CORAL TRIANGLE INITIATIVE
ON CORAL REEFS, FISHERIES AND FOOD SECURITY

STOCKTAKE REPORT

# Marine Plastic Pollution and Its Sources in the Coral Triangle

Development of this report was supported by WWF

Stocktake report
Marine Plastic Pollution and Its Sources in the Coral Triangle



This report is prepared for the Coral Triangle Initiative on Coral Reefs, Fisheries & Food Security (CTI-CFF) by the Regional Secretariat and WWF's Coral Triangle Programme, as requested at the 15th Senior Officials Meeting (SOM 15) in 2019. The content for this report has been developed as part of a regional Coral Triangle stocktake on marine plastic pollution and its sources, with contribution from the National Coordinating Committees of the six governments of the Coral Triangle, as well as the strategic partners to CTI-CFF and from contributors for the case studies.



This report can be viewed in **www.coraltriangleinitiative.org**

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# Foreword

Marine plastic pollution is a crisis that transcends borders, impacting not only the natural environment but also the very fabric of our societies. Its consequences, both known and unknown, reverberate through our oceans, affecting wildlife, contaminating fish stocks, and degrading the delicate habitats that support a rich biodiversity. The urgency to address this global emergency cannot be overstated.

This report, titled "Marine Plastic Pollution and Its Sources in the Coral Triangle," sheds light on the grave issue of plastic waste in one of the world's most diverse and fragile marine ecosystems. The Coral Triangle is renowned for its unparalleled marine biodiversity, encompassing a vast expanse of ocean where Indonesia, Malaysia, Papua New Guinea, the Philippines, Solomon Islands, and Timor-Leste converge. However, this region, teeming with life and natural wonders, is now confronted with the daunting challenge of marine plastic pollution.

The staggering statistic that 11 million tonnes of plastic waste enters our oceans each year, with a projected increase to 29 million tonnes by 2040, highlights the pressing need for immediate action. This report serves as a vital tool in understanding the sources, implications, and potential solutions to combat marine plastic pollution within the Coral Triangle.

Beyond its environmental ramifications, marine plastic pollution is also a developmental problem, impacting industries, livelihoods, and the well-being of coastal communities. Recognizing this multifaceted nature of the issue, the Coral Triangle Initiative on Coral Reefs, Fisheries, and Food Security (CTI-CFF) has embarked on a mission to develop scalable action programs and management plans that protect marine ecosystems, preserve biodiversity, and foster better livelihoods.

This comprehensive stocktake report encompasses a range of objectives. It provides crucial information to address the problem at hand, enabling the development of scalable and adaptable solutions for key coastal areas within the Coral Triangle. It assesses and adapts existing initiatives and innovations while identifying potential sources of capital to inform planning, partnerships, and implementation strategies.

The stocktake methodology employed a meticulous approach, combining a thorough review of existing reports and analyses with targeted questionnaires sent to key stakeholders such as MPA management groups, the CTI-CFF's Local Government Network, strategic partners, and National Coordination Committees. By incorporating the latest research findings and publications relevant to the Coral Triangle, this report presents an up-to-date assessment of the marine plastic pollution landscape.

The recommendations outlined in this report are aimed at supporting the CTI-CFF in achieving its goals, including contribution to the protection of 30 percent of the coastal and marine waters in the Coral Triangle region by 2030 (30x30, and aligning with the Coral Triangle countries' commitments to the United Nations Sustainable Development Goals (SDGs), particularly Goal 14: Life Below Water.

As we delve into the pages of this report, we are confronted with the harsh reality of marine plastic pollution in the Coral Triangle. Yet, we are also presented with hope and a call to action. It is my sincere hope that the knowledge and insights provided in this report will serve as a catalyst for change, inspiring individuals, organizations, and governments to take bold steps towards a future free from the shackles of marine plastic pollution.

