environmental investigation agency

Plastic Pollution Prevention in Pacific Island Countries:

Gap analysis of current legislation, policies and plans

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Executive Summary

Pacific Island countries (PICs) contribute less than 1.3 per cent of the mismanaged plastics in the world's oceans yet are one of the main recipients of plastics pollution and its impacts.

The costs of plastic pollution and climate-related impacts on these islands are massively disproportionate to their contributions. Plastics entering the region are polluting the region's life support systems and impacting their Indigenous peoples' cultural, economic and social ties to the ocean.

While the transboundary flows of plastic waste through Pacific Ocean currents is distinctly recognisable and increasingly documented, this report significantly widens the scope beyond marine-based litter to consider the impacts along the full lifecycle of plastics, from extraction and production to the ongoing impacts on air, water and soil.

Using a gap analysis, this study aims to identify the current limitations in national plastic pollution policy for preventing plastic pollution. It also explores the potential to implement best practice for the reduction of plastic pollution and the promotion of a safe circular plastics economy.

An analytical framework was developed using publicly available online resources to examine national legislation, policies, strategies and plans relevant to plastic pollution in each of the countries included. The final framework consisted of five categories: Global Objectives, Waste Prevention, Waste Management, Microplastics and Standardisation. A total of 10 PICs from Melanesia, Polynesia and Micronesia were analysed.

The core finding of this report is that while a growing number of countries have implemented ambitious legislation to restrict the import and trade of the some of the most problematic plastics into the region, PICs are failing to address plastic pollution beyond waste management. Many countries have ratified, signed or acceded to regional and global instruments, protocols and conventions related to plastics pollution. However, the implementation of these obligations is rarely reflected in country-level policy frameworks. Where the transposition of an international convention into national law is made, these are usually aimed at waste management – when plastics have already become waste or pollution – rather than preventative measures.

Plastic pollution is often subsumed within the broad category of 'waste management' and a range of terms associated with plastics lacked standardised definitions and best practice. As a result, current policy does not protect the health of Pasifika peoples (including consumers and workers) and the environment from the chemical and physical harms specific to plastic pollution. Microplastics was only noted in one of the national documents analysed and few linkages were made between human health, climate change and

plastic pollution. This may, in part, be the result of a limited access to the latest science-based evidence on plastic pollution as well as its interpretation. The latest information on false solutions to the plastics crisis, such as incineration technologies, bioplastics and downcycling, is urgently needed if the region is to avoid the perverse outcomes that come with locking investment into these responses.

Cleaner Pacific 2025 illustrates that preventing plastic pollution will not be possible in the absence of a comprehensive policy framework which fosters sustainable consumption and production. The report corroborates these insights by underscoring the importance of sustainable financing mechanisms, transparency of information, monitoring and performance indicators and regional and national cooperation.

Pacific Island Countries rely heavily on imported goods and many of these either contain or are packaged in plastic. Where plastics are necessary, 'repatriation' maybe considered an additional 'R' to the '3Rs' seen in many of the documents analysed in this study. This would see a range of 'takeback' schemes whereby all the plastics that enter the region were repatriated by producers at the end of their useful life. Furthermore, the legal regulation of a broad set of priority plastic products (e.g. single-use plastics including polyvinyl chloride [PVC]] and polystyrene [PS and EPS], whiteware, tyres and e-waste). Priority products enacted under a legislative instrument could trigger government-mandated extended producer responsibility schemes with the flexibility to accommodate additional priority products as the need arose.

There may be a case for an eco-levy on all single-use plastics to financially support and incentivise a shift to refillables/reusables and safe product design. A range of mandatory measures with inbuilt financial mechanisms could aid in setting and meeting ambitious and measurable national plastic pollution elimination targets.

Traditional and local knowledge, values and alternatives to plastics are underutilised across the participating countries. Expanding on pre-existing public-private partnerships across the Pacific region will also support the prevention, reduction and repatriation or removal of plastic pollution (e.g. for collection, sorting, sanitising, processing, takeback schemes and reverse logistics).

The findings strongly suggest that in order to address these issues and prevent growing volumes of increasingly problematic types of plastics entering the Pacific region, a global agreement is urgently needed. Only this can address the transboundary flow of marine litter, safe reusable and recyclable product design and the global reduction of plastic production. These responses sit outside the national and regional jurisdiction of PICs.

A global agreement could also provide scientific, financial and technical assistance to develop tailored national action plans and policy tools to prevent plastic pollution, develop harmonised standards for reporting and monitoring at national levels and the required industry standards to ensure a safe circular economy for plastics.

Over the years, PICs have repeatedly demonstrated leadership in international fora on environmental issues, leading the world in a call for the standalone Sustainable Development Goal for the ocean, SDG14 and advancing international progress towards addressing the climate crisis.

As with climate change, tackling plastic pollution requires an urgent and coordinated global response that reflects the needs of countries most directly affected by it. This report takes fundamental steps towards analysing the gaps in the region and making concrete recommendations for how these challenges can be overcome through strategic and ambitious policy-making.

Key recommendations

Global Objectives

- Policy frameworks prioritising prevention over waste management.
- Specific references to 'plastic pollution prevention/ elimination' within relevant policy frameworks.
- Legislative mechanisms to address the intergenerational sociocultural, economic, environmental, climate change, and public health impacts of plastic pollution.
- Intergenerational equity to include gender and informal workers.
- Incorporation and implementation of regional and international obligations where possible (e.g. marine litter, toxic chemicals, climate change, and waste trade).
- Inter-ministerial integration and policy coherence specific to plastic pollution.

Waste Prevention

- Plastic pollution policy focused high up the waste hierarchy.
- Importation and trade restrictions on problematic plastics and polymers (including single-use bioplastics).
- Measurable and ambitious national reduction targets.
- Reduction, monitoring, and management plans for virgin plastics.
- Promotion of traditional/local alternatives.
- Financial mechanisms to incentivise prevention.
- National inter-ministerial plastic pollution elimination committees.

Microplastics

- Open source access to the latest science.
- Product design legislation.
- Market and import restrictions (e.g. for products containing microbeads and non-durable products).
- Legislated return schemes (e.g. for degradable agricultural films).
- Monitoring, management, and reporting systems for plastic pellets.

Standardisation

- National monitoring, reporting and inventories specifically for plastics.
- 10-digit globally harmonised system (GHS) for customs tariff codes to restrict problematic plastics imports.
- Freedom of information enacted all along the supply chain, from production to packaging and point of sale (including ecolabeling).
- Standardised definitions.
- Harmonised monitoring / reporting.
- Extended producer responsibility certified schemes.
- Strengthen compliance and enforcement.

ACRONYMS

ADB	Asian Development Bank
AHOEEG	Ad Hoc Open-Ended Expert Group
ALDFG	Abandoned, Lost or otherwise Discarded Fishing Gear
ARF	Advanced Recycling Fee
BMW	International Convention on the Control and Management of Ship's Ballast Water and Sediments
BPA	Bisphenol A
BPS	Bisphenol S
CBD	Convention on Biological Diversity
CDS	Container deposit scheme
CFCs	Chlorofluorocarbons
CIEL	Center for International Environmental Law
CLiP	Commonwealth Litter Programme
CMM	Conservation Management Measure
CROP	Council of Regional Organisations in the Pacific
DWM	Department of Waste Management
ECAL	Environment and Climate Adaptation Levy
EDCs	Endocrine disrupting chemicals
EDO	Environment Defenders Office
EIA	Environmental Investigation Agency
EPA	Environmental Protection Agency
EPR	Extended Producer Responsibility
GEF	Global Environmental Facility
GESAMP	Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection
GHGs	Greenhouse Gas Emissions
GPA	Global Programme of Action for the Protection of the Marine Environment from Land Based Activities
GPML	Global Partnership on Marine Litter
HBCD	hexabromocyclododecane
IMO	International Maritime Organisation
ISO	International Organisation for Standardization
JICA	Japan International Cooperation Agency
KSWMP	Kiribati's Solid Waste Management Plan
LDPE	Low Density Polyethylene
MARPOL	International Convention for the Prevention of Pollution from Ships
MLAP	Pacific Marine Litter Action Plan
MWAP	Solomon Islands National Waste Management Action Plan
NDCs	Nationally Determined Contributions
NIAS	Non-Intentionally Added Substances
PACPOL	Pacific Oceans Pollution Prevention Programme
PBBs	Polybrominated Biphenyls
PCBs	Polychlorinated Biphenyls
PCTs	Polychlorinated Terphenyls
PERC	Political Ecology Research Centre
PET	Polyethylene Terepthalate
PFOA	Perfluorooctanoic Acid
PIC	Pacific Island Country
PNG	Papua New Guinea
POLP	Pacific Ocean Litter Project
POPs	Persistent Organic Pollutants
PRIF	Pacific Regional Infrastructure Facility
PVC	Polyvinyl Chloride
PwC	PricewaterhouseCoopers
SAMOA	Small Island Developing States Accelerated Modalities of Action
SDGs	Sustainable Development Goals
SIDS	Small Island Developing States
SPREP	Secretariat of the Pacific Regional Environment
STaRS	National Strategy for Responsible Sustainable Development for Papua New Guinea
SWAT	The Solid Waste Agency of Tuvalu (now the Department of Waste Management [DWM)
UNCLOS	United Nations Convention on the Law of the Sea
UNEA	United Nations Environment Assembly
UNEP	The United Nations Environment Programme
UNFCCC	The United Nations Framework Convention on Climate Change
UPOPS	Unintentional Persistent Organic Pollutants
WCPFC	Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean (WCPFC Convention)
WRC	Nairobi International Convention on the Removal of Wrecks
WWF	World Wildlife Fund

Background

Plastic production is increasing at alarming rates, set to quadruple by 2050. Up to 12 million tonnes of plastic leak into our oceans each year, and 51 trillion plastic particles are already present in the marine environment

The Pacific is the world's largest ocean, covering 30 million square kilometres (nearly 15 per cent of the Earth's surface). It comprises approximately 25,000 islands that are home to 2.3 million people. For thousands of years, the people of the Pacific region have been sustained by the rich natural resources of their marine environment. Pasifika peoples depend on the ocean for food, transport, traditional practices and economic opportunity. Plastic pollution adversely affects the health of Pasifika peoples and the biodiversity of marine and terrestrial ecosystems.

Pacific Island Countries (PICs) are vulnerable to plastic pollution due to their expansive coastlines – the total coastline of Pacific island countries is 57,797km (Andrew et al 2019) – and position within the trade winds and at the outer edges of oceanic gyres. Remote islands are often exposed to marine plastic pollution disproportionate to their size and domestic contributions, with the source and responsibility often originating thousands of kilometres away. Offshore sources of marine plastic debris, e.g., abandoned, lost or otherwise discarded fishing gear (ALDFG), and other plastic pollution carried on ocean currents from other nations can represent the most significant types of debris on these islands (Richardson et al. 2017). The beaches of the World Heritage-listed and uninhabited Henderson Island in the Pitcairn Group, for example, contains an estimated 37.7 million items of plastic debris, giving it the dubious honour of being the island with the world's greatest density of marine plastic litter. Marine plastic densities have been found to be high on sea floors throughout the region. These marine plastic pollution inflows threaten ecological and human health and economic systems (Lachmann et al. 2017); they place additional burdens on already over-stretched waste management infrastructure and cannot be captured by country-level policy mechanisms alone.

Unregulated inflows of plastics not only carry macro- or mega-sized plastics, but also micro- and nano-sized plastic particles. A 2011 study found more than 700 items of macroplastic debris in 3300m2 of the shallow lagoon of the Majuro Atoll, Republic of the Marshall Islands (or 234,000 items per sq km) and more than 780 plastic items in 3900m2 on the exposed reef (more than 200,000 items per sq km) (Richards & Beger, 2011). Microplastics density found on Easter Island shores average 800 items per m2. Studies involving samples taken in the ocean region between New Zealand, Samoa, Tahiti and Rapa Nui found microplastics in 97 per cent of 33 of the 34 fish species examined, compared to a global trend of 67 per cent: stark evidence that the marine environment of the Pacific region is disproportionately impacted by marine plastics (Markic et al 2018). While the risk to marine fauna from ingestion and entanglement of plastics are now well-documented, the full extent of harms from micro- and nano-sized plastics to fauna, flora, biodiversity, food safety and human health are nascent yet growing fields of research. There is growing evidence that edible plants have the potential to take up microplastics (Conti et al 2020; Li et al 2019). 'Agriplastics' or agricultural plastics have the potential to contaminate crops. They include microplastics found in slow-release and sewage sludge fertilisers, as well as from degraded agricultural films such as plastic mulch, plastic greenhouses and silage wraps. Plastics are also known to raft pathogens and invasive species, thus threatening bio- and food security in a region that is heavily dependent on the sea as a source of food and sustainable livelihoods (Rodriquez et al 2019; Miller et al 2018).

The increase in the generation of domestic plastic pollution in PICs further threatens livelihoods and environments. PICs have seen a significant shift away from traditionally locally grown and fished food sources toward cash cropping and commercial fishing (Friel et al., 2013, p. 126). This, combined with the trend in rapidly growing urban communities and increasing preferences for imported, processed and pre-packaged foods, leads to growing volumes of disposable packaging waste and other plastics requiring safe management post-consumption (SPREP 2016). Many PICs are over-dependent on income from tourists who are attracted to the high biodiversity, cultural diversity, heritage and natural resources of the Pacific. Tourism, including cruise ships and beachside resorts, contributes significantly to all PIC economies. The Cook Islands is the most dependent on tourism, which contributes 87 per cent of GDP (SPTO, 2020). However, tourism also generates a significantly amount more waste per capita than residents (Mohee et al. 2015). Many resorts and tourist sites import a high volume of packaged products to meet tourists' requirements. Paradoxically, plastic pollution from any source presents economic threats to the tourism sector, which relies heavily of the perception of the region as a "Pristine Paradise" (e.g., Government of Palau Tourism Slogan). For the tourism industry to thrive in the region, PICs will need to ensure their environments are clean, healthy and functioning (Lachmann et al. 2017).

Like all nations, PICs face the challenge of managing these increasing volumes of plastic pollution. PICs are Small Island Developing States (SIDS) and characterised as small, isolated and resource-limited island states that face 'specific social, economic and environmental vulnerabilities' (UN-OHRLLS 2011). PICs are limited in land size (only two per cent of the Pacific region is land mass) and, therefore, limited in terms of landfill capacity and site suitability (Mohee et al 2015). This, coupled with the fact that populations are geographically dispersed, means most PICs lack regular and accessible domestic collection and sorting services, infrastructure and regional networks. Further, many municipal dumpsites are open and unsanitary and burning in open pits is

standard waste management practice. Poor waste management results in ecological damage and poses human health risks, particularly when plastic and other toxic wastes escape poorly controlled landfills or are burnt. Consequences include the toxic contamination of water, air and soil from residual ash (Verma et al 2016).

Recycling is also restricted in PICs due to intra- and inter-island logistical and transport challenges, lack of collection and sorting facilities, limited port capacity in some countries, lack of backloading/reverse logistics agreements and difficulty in securing and retaining markets for post-consumer materials.

In addition to these constraints, the Pacific region, with its many low-lying islands and atolls, is one of the most vulnerable regions in the world to climate change-induced sea level rise, storm surges and other increasingly frequent weather events. Due to limited suitable land, landfills and dumpsites are often situated near human settlements and fragile ecosystems. This offers landfill leachate a direct pathway to soils, marine ecosystems and freshwater sources. Landfills and dumpsites are also often located in flat coastal areas most exposed to weather events and rising sea levels (Mimura et al., 2007). Extreme weather events aggravate the pre-existing environmental impacts of poorly sited and managed landfills (Farrelly, Stupples, and Schneider, 2016), which are likely to increase in frequency and intensity as climate change progresses. Drinking water potability can also be threated through climate change impacts, including rising sea levels. This can occur when saltwater flows into unconfined aquifers in low lying areas and where groundwater discharges to streams (WHO 2017).

The key constraints for sustainable development in relation to plastic pollution for PICs include the following:

- rapidly growing urban populations and growing dependence on tourism and growing dependence on processed and pre-packaged foods;
- small domestic markets and dependence on a few external import markets;
- limitations of suitable sites for landfill, few sanitary landfills and high costs of improvements to current sites;
- high costs for energy, infrastructure, transportation, communication, maintenance and servicing to implement waste services more widely and to expand recycling networks;
- uncontrolled inflow of plastic marine debris arriving from distant shores;
- a narrow resource base restricting access to the benefits of economies of scale;
- low volume of recyclables, poor quality materials, a growing range of material including (an increasing range of hard-to-recycle or unrecyclable hazardous materials) and low global demand for recyclable materials;
- low and irregular international traffic offer poor opportunities for reverse logistics and take-back/ end-of life logistics;
- fragile natural environments with low resilience to natural disasters, climate disruption and uncontrollable marine debris inflows

Aims

Global policy and the work on plastic pollution now acknowledge the limitations of focusing purely on preventing and mitigating 'marine litter', considering approximately 80 per cent of marine litter comes from land-based sources and all plastics are produced on land. This report significantly widens the scope beyond marine-based litter to consider the impacts along the full life cycle of plastics: from extraction to ongoing impacts on air, water and soil. Using a gap analysis, this study aims to identify the following in national plastic pollution policy frameworks in PICs:

1. limitations in the ability to prevent plastic pollution;
2. potential to implement an adaptation of Pillar Two of a multilateral plastic pollution convention proposed by the Environmental Investigation Agency (EIA) (2020).

This is phase one of a two-phase research project. Phase two will extend the scope beyond document analysis to incorporate qualitative data from interviews with country delegates. Phase two aims to contextualise the gaps identified in phase one by providing insights into the following:

- current capacities to prevent and mitigate plastic pollution;
- expectations for in an international legally binding plastic pollution convention;
- readiness to implement a proposed multilateral plastic pollution convention;
- support needed from regional networks, private sector and the global community to prevent plastic pollution in the region and to implement such a convention in national and regional policy and legislation.

Methods

In this study, the term 'plastic pollution' captures not only the physical properties of plastics but also plastic feedstocks (fossil fuel and bio-based); monomers (the building blocks of plastic polymers) and additives (such as plasticisers, flame retardants and stabilisers); the risks borne by associated chemicals such as persistent organic pollutants [POPs] that are adsorbed by hydrophobic plastics and the furans and dioxins that are released when plastics are burnt; and the methane and chlorine plastics have the propensity to 'offgas' and contribute to GHG emissions and damage the ozone layer.

The prevention of plastic pollution is also concerned with harms caused by the physical properties of plastics, including coral reef and vessel damage and fauna

strangulation, entanglement and ingestion. Plastic pollution is also concerned with the organisms or novel ecosystems associated with plastic pollution, including the pathogens and invasive species that can raft on plastics, and the microbial communities that can form on plastics. These pathogens and microbial communities associated with plastic pollution can threaten biodiversity and marine-based food systems. Plastics pollution also captures plastic alternatives such as bioplastics and plastic management technologies, such as chemical recycling and waste-to-energy incineration.

The gap analysis methodology involved desktop research using publicly available online resources. An analytical framework initially based on 'Pillar Two: Plastic Pollution Prevention' of the Environmental Investigation Agency's (EIA's) proposed 'Pillars of Action' (2020) (Figure 1) was developed to examine national legislation and policies relevant to plastic pollution in each Pacific country. Pillar Two presents measures to reduce plastic pollution and to promote a safe circular plastics economy.

The analytical framework was adapted iteratively. The final framework (Table 1) was informed by preliminary document analysis, regular research team discussions and the following documents:

- Environmental Investigation Agency (EIA) (June 2020). Convention on Plastic Pollution: Toward a New Global Agreement to Address Plastic Pollution. London, UK: EIA;
- Raubenheimer, Karen (2019). Desktop studies on Principles of Waste Management and Funding Mechanisms in Relation to the Commonwealth Litter Programme (CLiP): Vanuatu and Solomon Islands. University of Wollongong Australia, Wollongong, Australia;
- Raubenheimer, K., N. Oral, and A. McIlgorm (2017). Combating Marine Plastic Litter and Microplastics: An Assessment of the Effectiveness of Relevant International, Regional and Sub regional Governance Strategies and Approaches. UNEP/EA.3/INF/5, UN Environment.

In this study, 'Global Objectives' include cross-cutting objectives and principles. The national actions that are more likely to prevent the flow of plastics into the economy are categorised as 'Waste Prevention'. Virgin plastics are not produced in PICs, so this category is entitled 'reduction in virgin plastics' (related to manufacturing). Actions that contribute to the prevention of further damage once plastics have already entered the environment are located under 'Waste Management'. 'Agriplastics' are added under 'Microplastics' to capture microplastics found in agricultural products such as slow-release fertilisers most likely to threaten terrestrial food security. 'Product design and additive restrictions' are separated out under the broader theme 'Standardisation'. Additional themes have been added to 'Standardisation', including 'national monitoring, reporting and inventories', 'transparency and freedom of information' and 'enforcement' (since monitoring and reporting to check compliance are minimum requirements of enforcement). 'Definitions' and 'transport' emerged as additional key themes across the country documents. Definitions are located under 'Standardisation' and transport is located under 'Waste Management'.

