater impact on leakage and need to be addressed to resolve marine plastic pollution.

5. Findings across case studies

Each of these three case studies has illustrated a distinctive waste management context, with regards to their trading relationships and recycling capacities. The Vietnam example highlighted the challenges that are being faced by Southeast Asian countries that have recently started to import and process plastic waste, in terms of environmental impacts and the rapid implementation of new controls. However, it also highlights the gaps in domestic waste management, which are likely to have even greater environmental impacts. The Pacific Island Countries (PICs) example illustrates the waste management challenges faced by remote locations, and the physical, technological and capacity constraints for waste management and recycling for small populations. The Japan example demonstrates some of the initiatives that have achieved success and some that still need improvement in an advanced recycling economy, both with regards to domestic waste management and trading practices.

While the case studies are distinctive, there are some commonalities across them. In Vietnam and the PICs, there are a lack of domestic collection systems and a lack of sanitary landfills, which both lead to leakage. A lack of collection and separation for recycling also inhibits domestic recycling opportunities where scale is important. Single use plastics, composites, complex multi-layer plastics and other low value types of plastics remain a problem in all countries. These types of plastics are not readily recyclable, which means they may not be collected or sorted, and when they are separated from recyclable plastics they must be disposed of, and the primary options are landfill or incineration. In Vietnam and Pacific Island Countries, disposal may be at sanitary or unsanitary landfills or through landfill burning, and in Japan they are incinerated. There are capacity building needs in both Vietnam and the PICs, to facilitate adoption of improved waste management practices and greater environmental monitoring.

The case studies have also highlighted some common successes as well as challenges. For example, container deposit schemes and producer responsibility have proven highly successful for achieving high collection and recycling rates in both Japan and Palau. Complexity in institutional arrangements and responsibilities with regard to waste have created some challenges in both Vietnam and Japan. In Vietnam, responsibilities for waste are split across six different ministries, which challenges accountability and coordination. In Japan, the producer responsibility schemes have enabled very high recycling rates for municipal household waste, but there are gaps in recycling for the commercial, industrial and agricultural sectors and a parallel recycling system which is less efficient. In all three countries, financial support is required to improve recycling technology, for example to improve sorting systems in Japan, to develop recycling efficiency and environmental controls in Vietnam, and to facilitate collection, aggregation and processing in the Pacific Islands.