I would like to express my sincere gratitude to the WWF Coral Triangle Programme for their invaluable support in the development of this report. Special appreciation I give to the writer of this report, Jackie Thomas. Her commitment to meticulous research, insightful analysis, and clear communication has been crucial in crafting this valuable document.

I would also like to acknowledge the contributions of the numerous individuals, organizations, and institutions who generously shared their knowledge, insights, and data during the process of preparing this report. Their collaboration and cooperation have been essential in creating a comprehensive and accurate assessment of marine plastic pollution and its sources in the Coral Triangle.

Lastly, I would like to express my heartfelt appreciation to all the individuals and communities living within the Coral Triangle region, who are directly affected by marine plastic pollution. Their resilience, perseverance, and commitment to protecting their marine environment are an inspiration to us all. It is our collective responsibility to support and amplify their voices, ensuring that the necessary actions are taken to safeguard the future of the Coral Triangle.

Truly,

Dr. Mohd. Kushairi bin Mohd. Rajuddin
*Executive Director CTI-CFF Regional Secretariat*

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# Abbreviations and Acronyms

| | |
|---|---|
| ADB | Asian Development Bank |
| ALDFG | Abandoned, Lost, Discarded Fishing Gear |
| AMS | ASEAN Member States |
| APEC | Asia-Pacific Economic Cooperation |
| ASEAN | Association of Southeast Asian Nations |
| AWGCME | ASEAN Working Group on Coastal and Marine Environment |
| AWGESC | ASEAN Working Group on Environmentally Sustainable Cities |
| CI | Conservation International |
| COBSEA | Coordinating Body on the Seas of East Asia |
| COST | ASEAN Committee on Science and Technology |
| CTI-CFF | Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security |
| CTC | Coral Triangle Center |
| EAS | East Asian Summit |
| EPR | Extended Producer Responsibility |
| ESR | Extended Stakeholder Responsibility |
| EPS | Expanded Polystyrene |
| EU | European Union |
| FADs | Fish Aggregating/Attracting Devices |
| FAO | Food and Agriculture Organization |
| GESAMP | Group of Experts on the Scientific Aspects of Marine Environmental Protection |
| GGGI | Global Ghost Gear Initiative |
| GHG | Green House Gas |
| GPAP | Global Plastic Action Partnership |
| GPML | Global Partnership on Marine Litter |
| HDPE | High-density Polyethylene |
| ICC | International Coastal Clean-up |
| ICM | Integrated Coastal Management |
| IMO | International Maritime Organization |
| ISO | International Organization for Standardization |
| IUCN | International Union for Conservation of Nature |
| JICA | Japan International Cooperation Agency |
| LGA | Local Government Authority |
| LGN | Local Government Network |
| LGU | Local Government Unit |
| LLG | Local Level Government |
| MLAP | Pacific Marine Action Plan: Marine Litter 2018–2025 |
| MRF | Materials Recovery Facility |
| MSW | Municipal Solid Waste |
| NCC | National Coordination Committee (CTI-CFF) |