Figure 1: EIA Pillars of Action for a Convention on Plastic Pollution (2020)

Pillars of Action

Member States have identified several areas where activities are needed, which can be broadly placed into four pillars of action that form the structural and conceptual framework for the Convention on Plastic Pollution:

CONVENTION ON PLASTIC POLLUTION

PILLAR 1 MONITORING AND REPORTING

Monitoring and reporting on the state of the environment and implementation

Harmonisation
- Definitions
- Methodologies (monitoring, reporting)
- Standardised formats

Environmental monitoring
- Baselines (seafloor, seawater, shoreline, biota, freshwater, soils)
- Indicator species
- Evolution of plastic pollution in marine and other environments

National data reporting
- National inventories and sources:
  - virgin plastic production and use
  - recycled plastic production and use
  - plastic-waste management
  - plastic-waste trade
  - land-based sources
  - sea-based sources
  - microplastics
- Evolution of circular economy and leakage

Reporting on national action
- Submission of national action plans
- Periodic review and update

Periodic comprehensive assessments
- Progress toward global objectives
- Scientific and socio-economic reviews

PILLAR 2 PLASTIC POLLUTION PREVENTION

Measures to reduce plastic pollution and promote a safe circular economy for plastics

Global objectives
- Long-term elimination of discharges
- Safe circular economy for plastics

National action plans
- Policies and legislation:
  - targets and market restrictions
  - waste prevention and management
  - recycling and secondary markets
- Sustainable financing mechanisms
- Infrastructure investments
- International and regional commitments

Microplastics
- Intentionally added (e.g. microbeads, fertilisers)
- Wear and tear (e.g. tyres, textiles)
- Mismanagement (e.g. pellets)

Standardisation
- Labelling
- Product design and additive restrictions
- Certification schemes
- Voluntary industry standards

Virgin plastic production and use
- Controls and quality standards

Remediation and legacy pollution
- Protocols and guidelines

PILLAR 3 COORDINATION

Coordination with other international and regional instruments on relevant topics

Sea-based sources (including fishing gear)
- International Maritime Organization (IMO)
- Food and Agricultural Organization (FAO)

Plastic waste trade
- Basel Convention
- Organisation for Economic Co-operation and Development (OECD) and regional instruments

Chemicals and additives
- Stockholm Convention
- Strategic Approach to Integrated Chemical Management (SAICM)

Biodiversity
- Convention on Biological Diversity (CBD)
- Convention on Migratory Species (CMS)
- International Whaling Commission (IWC)

Climate change
- United Nations Framework Convention on Climate Change (UNFCCC)
- Intergovernmental Panel on Climate Change (IPCC)

Agriculture
- Food and Agricultural Organization (FAO)

Cross-regional knowledge exchange
- Regional seas conventions and programmes
- Regional fisheries management organisations

PILLAR 4 TECHNICAL AND FINANCIAL SUPPORT

Technical support to policymakers and financial support to developing countries

Scientific Assessment Panel
- Periodic comprehensive assessments
- Ad hoc reports

Socio-Economic Assessment Panel
- Periodic comprehensive assessments
- Ad hoc reports

Implementing and bilateral agencies
- Technical assistance:
  - capacity-building and training
  - policy development
  - monitoring and reporting
- Best practices and knowledge exchanges

Financial resources and mechanism
- Enabling activities:
  - capacity-building and training
  - policy development
  - monitoring and reporting
  - institutional strengthening
  - Pilot and demonstration projects
- Incremental costs

Implementation and compliance mechanism
- Implementation guidance
- Assistance for countries in non-compliance

Table 1: Analytical Framework including the categories, themes and definitions based on the EIA Pillars of Action and supporting documents.

Category	Themes	Definition
Global objectives	Long-term elimination of discharges	Sustainable, long-term solutions.
	Safe circular economy for plastics	A circular economy has minimal waste and reuses raw materials again and again. Any materials circulating in the economy are safe by design, allowing their introduction into the economy and their reuse without risks for human health and the environment. This includes keeping 'substances of very high concern' (e.g. POPs as plastic additives) out of the circular economy and ultimately aims to eliminate them entirely.
	Intergenerational equity and justice	Ensures future generations flourish as a result of the current policy, legislation and action.
	SDGs	Progresses the UN Sustainable Development Goals: Target 3: Good health and well-being Target 6: Clean water and sanitation Target 11: Sustainable cities and communities Target 12: Responsible consumption and production Target 13: Climate action Target 14: Life below water (protection of the seas and oceans) Target 15: Life on land (restore ecosystems and preserve diversity).
	Protection of human health	The connection between plastics and human health is explicit and/or provisions made.
	Vertical integration	Responds to regional and international obligations.
	Horizontal Integration	Evidence of coherence between legislation, and national policies, plans and strategies (inter-ministerial cooperation).
	Precautionary approach	Lack of scientific data or certainty is not a reason for not acting to prevent serious or irreversible damage.
	Waste hierarchy	There is either explicit reference to the waste hierarchy and/or a focus on the top of the waste hierarchy (refuse, reduce, reuse, redesign).
	Climate Change	The connection between plastic pollution and climate change is made explicit and/or provisions are made.
Waste prevention	Trade in non-hazardous, recyclable and reusable plastics	Import and export bans and restrictions, minimum environmental standards for plastics imports and exports, fees on problematic imported plastic.
	National reduction targets	Measurable plastic pollution reduction targets and timelines.
	Virgin plastic use	Controls and standards to reduce virgin plastics entering the economy (e.g. caps).
	Market Restrictions	Prohibitions on certain polymers (including bioplastics) and additives and controls on the use of Endocrine Disrupting Chemicals (EDCs), Persistent Organic Pollutants (POPs), and carcinogens.
	Promotion of traditional/local solutions	E.g., woven reusable bags to replace single-use plastic bags, leaf wraps for food, and the promotion of traditional/local knowledge.
Waste Management	Closed loop recycling (primary market) or secondary markets	Secondary ('cascade' markets) recycling is also known as 'downcycling' from a higher value product to a lower grade product. E.g., from a PET bottle into a less/non- recyclable product such as carpet.
	Government infrastructure investments	The government invests in accessible and regular separate waste collection, recycling, reuse, and preventative measures.
	Legal basis for sustainable financing mechanisms/market-based instruments	Examples include waste-management fees, deposit-refund schemes, extended producer responsibility (EPR) schemes, licensing schemes, plastic taxes and levies, advanced disposal fees, polluter pays, and user pays.
	Recognised impact on economic development	An explicit link is made between the impact of plastic pollution on economic development (e.g. tourism, safe and secure employment opportunities, agriculture). This might also factor in the economic cost of not preventing plastic pollution/inaction. Plastic pollution is presented as a potential business risk.
	Remediation and legacy pollution	Includes protocols and guidelines to recover legacy plastics (e.g., marine debris) to be safely reused, recycled or repurposed and remediation of landfills (e.g. following storm damage).
	Transport	Transport infrastructure; access; port capacity; backloading (filling empty trucks and/or shipping containers with waste on their return to point of origin/producers); and reverse logistics (shipping the product back to the producer post-consumption for recycling or reuse).
Microplastics	Intentionally added (e.g., microbeads)	Restrictions on the importation and trade of products with added microbeads.
	Wear and tear (e.g., tyres, textiles)	Restrictions on the importation of plastic products with high wear and tear.
	Agriplastics	Management and prevention of plastics used in agriculture such as plastic mulch and microbeads in controlled-release fertilizers.
	Management (e.g., pellets)	Handling guidelines or restrictions.
Standardisation	Product design	Eco- and bio- benign product design.
	Polymer restrictions	Restrictions on the importation and trade of certain polymers.
	Additive restrictions	Restrictions on the importation and use of toxic additives and monomers, such as those categorised as EDCs, POPs, and carcinogens.
	Voluntary certification schemes and industry standards	Compliance to certification schemes such as ISO for home compost-ability; and products and services certified 'zero waste to landfill'. Businesses commit to reducing plastics throughout their supply chain.
	Mandatory product stewardship	Government mandated participation in accredited schemes for the stewardship of plastic products.
	National monitoring and reporting, national inventories and reduction targets	Tracking of production, trade, consumption, and recycled content, final treatment. National reduction targets with agreed timelines.
	Transparency & Freedom of information (consumer justice, labelling)	Information is readily available to the consumer. Information could include recycled content, recyclability, appropriate disposal, compost-ability, additives, GHGs, and hazard potential.
	Compliance measures (monitoring and reporting) and enforcement	Minimum requirements, monitoring and reporting. Mechanisms for managing suspected or identified instances of non-compliance such as financial penalties, imprisonment, or confiscation.
	Definitions	Standardised definitions. E.g., 'reusable', 'compostable', 'recyclable', 'biodegradable'.

Pacific Islands countries and documents analysed

The documents analysed in this report (Appendix 1) were limited to country-level legislation, policies, plans and strategies relevant to plastic pollution in 10 PICs which are confronted with similar constraints to their sustainable development efforts in relation to plastic pollution and its ecological, social and economic impacts:

- Melanesia: The Republic of Fiji, Papua New Guinea, Solomon Islands, Vanuatu;
- Polynesia: The Independent State of Samoa, the Kingdom of Tonga, Tuvalu;
- Micronesia: The Republic of Kiribati, the Republic of the Marshall Islands, the Republic of Palau.

These countries were selected due to their participation in the United Nations Environmental Assembly (UNEA) (Marine Litter and Microplastics Resolution) process. In addition, delegates from the participating countries had previously expressed interest in, or support for, a multilateral plastic pollution convention. These expressions of interest resulted in the establishment of an advocacy group led by EIA and the Centre for International Environmental Law (CIEL) and supported by representatives from WWF (Pacific), the International POPS Elimination Network (IPEN) and Massey University's Political Ecology Research Centre (a principle investigator of this study) and Environmental Law Oceania Consultancy.

The following sources and documents were cross-referenced to ensure the most current legislation, policies, plans and strategies relevant to plastic pollution were captured in each country gap analysis:

- Duke University Plastics Policy Inventory;
- FAOLEX;
- ECOLEX;
- the Pacific Islands Legal Information Institute (PacLII);
- Pacific Region Infrastructure Facility (2018) Pacific Region Solid Waste Management and Recycling Country and Territory Profiles. Pacific Region Infrastructure Facility (PRIF). Sydney, Australia;
- Peel, J., L. Godden, A. Palmer, R. Gardner, and R. Markey-Towler (2020). Stocktake of Existing and Pipeline Legislation in the 15 PacWastePlus Participating Countries. University of Melbourne, Melbourne, Australia;
- Raubenheimer, Karen (2019). Desktop studies on principles of waste management and funding mechanisms in relation to the Commonwealth Litter Programme (CLiP): Vanuatu and Solomon Islands. University of Wollongong Australia, Wollongong, Australia;
- national official online sources of legislation. For example, the Laws of Fiji.

Additional documents and reference sources were accessed to check that all multi-lateral environmental agreements and regional agreements relevant to plastic pollution for each of the countries studied were captured in the report:

- InforMEA;
- Karasik, R., T. Vegh, Z. Diana, J. Bering, J. Caldas, A. Pickle, D. Rittschof, and J. Virdin. 2020. 20 Years of Government Responses to the Global Plastic Pollution Problem: The Plastics Policy Inventory. NI X 20-05. Durham, NC: Duke University;
- Environmental Investigation Agency (EIA). (April 2020). Islands of Opportunity: Toward a Global Agreement on Plastic Pollution for Pacific Island Countries and Territories;

- Environmental Investigation Agency (EIA) (June 2020). Convention on Plastic Pollution: Toward a new global agreement to address plastic pollution. London, UK: EIA;
- SPREP (2019). PACPOL Strategy and Workplan prepared by Asia-Pacific ASA (APASA) for the Secretariat of the Pacific Regional Environment. Apia, Samoa: SPREP;
- SPREP (2016). Cleaner Pacific 2025: Pacific Regional Waste and Pollution Management Strategy 2016–2025. Apia, Samoa: SPREP;
- Commonwealth Marine Economies Programme (2018). Pacific Marine Climate Change Report Card.

Analysis

The gap analysis review process comprised five components:

1. keyword search of documents. Documents were searched for the following terms: 'waste', 'plastic', 'refuse', 'garbage', 'litter', 'pollution', 'microplastic', 'marine debris', 'hazardous waste' 'emission' and 'contaminant' to find references to plastic pollution;
2. each document was reviewed to determine its instruments and mechanisms for plastic pollution prevention and whether these focused on the top of the waste hierarchy (prevention): refuse, rethink, reduce, redesign and reuse. From this, documents were selected that were considered 'key' to preventing plastic pollution in each country;
3. next, a granular thematic analysis of the key documents was undertaken using the key words and themes derived from the analytical framework (Tables 4-8). Synonyms and synonymic phrases in the themes were examined for their application within and across national legislation, policies, and plans;
4. based on the definitions provided in the analytical framework (Table 1), green indicates explicit mention of the theme in the document, yellow indicates that the document either partially includes the theme or that it is inferred and red indicates that that theme is absent in the document;
5. country delegates were emailed to request validation of the selected documents. The analysis was validated through an internal peer review process.

International and regional plastic policy overview

While several PICs are leading the world in activities to regulate plastic pollution by implementing national bans and levies, solving the issue of plastic pollution in the Pacific requires national, regional and international coordination and support. There are existing legal frameworks at multiple levels of governance to prevent and manage plastic waste and marine litter in the Pacific. Here, we present a brief summary of the instruments the study countries have signed, ratified or acceded to that are relevant to plastic pollution prevention and mitigation in the Pacific Region (Tables 2 and 3).

International policy overview

The first international legally binding instrument relevant to plastic waste and marine debris in the Pacific region is the 1982 United Nations Convention on the Law of the Sea (UNCLOS) which entered into force in 1994 with 167 state parties (see Table 2 for ratified PICs). UNCLOS is a binding international instrument that requires parties to adopt regulations and laws to control pollution of the marine environment from land-based sources of pollution as well as pollution from ships. UNCLOS outlines best practices; however, it does not provide guidance on Extended Producer Responsibility (EPR) or polluter pays mechanisms, that is, when external costs are incorporated into products and carried by producers to address marine pollution. There are two specific legally binding instruments within the framework of UNCLOS relating to plastic pollution:

- the International Convention for the Prevention of Pollution from Ships (MARPOL) 1973, amended in 1978. Annex V of MARPOL, which came into force in 2013, addresses ocean-based litter pollution and prohibits the discharge of all plastics from ships (IMO 2017b);
- The London Convention, or Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972, adopted in 1975, "promotes the control of marine pollution from human activities and aims at preventing pollution of the ocean from the dumping of wastes and other matter" (IMO 2017c). The London Convention Protocol 1996 is a legally binding protocol for the "[p]revention of marine pollution by dumping of wastes and other matter". This later protocol includes guidance on polluter pays mechanisms for addressing marine litter.

The Global Programme of Action for the Protection of the Marine Environment from Land Based Activities (GPA) adopted in 1995 is a voluntary, action-orientated programme aimed at reducing the degradation of the marine environment from land-based activities. There are several Global Partnerships that focus on specific activities or impacts. The Global Partnership on Marine Litter (2012) (GPML) is a voluntary agreement specifically aimed at reducing and managing marine litter. The key policy recommendations from the GPML for the long-term are aimed at the top of the waste hierarchy: phasing out microbeads, significant reductions in single-use plastics, upstream reductions (but also acknowledges the need for short-term improvements in waste management), avoiding replacing single-use plastics with 'biodegradable' alternatives, harmonisation and standardisation of government monitoring frameworks. The GPML provides support to member states to develop marine litter action plans and assesses the effectiveness of regional and sub-regional governance strategies, with the aim of identifying gaps and solutions. It also supports the establishment of public awareness campaigns and encourages public-private partnerships to find solutions to marine litter. A key outcome of the GPML is the establishment of the Open-Ended Expert Group on Marine Litter and Microplastics at UNEA-3. GPML also has plans to develop a "Plastics Management Strategy for SIDS and Islands". The GPML aligns closely with the UNEP Regional Seas Programme (summarised below).

The Honolulu Strategy (2011) was developed under the umbrella of the GPML at the fifth International Marine Debris Conference. This voluntary strategy provides a global framework for a collaborative effort to "reduce the ecological, human health, and economic impacts of marine debris worldwide". To support policy development, the Honolulu Strategy draws on polluter pays and EPR principles, outlining best practices and a set of goals and strategies that are broadly applicable, regardless of country-specific conditions or challenges. The Honolulu Strategy has three key goals:

1. reduce amount and impact of land-based sources of marine debris introduced into the sea;
2. reduce amount and impact of sea-based sources of marine debris including solid waste; lost cargo; abandoned, lost or otherwise discarded fishing gear (ALDFG); and abandoned vessels;
3. reduce amount and impact of accumulated marine debris on shorelines, in benthic habitats and in pelagic waters.

Each of the goals provide a list of strategies and indicators to direct the development of policies that work towards achieving these goals. The Secretariat of the Pacific Regional Environment Programme (SPREP) administers the GPML and the Honolulu Strategy in the Pacific Islands region. It also develops the Pacific Regional Action Plan on Marine Litter 2018-25 as part of this agreement.

Existing global agreements on the protection of marine ecosystems and biodiversity also have direct relevance to the issue of plastic pollution. For example, the Convention on Biological Diversity (1993) (CBD) is a binding international instrument for the "conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out the utilisation of genetic resources". The impacts of plastic pollution on biological diversity were recognised in the CBD early on. The 2012 CBD Technical Series No 67 Report: Impacts of marine debris on biodiversity: current status and potential solutions covered the state of knowledge on the impacts of plastics, including ALDFG and microplastics on marine life and ecosystems, and gave an overview on multilevel legal instruments on solutions. The report highlighted the potential of EPR (including container deposit schemes), eco-labelling, user-pays approaches, bans, producer responsibility and a precautionary approach. A key aspect of the CBD generally is the inclusion of promoting inter- and intra-generational equity in all efforts to conserve biological diversity and ecological integrity. All countries participating in this study have ratified the Convention on Biological Diversity (Table 2). The Aichi Biodiversity Targets, developed in accordance with the CBD include references to reducing pollution to levels that "are not detrimental" to marine wildlife and ecosystems in Target 8.

The 17 Sustainable Development Goals (SDGs) aim to promote sustainability in the use of natural resources, protection of ecological life support systems and ending poverty and inequalities. The SDGs provide important framing for addressing cross-cutting issues in the Pacific region that simultaneously need to be addressed in order to achieve effective plastic pollution prevention. Goal 12: Responsible Consumption and Production relates to the production of disposable plastic products. Goal 14: Life Under Water specifically states the need to combat marine pollution of all kinds. However, several other targets under other SDGs are also pertinent to plastic production, use and disposal:

Target 3: Good health and well-being

- 3.3 By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases.
- 3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.
- 3.3 By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases.

Target 6: Clean water and sanitation

- 6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all.
- 6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimising release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.

Target 11: Sustainable cities and communities

- 11.6: By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to waste management.

Target 12: Responsible consumption and production

- 12.1: Implement the 10-year framework of programmes on sustainable consumption and production.
- 12.2: By 2030, achieve the sustainable management and efficient use of natural resources.
- 12.4: By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle.
- **12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling, and reuse.**

- 12.b: Develop and implement tools to monitor sustainable development impacts for a sustainable tourism industry.

Target 13: Climate action

- All, but particularly:
- 13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries
- 13.2 Integrate climate change measures into national policies, strategies and planning
- 113.3b Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalised communities

Target 14: Life below water (protection of the seas and oceans)

- **14.1: By 2025, prevent and significantly reduce marine pollution of all kinds, from land-based activities, including marine debris and nutrient pollution.**
- 14.2: By 2020, sustainably manage and protect marine and coastal ecosystems.
- 14.a: Increase scientific knowledge, develop research capacity and transfer marine technology in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular SIDS.

Target 15: Life on land (restore ecosystems and preserve diversity).

- 15.5: Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity (linked to the CBD).

The Basel Convention (1989) is a binding international agreement for the Control of Transboundary Movements of Hazardous Waste and their Disposal. Plastic waste-related amendments include Annex VIII-A3210 which defines plastics that are hazardous; Annex IX - B3011, which clarifies the types of plastic wastes presumed to not be hazardous; and the entry Y48 into Annex II which places all plastic wastes subject to prior informed consent (PIC) unless they fall within this category. Fluorinated polymers and cured resins including thermoset are often inherently toxic and challenging, if not impossible, to recycle. Hazards triggered during their disposal means they are likely to be considered as belonging to Annex II or even Annex VIII and thus controlled under the Basel Convention (subject to PIC). Decision BC-14/13: Further actions to address plastic pollution under the Basel Convention, links to SDG target 12.5 (substantially reduce waste generation). The Decision calls upon parties to make efforts to reduce plastic waste, increase reusability, recyclability and durability of plastic products and promote environmentally sound and efficient management of plastic wastes and adds controls on the transboundary movement of plastic wastes. It further outlines the potentially hazardous additives associated with plastics and plastic waste and strongly encourages parties to make efforts to reduce the use of hazardous additives in the production of plastics, linking directly to the Stockholm Convention on Persistent Organic Pollutants. The Plastic Waste Partnership (PWP) was also established under the Basel Convention agreement to "mobilise business, government, academic and civil resources, interests and expertise to improve and promote the environmentally sound management of plastic waste …".

The Rotterdam Convention (2004) is a legally binding agreement created to protect human health and the environment from the harmful impacts of the trade of certain chemicals. It requires prior and informed consent from receiving countries before exporting chemicals from host nations.

The Stockholm Convention (2004) on Persistent Organic Pollutants is a legally binding international agreement that aims to protect human health and the environment by banning some of the most toxic chemicals (persistent organic pollutants [POPs]). In relation to plastics, the Stockholm Convention include dioxins (released when plastics are burned) and additives that are used in the production of plastics, such as brominated flame retardants, Dicofol and Perfluorooctanoic Acid (PFOA) and its salts and hexabromocyclododecane-(HBCD) in some polystyrene. The polluter-pays principle is explicit in the preamble of the Stockholm Convention – "promote the internalisation of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution".

The Basel, Rotterdam and Stockholm conventions (the 'BRS') collectively provide legally binding mechanisms for the control of the transboundary movement and safe disposal and management of hazardous substances. Decisions by UN member states in 2019 added plastics-related additives to the Stockholm Convention and the Rotterdam Convention which provided greater legal power to countries to control the import of harmful plastics and their additives (Secretariat of the Basel, Rotterdam and Stockholm conventions 2019).

Ninety-nine per cent of plastics derive from fossil fuels. Plastic production is estimated to produce >400 million tonnes of GHGs per year, not including emissions from the waste management, disposal and degradation of plastic products (Royer et al. 2018). By 2050, it is estimated that GHG emissions from plastic 'could reach over 56 gigatonnes—10-13 per cent of the entire remaining carbon budget' (CIEL, 2019, p. 2). Thus, international instruments acting on climate change are relevant to the full life cycle of plastics. The United Nations Framework Convention on Climate Change (1992) (UNFCCC) aims to "stabilise greenhouse gas emissions in the atmosphere …". The ratification of UNFCCC means countries have an obligation to transition towards renewable energy sources, which would generally preclude implementing waste-to-energy incineration or any other linear methods to manage plastic wastes.

The Montreal Protocol (1987) is a binding international agreement to phase out and eliminate ozone depleting substances. Included are substances such as plastic foams that contain ozone-depleting compounds – some which have been prohibited in national legislation for the PICs evaluated here (Appendix 1). The Montreal Protocol has also been identified as a model international agreement for preventing plastic pollution (Raubenheimer & McIlgorm, 2017).

The Nairobi International Convention on the Removal of Wrecks (2007) (WRC) provides "a set of uniform rules for the prompt and effective removal of wrecks located beyond the territorial sea." While the Convention does not mention plastics specifically, plastic components of ships and/or contents of shipping containers could be included in the requirements for recovery.

The Hong Kong Convention (2009) is aimed at "ensuring that ships, when being recycled after reaching the end of their operational lives, do not pose any unnecessary risk to human health and safety or to the environment. There are no specific provisions for plastic components of ships in this convention; however, they may be included generally as part of the recovery and recycling process.

The International Convention on the Control and Management of Ship's Ballast Water and Sediments (2017) (BMW) aims to prevent the spread of harmful aquatic organisms from one region to another. The BMW does not mention plastics; however, there have been calls to include microplastics in future amendments to the Convention (Kichner 2017).

Regional policy overview

There are several binding and non-binding regional mechanisms related to plastic waste and marine debris in the Pacific region. The five binding instruments provide legal basis for managing plastic and the regional strategies provide guidelines to coordinate actions and policies among member states. The United Nations Environment Programme (UNEP) Regional Seas Programme (launched in 1972) aims to halt and reverse the accelerating degradation of the world's oceans and coastal areas. There are 18 region-specific programmes, which are guided by the legal framework of the global programme. The Noumea Convention, the Cleaner Pacific 2025 Strategy, and the Pacific Marine Litter Action Plan 2018-2025 were developed in the Pacific region under the UNEP Pacific Regional Seas Programme.

Noumea Convention (1986) is the Convention for the Protection of Natural Resources and Environment of the South Pacific Region. It is also known as 'the SPREP Convention'. The Noumea Convention is a legally binding South Pacific Regional Convention. It is an umbrella agreement aimed to protect, manage and develop the marine and coastal environment of the South Pacific. One protocol under the Noumea Convention directly relating to plastics is the SPREP Dumping Protocol which obligates Parties to "prevent, reduce and control pollution by dumping of wastes and other matter into the South Pacific". An amendment to the Dumping Protocol that recognises "the danger posed to the marine environment caused by the dumping and incineration of wastes" and places further emphasis on the precautionary and polluter-pays principles was adopted by parties but is yet to come into force. The Noumea Convention administrators have provided draft models of legislation for PICs including the Pacific Model Marine Pollution Prevention Act, the Pacific Model Pollution Prevention Act, the Pacific Model Pollution Levies Regulation, the Pacific Model Port Reception Facilities Regulations and the Pacific Model Ballast Water Management Regulations.

Under MARPOL, the Conservation and Management Measure on Marine Pollution (effective 1 January 2019) specifically address the impacts of abandoned, lost or otherwise discarded fishing gear (ALDFG) on marine species and ecosystems. The measure encourages PICs that have not already ratified MARPOL Annex V and The London Convention to do so and to "prohibit their fishing vessels from discharging any plastics; undertake research on marine pollution related to fisheries; to encourage all vessels to retrieve fishing gears; ensure port reception facilities are adequate to receive waste from fishing vessels".

The Waigani Convention (2001) is a legally binding agreement to ban the import of hazardous and radioactive wastes and to control the transboundary movement and management of hazardous wastes within the Pacific region. It is modelled on the Basel, Rotterdam, and Stockholm conventions (BRS) and directly references The London Convention. The obligations are for parties to reduce and control movement of the wastes defined in Annex 1. Substances that directly relate to plastics include Y10 waste substances and articles containing or contaminated with polychlorinated biphenyls (PCBs) and/or polychlorinated terphenyls (PCTs) and/or polybrominated biphenyls (PBBs); Y13 Wastes from production, formulation and use of resins, latex, plasticisers, glues/adhesives; Y17 Wastes resulting from surface treatment of metals and plastics; Y39 phenols; Y41 Halogenated organic solvents; Y 43 Any congener of polychlorinated dibenzo-furan; Y44 Any congener of polychlorinated dibenzo-p-dioxin; Y46 Wastes collected from households, including sewage and sewage sludges; and Y47 Residues arising from the incineration of household wastes. The Convention defines characteristics of hazardous materials including the attributes of plastic pollution as "Ecotoxic Substances: or wastes which, if released, present or may present immediate or delayed adverse impacts to the environment by means of bioaccumulation and/or toxic effects upon biotic systems."

In 2000, the Republic of the Marshall Islands led the development of the binding Convention on the Conservation and Management of High Migratory Fish Stocks in the Western and Central Pacific Ocean (2000). The convention parties agreed on the Conservation Management Measure (CMM) on Marine Pollution in 2017 (CMM 2017-04) which came into force in 2019. This measure encourages all member states to ratify MARPOL, prohibits any vessel operating in the Western Central Pacific Fisheries Commission (WCPFC) convention area from discharging any plastics including "plastic packaging, items containing plastic and polystyrene) but not including fishing gear". Undertaking research into marine pollution related to fisheries, refining measures to reduce marine pollution and encouraging vessels to "retrieve abandoned, lost or

Table 2: *International Conventions ratified, signed or acceded by the Pacific Island Countries examined here. Green represents the countries are party to the agreement, yellow that they have participated and/or acknowledged they will sign (but have not yet).*

International Agreements	Description	Pollution source	Fiji	Kiribati	Marshall Islands	Palau	Papua New Guinea	Samoa	Solomon Islands	Tonga	Tuvalu	Vanuatu
UNCLOS - United Nations Convention on the Law of the Sea (1982)	Legally binding global instrument for the protection of the marine environment from all sources of pollution.	Land and Marine										
MARPOL 73/78 Annex V	Legally binding global instrument to prevent marine pollution from ships (Annex V - Prevention of pollution by garbage from ships (includes all plastics & fishing gear).	Marine										
London Convention 72 ("Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter")	Legally binding global instrument listing prohibited pollutants and those requiring permits for dumping (intentional dumping into the sea).	Marine										
London Convention Protocol 96	Legally binding agreement for the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (1996).	Marine										
Conservation Management Measure on Marine Pollution (2019)	Prevent and significantly reduce marine pollution of all kinds to Support the Implementation of Sustainable Development Goal 14, International Convention for the Prevention of Pollution from Ships (MARPOL) Annex V, London Convention and London Protocol.	Marine										
Intervention Protocol 73	Concerning pollutants other than oil in the high seas.	Marine										
Convention on Biological Diversity (CBD)	The CBD has three main objectives: 1) The conservation of biological diversity, 2) The sustainable use of the components of biological diversity, 3) The fair and equitable sharing of the benefits arising out of the utilization of genetic resources.	Land and Marine										
The 2030 Agenda for Sustainable Development (SDGs)	Broad scope including pollution management.	Land and Marine										
Basel Convention 1992 (Plastic Waste Amendments)	Legally binding global instrument on the transboundary movement of hazardous wastes and other wastes (plastics as other wastes).	Land										
Stockholm Convention (2004)	Legally binding global instrument to control persistent organic pollutants.	Land										
Rotterdam Convention (2004)	The Convention creates legally binding obligations for the implementation of prior informed consent in the trade of hazardous waste.2019 decisions to protect human health and the environment from the harmful effects of chemicals and wastes, including plastic waste.	Land										
International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM) 2004	Adopted in 2004. Aims to prevent the spread of harmful aquatic organisms from one region to another by establishing standards and procedures for the management and control of ships' ballast water and sediments.	Marine										
Nairobi WRC (2007)	A legal basis for coastal states to remove wrecks which pose a hazard to the safety of navigation or to the marine and coastal environments. Covers prevention, mitigation or elimination of hazards created by any object lost at sea from a ship (e.g. lost containers).	Marine										
Hong Kong Convention (2009)	Aimed at ensuring that ships do not pose any unnecessary risk to human health and safety or to the environment when recycled after reaching the end of their operational lives.	Marine										
United Nations Framework Convention on Climate Change (UNFCCC)(1992)	Climate change convention 1993	Land and Marine										
Montreal Protocol (1987)	Designed to protect the ozone layer by phasing out the production of numerous substances responsible for ozone depletion.	Land										
Vienna Convention on the Protection of the Ozone Layer	Convention to restrict production and use of ozone depleting substances	Land										
Strategies												
The Honolulu Strategy (2011)	A global framework for prevention and management of marine debris including land and sea-based sources.											

discarded fishing gear and retain the material on board, separate from other waste for discharge to port reception facilities", including recording location, are part of this measure. Parties are also required to ensure adequate port reception facilities and vessels with WCPFC country flags ratify MARPOL "to develop communication frameworks to enable the recording and sharing of information on fishing gear loss in order to reduce loss and facilitate recovery of fishing gear". In addition, training is required for WCPFC fishing vessel crew and three-yearly review of implementation of the CMM.

Regional plans and strategies

The Cleaner Pacific 2025: Pacific Regional Waste and Pollution Management Strategy 2016-25 is a voluntary strategy that aims to protect the marine environment through a collaborative approach across neighbouring states. The Cleaner Pacific 2025 Strategy is a comprehensive long-term strategy for integrated waste management and pollution prevention and control with relation to Pacific regional challenges (SPREP 2016). It outlines four strategic goals for the Pacific Region:

1. prevent and minimise the generation of wastes and pollution and their associated impacts;
2. recover resources from wastes and pollution;
3. improve life-cycle management of residuals;
4. improve monitoring of the receiving environment.

These goals are built from a policy framework that is based on conventional waste management, procedural and organisational principles:

- conventional principles include the 3Rs + Return (reduce, reuse, recycle and return); product stewardship, which is defined as "the act of minimising the health, safety, environmental and social impacts of a product and its packaging throughout all lifecycle stages"; the polluter-pays principle; and the proximity principle, which states that "waste should be disposed of as closely as possible to where it is produced";
- procedural principles include transparency, public consultation and participation and involvement of multiple sectors;
- organisational principles include public-private partnerships (may conflict with the transparency principle), and selection of appropriate and affordable technology.

Cleaner Pacific 2025 Pacific Regional Waste and Pollution Management Strategy 2016-25 suggests a shift in focus to the top of the waste hierarchy (3Rs + Return) rather than end-of-pipe solutions such as landfills. The report emphasises evidence-based policy and that "Pacific experience shows that the most successful examples of sustainable waste management programmes are supported by sustainable financing mechanisms." Further, the Strategy suggests waste-to-energy is unsuitable for PICs on the basis that this management has high maintenance needs and costs. It also acknowledges that waste-to-energy technologies perpetuate consumption and result in adverse human health and environmental impacts. The goals of the Cleaner Pacific 2025 Strategy are translated into actions aimed at strengthening institutional capacity (e.g., policy development), adoption of best practices (e.g., recovery, prevention and reduction programmes, user-pays collection services), promoting public-private partnerships and enhancing human capacity, transparency of information and promoting regional and national cooperation. Monitoring and performance indicators are included in the Strategy's goals and actions including recycling rates and waste collection service coverage (SPREP 2016). However, the Strategy's waste reduction targets do not match the its first goal" "to prevent generation of wastes and pollution": In 2014, the baseline was 1.3 kg/person/day and the 2020 and 2025 targets remain unchanged at 1.3kg/person/day. In addition, despite presenting itself as a strategy focused on prevention, the strategic goals are disproportionately focused on waste management rather than prevention.

The SPREP Strategic Plan 2017-2026 is nested within the Cleaner Pacific 2050 Strategy and builds on existing regulatory frameworks for both land-based and sea-based sources of marine debris: the SDGs, GPA, Noumea Convention, PACPOL and MARPOL. The Strategic Plan outlines the Pacific policy context and key actions with the aim of reducing marine debris in the Pacific region. The strategy heavily promotes actions at the top of the waste hierarchy and circular economy principles. However, there are recommended actions for cleaning up beaches, thus addressing also plastic wastes from external sources. Emphasis is placed on regional coordination and collaboration of harmonised policies and approaches to manage, control and reduce plastic waste and adequate port reception facilities to receive rubbish from vessels. Improving community awareness and a focus on the tourism sector are included in the key actions. Importantly, the plan provides model legislation drafts for plastics and takeaway food containers. In addition, it provides draft compliance protocols for cruise ships in relation to MARPOL and tourist resorts to encourage improved waste management. These resources require additional discussion, development, adaptation and implementation. A review of progress on the implementation of policies and actions recommended in the Strategic Plan is planned for 2020 and again in 2025.

The Pacific Marine Litter Action Plan 2018-2025 (MLAP) was developed as part of the Regional Seas Programme and the Global Partnership on Marine Litter (GPML) (SPREP is the Pacific Regional Node). The MLAP primarily aims to address marine debris but also includes some terrestrial-based marine litter point sources as described in the Cleaner Pacific 2025 Strategy. The plan sets out the policy framework and actions to prevent and reduce marine debris across PICs. The MLAP is related to the Pacific Regional Waste and Pollution Management Strategy 2016-2025 (Cleaner Pacific 2025) and the Pacific Oceans Pollution Prevention Programme (PACPOL) 2015-2020. Cleaner Pacific 2025 and PACPOL were developed in the context of the Blue Pacific narrative under the framework of the Pacific Framework for Regionalism, the SPREP Strategic Plan 2017-2026 and the Pacific Oceanscape Framework (2010).

The Pacific Oceans Pollution Prevention Programme (PACPOL) 2015-2020 was developed under the GPML framework and aims to "provide overall leadership and technical assistance to improve the prevention and response to ship sourced and related marine pollution in the Pacific Islands region". It takes a "bottom up" approach, in that it identifies and addresses the needs and priorities of recipient countries. PACPOL strives to follow international best practices and sets out 15 work plans to reduce the impacts of ship-based waste in the Pacific region. Key priorities of PACPOL include promoting public awareness among seafarers on marine pollution sources, reinforcing international best practices, polluter-pays principle, including enforcement provisions, and capacity-building. It also includes guidelines for monitoring and reporting. However, marine litter and ADLFG were not identified as priority issues for any of the PICs included under PACPOL.

The Framework for Regionalism 2014 is voluntary and sets out objectives for the Pacific region that includes sustainable economic, social and cultural development in ways that "improve livelihoods and well-being and use the environment sustainably". The Framework seeks economic growth that is inclusive and equitable and security that results in safe human, environmental and political conditions and strengthening "governance, legal, financial and administrative systems". Processes for working toward these objectives were focused on the collaboration and coordination of PICs and priority setting. There are no specific provisions in the Framework for plastic waste management and pollution control. However, the Framework defines process for regional participation and ways to harmonise policy development on environmental and human health and well-being legal instruments.

The Small Island Developing States Accelerated Modalities of Action (SAMOA Pathway) 2014 is a regional non-binding declaration made at the third International Conference on Small Island Developing States in Apia, Samoa. The Pathway calls for measures to manage waste, including marine plastic litter. It also provides guidance for parties to develop action plans and policies to address regional issues. PICs that are party to the SAMOA Pathway can choose which measures they wish to take up and which they wish to exclude.

GEF-7 - Global Environmental Facility funding for chemical and waste management in the Pacific is a joint initiative between the UN Environment and SPREP. The priority waste types include solid waste, recyclable materials, POPs and marine plastics. The work is guided by the Cleaner Pacific 2025 Strategy.

SPREP's Pacific Ocean Litter Project (POLP) is a six-year regional programme funded by the Australian Government (AU $16 million) and is intended to meet the goals of SPREP's Marine Litter Action Plan 2018. This will focus on prevention and aims to reduce single-use plastics from land-based sources. It will emphasise strengthening policy and legislative frameworks, including the implementation of band and levies. This is a new programme which looks promising in terms of plastic pollution prevention.

Regional public-private partnerships

The Moana Taka Partnership 2018-2021 is a public private partnership with SWIRE Shipping. The partnership aims to support backloading of recyclable plastic materials. It provides mechanisms for empty containers to be used to remove recyclable waste, plastic bottles and aluminium cans and e-waste from eligible Pacific island ports, pro-bono, to be delivered to suitable ports across the Asia Pacific region to be recycled or reused. The development of the partnership was facilitated by SPREP and UNEP. Fifty shipments were made in 2019, including recyclable plastics.

Summary

While many of the countries have ratified, signed or acceded to the international and regional documents (Tables 2 and 3), the implementation of these obligations is rarely reflected in country-level documents. Multilateral agreements require party states to take actions, but these requirements are often generally formulated, thus their achievements depend on the choices and level of participation of individual states. Where these obligations are not specifically incorporated into national legislation (even when it is a requirement of accession to a Convention), there is no national legal obligation to comply. Where the transposition of international convention into national law is made, these are usually aimed at down-stream processes, i.e., when plastics have already become waste or pollution. Therefore, a shift in focus to upstream control of material flows into Pacific Island States, with legally binding provisions for any plastic materials imported to have end of life export and management solutions, is needed.

Table 3: *Regional Instruments ratified, signed or acceded by the Pacific Island Countries examined here. Green represents the countries are party to the agreement.*

Policy Instrument or Strategy	Description	Pollution source	Fiji	Kiribati	Marshall Islands	Palau	Papua New Guinea	Samoa	Solomon Islands	Tonga	Tuvalu	Vanuatu
Noumea Convention (1990)	Legally binding regional agreement to prevent marine Pollution from ships in the South Pacific.	Marine										
Protocol for the Prevention of Pollution of the South Pacific Region by Dumping (1986)	"SPREP Dumping Protocol" - prohibits the dumping of wastes from ships.	Marine										
Noumea Protocol on Combatting Pollution Emergencies (1990)	In the event of a pollution emergency, prompt and effective action should be taken initially at the national level to organise and co-ordinate prevention, mitigation and clean-up activities.	Land										
Waigani Convention (2001)	Supports the regional implementation of the international hazardous waste control regime (Basel, Rotterdam and Stockholm Conventions), and the London Convention.	Land										
Conservation management Measure (CMM) on Marine Pollution in 2017 (CMM 2017-04)	CMM to eliminate discharges of plastic waste and collect ALDFG from Western Pacific Fisheries Commission Convention areas	Marine										
Strategies												
The SAMOA Pathway (2014)	Supporting and implementing existing instruments aimed at sustainable development in the Pacific region.											
Framework for Pacific Regionalism (2014)	Sustainable development that combines economic social, and cultural development in ways that improve livelihoods and well-being and use the environment sustainably. Regional policies complement national efforts.											
Pacific Ocean Pollution Prevention Programme (PACPOL) 2015-2020	Sets out 15 work plans to "promote safe, environmentally sound, efficient, and sustainable shipping" throughout the Pacific region.											
Pacific Regional Waste and Pollution Management Strategy 2016-2025 (Cleaner Pacific 2025)	A regional framework for sustainable waste management and pollution prevention in the Pacific region up until 2025.											
SPREP Strategic Plan 2017-2026	Prioritises four regional goals with supporting objectives. Together these define the core priorities and focus of SPREP for the next ten years.											
Pacific Marine Litter Action Plan 2018 – 2025 (MLAP)	Aimed to address the plastic pollution crisis and sets out the key actions to minimise marine pollution across PICTs under the auspices of the Noumea Convention and the Cleaner Pacific 2025 Strategy.											

Country level gap analysis

…the most effective way of protecting human health and the environment from the dangers posed by such wastes is the reduction of their generation to a minimum in terms of quantity and/or hazard potential (UNEP, Basel Convention, 2014, p. 5).

This section refers to the results in Tables 4-8 to discuss gaps identified in the key documents (Appendix 1). The assumption of this study is that the greater the representation and implementation of the analytic themes, the closer PICs may be to implementing an international plastic pollution convention such as that proposed by EIA. It is acknowledged that due to the unique economic and geographic context of the region, support from the international community will be needed to fully implement actions across the themes.

Interpreting the traffic light system in the results table

Green indicates explicit mention of the theme in the document, yellow indicates that the document either partially includes the theme or that it is inferred and red indicates the theme is absent in the document.