| | |
|---|---|
| NPAP | National Plastic Action Plan |
| NPOA | National Plan of Action |
| OECD | Organization for Economic Cooperation and Development |
| PEMSEA | Partnerships in Environmental Management for the Seas of East Asia |
| PET | Polyethylene terephthalate |
| PP | Polypropylene |
| PPP | Public Private Partnership |
| PRIF | Pacific Regional Infrastructure Facility |
| RAP MALI | COBSEA Regional Action Plan for Combating Marine Debris 2019 |
| RFMO | Regional Fisheries Management Organization |
| SIDs | Small Island Developing States |
| SPC | Pacific Community (Secretariat) |
| SPREP | Secretariat of the Pacific Regional Environment Programme |
| SPTO | Pacific Tourism Organization |
| SUP | Single-Use plastics |
| SWM | Solid Waste Management |
| TNC | The Nature Conservancy |
| TPA | Indonesian Final Disposal Sites (central open dump sites or landfills) |
| TPS | Indonesian Temporary Disposal or Dump Sites |
| TPS3R | Tempat Pengolahan Sampah – Reduce, Reuse, Recycle (Solid Waste Processing Centre – 3R) |
| TPST | Indonesian Intermediate Transfer Facilities |
| UNCLOS | United Nations Convention on the Law of the Sea |
| UNDP | United Nations Development Program |
| UNEP | United Nations Environment Program |
| UNESCAP | United Nations Economic and Social Commission for Asia and the Pacific |
| UNESCO | United Nations Educational, Scientific and Cultural Organization |
| UN SDG | United Nations Sustainable Development Goals |
| USAID | United States Agency for International Development |
| WBG | World Bank Group |
| WCPFC | Western and Central Pacific Fisheries Commission |
| WCS | Wildlife Conservation Society |
| WEF | World Economic Forum |
| WLF | Women Leaders Forum (CTI-CFF) |
| WWF | World Wide Fund for Nature |

# Executive Summary

Each year, 11 million tonnes of plastic leaks into the oceans. By 2025, the Coral Triangle region alone is predicted to contribute between 2.2 and 5.9 million tonnes of plastic into the oceans annually – were there to be no significant actions to address the problems. Much of this comes from mismanaged waste, estimated to be at least 6.2 million tonnes per year and potentially doubling by 2025.

In a landmark agreement that recognises plastic pollution as a planetary crisis, the global community came together at the United Nations Environment Assembly (UNEA 5.2) in March 2022 and agreed to work together on a new treaty that would address plastic pollution globally.

The six Coral Triangle countries were among the 175 countries that supported UNEA 5.2 outcomes – which includes calling for an Intergovernmental Negotiating Committee (INC) to be established in order to develop the new treaty by end of 2024.

Leading up to this ground-breaking event, in 2019 member states of the CTI-CFF had requested for the Regional Secretariat and WWF to collaborate on a stocktake of the marine plastic pollution and its sources in the Coral Triangle with the aim of identifying a regional strategic approach.

The timing of which the stocktake was conducted – between October 2020 and June 2021 – is noteworthy as this was in the midst of the COVID-19 Pandemic. As a result, the stocktake's methodology was restricted to desktop reviews of existing reports and analyses, supplemented by questionnaires sent to MPA management groups, the CTI-CFF's Local Government Network, strategic partners and National Coordination Committees. Over the period of the stocktake, new research and publications provided updated information relevant to the Coral Triangle. On completion of the research, a report was prepared and endorsed by the 8th CTI-CFF Ministerial Meeting in November 2022 and published in 2023.

Alarming volumes of marine plastic pollution continue to enter Coral Triangle waters with a looming potential for severe impact on human and ecosystem health, in particular to marine and coastal ecosystems. This affects key industries including fishing, aquaculture, tourism and shipping, which millions of coastal communities depend on for income, livelihoods, and food security.

Numerous initiatives are already being led by governments, industry and civil society organisations to address marine plastic pollution; with multiple regional and national strategies and initiatives across Asia Pacific. For example, the stocktake reports on:

- **Over 16 regional initiatives** led by CTI-CFF's strategic partners and other regional stakeholders
- **At least 40 government-led initiatives** at the national level across the Coral Triangle (as of 2021); and
- **10 case studies** discussing challenges and opportunities in MPAs, urban coastal areas and in dealing with ghost gear

### The Key factors contributing to the high plastic waste in the Coral Triangle included:

- ✓ Mismanaged waste, poor solid waste management; lack of infrastructure; and low rates of recycling
- ✓ Lack of adequate legal and policy frameworks; poor enforcement
- ✓ A lack of consistent data on plastic sources and leakage
- ✓ Lack of financial and human capacity to cope with escalating volumes of land and sea-based waste
- ✓ Unsustainable production and consumption with an increasing demand for plastics packaging and products
- ✓ Vulnerable communities often lack resources for alternatives to plastic or to manage plastic waste
- ✓ Large influx of plastic waste to South East Asian countries of the Coral Triangle from Europe and the US, (both legal and illegal); and
- ✓ Growth in global fisheries contributes abandoned, lost, discarded fishing gear to the ocean