Many PICs policies, legislation, plans and strategies are out of date and/or have not been implemented. For example, the Fiji National Solid Waste Management Strategy 2011–2014 is Fiji's latest solid waste management strategy and Tonga's Draft National Environment Management Strategy 2018-2023 is yet to be launched.

Global objectives

The global objectives and principles have the potential to build a coherent narrative of the shared goal of plastic pollution prevention if applied across all national-level documentation.

Long-term elimination of discharges

One of the overarching objectives of EIA's proposed Convention on Plastic Pollution is to 'eliminate the long-term discharges of plastic into all compartments of the environment (land, sea, air)' (EIA 2020). Many countries refer to long-term elimination of discharges or emissions. These are presented in green in Table 4. However, on closer inspection these seldom refer specifically to plastic pollution and the legal instruments required to support the long-term elimination of plastic pollution are frequently absent. The following legislation was among those identified with the greatest capacity to capture the long-term elimination of plastic pollution discharges through a full life cycle approach: Fiji's Climate Change Bill 2019 and Tuvalu's Waste Management Act 2017 and Ozone Layer Protection Act (2008).

Safe circular economy for plastics

Plastics are essentially composed of different types of chemicals, which includes additives. Additives are the chemicals added to polymers along the supply chain to change their physical, thermal, electrical or aesthetic characteristics. While historically considered biochemically inert, it is now known that ***many of these chemicals and additives are toxic to human health*** *and have the capacity to pass biological membranes and disrupt physiological processes. This toxicity can undermine secondary markets for post-consumer pellets and a safe circular economy for plastics (EIA, 2020, p. 9).*

The second overarching objectives of EIA's proposed Convention on Plastic Pollution is to achieve 'a safe circular economy for plastics: one that is just and safeguards the climate system'. A circular economy allows high quality and safe recyclable or reusable materials into the economy. This means that high-quality materials can either recirculated within the economy or exported (where they can be responsibly recycled, reused or repurposed). If well-designed, circular economies internalise the full costs of materials and offset the need for the ongoing supply of those materials. Where circular economy approaches such as recycling are included in some country-level documents, the safety of the plastics that flowed through these circular systems is seldom acknowledged. Yellow indicates that the country acknowledged that recycling can contribute to a safer and healthier environment. However, no country acknowledges that recycling brings its own environment and health risks and none have committed to a set of safety standards for recycling or reuse/refill or redesign that ensures the safe circulation of materials through the economy.

Intergenerational equity and justice

EIA's proposed convention is intended to build upon and complement national and regional frameworks for a just, safe circular economy for plastics. Few countries

explicitly include the principle of intergenerational equity and justice (or similar) in their documents. However, some, while not referring specifically to the principle, comprehensively embed the intention of the principle into its documents. For example, Fiji's Climate Change Bill 2019 aims to ensure that 'the wellbeing of current and future generations is supported and protected by a socially inclusive, equitable, environmentally sustainable, net-zero emissions economy and the health, diversity and productivity of the environment is protected and enhanced for the benefit of future generations.' The Marshall Islands' National Environment Management Strategy 2017-2022 includes gender equity and women's empowerment in its strategic actions and the Kwajalein Atoll Local Government Solid Waste Management Plan 2019-2028 recognises that waste management is an 'ever-increasing "cross-bearing" endeavour" for future generations'. The Solomon Islands' Environment Act 1998 is based on the principle which it defines as "fairness for future generations in that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations." Finally, the National Strategy for Responsible Sustainable Development for Papua New Guinea (2nd Ed, 2014) (StaRS) is based on the principle of "long-term development for achieving growth, equity and sustainability for the benefit of our present and future generations."

Sustainable Development Goals (SDGs)

The 2030 Agenda for Sustainable Development, Sustainable Development Goals (SDGs) put plastic pollution on the international agenda. SDG 14.1 states the need "by 2025, [to] prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution," making the issue of plastic pollution a top global priority. However, as previously noted, it is not only SDG 14.1 that is relevant to plastic pollution. The development of a policy framework for plastics across a broad range of SDGs reflects a comprehensive and integrated systems approach that address the full life cycle of plastics. This systems approach is not reflected in any of the documents analysed.

Pacific Island countries have made several commitments to meet SDG targets related to plastic pollution. For example, Fiji announced its voluntary commitments at the first UN Ocean Conference in 2017 to combat plastic pollution for the implementation of SDG 14 by pledging to ban single-use plastics (UN 2020). Fiji, Micronesia, Marshall Islands, Nauru, Palau and Tuvalu are among the founding members of the new Group of Friends (a UN coalition) established to tackle plastic pollution. One of the key objectives of the Group of Friends is "to support implementing the relevant UN Sustainable Development Goals by 2030, in particular SDG 14 and 12' (Norway UN, 2020).

While many documents state commitments to sustainability/sustainable development, the SDGs are seldom mentioned across the documents. Where they are mentioned, the links to plastic pollution are either absent or tenuous. Those documents in which the SDGs are specifically mentioned include Palau's National Solid Waste Management Strategy 2017-2026 in which a key assumption is that "the current political system … will continue to provide commitment to the waste sector in adherence to the sustainable development goals." The thematic policy goals of the Republic of the Marshall Islands National Environment Management Strategy 2017-2022 are partly modelled on the SDGs. Their operational performance indicators are to be monitored and reviewed annually and this will serve a tracking tool in achieving the SDGs. While it does not specifically link SDGs to plastic pollution, Kiribati's 20-year Vision 2016-2036 states: "The contribution of fisheries and tourism sectors to the country's development aspirations is expected to directly contribute to achieving the Sustainable Development Goals (SDGs) for Kiribati by 2036." Greater attention to the relationships between plastic pollution in meeting a wide range of SDG targets is needed across the region's documents.

Protection of human health

Plastics can present hazards to human health all along the supply chain (Campanale et al 2020, De-la-Torre 2019, Smith et al 2018). However, the relationship between the full range of known harms plastics can present to human health are not captured in any of the documents analysed. Consequently, there are few legislative provisions and actions that protect Pacific islands peoples from the harmful impacts of the physical and chemical properties of plastics and associated persistent organic pollutants (POPs).

Most of the documents in this study offer protections for human health only in relation to waste control. This is limited to the physical properties of plastic 'waste' or 'litter' rather than harms associated with plastic food contact materials, micro- and nano-plastics, food contamination, POPs, monomers and additives, waste treatment technologies and the contamination of agricultural soil and fishing areas; for example, Kiribati's Environment Act 1999 (as amended 2007) defines 'pollutant' as "any solid, liquid or gaseous substances or energy present in such concentration as may be, or tend to be, injurious to the environment or human health." One of the objects of the Act is to reduce risks to human health, including through the promotion of "recycling, re-use, reduction … and recovery of materials …". Plastics' propensity to offer ideal conditions for mosquito breeding which can act as vectors for diseases such as dengue fever is the only health concern related to plastics present in some of the documents studied. There is no acknowledgement that there are health risks posed by plastics all along the supply chain, including in recycling and materials recovery. In addition, seldom is plastic recognised as a specific kind of material/waste with its own set of harmful properties and fates at different points along its life cycle.

One set of documents with the potential to respond to the chemical and physical human harms associated with plastics are those that aim to meet a country's obligations under either the Basel, Stockholm, or Rotterdam conventions (and/or the Waigani Convention). An excellent example of this is the Solomon Islands National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants 2018. Explicit links to human health is made across a range of plastics and their constitutive chemicals regulated under the Convention. The Plan also acknowledges the relationship between the consumption and disposal of plastics and the associated environmental and human health impacts at these points along the supply chain. Fiji's National Plan for Implementation of the Stockholm Convention on Persistent Organic Pollutants in Fiji Islands 2006 specifically refers to dioxins and furans (as unintentional POPs) from burning plastics. Polychlorinated biphenyls (PCBs) are produced when plastics are burned. While the Plan recognises the risk of PCBs to human health (it references a 2002 study showing PCBs in breast milk), no link between PCBs and their association with plastics is made. Tuvalu's National Action Plan to Reduce Releases of Unintentional Persistent Organic Pollutants 2018-2022 also identifies PCBs as an environmental and human health concern. However, there is a difference between acknowledging obligations to a Convention and having the capacity to enact those obligations. Those countries with POPs legislation (as a result of its international commitments) lack in-country POPs technical capacity, limiting the effectiveness of the legislation.

Plastic packaging can leach endocrine disrupting chemicals (EDCs) and carcinogens into food and beverages. The only legislation that recognises this risk is Palau's Plastic Bag Use Reduction Act, RPPL No. 10-14 2017. The Act states that Bisphenol A (BPA) and polystyrene oligomer as plastics-related toxicants impact human hormone systems.

Human health is a focus in the interpretations of harmful substances and non-indigenous harmful aquatic organisms or pathogens in Samoa's Marine Pollution Prevention Act 2008 and provisions are made to protect against these harms. While these do not specifically mention plastics, the Act could broadly be interpreted to capture the propensity for harmful aquatic organisms, pathogens and POPs to 'raft' across territorial boundaries on plastics in the marine environment. This, however, is nowhere acknowledged as a potential risk to food safety and security and to biosecurity.

Conventional disposable sanitary products contain a large volume of plastic per unit made from up to 90 per cent ethane and associated plasticising chemicals such as BPA and BPS and petrochemical additives which are known endocrine-disrupting substances. This is not recognised in legislation in the Pacific. For example, Tuvalu's Waste Management (Levy Deposit) Regulations considers sanitary products of low risk to human health: "As long as the waste is suitably wrapped, properly handled and free from residual liquids, the risk to human health is considered low".

Vertical integration

…transpos[e] international obligations into policies and legislation, including measures and incentives to be implemented at the national level. ***They will be tailored to each country's specific needs and circumstances*** *in order to reflect the realities on the ground… (EIA, 2020, p. 7).*

The main goal of vertical integration or alignment is to ensure that national level policies are consistent with regional and international level policies. Vertical policy integration can lead to convergence of policy and, ultimately, coherence in plastic pollution prevention efforts across multiple scales of governance. At first glance within Table 4, there appears to be significant vertical integration across the policy framework for waste management in the Pacific. However, while international and regional obligations are acknowledged in country-level documents, the relevant legislation does not always adequately reflect those obligations and nor may strategy and planning goals and actions. For example, Samoa's National Implementation Plan for Persistent Organic Pollutants 2004 is now 16-years-old and provides the implementation plan for actions addressing a now-obsolete Waste Management Strategy. In addition, the indicators do not adequately address the targets. Obligations to enact national plans and legislation upon becoming a party to an international convention can be extremely difficult in the absence of adequate, sustainable and long-term support for monitoring, reporting, implementation, infrastructure, supportive technologies, partnership-building and enforcement measures.

Horizontal integration

A holistic management system is founded on strong regulatory and fiscal policies, technologies appropriate to local socio-economic and geographic situations, as well various public and private sector voluntary measures (Raubenheimer, 2020, p. 17).

Key to the success of any integrated waste management strategy is inter-ministerial cooperation. This is reflected in the seventh guiding principle of Palau's Solid Waste Strategy, the multi-sectoral approach: "Waste management and pollution control approaches shall involve multiple sectors (such as climate change, biodiversity conservation, health, tourism and agriculture) in order to improve the success and effectiveness of interventions". This reflects horizontal policy integration or alignment which is the relationship between policies, laws and/or plans at the same level of governance. The main goal of horizontal integration is to ensure plastic pollution policies, laws and plans related to plastic pollution can attain their collective goals – the prevention of plastic pollution (Figure 1).

'Horizontal Integration' in Table 4 indicates whether a specific document references at least one other ministerial document or ministry. A deeper analysis of these documents suggests that this criterion does not necessarily indicate a cohesive and coherent policy framework for plastic pollution in each country. For example, Tonga's major waste sector management responsibilities are spread over various Ministries and Government departments: Environment, Public Enterprise, Health and Infrastructure which, perversely, illustrates coordination and effectiveness challenges. Not only does solid waste management in Tonga lack horizontal coherence but plastics/plastic pollution are seldom specified – even in the key documents. In the PICs broader environmental management plans and strategies, waste is often presented in sections but not as a cross-cutting theme (for example, Samoa's National Environment Sector Plan 2017-2021). Documents may reference a range of ministerial departments, but this does not support a unified policy framework for solid waste management and certainly not for plastic pollution.

Waste hierarchy

Objectives and principles that focus high on the waste hierarchy (Figure 2) will also 'provide the mandate to further investigate the adoption of legislation that holds various stakeholders accountable for their waste' (Raubenheimer 2019, p. 14). Some PIC documents reference 3Rs (reduce, reuse and recycle), some refer to 4Rs (refuse, reduce, reuse, recycle) and many did not reference any waste hierarchy at all. The Zero Waste Europe waste hierarchy illustrates a comprehensive and contemporary model (Figure 2) which goes beyond the 3Rs and 4Rs models to include rethinking, redesign and preparation for reuse). Working at the top of the waste hierarchy means aiming to 'turn off the plastic pollution tap' at the source. PICs do not produce virgin plastics which means that their ability to effect significant change in global production volumes is limited. However, PICs do import plastic products as well as the virgin plastics, pre-polymers and associated chemicals to manufacture plastic products. PICs also have a greater capacity than currently enacted through existing legislation to restrict, disincentivise or ban the importation of problematic polymers and plastic products (non-recyclable/hard to recycle, toxic and disposable and unnecessary plastics) and their associated chemicals. Simultaneously, there is the capacity to incentivise the importation of recyclable and safer polymers and plastic products. Currently, only six of the key documents include commitments to a focus at the top of the waste hierarchy (Table 4); instead, PICs are prioritising limited resources and financial investment to waste management over prevention and reduction, reuse and the redesign of products and delivery systems to reduce or eliminate the need for single-use plastics.

Precautionary approach

Resolution 1/6: Marine plastic debris and microplastics (2014). At its inaugural session, UNEA stresses the importance of the precautionary approach…A lack of obligation to disclose information on substances contained in plastic products and to report on the specific additives used throughout the supply chain, combined with a limited understanding of health implications, means that existing instruments are at present ineffectual at safeguarding human and environmental health and promoting a safe circular economy for plastics. The new Convention on Plastic Pollution would work to address these shortfalls by ***controlling the use of all additives in plastic on the basis of the precautionary principle*** *(EIA, 2020, pp. 2 & 9).*

The precautionary approach is specifically mentioned in 13 of the 50 key documents analysed. It is often applied where the strongest connections are made between plastic pollution and human health. However, the principle is commonly referenced with no clear connection to implementation to protect human and environmental health from the full life cycle of plastics. This is likely due, on the one hand, to a notable lack of current peer-reviewed science-based evidence supporting the need for such an approach as it specifically applies to a wide range of plastics and the fate of plastics and, on the other hand, to challenges PICs face in translating global policy to national practice.

Climate change

Plastic has a large and rapidly growing greenhouse gas footprint, *primarily in its production phase and secondarily upon incineration and decomposition. Plastic also significantly exacerbates climate disruption in many locales (e.g. plastic bags block drains, exacerbating flooding; plastic damage to coral reefs undermines climate-stressed ecosystems upon which local economies depend). (EIA, 2020, p. 10).*

When burnt, many plastics release dioxins and furans and greenhouse gas emissions (GHGs). Plastics can also release methane (a GHG) and chlorine (an ozone-depleting chemical) as they break down over time. Some waste management legislation does include the burning of waste and impacts of this on the ozone layer but plastics are rarely specified. Palau's Air Pollution Control Regulations do, however, prohibit open burning of wastes and specifies plastics including tyres, rubber products and packaging waste.

Very few countries make the connection between plastics and climate change (three out of 50 documents). But while Fiji's Climate Change Bill 2019 is yet to be enacted, it is one of the most comprehensive pieces of legislation on plastic pollution across all Pacific Islands documents. The Bill recognises the impact marine plastic pollution has on the health of the marine environment and that a healthy climate relies on a healthy ocean. It also recognises that a healthy climate means a healthy human population. Part 14, Section 92 is dedicated to reducing plastic pollution. The Republic of Fiji National Climate Change Policy 2012 draws correlations between climate change and waste but not plastics, specifically. The Policy acknowledges that climatic conditions will impact landfill management practices and recommends reducing household burning, improved landfill management and increased recycling facilities and collection.

Some countries recognise the link between climate change resilience and waste management infrastructure. For example, the Papua New Guinea (PNG) National Climate Compatible Development Management Policy recommends a national infrastructure policy including improving solid waste management for increased resilience in the face of extreme weather events exacerbated by climate change. However, the strategic pathway is via waste-to-energy technologies.

One of the key objectives of the Solomon Islands' National Waste Management and Pollution Control Strategy 2017-2026 is that management and pollution control are fully addressed in response to climate change impacts. However, the Strategy claims that neither the Montreal Protocol nor the Ozone Layer Convention are relevant to waste management. This is likely to explain why they have not enacted ozone layer legislation as some of the other PICs in the study have. Conversely, some other countries understand that CFC-blown plastic foams (e.g., rigid polyurethane foam insulation to insulate buildings, appliances, pipes and tanks) release chlorine as the material breaks down, thus contributing to ozone depletion. For example, Palau's Ozone Layer Protection Regulations prohibits the import or use of any plastic foams containing ozone-depleting chemicals.

Figure 2: (Source: Zero Waste Europe 2019)

Table 4: *Global Objectives gap analysis of key documents using the analytical framework. Green indicates explicit mention of the theme in the document; yellow indicates that the document either partially includes the theme or that it is inferred; and red indicates that the theme is absent in the document.*

Country	Legislation	Long-term elimination of discharges	Safe circular economy for plastics	Intergenerational equity & justice	SDGs	Protection of human health	Vertical integration	Horizontal Integration	Precautionary approach	Waste hierarchy	Climate Change
Fiji	Environment Management Act 2005 and Regulations; Environment Management (Budget Amendment) Act 2019										
	Litter Act 2008 and Litter (Amendment) Act (2010)										
	Public Health Act 1935 including Public Health Regulations 1937 (as at 1 August 2018) [PHA 128]; and Public Health and Sanitary Services Regulations 1941										
	Climate Change Bill 2019										
	Republic of Fiji Climate Change Policy 2012										
	Fiji National Solid Waste Management Strategy 2011-2014										
Kiribati	Environment (Amendment) Act 2007										
	Special Fund (Waste Materials Recovery) Act 2004										
	Kiribati Solid Waste Management Plan (KSWMP) 2007										
	Kiribati 20-year Vision 2016-2036 or KV20										
	Kiribati Development Plan 2016-19										
	Customs Act 2019										
Marshall Islands	Styrofoam cups and plates, and plastic products prohibition, and container deposit Act 2016										
	Styrofoam Cups and Plates, and Plastic Products Prohibition Container Deposit (Amendment) Act, 2018 (2018-0054)										
	National Environment Management Strategy 2017-2022										
	Kwajalein Atoll Local Government Solid Waste Management Plan 2019-2028										
Palau	National Code: Title 24: Environmental Protection										
	The Recycling Act 2006 (including 2009 Amendments)										
	Plastic Bag Use Reduction Act 2017										
	Zero Disposable Plastic Policy, Executive Order No. 417										
	The National Solid Waste Management Strategy: the roadmap towards a clean and safe Palau 2017-2026										
Papua New Guinea	Environmental Contaminants Act 1978										
	Environment Act 2000										
	Public Health Act 1973										
	STaR										
Samoa	Marine Pollution Prevention Act 2008										
	Samoa Water Authority Act 2003 - Samoa Water Authority (Sewerage and Wastewater) Regulations 2009										
	Waste Management Act 2010										
	Waste (Plastic Bag) Management Regulations 2018										
	National Waste Management Strategy 2019-2023										
Solomon Islands	National WMAP Strategy										
	The Environmental Health (Public Health Act) Regulations 1980										
	Environment Act 1998										
	Shipping (Marine Pollution) Regulation										
Tonga	Waste Management (Plastic Levy) Regulations 2013										
	Environment Protection Act (2008) - Litter and Waste Control Regulations 2013										
	Marine Pollution Prevention Act										
	Hazardous Wastes and Chemicals Act 2010										
Tuvalu	Ozone Layer Protection Act										
	Waste Management Act 2017										
	Waste Management (Litter and Waste Control) Regulations 2018										
	Waste Management (Levy Deposit) Regulation 2019										
	Waste Management (Prohibition on the Importation of Single-Use Plastic) Regulation 2019										
	Environment Protection Act (2008) - Litter and Waste Control Regulations 2013										
	Ozone Layer Protection Act (2008)										
	Integrated Waste Policy and Action Plan 2017 -2026										
Vanuatu	National Action Plan to Reduce Releases of Unintentional Persistent Organic Pollutants 2018-2022										
	Waste Management Act 2014										
	Regulations 2018										
	Ozone Layer Protection Act 2010										

Waste prevention

At the heart of the global agreement will be country level plastic pollution reduction plans – national action plans, as it were – transposing international obligations and setting out the specific policies and measures taken or to be taken to reduce plastic pollution (EIA, 2020, p. 7).

PICs rely heavily on imported goods and this limits their ability to influence the design of the products they import. Where domestic recycling or recycling exports are limited or non-existent, plastics are either dumped or burnt. For example, at the time of the 2018 Pacific Regional Infrastructure Facility (PRIF) report, PNG did not export any plastics, and yet 1.1 per cent of all imports were PET. This means that all the plastics they imported remain in the country's landfills and environment or have been burnt (adding to carbon emissions, presenting risks to human health and polluting soil and water with toxic ash). Prevention and reduction involve narrowing the range of types of plastics entering the economy, thus improving the management of plastics already in the region. As much plastic as possible should be recovered and reused/recycled/repurposed, exported or repatriated for processing.

Market restrictions, virgin plastics, and trade in safe plastics

Of those countries that have applied market restrictions on plastics, the most common option is to impose bans as these can present less complex and resource-intensive instruments than others to implement. For example, Fiji's Customs Tariff Act (2009) levies tariffs on imported and exported single-use or non-recyclable plastics. Tariffs on imports are set annually as part of the national budgetary process. Thus, there is potential to create economic incentives and disincentives and an additional duty to fund repatriation or local recycling. Further, a law regulating imports and exports of single-use, hazardous and hard-to-recycle plastic products, polymers and associated toxic chemicals could also be regulated under Fiji's Customs (Prohibited Imports and Exports) Regulations 1986. Indeed, Fiji's National Solid Waste Management Strategy 2011-2014 recommends duty incentives on environmentally friendly products, coupled with disincentives on non-environmentally friendly alternatives. This is also partly reflected in the PWC Fiji National Budget 2019-2020 (1 August 2019 to 31 July 2020) which states that fiscal duty on biodegradable kitchenware and tableware will be reduced from 32 per cent to zero per cent and for non-woven plastic bags, on-fiscal duty will be increased from 15 per cent to 32 per cent under the Customs Tariff Act (p. 11), and (under ECAL) the plastic levy will be increased from 20 cents to 50 cents on Low Density Polyethylene (LDPE) plastic bags, effective from 1 January 2020.

Tuvalu's Prohibition on the Importation of Single-Use Plastic Regulation 2019 prohibits the most comprehensive list of single-use items seen across the documents analysed. This includes the import, manufacture, sale and distribution of single-use plastics listed under Section 5 (1): shopping bags, plastic water bottles, plastic water pouches and plastic ice block bags, straws, plastic and polystyrene plates, cups, takeaway containers (including those with a plastic coating or lining), cutlery, food wrapping, table cloths and flags. The Prohibition on the Importation of Single-Use Plastic Regulation 2019 is supported by the Waste Management (Levy Deposit) Regulation 2019 as promoted by the Integrated Waste Policy and Action Plan 2017-2026. The Regulation makes provisions for a levy on certain imported products. The purpose of the Regulation is to 'support the recovery, processing, treatment and shipment of incoming goods at the end of their operation conditions, provide a mechanism for revenue collection and administration and provide a legal framework that encourages waste avoidance and resource recovery behaviour'. Levies are applied to PET bottles and other products such as nappies and whiteware that involve significant volumes of plastics. The Tuvalu waste levy system is a combination of the Container Deposit System (CDS)10, the Advanced Recycling Fee (ARF)11 and special Product Tax for waste management purposes (Waste Policy Performance Review 2019, p. 25). The Republic of Kiribati prohibits the import of the specific plastic products including 'ice-block bags', non-biodegradable nappies and single-use shopping bags under the Customs Act 2019, which replaced the 2005 Act.

Some national bans on plastic items exist which do not always extend to importation restrictions. For example, Section 2 of Vanuatu's Waste Management Act 2014 - Regulations 2018 prohibits the manufacture, sale or provision of disposable containers, single-use plastic bags and plastic straws. However, like Fiji's Climate Change Bill 2019, this does not appear to extend to the prohibition of the importation of these items (unless the interpretation of 'provision' in the Bill is extended to include 'importation').

Some governments are leading by example by banning disposable plastics in their procurement arrangements. In 2018, Palau President Remengesau Jr issued Executive Order No. 417 under the powers of the Constitution establishing the Zero Disposable Plastic Policy. The Executive Order states "All government offices and agencies shall immediately stop the practice of providing disposable plastics and polystyrene beverage containers ...'.

National reduction targets

Palau's Zero Disposable Plastic Policy is considered the only document to set national reduction targets as it aims for zero disposable plastics in government offices and agencies. It was implemented on 8 August 2018. The Republic of Fiji Climate Change Policy 2012 and Climate Change Bill 2019 provide for national long term emissions reduction targets. Although these are not specific to plastics, the reduction in plastic pollution will substantially reduce carbon emissions. While no quantifiable target has been set, one of the Solomon Islands National Waste Management and Pollution Control Strategy 2017-2026 actions is that 'legislation banning the use of all plastic bags to be in place by 2020 with bio-degradable bags as a replacement'.

Virgin plastic use

Significant reductions in the quantity of virgin plastic produced *and used is key to the long- term elimination of emissions into marine and other environments. This will require a series of control measures to be negotiated at the global level to cap and gradually phase down virgin plastic production and use. These measures should be accompanied by quality specifications on virgin pellets and resins, allowing for recycling into the circular economy (p. 8).*

Some PIC's ozone layer protection restrictions may cover the importation of expanded polystyrene beads Table 5). However, only Palau plans to control virgin pellets as outlined in the National Solid Waste Management Strategy: The Roadmap Towards a Clean and Safe Palau 2017-2026. No other PICs regulate the importation, or use of, virgin pre-production flakes. In addition, there are no plans to monitor, manage nor set reduction targets for virgin plastics in the key documents.

Market restrictions

The number of countries placing restrictions on plastics imports has increased over the past five years. In many countries across the Pacific region, market restrictions on plastics have come with preferred alternatives in the form of 'biodegradable' plastics. For example, Palau's Plastic Bag Use Reduction Act 2017 prohibits the distribution of plastic bags by retailers by 2019 unless they are biodegradable or compostable. Fiji's National Solid Waste Management Strategy 2011-2014 places incentives on environmentally friendly products such as fully biodegradable nappies and disincentives on non-environmentally friendly alternatives. However, the bioplastic alternatives currently on the market present perverse environmental, economic (Northcott and Pantos 2018) and human health outcomes (Zimmermann et al 2019) and should be avoided. Furthermore, it is not only plastic products that need to be restricted to protect human and ecological health, it is also their associated toxic chemicals.

Some documents that plan for the implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs) and ozone layer protection have the potential to significantly contribute to coherent and effective national plastic pollution action plans. However, national implementation plans are currently underutilised and are not cross-referenced in other relevant national documents. For example, the Solomon Islands' National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants 2018 commits to eliminating the importation and use of Annex A and B chemicals (Article 3) (POPs found in plastic products) and yet there is no specific legislation addressing the management of POPs chemicals. However, as is the case with most of the plans in the Pacific for the implementation of the Stockholm Convention, the plan recommends the restricted importation of plastic-related POPs but not to plastics containing POPs.

Some ozone layer protection legislation exists in the Pacific, some of which either explicitly or implicitly restricts the importation of plastics associated with CFCs (Table 5). Tuvalu's Ozone Layer Protection Act 2008 prevents problematic plastics entering the country. The Act prohibits the manufacture or importation of plastic foam or of any goods containing plastic foam (including extruded polystyrene foam, polystyrene board stock and thermoformed plastic packaging such as supermarket meat/produce trays, egg cartons, fast-food containers, disposable plates and cups, horticultural packaging trays and packaging netting). It also prohibits pre-polymers (a reactive mixture of isocyanate and polyol to which chlorofluorocarbons are added to make rigid plastic foams) (see also Tonga's Ozone Layer Protection Act Regulation 1996). Part 7 of Fiji's Climate Change Bill 2019 regulates 'imports, exports, manufacture, sales and the nature of the use of products that contain hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride'.

Promotion of traditional solutions

Some PIC documents contain principles additional to those listed as analytical themes in this study. These reflect the region as a whole, as well as the specific requirements, challenges and values of each country and include:

- 'common but differentiated responsibilities and capabilities';
- 'climate change [as] the single greatest threat to Pasifika peoples';
- 'carrying capacity';
- 'integration of the environment and development';
- the 'proximity principle' – the treatment and disposal of waste and pollutants should take place at the closest possible location to the source, in order to minimise the risks involved in its transport;
- 'public-private partnerships' to harness the comparative and competitive advantages of the private sector to improve the delivery of waste management and pollution control;
- 'indigenous knowledge, practices, and innovations';
- 'oceans [as] critical to the identity and livelihoods of Pacific island peoples'.

However, only six of the 50 key documents promote traditional solutions (Table 5). When adapting/indigenising national policy frameworks to meet international or regional obligations, local principles and values are crucial. Local laws and bylaws are important in the effective implementation of national policy. For example, in Tuvalu the buy-in of village councils and chiefs is necessary to legislate waste under local governance laws: the *Falekaupule* Act (as amended 2008) regulates the composition, operation and functions of local governance (see also the Fijian Affairs Act 1978 and iTaukei Affairs Act 1944). Customary conservation practices such as *i qoliqoli* in Fiji and *ra'ui* in the Cook Islands, traditional leadership (e.g. *Koutu Nui* in the Cook Islands) and traditional women's groups could play a significant role in influencing plastic pollution policy at multiple scales of governance, including at village level.

Table 5: *Waste Prevention gap analysis of key documents using the analytical framework. Green indicates explicit mention of the theme in the document; yellow indicates that the document either partially includes the theme or that it is inferred; and red indicates that that theme is absent in the document.*

Country	Legislation	Trade in non-hazardous, recyclable and reusable plastics	National reduction targets	Virgin plastic use	Market Restrictions	Promotion of traditional solutions
Fiji	Environment Management Act 2005 and Regulations; Environment Management (Budget Amendment) Act 2019					
	Litter Act 2008 and Litter (Amendment) Act (2010)					
	Public Health Act 1935 including Public Health Regulations 1937 (as at 1 August 2018) [PHA 128]; and Public Health and Sanitary Services Regulations 1941					
	Climate Change Bill 2019					
	Republic of Fiji Climate Change Policy 2012					
	Fiji National Solid Waste Management Strategy 2011-2014					
Kiribati	Environment (Amendment) Act 2007					
	Special Fund (Waste Materials Recovery) Act 2004					
	Kiribati Solid Waste Management Plan (KSWMP) 2007					
	Kiribati 20-year Vision 2016-2036 or KV20					
	Kiribati Development Plan 2016-19					
	Customs Act 2019					
Marshall Islands	Styrofoam cups and plates, and plastic products prohibition, and container deposit Act 2016					
	Styrofoam Cups and Plates, and Plastic Products Prohibition Container Deposit (Amendment) Act, 2018 (2018-0054)					
	National Environment Management Strategy 2017-2022					
	Kwajalein Atoll Local Government Solid Waste Management Plan 2019-2028					
Palau	National Code: Title 24: Environmental Protection					
	The Recycling Act 2006 (including 2009 Amendments)					
	Plastic Bag Use Reduction Act 2017					
	Zero Disposable Plastic Policy, Executive Order No. 417					
	The National Solid Waste Management Strategy: the roadmap towards a clean and safe Palau 2017-2026					
Papua New Guinea	Environmental Contaminants Act 1978					
	Environment Act 2000					
	Public Health Act 1973					
	STaR					
Samoa	Marine Pollution Prevention Act 2008					
	Samoa Water Authority Act 2003 - Samoa Water Authority (Sewerage and Wastewater) Regulations 2009					
	Waste Management Act 2010					
	Waste (Plastic Bag) Management Regulations 2018					
	National Waste Management Strategy 2019-2023					
Solomon Islands	National WMAP Strategy					
	The Environmental Health (Public Health Act) Regulations 1980					
	Environment Act 1998					
	Shipping (Marine Pollution) Regulation					
Tonga	Waste Management (Plastic Levy) Regulations 2013					
	Environment Protection Act (2008) - Litter and Waste Control Regulations 2013					
	Marine Pollution Prevention Act					
	Hazardous Wastes and Chemicals Act 2010					
Tuvalu	Ozone Layer Protection Act					
	Waste Management Act 2017					
	Waste Management (Litter and Waste Control) Regulations 2018					
	Waste Management (Levy Deposit) Regulation 2019					
	Waste Management (Prohibition on the Importation of Single-Use Plastic) Regulation 2019					
	Environment Protection Act (2008) - Litter and Waste Control Regulations 2013					
	Ozone Layer Protection Act (2008)					
	Integrated Waste Policy and Action Plan 2017 -2026					
Vanuatu	National Action Plan to Reduce Releases of Unintentional Persistent Organic Pollutants 2018-2022					
	Waste Management Act 2014					
	Regulations 2018					
	Ozone Layer Protection Act 2010					

Waste management

Waste management is the collection, transport, treatment and disposal of waste. It is particularly important for PICs to invest in robust plastic pollution management strategies considering plastic pollution prevention strategies can be more challenging for SIDS due to, inter alia, limited resources and capacity and geographical spread and isolation. Effective waste management infrastructure and systems are also more difficult to establish and sustain for the same reasons.

While the focus of this study is waste prevention, many of the waste management options listed below can be utilised to reduce and eventually prevent plastic pollution, if well designed. For self-financing product stewardship schemes, producers can be incentivised to redesign their products and delivery systems. This can result in designing problematic plastics out of the economy while funding the expansion of materials captured in the schemes as well as additional plastic pollution prevention and mitigation schemes.

Closed loop recycling

(see Extended Producer Responsibility and CDS below)

Sustainable financial mechanisms and infrastructure investments

In order to achieve sustainable financing for plastic-waste management, economic and other fiscal measures will need to be adopted by municipal and national governments (EIA, 2020, p. 11).

One of the key challenges in waste management in PICs is funding, with the cost of waste management generally falling to the public sector. All the study country strategies and plans indicated inadequate funding, resources and capacity to support a robust waste management infrastructure.

The need to develop financially sustainable mechanisms to support waste management systems is reflected in the €16.5 million funding of PacWaste Plus Programme, implemented by SPREP. A significant strength of this programme is that it addresses specific country needs rather than taking a 'one size fits all' approach across the region. The programme includes "[p]roviding support to manage waste and pollution sustainably through the implementation of preferred sustainable financing options such as polluter pays, buy-back schemes and Container Deposit Legislation for difficult waste streams and collected wastes and extended producer responsibility programmes for imported goods."

Polluter/importer pays

A common sustainable financial mechanism promoted by PICs is 'polluter pays' (e.g., levies/taxes, advance recycling fees and post-pollution clean-up costs). Polluter-pays is variably defined across PICs and key documents within countries. In some cases, polluter-pays assumes the producer is the polluter, others refer to the consumer as polluter and yet, at other times, the term applies to both producer and consumer. However, one version of polluter-pays (polluter as importer) is outlined in Tuvalu's Prohibition on the Importation of Single-Use Plastic Regulation 2019. This form of polluter-pays comes in the form of a fine for importers when convicted for contravening the prohibitions on the importation of certain single-use plastics – up to $5,000 for a first-time individual offence and the possibility of imprisonment for a repeat offence. The fine is doubled for a corporate body. However, it is not clear whether this fine goes to an environmental fund to support plastic pollution prevention or management.

Due to the socio-economic conditions in most PICs, a user-pays approach is not always feasible nor effective, particularly when alternatives and adequate waste management infrastructure are non-existent. In many cases in the Pacific, even where user-pays mechanisms such as landfill levies are legally supported, these may still not be enough to cover the effective provision of services and maintenance of infrastructure. Where there is a lack of prevention/reduction legislative instruments, alternative delivery systems, safe and sustainable material alternatives and poor collection services, increasing landfill levies in developing countries may result in perverse outcomes including fly tipping. This has also led some countries to consider options that contradict carbon emission obligations and threaten human and ecosystem health (including various incineration options). Some countries' legislation provides for an advanced recycling/deposit fee as a polluter and user-pays financial mechanism. For example, in the case of Tonga and Samoa's Waste Management Acts, fees can be invested in an environmental fund to support the expansion and efficiency of container deposit schemes (CDSs), improved and expanded collection and sorting systems, transport infrastructure and supportive technologies.

User pays

User-pays can be an effective and sustainable financial instrument when costs are shared between the producer and the consumer within the purchase price. User-pays can incentivise sustainable alternatives particularly when the product or service is either a luxury item or where appropriate and affordable alternatives are easily accessible. When there are no alternatives (e.g. in the case of non-recyclable packaging of necessary food items in the Pacific), it could be argued that the responsibility should not fall to the user to but to the producer to bear the full cost of the economic and environmental impacts of that product along its supply chain.

Although plastic pollution monitoring is limited in the region, it is known that a significant source of plastic pollution in SIDS is tourism (Mohee et al 2015). However, there is little evidence of regulated or voluntary action specifically directed at tourist operations other than environmental levies and some bans on single-use items. The 2017 amendment to Palau's National Code Title 24; Pristine Paradise Environmental Fee, RPPL No. 10-02 2017 seeks to address this by requiring visitors (non-Palauan passport holders) departing the country pay an environmental protection departure fee ('Green Fee') of $30 to be used to mitigate the environmental impacts of tourism. Other examples of levies charged to foreign visitors in the Pacific include Fiji's Service Turnover Tax Decree No.8 2012; Fiji's 10 per cent Environment & Climate Adaptation Levy (ECAL). Palau and Fiji also charge a hotel tax. The Solomon Islands' National Waste Management and Pollution Control Strategy 2017-2026 suggests exploring the possibility of establishing a trust fund for waste management and pollution control programmes, e.g., a tourism tax.

Extended producer responsibility

Extended producer/importer responsibility (EPR) is based on the principle of 'polluter pays' in which producers are required to design, manage and finance programs for end-of-life management of their products and packaging as a condition of sale. EPR is often used interchangeably with 'product stewardship'. However,product stewardship ensures all parties involved in the supply chain of the product take responsibility for its impacts.

EPR systems go beyond polluter-pays to incentivise improved product design (e.g., durable reusables or refillables, recycled content, toxicant-free\,, free of intentionally added microplastics). EPR can also incentivise recycling and alternative delivery systems designed to eliminate dependencies on single-use/ disposable plastics. EPR can include reuse ortake-back schemes. For example, government procurement of 'green' certified products which producers ship back to point of origin at end of life or lease period.

One of the most promising financially sustainable product stewardship schemes appearing across PICs are container deposit schemes (CDSs). There are several private recycling and non-profit recycling enterprises in the Pacific region. For example, there are approximately 170 community recycle cages spread across most villages in Tonga and throughout Nuku'alofa. Householders deposit their recyclables in cages that are cleared by a private recycling company. Plastic bottles are among other recyclable materials are exported (PRIF 2018). While five companies have been issued recycling licenses in Tonga, only one of them operates in Ha'apai and Vava'u. In addition, 'E-waste Tonga', a non-profit organisation, was established in Nuku'alofa in 2010. Together with the outer islands of Ha'apai and Vava'u, it has created an e-waste recycling programme, charging one company T$0.10 Tongan pa'anga per kg. However, in general, a lack of guiding policies to promote waste minimisation, closed-loop recycling systems and government incentives to encourage the private sector to invest in recycling has led to recyclable materials being disposed of at Tapuhia Landfill, placing more pressure on the system (Tonga Draft National Environmental Management Strategy, 2018).

Palau presents a CDS success story because the CDS for recyclable plastics is now financially sustainable. This is due to the dedicated recycling fund established under the Recycling Act 2006. The CDS has a 90 per cent recovery rate and since 2013, when the CDS became operational, it has processed about three tonnes of waste per month (Beverage Container Recycling Program Annual Report FY 2011-16). A wider range of plastic containers could now be added to the legislation. Other benefits potentially gained from expanding the CDS include income generation from the informal recovery sector, reductions in the damage costs for the local fisheries operations and amenity value for coastal communities and tourism (PRIF 2018). The success of the CDS and recycling scheme in Koror, Palau is the result of initial financial investment and expertise provided by the Government of Japan, along with the advantages unavailable in other Palau States. Koror is the wealthiest and most populated state and has established infrastructure and well-connected roads which make the private collection of recyclable wastes easier (Starkey, 2017).

Fiji's Green Growth Framework (2014) notes several voluntary industry initiatives in which Coca Cola Amatil (Fiji) and Fiji Water have established collection and recycling systems. However, across the solid waste management policy framework, apart from the CDS and levy on single-use plastic bags no other mandatory product stewardship schemes such as incentivising backloading/reverse logistics and reuse/refill systems, exist in Fiji that could provide sustainable financing for plastic pollution prevention. In addition, in general, the Green Growth Framework (2014) notes several voluntary industry initiatives in which Coca Cola Amatil (Fiji) and Fiji Water have established collection and recycling systems. Two Regulations of Fiji's Environment Management Act set out the conditions and permitting requirements for a UNDP-funded container deposit scheme (CDS). These Regulations are the Environment Management (Waste Disposal and Recycling) Regulations 2007 which also provides for the Environmental Management (Container Deposit) Regulations 2011. Despite these provisions, no national government-mandated CDS exists in Fiji.

The Kiribati CDS is recognised as a 'best practice' recycling system in the Pacific (Government of Kiribati 2013). However, efforts to sustain the CDS scheme for PET bottles have been unsuccessful due to a lack of capacity, capability and confusion among the public due to multiple agencies operating the waste management systems (Local Government New Zealand 2019). As of 2018, the CDS has been effectively halted and tonnes of plastics imported annually remain in the country.

Economic development

The study sought explicit links between the impact of plastic pollution on economic development (e.g., tourism). These links were seldom found in the key documents analysed. The exceptions include the Marshall Island's Kwajalein Atoll Local Government Solid Waste Management Plan 2019-2028 which acknowledges that tourism increases solid waste in the country and also that the tourism sector is detrimentally impacted by increased pollution. Palau's National Code: Title 24: Environmental Protection notes that 'The people, plants and animals of the Trust Territory are dependent upon the air, land and water resources of the islands for public and private drinking water systems, for agricultural, industrial and recreational uses and as a basis for tourism.

Remediation and legacy pollution (recovery)

Recovery involves mining the environment for materials that can be reused, repurposed or recycled. While national mandatory container deposit schemes can incentivise the recovery of plastics and other materials for re-entry into a circularised economy, there is very little evidence of other plans or legal support for plastic pollution recovery in PICs. Remediation of landfills in PICs can be expensive. However, all sanitary landfills eventually fail – often after only a decade of use, they are often situated near water sources (lagoons, coastal areas and rivers) or near settlements and in the Pacific region many are susceptible to storm surges or cyclones.

This means that remediation is essential to prevent the contents (leachate, biomass and the physical matter) contaminating soil and water.

The 'remediation' theme was applied to determine which PICs have protocols and guidelines for remediating landfills, such as those damaged by cyclones or storm surges. A few documents refer to support for the remediation of landfills (Table 6). For example, Kiribati's Solid Waste Management Plan (KSWMP) 2007 refers to landfill rehabilitation and park construction on reclaimed landfill and the Kiribati Development Plan 2016-19 refers to landfill rehabilitation and targets. Sometimes documents referred to 'recovery' of landfills instead of remediation; the Solomon Islands' National Waste Management Action Plan (MWAP) refers to post-disaster landfill recovery. However, it also uses the term 'recovery' in terms of the potential energy 'recovery' from landfills (methane capture), as is the case in other documents analysed. This is further evidence of the need to standardise definitions across policy frameworks. In addition, no standardised protocols nor guidelines for landfill remediation are evident in the documents analysed.

Transport (including reverse logistics/backloading)

Transport of waste and recyclables is a challenge across the region due to the spread of the countries across the Pacific Ocean, the spread of islands within each country, remote rural communities and poor transport infrastructure to more remote areas. Backloading or reverse logistics involves loading empty shipping containers and trucks with post-consumer items once their cargo has been unloaded. The backloaded items can be either returned to point of origin or delivered to a site where they can be responsibly recycled, reused or repurposed. According to PRIF (2018), many countries have the port capacity for backloading/reverse logistics and yet are not taking advantage of this. This appears to be because the resources required to collect, sort and transport recyclables to port are lacking.

A key goal of Fiji's National Solid Waste Management Strategy 2011-2014 is for everyone to have access to sound waste collection services. The Strategy proposes a 'time and motion' study to identify issues with collection and disposal, site locations and transportation services (p. 49). In Fiji's Climate Change Bill 2019, a key objective is to enhance energy conservation, efficiency and use of renewable energy including in the transport sector. However, there is no mention of backloading/reverse logistics in Fiji's Environment Management Act nor its Amendments and Regulations.

One of the strategic actions of Tuvalu's Integrated Waste Policy and Action Plan 2017-2026 is to develop public-private partnerships in the delivery of waste services, improve markets for wastes, provide business opportunities and ensure sustainable financing, including a system of backloading of recycled waste (including plastics) to potential markets. This strategic action is a result of the reverse logistics study conducted by JICA in 2013, which recommended a strong public sector involvement in the recycling business (pp. 34-35).

Kiribati's Environment (Amendment) Act 2007 regulates the transport, collection, storage, treatment and disposal of wastes. As of 2018, the collection of PET recyclables in Kiribati continues but the exportation has effectively been halted and no other materials (e.g., e-waste) have been added to the recycling scheme. A review by the New Zealand Ministry of Foreign Affairs and Trade found that the main barrier to participation in kaoki mange! ('return the rubbish!') on Kiritimati is access as there is only one drop-off location servicing spatially distanced settlements. On South Tarawa, access was better due to multiple drop-off locations (Local Government New Zealand 2019).

Table 6: *Waste Management gap analysis of key documents using the analytical framework. Green indicates explicit mention of the theme in the document; yellow indicates that the document either partially includes the theme or that it is inferred; and red indicates that that theme is absent in the document.*

Country	Legislation, policies, and plans	Closed loop recycling (primary market) or secondary markets	Infrastructure investments	Legal basis for sustainable financing mechanisms	Economic development/Legal basis for loss or damage	Remediation and legacy pollution	Transport
Fiji	Environment Management Act 2005 and Regulations; Environment Management (Budget Amendment) Act 2019						
	Litter Act 2008 and Litter (Amendment) Act (2010)						
	Public Health Act 1935 including Public Health Regulations 1937 (as at 1 August 2018) [PHA 128]; and Public Health and Sanitary Services Regulations 1941						
	Climate Change Bill 2019						
	Republic of Fiji Climate Change Policy 2012						
	Fiji National Solid Waste Management Strategy 2011-2014						
Kiribati	Environment (Amendment) Act 2007						
	Special Fund (Waste Materials Recovery) Act 2004						
	Kiribati Solid Waste Management Plan (KSWMP) 2007						
	Kiribati 20-year Vision 2016-2036 or KV20						
	Kiribati Development Plan 2016-19						
	Customs Act 2019						
Marshall Islands	Styrofoam cups and plates, and plastic products prohibition, and container deposit Act 2016						
	Styrofoam Cups and Plates, and Plastic Products Prohibition Container Deposit (Amendment) Act, 2018 (2018-0054)						
	National Environment Management Strategy 2017-2022						
	Kwajalein Atoll Local Government Solid Waste Management Plan 2019-2028						
Palau	National Code: Title 24: Environmental Protection						
	The Recycling Act 2006 (including 2009 Amendments)						
	Plastic Bag Use Reduction Act 2017						
	Zero Disposable Plastic Policy, Executive Order No. 417						
	The National Solid Waste Management Strategy: the roadmap towards a clean and safe Palau 2017-2026						
Papua New Guinea	Environmental Contaminants Act 1978						
	Environment Act 2000						
	Public Health Act 1973						
	STaR						
Samoa	Marine Pollution Prevention Act 2008						
	Samoa Water Authority Act 2003 - Samoa Water Authority (Sewerage and Wastewater) Regulations 2009						
	Waste Management Act 2010						
	Waste (Plastic Bag) Management Regulations 2018						
	National Waste Management Strategy 2019-2023						
Solomon Islands	National WMAP Strategy						
	The Environmental Health (Public Health Act) Regulations 1980						
	Environment Act 1998						
	Shipping (Marine Pollution) Regulation						
Tonga	Waste Management (Plastic Levy) Regulations 2013						
	Environment Protection Act (2008) - Litter and Waste Control Regulations 2013						
	Marine Pollution Prevention Act						
	Hazardous Wastes and Chemicals Act 2010						
Tuvalu	Ozone Layer Protection Act						
	Waste Management Act 2017						
	Waste Management (Litter and Waste Control) Regulations 2018						
	Waste Management (Levy Deposit) Regulation 2019						
	Waste Management (Prohibition on the Importation of Single-Use Plastic) Regulation 2019						
	Environment Protection Act (2008) - Litter and Waste Control Regulations 2013						
	Ozone Layer Protection Act (2008)						
	Integrated Waste Policy and Action Plan 2017 -2026						
Vanuatu	National Action Plan to Reduce Releases of Unintentional Persistent Organic Pollutants 2018-2022						
	Waste Management Act 2014						
	Regulations 2018						
	Ozone Layer Protection Act 2010						

Standardisation

Another key issue impeding progress towards achieving circular-economy objectives is a lack of global criteria and standards on products and recycled materials, undermining secondary markets and the circular economy. The Convention on Plastic Pollution should systematically address these issues through a combination of ***labelling, product design, additive restrictions and certification schemes****. These activities would work to bring structure and organisation to the global plastics value chains and enable consistent approaches that would actively promote resource efficiency, best practice and waste reduction at national levels. (EIA, 2020, p. 8)*

UNEA's Resolution 2/11: Marine Plastic Litter and Microplastics (2011) emphasises the need for Parties to develop "a harmonised environmental monitoring framework" including "methodologies and formats for the purposes of establishing baselines and inventories … in collaboration with the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP) and/or other dedicated bodies" (EIA, 2020, p. 6).

National monitoring, reporting and inventories

Documents that include provisions for national monitoring and reporting seldom mention plastics. It is assumed that plastics are incorporated into the monitoring and reporting of solid waste management. For example, PNG's Environment (Amendment) Act 2014 includes environmental impact assessments, public review and submissions, environmental audits and investigations, environmental management plans for risk assessments including internal and external monitoring and reporting. However, none of these specifically target plastic pollution. Fiji's National Solid Waste Management Strategy 2011-2014 prioritises environmental monitoring (Chapter 10) and a key target of the Strategy is an environmental monitoring programme butit does not include monitoring the volume and types of waste flowing into and through the economy and waste leaking into the environment, including plastics.

A key objective of Fiji's Climate Change Bill 2019 is to establish a transparent framework for the monitoring, reporting and verification of anthropogenic emissions by sources and removals by sinks of greenhouse gases. On reading the Bill, it is assumed this would include the open burning, waste-to-energy incineration and chemical recycling of plastics but plastics are not specifically referenced. Nor does the Bill capture the methane and chlorine plastics emit as they degrade.

The only provisions for monitoring in Solomon Islands' waste management legislation found in the Environment Act 1998. One of the objects of the Act is to 'prevent, control and monitor pollution'. The function of the Division responsible for the Act is to 'develop national standards to promote sustainable development and to monitor those standards through environmental auditing'. However, standards, monitoring and reporting is limited to the control of the environmental impact of development. A major focus area of the National Waste Management and Pollution Control Strategy 2017-2026 is to monitor waste and pollution. Chapter 11 of the strategy is dedicated to a monitoring and evaluation framework for Solomon Islands including strategic actions, lead agencies, partners and timeframes. There are significant gaps in the monitoring and reporting and target setting for plastic pollution across the PICs in this study.

Transparency of information, freedom of information and labelling

An example of ecolabeling is Environmental Choice NZ which operates to the ISO 14024 standard "Environmental labels and declarations – Guiding principles." This is based on the life cycle approach 'to identify and understand environmental issues (adverse or beneficial impacts) across the whole life of a product or service (within a defined product or service category).' None of the key documents include requirements for the labelling of plastics to protect ecological and human health (Table 7).

The following are some examples where transparency of information pertaining to the safety of plastics including ecolabeling could be included. PNG's Environmental Contaminants Act 1978 is responsible for "prescribing the labelling, packaging, transportation, storage, advertising or use of any hazardous environmental contaminant." The Environment Act 2000 restricts and applies conditions to the "importation, exportation, manufacture, labelling, packaging, advertising, distribution, sale, storage and transportation of hazardous contaminants …". 'Eco-bags' must be labelled under the bag ban although it is not clear what these are. The National Strategy for Responsible Sustainable Development for Papua New Guinea (2nd Ed, 2014) (StaRS) promotes certification schemes for sustainable production and trade and green product labelling.

Fiji's Climate Change Bill 2019 states that in implementing the Paris agreement, the Minister must take all reasonable steps in communicating Fiji's Nationally Determined Contributions (NDCs) and provide the information necessary for clarity, transparency and understanding. This includes a GHG inventory. However, the Bill does not include requirements for the monitoring and reporting of GHGs emitted, including in the manufacture, transportation, recycling and landfilling/ dumping of plastics.

Palau's Environmental Protection (Litter and Waste Control) Regulations 2013 states: 'Where a prosecution relates to a chemical or other similar substance, the court may have regard to any information disclosed on the packaging of the chemical or substance to determine whether there is a danger to health or to the public.' Palau's Labelling Act 2015, which establishes labelling requirements for imported goods, does not currently cover labelling for plastic products in relation to human health impacts of pollution. Information transparency such as labelling would support the work of the court in preventing human and environmental harms from plastic.

Under Kiribati's Environment (Amendment) Act 2007, one of the functions of the Minister is to ensure that there is freedom of, and access to, information, particularly that the public has access to this information about hazardous materials. Phase 2 of the Kiribati Solid Waste Management Plan (KSWMP) 2007 focuses on leveraging resources and information sharing with stakeholders and donors.

The sixth Goal in Tuvalu's Integrated Waste Policy and Action Plan 2017-2026 is that "Waste activity outcomes are reported and disseminated to relevant stakeholders" and The SWAT (The Solid Waste Agency of Tuvalu ,now the Department of Waste Management [DWM]) shall undertake regular waste data collection and analysis … SWAT shall implement monitoring and reporting programmes to ensure more informed decisions in the waste sector."

The Integrated Policy and Plan has several targets and key performance indicators (KPIs) but none that specifically target a reduction in plastic pollution.

Enforcement

Most of the legislation included financial or in extreme cases, imprisonment for non-compliance. For example, Kiribati's Environment (Amendment) Act 2007, which targets plastic waste pollution broadly through multiple mechanisms, makes it an offence to litter with a maximum fine of $100,000 or five years' imprisonment (s 12) and enforces a "Duty to clean up the environment' to any person who causes or allows wastes to be discharged in contravention of the Act (s 20).

Likewise, the Styrofoam cups and plates and plastic products prohibition and container deposit Act 2016 in the Marshall islands gives power to authorities to enforce compliance for the illegal importation and sale of plastic products listed in the Act; failure to comply with the legal requirements of the CDS includes a criminal conviction with up to six months' imprisonment or $10,000 fine. In addition, the Plastic Prohibition Act gives the power to immigration, EPA (Environmental Protection Agency) and customs officers to seize, forfeit or destroy any listed imported goods.

A 2013 amendment of the Palau National Code Title 17: Crimes Penal Code of the Republic of Palau, RPPL No. 9-21 2013 establishes "criminal littering "as an offence: if anyone intentionally throws or drops litter on public or private property or waters, except in a place designated for the disposal of garbage, it is a criminal offence. A violation or refusal to comply with any provisions of Chapter 16: Recycling Program of the National Code in Palau, or with any regulation is an offence liable to imprisonment for up to 90 days and or fine up to $500 (§1,617). However, national plans frequently note insufficient enforcement across solid waste management regulations and legislation across waste management (e.g., Samoa's national plan p. 34) and note strengthening the legal frameworks and enforcement as a priority area. Samoa also sets the target that by 2023 the number of legal frameworks will be developed or enhanced. This is also noted in Tuvalu's National UPOPs Implementation Plan: "A lot of awareness raising has been conducted on Funafuti on the open burning ban and on waste collection arrangements, resulting in a lot fewer residents burning their waste. However, community awareness and enforcement of the existing laws continues to be a challenge, particularly on the outer islands" (p. 10).

Definitions

One of the first steps to a harmonised system of monitoring and reporting is the standardisation of definitions. However, there is a lack standardisation of the following definitions across documents: 'waste', 'plastic', 'refuse', 'garbage', 'litter', 'pollution', 'microplastic', 'marine debris', 'hazardous waste', 'emissions' and 'contaminant'. Only countries that provide definitions and use them consistently within policy documents are seen to be standardised (Table 7). Across documents, many key words are used interchangeably.

In addition, within and across the documents, it was often difficult to determine whether plastics are captured under these key terms even when definitions were provided. For example, it is not clear if plastics are considered hazardous waste. Other definitions that require standardisation include 'recovery' and 'polluter pays'. It is likely that PICs will also need to standardise additional definitions in the future where freedom of information may be incorporated into plastic pollution policy (e.g., 'recyclable', 'compostable', 'EDC-free', 'POP-free', 'safe recycled content', 'microbead-free').

Table 7: *Standardisation gap analysis of key documents using the analytical framework. Green indicates explicit mention of the theme in the document; yellow indicates that the document either partially includes the theme or that it is inferred; and red indicates that the theme is absent in the document.*

Country	Legislation, policies, and plans	Product design	Polymer restrictions	Additive restrictions	Voluntary certification & industry standards	Mandatory product stewardship	National monitoring, reporting, & inventories	Transparency & Freedom of information	Enforcement	Definitions
Fiji	Environment Management Act 2005 and Regulations; Environment Management (Budget Amendment) Act 2019									
	Litter Act 2008 and Litter (Amendment) Act (2010)									
	Public Health Act 1935 including Public Health Regulations 1937 (as at 1 August 2018) [PHA 128]; and Public Health and Sanitary Services Regulations 1941									
	Climate Change Bill 2019									
	Republic of Fiji Climate Change Policy 2012									
	Fiji National Solid Waste Management Strategy 2011-2014									
Kiribati	Environment (Amendment) Act 2007									
	Special Fund (Waste Materials Recovery) Act 2004									
	Kiribati Solid Waste Management Plan (KSWMP) 2007									
	Kiribati 20-year Vision 2016-2036 or KV20									
	Kiribati Development Plan 2016-19									
	Customs Act 2019									
Marshall Islands	Styrofoam cups and plates, and plastic products prohibition, and container deposit Act 2016									
	Styrofoam Cups and Plates, and Plastic Products Prohibition Container Deposit (Amendment) Act, 2018 (2018-0054)									
	National Environment Management Strategy 2017-2022									
	Kwajalein Atoll Local Government Solid Waste Management Plan 2019-2028									
Palau	National Code: Title 24: Environmental Protection									
	The Recycling Act 2006 (including 2009 Amendments)									
	Plastic Bag Use Reduction Act 2017									
	Zero Disposable Plastic Policy, Executive Order No. 417									
	The National Solid Waste Management Strategy: the roadmap towards a clean and safe Palau 2017-2026									
Papua New Guinea	Environmental Contaminants Act 1978									
	Environment Act 2000									
	Public Health Act 1973									
	STaR									
Samoa	Marine Pollution Prevention Act 2008									
	Samoa Water Authority Act 2003 - Samoa Water Authority (Sewerage and Wastewater) Regulations 2009									
	Waste Management Act 2010									
	Waste (Plastic Bag) Management Regulations 2018									
	National Waste Management Strategy 2019-2023									
Solomon Islands	National WMAP Strategy									
	The Environmental Health (Public Health Act) Regulations 1980									
	Environment Act 1998									
	Shipping (Marine Pollution) Regulation									
Tonga	Waste Management (Plastic Levy) Regulations 2013									
	Environment Protection Act (2008) - Litter and Waste Control Regulations 2013									
	Marine Pollution Prevention Act									
	Hazardous Wastes and Chemicals Act 2010									

Table 7 (cont'd): *Standardisation gap analysis of key documents using the analytical framework. Green indicates explicit mention of the theme in the document; yellow indicates that the document either partially includes the theme or that it is inferred; and red indicates that the theme is absent in the document.*

Country	Legislation, policies, and plans	Product design	Polymer restrictions	Additive restrictions	Voluntary certification & industry standards	Mandatory product stewardship	National monitoring, reporting, & inventories	Transparency & Freedom of information	Enforcement	Definitions
Tuvalu	Ozone Layer Protection Act									
	Waste Management Act 2017									
	Waste Management (Litter and Waste Control) Regulations 2018									
	Waste Management (Levy Deposit) Regulation 2019									
	Waste Management (Prohibition on the Importation of Single-Use Plastic) Regulation 2019									
	Environment Protection Act (2008) - Litter and Waste Control Regulations 2013									
	Ozone Layer Protection Act (2008)									
	Integrated Waste Policy and Action Plan 2017 -2026									
Vanuatu	National Action Plan to Reduce Releases of Unintentional Persistent Organic Pollutants 2018-2022									
	Waste Management Act 2014									
	Regulations 2018									
	Ozone Layer Protection Act 2010									

Microplastics

The theme afforded the least attention and, therefore, regulation across all PICs are 'Microplastics' (Table 8). This is likely due to a lack of information regarding the hazards posed by them.

All plastics that enter marine, freshwater and terrestrial ecosystems will eventually degrade into micro- and nano-sized plastic fragments. Primary microplastics can be introduced into agricultural soils when waste sewage sludge from waste treatment plants are used as fertilisers or when controlled-release fertilisers are applied. Secondary microplastics can be released into agricultural areas when the following degrade: plastic mulching, plastic greenhouses; and plastics in compost. Primary or intentionally added microbeads are also found in some cosmetics (some are called 'acrylates polymer'), commercial and industrial paints (including road markings), detergents and abrasives. A 'secondary microplastic' is tyre dust caused by wear and tear. Tyre dust contributes significantly to the flux of microplastics into the environment (Sommer et al 2018), as do microfibres from synthetic fabrics (Napper and Thompson 2016). The only document that referenced microplastics was Palau, which plans to control virgin pellets ('preproduction pellets'/'nurdles') as outlined in the National Solid Waste Management Strategy: The Roadmap Towards a Clean and Safe Palau 2017-2026. However, no handing guidelines or specific control mechanisms are cited in the document.

Table 8: *Microplastics gap analysis of key documents using the analytical framework. Green indicates explicit mention of the theme in the document; yellow indicates that the document either partially includes the theme or that it is inferred; and red indicates that that theme is absent in the document.*

Country	Legislation	Intentionally added (e.g., microbeads)	Wear and tear (e.g., tyres, textiles)	Agriplastics	Management (e.g., pellets)
Fiji	Environment Management Act 2005 and Regulations; Environment Management (Budget Amendment) Act 2019				
	Litter Act 2008 and Litter (Amendment) Act (2010)				
	Public Health Act 1935 including Public Health Regulations 1937 (as at 1 August 2018) [PHA 128]; and Public Health and Sanitary Services Regulations 1941				
	Climate Change Bill 2019				
	Republic of Fiji Climate Change Policy 2012				
	Fiji National Solid Waste Management Strategy 2011-2014				
Kiribati	Environment (Amendment) Act 2007				
	Special Fund (Waste Materials Recovery) Act 2004				
	Kiribati Solid Waste Management Plan (KSWMP) 2007				
	Kiribati 20-year Vision 2016-2036 or KV20				
	Kiribati Development Plan 2016-19				
	Customs Act 2019				
Marshall Islands	Styrofoam cups and plates, and plastic products prohibition, and container deposit Act 2016				
	Styrofoam Cups and Plates, and Plastic Products Prohibition Container Deposit (Amendment) Act, 2018 (2018-0054)				
	National Environment Management Strategy 2017-2022				
	Kwajalein Atoll Local Government Solid Waste Management Plan 2019-2028				
Palau	National Code: Title 24: Environmental Protection				
	The Recycling Act 2006 (including 2009 Amendments)				
	Plastic Bag Use Reduction Act 2017				
	Zero Disposable Plastic Policy, Executive Order No. 417				
	The National Solid Waste Management Strategy: the roadmap towards a clean and safe Palau 2017-2026				
Papua New Guinea	Environmental Contaminants Act 1978				
	Environment Act 2000				
	Public Health Act 1973				
	STaR				
Samoa	Marine Pollution Prevention Act 2008				
	Samoa Water Authority Act 2003 - Samoa Water Authority (Sewerage and Wastewater) Regulations 2009				
	Waste Management Act 2010				
	Waste (Plastic Bag) Management Regulations 2018				
	National Waste Management Strategy 2019-2023				
Solomon Islands	National WMAP Strategy				
	The Environmental Health (Public Health Act) Regulations 1980				
	Environment Act 1998				
	Shipping (Marine Pollution) Regulation				
Tonga	Waste Management (Plastic Levy) Regulations 2013				
	Environment Protection Act (2008) - Litter and Waste Control Regulations 2013				
	Marine Pollution Prevention Act				
	Ozone Layer Protection Act				
Tuvalu	Waste Management Act 2017				
	Waste Management (Litter and Waste Control) Regulations 2018				
	Waste Management (Levy Deposit) Regulation 2019				
	Waste Management (Prohibition on the Importation of Single-Use Plastic) Regulation 2019				
	Environment Protection Act (2008) - Litter and Waste Control Regulations 2013				
	Ozone Layer Protection Act (2008)				
	Integrated Waste Policy and Action Plan 2017 -2026				
	National Action Plan to Reduce Releases of Unintentional Persistent Organic Pollutants 2018-2022				
Vanuatu	Waste Management Act 2014				
	Regulations 2018				
	Ozone Layer Protection Act 2010				
	National Waste Management and Pollution Control Strategy and Implementation Plan 2016-2020				

Key recommendations

Global Objectives

Long-term elimination of discharges

Commitments to long-term thinking and action specific to plastic pollution are required across a cohesive plastic pollution policy framework. Long-term thinking should not be sacrificed for lock-in investments into short-sighted and expensive 'technofixes' with perverse outcomes.

Safe circular economy and human health

Legislative mechanisms are needed across the region to safeguard human and ecosystem health from the monomers and additives in plastics including the introduction of non-intentionally added substances (NIAS) in plastics manufacturing and recycling systems.

Intergenerational equity and justice

Intergenerational equity and justice specific to plastics pollution should be spread across the policy framework and include gender equity and justice, and equity and justice for informal waste workers/waste pickers, recognising their vital role in waste management in the Pacific region.

SDGs

All countries including those in the Pacific Islands region will need to consider the impacts of plastic pollution in meeting SDG targets. These targets reflect a full life cycle and integrated 'whole of environment' approach to plastic pollution and should be captured in national plans and policies.

Protection of human health

PICs will need access to the latest science on the genetic and transgenerational harms impacts from EDCs, as well as carcinogens and POPs associated with plastics. A regional plastic pollution agreement could require all member states to legislate to prohibit the importation of the most toxic, non-recyclable, disposable plastics (including bioplastics), and against their incineration. Plastic pollution prevention policies should be coordinated with national public health policy.

Missed opportunities to protect consumers from hazardous plastic packaging have been identified in this study. The Solomon Islands' Consumer Protection Act 1995 provides for the safety of the consumer including safety standards, measures or specifications to prevent risk or injury and information about what consumers should do so that goods do not become hazardous through improper handling or storage. While no specific reference is made to plastic packaging, an opportunity exists to amend the Act to build in protections for consumers from toxic, disposable and hard-to-recycle plastic packaging and the contamination of packaged food and beverages. Similarly, Palau's Labelling Act 2015, which establishes labelling requirements for imported goods, could be amended to include labelling for plastic products to protect consumers.

Vertical integration

An integrated and holistic approach to plastic pollution would need to incorporate obligations and practices from regional and international multilateral instruments. It is not enough to reference these obligations in national policy frameworks. Additional financial, technical and capacity-building support from donors will be required to action these obligations and set targets. Financial mechanisms for this purpose have been built into EIA's proposed plastic pollution convention.

A regional committee and action plan could also support economies of scale, networking, public-private partnerships, technical capacity and knowledge sharing across the region necessary to prevent plastic pollution. National plastic pollution elimination action plans will need to be vertically integrated to meet obligations and seek guidance from the Pacific regional policy framework. This will mean continuing to work closely with the Secretariat of the Pacific Regional Environment Programme (SPREP) as the region's key inter-governmental organisation for environment and sustainable development the broader Council of Regional Organisations in the Pacific (CROP).

The regional policy framework relevant to plastic pollution comprises the following binding multilateral agreements:

- The Waigani Convention (1995);
- Noumea Convention (1990);
- Noumea Emergencies Protocol (1990);
- Noumea Dumping Protocol (1990);
- Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean (WCPFC Convention, 2004);
- Conservation Management Measure on Marine Pollution (CMM 2017-04) (adopted in accordance with article 5 of the WCPFC Convention).

None of these binding agreements prevent plastic pollution entering the Pacific region on tidal flows nor do they prevent problematic plastics entering the region through trade and tourism. The Waigani Convention is currently due for review. This is an excellent opportunity to transpose the Basel plastics amendments into national legislation.

The Secretariat of the Pacific Regional Environment Programme (SPREP), SPREP partners and donors and governments of SPREP Member countries have produced excellent work in addressing marine litter and to manage waste in the region. This work is seen in the following regional plans and strategies:

- Cleaner Pacific 2025 Pacific Regional Waste and Pollution Management Strategy;
- Cleaner Pacific 2025 Pacific Regional Waste and Pollution Management Strategy Implementation Plan 2016-2019;
- Pacific Marine Action Plan: Marine Litter (MLAP) 2018-2025.

The Cleaner Pacific 2025 provides "a comprehensive long-term strategy for integrated sustainable waste management and pollution prevention and control in the Pacific islands region until 2025" (SPREP 2016) and the "Marine Litter Action Plan 2018-2025 (MLAP) sets out the policy context and key actions to minimise marine litter across the Pacific region.

While these instruments have strengths, they focus on sea-based sources and do not fundamentally address the full life cycle impacts of plastic pollution and the transboundary nature of the problem. A greater focus on prevention over end-of-pipe management solutions is needed. If the tap is turned off at source, heavy investment in waste management will no longer be needed.

However, the reality is that no international nor regional instruments currently exist that can effectively prevent plastic pollution in any region. This is particularly difficult to achieve in Large Ocean Small Island Developing States. UNEP's review of 18 international instruments and 36 regional instruments relevant to plastic pollution concludes that "current governance strategies and approaches provide a fragmented approach that does not adequately address marine plastic litter and microplastics" (Raubenheimer, Oral and McIlgorm's 2018).

- Some of the current gaps identified in the effectiveness of current global measures include:
- risks to human health from micro and nano plastics;
- inadequate application of the precautionary principle and freedom of information;
- emphasis of waste management over prevention;
- varying strategies and timelines across regional action plans;
- prevention and management microplastics from land-based sources and plastic pollution emissions into water bodies;
- loss of microplastics from wear and tear;
- the mandate to manage upstream production;
- due diligence within the plastics industry;
- attention to differences in capacity and geographic scope; and
- plastic waste dumping.

The key to preventing plastics pollution in the Pacific region and around the world is to regulate the most powerful plastics producers at source. Therefore, a key recommendation in this report is that PICs continue to support the development of an international plastic pollution agreement that addresses the full lifecycle of plastics, prevention at source and the transboundary flows of plastic pollution. PICs can support such a convention by taking the following actions:

- demonstrate Pacific island leadership on plastic pollution prevention with a national and regional declarations of support for a global agreement;
- ratify existing regional instruments (Noumea Convention, Noumea Emergencies Protocol and Dumping Protocol, Waigani Convention;
- ratify existing global instruments: London Convention and its Protocol under the International Maritime Organisation, MARPOL, and the Basel Convention;
- build on national and regional consultation around the Ad Hoc Open-Ended Expert Group and other regional meetings, identify Pacific needs and priorities within a global agreement addressing the full life cycle of plastics;
- engaging at AHOEEG-4, AHOOEG-5, and UNEA-5 in order to secure a negotiating mandate at UNEA-5.

(EIA 2020, p. 14).

Horizontal integration

Due to the complexity of plastic pollution, plastics cannot be adequately prevented and managed within a set of management policies that broadly aim to manage 'waste/solid waste'. An integrated plastic pollution management approach is needed address the sociocultural, economic, environmental, public health and political aspects of plastic pollution.

Some PICs have formed waste management committees (e.g. Samoa and Tuvalu). These committees may consider working with the relevant government ministries to support the development of national plastic pollution action plans. A key goal of each committee could be to set national plastic pollution reduction targets (currently absent across PICs) supported by regular monitoring, reporting and enforcement measures to ensure countries are meeting their regional and international obligations to reduce plastic pollution emissions. Legislating the existence of the committee, the ministries that must attend meetings and the reporting would provide a solid foundation for integrated plastic pollution management in all PICs.

Notable gaps across the documents analysed that should be incorporated into national plastic pollution action plans include activities and targets directed to plastic pellets and other microplastics, nano-plastics, non-recyclable/hard to recycle plastics and other hazardous composite plastics, e-waste, reusable and refillable schemes, traditional knowledge and plastics alternatives, agriplastics, the rights, health and safety of waste-pickers and other waste workers and the prevention and retrieval of lost and discarded fishing gear.

Regular reviewing and updating of national and regional plastic pollution prevention action plans is required. It is recommended that PICs seek the technical and financial support to amend legislation and update policies, strategies and plans as a matter of urgency. In so doing, they are recommended to source open access to the

latest scientific evidence and best practice on plastic pollution risks, prevention and mitigation.

Precautionary approach

Due to the chemical and physical properties of plastics and their known and as yet unknown harms and fates, the precautionary principle should be applied across all documents within each country's plastic pollution policy framework.

Waste hierarchy

Plastic pollution policy frameworks should prioritise top-of-pipe (preventative) solutions over-end-of-pipe (waste management) solutions, waste-to-energy incineration and secondary recycling ('downcycling'). For the Pacific region, the best prevention strategies include prohibiting imports of non-recyclable low grade and toxic plastics; establishing efficient collection, washing, and sorting systems (with the support of backloading); prioritising and legislating onshore refillable and reusable systems; establishing national mandatory CDSs; and building public-private partnerships for offshoring, clean, recyclable high-quality plastics (also with the support of backloading). Countries may also consider the development of product return schemes whereby products are shipped back to producers at end of life. The cost of return should be built into the purchase price.

Climate change

All PICs have ratified The United Nations Framework Convention on Climate Change (1992) (UNFCCC). The ratification of UNFCCC means countries have an obligation to transition towards renewable energy sources. For these obligations to be met, the connection between climate change and plastic pollution must be made explicit across the policy framework. Making these connections explicit will strengthen the case for PICs at international conventions to argue for the world's major producers of GHGs to shift to renewable energy and away from fossil fuel extraction and single-use plastics production. The investigation of waste-to-energy options appears to be an increasingly common theme across the Pacific region. However, a growing number of countries are discovering that these technologies do not support their climate change obligations. For example, an Asian Development Bank (ADB) report (2010) found that the waste-to-energy facility considered for the Marshall Islands would not be financially viable. In addition, the facility would conflict with the Marshall Islands National Energy Policy and Energy Action Plan 2016 which aims for 20 per cent renewable energy by 2020 and its efforts to minimise the human health impacts of climate change. For PICs to move to renewable energy, they will also need to reject waste to energy incineration. This shift involves the acknowledgement that the vast majority of plastics are derived from fossil fuels and that they emit methane as they degrade.

Waste prevention

Market restrictions, virgin plastics and trade in safe plastics

While some PICs are working toward circular economies, safe circular economies will remain elusive if additives, monomers and associated persistent organic pollutants (POPs) are not eliminated from the supply chain.

Parties may wish to set out global market restrictions, such as ***prohibitions on certain polymers and additives, and controls on the use of toxic additives****, such as endocrine-disrupting chemicals and carcinogens (EA, 2020, p. 8).*

PICs have two main options to restrict or prevent certain plastics from entering the economy:

- prohibit the importation of problematic plastics and polymers;
- apply variable taxes or levies on imported products.

The more difficult the product is to recycle and the more restricted it is under international conventions (e.g. Basel/ Waigani convention), the higher the tax or levy on the importation of the product. This would incentivise the importation of safe and recyclable/refillable/reusable products. Levies could go into an environmental fund to support the recovery of legacy plastics and partly finance onshore reusable, refillable and recyclable systems.

Of import to PICs, single-use bioplastics should be considered a prohibited category of imported products. There are several problems associated with the bioplastics available on the market today and the waste infrastructure required to manage them at end of life. The bioplastics that are currently available degrade at a similar rate to fossil fuel-based plastics when released into the environment and thus pose the same hazards to marine fauna. Almost all of them contain endocrine disrupting chemicals (EDCs) also known as 'hormone mimickers'. They release methane as they break down in anaerobic conditions (in landfills), most bioplastics can only be composted in a commercial facility and the vast majority cannot be recycled. Oxo-degradables are particularly problematic as they are fossil fuel-based and simply break down more readily in the environment. Consequently, a growing number of countries are banning them (see New Zealand Parliamentary Commissioner for the Environment, 2020 and Northcott and Pantos 2018 for more information and infographics).

Virgin plastics

While PICs do not manufacture virgin plastics, some import them to manufacture plastic products. Restricting virgin plastic imports and incentivising a higher volume of recyclable content per unit produced will contribute to overall reduction in new plastics circulating in the economy. It is recommended PICs establish monitoring and management plans for virgin plastics including clean-up strategies for pre-production pellet spills.

National reduction targets

National plans and policies should consist of national reduction targets for the most problematic plastics. Some examples include intentionally added microplastics, polystyrene, expanded polystyrene/Styrofoam, CFC-blown foams, single-use PVC, single-use food ware, bags, sachets, cigarette butts, wet wipes, disposable diapers and other sanitary items, expanded foams and artificial turf.

Waste management

Sustainable financial mechanisms and infrastructure investments

Successful sustainable financing requires regular monitoring and reporting of all sustainable financing mechanisms to demonstrate their ongoing effectiveness. If well-designed, these financial mechanisms and schemes can sustainably self-fund preventative measures.

Polluter pays

… plastic waste management must become self-sufficient at the local and national levels, ***financed predominantly by those economic actors (industries) profiting from plastic use*** *(EIA, 2020, p. 11).*

With a strong polluter-pays approach, the producer internalises the full cost of the product or service including the use of natural resources in the production of the product and its post-consumption treatment. A key benefit of this approach is that it can incentivise redesign and lead to designing single-use and other problematic plastics out of the economy altogether.

User pays

User-pays is pertinent in the Pacific when a part of the arrival tax is an environmental levy for cruise ship passengers. There may be a need to apportion part of the fund's proceeds to a plastic pollution reduction fund with specific levies dedicated to that fund where plastic pollution is identified as a priority. The Palau visitor fee (Pristine Paradise: Palau) is likely the highest globally. The fee increases the financial capacity of Palau to action environmental policies. This could also provide a strong regional incentive to implement similar schemes across the Pacific.

The Environment Defenders Office (EDO) suggests a list of non-legislative initiatives to address plastic pollution by international visitors including per capita waste reductions for the tourism sector where waste is measurable, voluntary certification programmes for operators and related procurement policies and agreements including encouraging the purchase of locally made plastic-free products and reducing plastic packaging. When accompanied by a strong marketing campaign, user-pays can encourage pollution prevention. The fees accrued can also be fed into funds dedicated to developing more direct preventative measures.

Extended Producer Responsibility

National action plans should include the requirement to legislate in the pursuit of establishing extended producer responsibility schemes and national reduction targets. (EIA, 2020, p. 7).

Extended producer responsibility schemes should incentivise the producer to change the product design in an environmentally benign way. For example, they may be incentivised to only manufacture a product that can be recycled, refilled or reused domestically. This also speaks to the 'proximity principle' – but not in a waste management sense; a circular sense. EPR could involve PICs' support for 'green' accredited procurements. These procurements could incentivise product design that is safe, durable, modular, recyclable, and made of recycled content. If these build in take back schemes, suppliers would remove these items from PICs at end of use.

Container deposit schemes

Based on an average reduction rate of 40% in mismanaged waste with a CDS in place, approximately 0.80t of PET and HDPE plastic could be recycled each day. This could increase to an 80% or above reduction rate, depending on access to recycling collection services and viable markets, among others… (PRIF 2018).

Container Deposit (or Return) Schemes (CDSs) as an example of product stewardship are also growing in popularity in the Pacific where bans may not be appropriate nor desirable for certain products. Successful CDSs are not only financially sustainable; they can also grow environment funds. These funds can then be used to expand the CDS to include a wider range of products, fund environmental clean-ups, remediation/recovery initiatives, improve sorting and sanitation processes and eventually expand to the scheme to include (or swap out all single-use for) refillables/reusables over time.

Due to the relatively small markets in PICs, product stewardship schemes such as CDSs coordinated at a regional level have the potential to support economies of scale and bargaining power. Mandatory product stewardship schemes level the playing field and ensure no-one free rides from operating outside the scheme. They also financially incentivise schemes that design single-use and other hazardous plastics out of the economy. It is recommended that PICs establish a regional product stewardship framework. To implement this, PICs are advised to seek out private-public regional and international partnerships.

PICs may wish to consider establishing national governance boards for container deposit schemes, comprising representatives from several stakeholder groups such as beverage, retailers, consumers, community, local and central government. These multi-stakeholder boards ensure that the strategic direction of the schemes is underpinned by positive social, economic and environmental outcomes. A successful national CDS would incentivise backloading/reverse logistics and reuse systems. An ecolevy could be charged for recyclables (and a higher ecolevy on non-recyclables) to incentivise refillables which sit further up the waste hierarchy. Existing CDSs could expand to include a wider range of containers (beyond beverage containers, to include janitorial, bathroom and other products) and refillable systems.

Remediation and recovery

Best practice is needed for landfill remediation post-disaster and for remediation of landfills at end of life. Financial support will be required to upgrade municipal dumpsites to sanitary landfills to avoid contamination of groundwater and other environmental and human health harms. Protocols and plans are needed for the recovery of legacy plastics for either recycling onshore or for export. 'Repatriation' should be a key strategy for PICs. This could capture legacy products but should first capture products higher up the waste hierarchy:

repatriation of products could be built into EPR 'takeback' schemes supported by reverse logistics/backloading programmes.

Transport/Backloading

Raubenheimer (2019) recommends backloading as an affordable transport of freight option: "such a system could benefit transport operators in PICs and provide a mechanism to transport clean, sorted waste from remote areas via delivery trucks and ferries" (p. iii). PRIF (2018) has identified many PIC ports as currently having the annual cargo handling capacity for backloading. The Moana Taka Partnership, facilitated by SPREP and UNEP, is a mechanism intended to remove recyclable waste including plastic bottles out of some PICs. It is recommended that PICs take advantage of this. There is potential to build additional partnerships, connecting businesses and government departments across the region to attract export markets and build coordinated and efficient recycling, return, reuse and refill schemes in the region.

An additional recommendation is the use of an app that connects freight in need of transport with truck drivers willing to transport it. By connecting drivers to the freight, the app could minimise the number of empty decks between driver appointments (Raubenheimer/ CLiP Report, 2019).

Standardisation

National monitoring, reporting and inventories

Ensure documents include national monitoring, reporting and inventories specifically for plastics. Some areas which may need monitoring can be found in Pillar 1: Monitoring and Reporting of EIA's Convention on Plastic Pollution (Figure 3). Develop streamlined monitoring systems so that the data gathered on plastics can be used in multiple reports. This will also reduce the burden of reporting on PICs. Some data monitoring and reporting is not relevant to many PICs (such as the standardisation of plastics production, packaging design and labelling). However, PICs may also consider supporting other countries' development of, and compliance to, these standards to ensure imports are safe and can be safely managed at end of useful life. An example of this may be to utilise the 10-digit globally harmonised system (GHS) for customs tariff codes. The GHS was updated from an eight-digit code to improve the tracking of trade in controlled substances under the Montreal Protocol. This system could be updated in 2022 to identify and track plastics and their associated chemicals entering and leaving the region via trade. However, this is likely to require strong leadership from effected countries such as PICs.

Transparency and freedom of information

Where practicable, PICs may consider setting labelling and other information standards and certification schemes to ensure safe recyclable or reusable materials are imported and manufactured in the region. Labels should identify whether a product and its packaging, or a service, is a sustainable choice. Labelling could include additives or monomers of concern, recycled content, appropriate disposal method/s, home or commercial/ home compostability, hazard potential, intentionally added microplastics, and recyclability. Freedom of information should be enacted all along the supply chain from production to packaging and point of sale. A wide range of actors will also need access to information on how to treat the product and/or its packaging at end of life.

Enforcement

The legislation in PICs is almost always supported by compliance measures such as financial penalty or imprisonment. However, the level of enforcement is not clear. Financial support, a review of governance structures and strengthening of capacity, as well as public awareness, may be required to support compliance and enforcement measures.

Definitions

It is recommended that national plastic pollution prevention committees and a dedicated regional plastic pollution body work to standardise definitions for plastic pollution policy frameworks, regional monitoring and reporting and certification schemes. PICs are likely to lack the capacity for committees dedicated specifically to plastic pollution. However, a small group of individuals might represent ministries responsible for plastic pollution prevention. These groups may work with SPREP and other regional and international bodies on plastics pollution prevention initiatives.

Figure 3: *Pillar 1 Monitoring and Reporting*

PILLAR 1
MONITORING AND REPORTING

Monitoring and reporting on the state of the environment and implementation

Harmonisation
- Definitions
- Methodologies (monitoring, reporting)
- Standardised formats

Environmental monitoring
- Baselines (seafloor, seawater, shoreline, biota, freshwater, soils)
- Indicator species
- Evolution of plastic pollution in marine and other environments

National data reporting
- National inventories and sources:
  - virgin plastic production and use
  - recycled plastic production and use
  - plastic-waste management
  - plastic-waste trade
  - land-based sources
  - sea-based sources
  - microplastics
- Evolution of circular economy and leakage

Reporting on national action
- Submission of national action plans
- Periodic review and update

Periodic comprehensive assessments
- Progress toward global objectives
- Scientific and socio-economic reviews

Microplastics

There is a clear lack of access to the most current science-based evidence on microplastics and their environmental and human health harms. Open source access to the latest science interpreted, if necessary, through a science advisory committee may be required. PICs may consider introducing product design legislation, bans and phase-outs (e.g., for intentionally added microbeads in cosmetics and a wide range of industrial products such as paints and abrasives), single-use plastics, biodegradable (and particularly oxo degradable) plastics; establishing legislated product return schemes (e.g. for agricultural films such as silage wrap or plastic mulch); prohibiting the import of nondurable tyres; and establishing monitoring and management and reporting systems for pre-production pellets used in plastics manufacturing in the Pacific islands is recommended for PICs. All of these actions will help prevent primary (intentionally added to products) and secondary microplastics (the product of degraded plastics) entering the food chain and ecological and biological systems.

Conclusion

This gap analysis shows that many PICs are failing to address plastic pollution beyond a traditional and siloed approach to waste management. Consequently, the many causes, pathways and impacts of plastic pollution across legislation, policies, and plans are not captured.

In addition, PICs are missing the opportunities to stem the flow of plastics entering the region that their current legislative instruments and mechanisms may offer. There appears to be a lack of guidance on sustainable funding mechanisms to ensure that national and regional solutions are sustainable where GDP is limited. There also appears to be a lack of access to the latest peer-reviewed, science-based evidence on plastic pollution to ensure policy and legislation protect the Pacific region into the future. The latest information on false solutions to the plastics crisis such as incineration technologies, bioplastics and downcycling/secondary recycling is urgently needed if the region is to avoid the perverse outcomes of locking themselves into investmentsin these areas.

The Cleaner Pacific 2025 illustrates that preventing plastic pollution will not be possible in the absence of a comprehensive policy framework that fosters sustainable consumption and production. The identification and legal regulation of a broad set of priority plastic products (e.g., single-use plastic bags and foodware, expanded polystyrene (Styrofoam) food containers or tyres) could trigger government-mandated extended producer responsibility schemes. Legislation could be flexible to allow for additional priority products and their associated schemes as new problematic products are released onto the global market.

This study also mirrors other key messages from the Cleaner Pacific 2025: focus at the top of the waste hierarchy; sustainable financing mechanisms are key; waste to energy is unsuitable for PICs; public-private partnerships, transparency of information; monitoring and performance indicators; and the promotion of regional and national cooperation. However, coordinated efforts are best invested in prevention and reduction measures before plastics have the opportunity to become problematic as 'waste' requiring expensive, technical and complex management systems in the region. Pacific Island countries rely heavily on imported goods and many of these either contain or are packaged in plastic. Where plastics are necessary, 'repatriation' may be considered an additional 'R' to the '3Rs' seen in many of the documents analysed in this study. This would see a range of take back schemes whereby all the plastics that enter the region were returned to producers at point of origin.

Pacific Island countries are among some of the most severely impacted by plastic pollution and among the world's peoples with the closest cultural economic and social ties to the ocean. PICs contribute as little as 1.3 per cent of the mismanaged plastics in the world's oceans and yet are one of its main recipients; plastics entering the region are polluting PICs' life support systems and the costs of plastic pollution and climate change impacts on PICs are massively disproportionate to their contributions.

For these reasons, PICs have been highly influential in securing Sustainable Development Goal 14.1 and in the strength of their interventions at UNEA-4 and the UNEA Ad Hoc Open-Ended Expert Group process on Marine Litter and Microplastics. The Pacific Heads of State at the August 2019 Pacific Island Leaders Forum signed the The Pacific Islands' Kainaki II Declaration. In so doing, they endorsed the Pacific Regional Marine Litter Action Plan (MLAP) 2018-2025 which includes the strategic action to "support the development of a global legal framework to address marine litter and microplastics".

The countries reiterated their commitment for a global legal framework at the Pacific Ocean Alliance in September 2019. A global agreement is urgently needed to prevent growing volumes of increasingly problematic types of plastics and plastic products entering the Pacific region. PICs are strong leaders in this space and could support the critical mass needed to secure a negotiating mandate for a global agreement at UNEA-5 in 2021.

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Appendix 1: Documents analysed

Fiji	**Legislation & Regulations**
	The Environment Management Act 2005 (EMA)
	Marine (Pollution Prevention and Management) Regulations 2014
	Environmental Management (Container Deposit) Regulations 2011
	Environment Management Act 2005 (Amendment 24 June 2019 come into force 1 January 2020)
	Environment Management (Waste Disposal and Recycling) Regulations 2007
	Litter Amendment Decree (2010)
	Environmental Management (EIA Process) Regulations 2007
	Litter Promulgation 2008
	The Environment and Climate Change Adaption Levy on Prescribed Services, Items and Income (ECAL), 2017
	Environment & Climate Adaptation Levy (Plastic Bags) Regulations 2017
	Customs Tariff Act 2009 (as 8th June 2019) (should be read as one with the Customs Act 1986)
	Customs (Prohibited Imports and Exports) Regulations 1986 (as at 8 June 2019)
	Litter Act 2008 (as at 1 August 2018)
	Public Health Act 1935 (Chapter 111)
	Public Health Regulations 1937 (as at 1 August 2018) [PHA 128].
	Public Health and Sanitary Services Regulations 1941
	iTaukei Affairs Act 1944 (as at 9 March 2012)
	iTaukei Affairs (Provincial Councils) Regulations 1996 (as at 1 December 2016)
	Biosecurity Act 2008
	National Policies, Plans and Strategies
	Container Deposit Legislation and Refund System for Fiji (CDL)
	Fiji National Solid Waste Management Strategy 2011–2014
	Climate Change and Health Strategic Action Plan 2016–2020
	A Green Growth Framework for Fiji: Restoring the Balance in Development that is Sustainable for Our Future (2014)
	National Plan for Implementation of the Stockholm Convention on Persistent Organic Pollutants in Fiji Islands 2006
	Reports
	Fiji State of Environment Report 2013
	The PWC Fiji National Budget 2019-2020
	Towards an integrated oceans management policy for Fiji: Policy and Law Scoping Paper (2017).
	PWC Fiji National Budget 2019-2020
	Solid Waste Management in the Pacific: Fiji Country Snapshot 2014
The Republic of Kiribati	**Legislation & Regulations**
	Environment Act 1999
	Environment (Amendment) Act 2007
	Special Fund (Waste Materials Recovery) Act 2004
	Deposits Order 2005
	Special Funds (Waste Material Recovery) Regulations 2005
	Local Government Act 1984
	Public Health Ordinance 1926
	Public Highways Protection Act 1989
	Fisheries (Amendment) Act 2017
	Customs Act 2019
	National Policies, Plans and Strategies
	Kiribati Solid Waste Management (SWM) Plan 2007
	Kaoki Mange! Program 2004 —Container Deposit Scheme
	Kiribati Integrated Environment Policy (2013)
	Kiribati Development Plan 2016-19
	Kiribati 20-year Vision 2016-2036
	Kiribati Trade Policy Framework 2017-2027
	Draft National Solid Waste Management Strategy (Oct 2007) (active 2008-2011)
	Reports
	Ninth Regional 3R Forum in Asia and the Pacific (Kiribati Country Report)

The Republic of the Marshall Islands	**Legislation & Regulations**
	Styrofoam cups and plates, and plastic products prohibition, and container deposit Act 2016
	Littering Act 1982
	204: Prohibition of littering 205: Power of arrest and removal of litter
	Prohibition of smoking (in public premises and public vehicles) Act 1986
	National Environmental Protection Act 1984 (EPA)
	Environmental Impact Assessment Regulations 1994
	Marine Water Quality Regulation 1992
	Solid Waste Regulation 1989
	Toilet Facilities and Sewage Disposal Regulations 1990
	The Sustainable Development Regulations 2006
	Fisheries Act 1997
	Coastal Conservation Act 1988
	Environmental Impact Assessment Regulations 1994
	Public Health, Safety and Welfare Act 1966
	Ministry for the Environment Act 2018
	National Policies, Plans and Strategies
	National Environment Management Strategy 2017-2022
	Kwajalein Atoll Solid Waste Management Plan 2019-2028
	National Energy Policy and Energy Action Plan 2016
	National Waste Management Strategy (in draft and has not been approved by cabinet)
	Reports
	Asian Development Bank (ADB) Waste to Energy Report (2018)
	Moana Taka Partnership
Palau	**Legislation & Regulations**
	Constitution 1979
	'Zero Disposable Plastic' Policy, Executive Order No. 417 (8 August 2018)
	Plastic Bag Use Reduction Act, RPPL No. 10–14 2017
	This act amended the National Code Title 11: Business and Business Regulation, Chapter 16: Recycling Program
	The Recycling Act 2006
	Beverage Container Recycling Regulations 2009
	National Code Title 24: Environmental Protection 1999
	Solid Waste Management Regulations 2013 (Chapter 2401-31)
	Marine & Fresh Water Quality Regulations 2013 (Chapter 2401-11)
	Wastewater Treatment and Disposal Regulations 2019
	Ozone Layer Protection Regulations 2016
	Air Pollution Control Regulations 2013
	Pristine Paradise Environmental Fee, RPPL No. 10-02 2017 (Amendment)
	Biosecurity Act 2014 (RPPL No. 9-58)
	National Code Title 34: Public Health, Safety and Welfare 2001
	Environmental Health Regulations 2004
	Article 12 establishes minimum standards governing the operation and maintenance of solid waste storage, collection and disposal systems.
	Toilet Facilities and Wastewater Disposal Regulations 1996
	National Code Title 40: Revenue and Taxation, Division 2: Unified Tax Act 1985
	Customs Regulations 2015
	National Code Title 17: Crimes (as at 2014)
	Penal Code of the Republic of Palau, RPPL No. 9-21 2013
	National Policies, Plans and Strategies
	National Solid Waste Management Strategy: The Roadmap towards a Clean and Safe Palau 2017 to 2026
	Palau Responsible Tourism Policy Framework 2017–2021
	Palau National Plan for Implementation of the Stockholm Convention on Persistent Organic Pollutants (2013)
	Palau Climate Change Policy 2015
	2008–2015 National Solid Waste Management Plan (draft only, superseded by NSWPS 2017-2026)
	Reports
	Palau Review of Natural Resource and Environment Related Legislation (SPREP, 2018)

Papua New Guinea	**Legislation & Regulations**
	Environment Act 2000 (as at 2006)
	Environment (Prescribed Activities) Regulation 2002 (under Environment Act 2000)
	Customs (Prohibited Imports) (Plastic Shopping Bags) Regulation 2009 and (Amendment) and 2011
	Full ban on importing or manufacturing plastic bags announced in 2018. This followed a ban on importing or manufacturing nonbiodegradable plastic bags that came into effect in 2014. Levies on imports and manufacturing of plastic bags. Ban came into effect 31st January 2020.
	Environment (Amendment) Act 2014
	Local-Level Governments Administration Act 1997
	Local-Level Governments Administration Act 1997 Amendment No. 47 (2014) 1997 (amendment No. 47 2014)
	Organic Law on Provincial and Governments and Local-Level Governments 1998
	Public Health Act 1973 (as at 1973)
	Public Health (Sanitation and General) Regulation 1973
	Public Health (Sewerage) Regulation 1973
	Public Health (Septic Tanks) Regulation 1973
	National Water Supply and Sanitation Act 2016
	Marine Pollution (Sea Dumping) Act No. 37 of 2013. (repeals the Dumping of Wastes at Sea Act 1979).
	Environmental Contaminants Act 1978
	National Policies, Plans and Strategies
	PNG Development Strategic Plan 2010 – 2030 (2010)
	National Health Plan 2011–2020
	PNG National Water, Sanitation and Hygiene (WaSH Policy) 2015–2030
	National Climate Compatible Development Management Policy
	Papua New Guinea Vision 2050 (2009)
	National Strategy for Responsible Sustainable Development for Papua New Guinea (2nd Ed, 2014) (StaRS)
	Medium Development Plan III 2018–2022
	National Oceans Policy of Papua New Guinea 2020-2030
	National Implementation Plan for Management of Persistent Organic Pollutants in Papua New Guinea (2009)
Samoa	**Legislation & Regulations**
	Agriculture and Fisheries Ordinance 1959
	Pesticides Regulations 2011
	Forestry Management Act 2011
	Health Ordinance 1959
	Land, Surveys and Environment Act 1989
	Plastic Bag Prohibition on Importation Regulations 2006
	Marine Pollution Prevention Act 2008
	National Parks and Reserves Act 1974
	Planning and Urban Management Act 2004
	Police Offences Ordinance 1961
	Quarantine and Biosafety Act 2005
	Samoa Water Authority Act 2003
	Samoa Water Authority (Sewerage and Wastewater) Regulations 2009
	Tourism Development Act 2012
	Water Resources Management Act 2008
	Waste Management Act 2010
	Waste Management (Importation of Waste for Electricity Generation) Regulations 2015
	Waste (Plastic Bag) Management Regulations 2018
	Waste (Plastic Bag Management Amendment Regulations 2020
	National Policies, Plans and Strategies
	Apia Waterfront Development Project Waterfront Plan 2017-2026
	City Development Strategy 2015
	Ministry of Natural Resources & Environment: Corporate Plan 2019-2021
	National Biodiversity Strategy and Action Plan 2015-2020
	National Implementation Plan for Persistent Organic Pollutants 2004
	National Infrastructure Strategic Plan 2011
	National Waste Management Strategy 2019-2023
	National Environment Sector Plan (NESP) 2017-2021
	National Community Development Sector Plan 2016-2021
	Reports
	National Inventory of E-wastes 2009
	Review of Natural Resource and Environment-Related Legislation: Samoa 2018
	Samoa Profile in the Solid Waste and Recycling Sector 2018
	State of Environment Report 2013

Solomon Islands	**Legislation & Regulations**
	Environment Act 1998
	Environment Regulations 2008
	Environment Regulation (Amendment) Regulation 2014
	Environmental Health Act 1980
	Environmental Health (Public Health Act) Regulations. (1980)
	Honiara City Act 1999
	Honiara City Council (Litter) Ordinance 2009
	Provincial Government Act 1997
	Ports Act 1956
	Solomon Islands Water Authority Act 1996
	Solomon Islands Water Authority (Catchment Areas) Regulations LN 42 1995
	Biosecurity Act 2013
	Customs and Excise Act 2003
	Consumer Protection Act 1995
	Fisheries Management Act 2015
	Pure Food Act 1996
	National Policies, Plans and Strategies
	Rural Water Supply, Sanitation and Hygiene Policy 2014
	National Development Strategy 2016-2035
	National Implementation Plan for Stockholm Convention on Persistent Organic Pollutants 2018
	National Solid Waste Management Strategy 2009-2014
	National Waste Management and Pollution Control Strategy 2017-2026
	National Climate Change Policy (NCCP) 2012-2017
	Solomon Islands National Plan of Action (CTI)
	The National Biodiversity Action Plan 2016-2020
	Reports
	Baseline Study for the Pacific Hazardous Waste Management Project – Healthcare Waste: Solomon Islands 2014
	Eco-Bag Pilot Project Report 2016
	Honiara Waste Characterisation Audit Report 2011
	PacWaste E-Waste Country Assessments – Solomon Islands Country Report Extract 2014
	Public Environment Report (Ranadi Dumpsite Environment Impact Assessment) 2013
	Review of Natural Resource and Environment Related Legislation: Solomon Islands (SPREP) 2018
	Solid Waste Management in Honiara 2008
	Solid Waste Management in the Pacific: Solomon Islands Country Snapshot 2014
	Solomon Islands Profile in the Solid Waste and Recycling Sector 2018
	SPREP Solid Waste Management Project 2000
	Taro Integrated Solid Waste Management Workshop Program Report 2015
Tonga	**Legislation & Regulations**
	Waste Management Act 2005 (revised 2016)
	Waste Management (Plastic Levy) Regulations 2013
	Hazardous Wastes and Chemicals Act (revised 2016)
	Environment Management Act 2010
	Environment Management (Litter and Waste Control) Regulations 2016
	Public Health Act 1992
	Public Health (Amendment) Act 2002
	Public Health (Amendment) Act 2005
	Pesticides Act 2002
	Ozone Layer Protection Act
	Ozone Layer Protection (Amendment) Act 2014
	Biosafety Act 2009
	Marine Pollution Prevention Act 2002
	Marine Pollution Prevention Act (Amendment) 2009
	Marine Pollution Prevention Act (Amendment) 2012
	Tonga Tourism Authority Act 2012
	Fisheries Management Act 2002
	National Policies, Plans and Strategies
	Tonga National Infrastructure Investment Plan (NIIP) (2013–2023)
	Tonga National Strategic Development Framework 2015–2025
	National Waste Management Strategy (Draft)
	National Implementation Plan (POPS)
	Reports
	Tonga Profile in the Solid Waste and Recycling Sector 2018
	State of Environment Report 2018
	Tonga Review of Natural Resource and Environment Related Legislation 2018

Tuvalu	**Legislation & Regulations**
	Waste Operations and Services Act 2009
	Waste Management Act 2017
	Waste Management (Levy Deposit) Regulation 2019
	Waste Management (Prohibition on the Importation of Single-Use Plastic) Regulation 2019
	Waste Management (Litter and Waste Control) Regulations 2018
	Environment Protection Act (2008 Revised Edition), Cap 30.25
	Environment Protection Act (2008 Revised Edition), Cap 30.25
	Environment Protection (Waste Reform) Amendment Act 2017
	Environment Protection (Litter and Waste Control) Regulations 2013
	Environnent Protection (Environnemental Impact Assessment) Régulations 2014
	Ozone Layer Protection Act (2008)
	Ozone Depleting Substances (ODS) Regulations 2010
	Public Health Act (2008)
	Public Health Regulations
	Waste Operations and Services Act 2009
	Pesticides Act (2008)
	Customs Revenue and Border Protection Act 2014
	Falekaupule Act/Local Government Act (2008)
	Penal Code (2008)
	Criminal Procedure Code (2008)
	National Policies, Plans and Strategies
	Infrastructure Strategy and Investment Plan 2016-2025
	Integrated Waste Policy and Action Plan 2017 -2026
	National Action Plan to Combat Land Degradation and Drought 2006
	National Action Plan to Reduce Releases of Unintentional Persistent Organic Pollutants 2018-2022
	National Biodiversity Strategy and Action Plan 2012-2016
	National Environment Management Strategy 2015-2020
	National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants 2008
	National Strategic Action Plan for Climate Change and Disaster Risk Management 2012-2016
	National Strategy for Sustainable Development 2016-2020
	Sustainable and Integrated Water and Sanitation Policy 2012-2021
	Reports
	Review of Natural Resource and Environment-Related Legislation: Tuvalu 2018
	PacWaste Plus Legislative Review (University of Melbourne)
	3R Progress Country Report (Draft)
	National Report to the Third International Conference on Small Island Developing States 2014
	Profile in the Solid Waste and Recycling Sector: Tuvalu 2018
	Second National Communication to the UNFCCC 2015
	Solid Waste Management in the Pacific: Tuvalu Country Snapshot 2014
	Waste Policy Performance Review 2019
Vanuatu	**Legislation & Regulations**
	Waste Management Act 2014
	Waste Management Regulations Order No 15 of 2018
	Private Waste Operator's Licence Fees Order No 16 of 2018
	Waste Management Penalty Notice Regulation Order No 17 of 2018
	Pollution Control Act 2013
	Environment and Conservation Act 2002
	Environment and Conservation Amendment Act 2010
	Water Resources Management Act 2002 (as at 2006)
	Water Resources Management (Amendment) Act 2016
	Public Health Act 1994
	Public Health (Amendment) Act 2018
	Ozone Layer Protection Act 2010
	Ozone Layer Protection Act No. 27 of 2010
	Ozone Layer Protection (Amendment) Act No. 4 of 2014
	Schedule to the Ozone Layer Protection Act No. 27 of 2010 (Amendment) Order
	National Policies, Plans and Strategies
	National Waste Management and Pollution Control Strategy and Implementation Plan 2016-2020
	Vanuatu National Water Strategy 2018-2030
	National Sustainable Development Plan 2016-2030
	National Biodiversity Strategy and Action Plan 2018-2030