### Regional Recommendations

The stocktake report provides a set of recommendations for regional action through the CTI-CFF:

1. Collaborate with academia, NGOs, strategic partners and other regional organisations (e.g. ASEAN, COBSEA, SPREP etc.) on knowledge resources, building research, data collection and monitoring, harmonizing policies and regulations, and sharing latest innovations and technology.
2. Build knowledge, share solutions to scale successful models, pilots and demonstrations through CTI-CFF's networks, regional exchanges and its upcoming 10-year Roadmap Towards Building Human Capital
3. Join the Global Ghost Gear Initiative to address abandoned, lost and discarded fishing gear by facilitating knowledge and best practices sharing with CTI's national committees (NCCs), Technical Working Groups, forums such as the Local Government Network and Women Leaders Forum and via CTMPAs

### A set of seven National Recommendations were included for consideration by the six countries summarized below:

1. Adopt circular economy approaches in national plans
2. Develop national policy and investment plans
3. Reduce institutional fragmentation and strengthen legislation
4. Encourage zero waste businesses models
5. Facilitate integration of local government in national plans
6. Encourage integration of Global Ghost Gear Initiative's (GGGI) Best Practice Framework
7. Support the Global Plastic Treaty framework

In brief, the stocktake confirms that marine plastic pollution is a complex problem with no one solution and that a *systemic shift* that addresses both upstream production and downstream management of waste is needed to prevent potentially between 2.2 M and 5.9 million tonnes of plastic from entering ocean annually from the six Coral Triangle countries (2010 fig.)

By assessing the applicability of existing initiatives and innovations addressing plastic pollution and reduction in plastic use including reuse, recycling and replacement of plastic, and identifying sources of capital to inform planning, partnerships and implementation towards stopping leakage of plastics into nature and our oceans, the stocktake aims to:

1. provide information for the CTI-CFF to better understand the scale of marine plastic pollution and its upstream sources in the Coral Triangle,
2. inform regional approaches including in the CTI-CFF RPOA 2.0 to help address the problem, and
3. enable the CTI-CFF to assess appropriate scalable and adaptable solutions for priority coastal cities, towns or tourism centres located in areas critical to marine biodiversity.

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# Introduction

Marine plastic pollution affects wildlife, contaminates fish stocks, and degrades the natural habitat in a way that directly impacts biodiversity, industry and communities, with consequences we do not yet fully understand. Plastic pollution is a global emergency that requires urgent action. Yet, it is estimated that every year, 11 million tonnes of plastic waste enters the world oceans, and this figure could rise to 29 million tonnes by 2040 under a business as usual scenario (Lau et al. 2020).

More than 80 per cent of marine plastic pollution comes from land-based sources, mostly due to mismanaged plastic waste. The rest comes "from marine sources such as fishing nets, ropes, and fleets. (Ritchie, 2021). One estimate suggests that in 2010 alone, more than 30 million tonnes of plastic waste was mismanaged globally (Jambeck et al. 2015). This means that the issue of marine plastic pollution is not limited to impacting just the ocean, nor is it the responsibility of national governments alone. The problem is marine and international, but the solutions are largely territorial and national, and must inevitably involve a change in the way plastic is treated around the world.

According to a report on the costs of plastics by Dalberg (2021) commissioned by WWF, while the unique properties of plastic have led to it taking an essential role in society, the production, consumption and disposal of this material significantly impact society, the environment, and the economy. A lack of understanding of the real costs of plastic has led to poor management of this material and growing ecological, social, and economic costs for countries (DeWit et al. 2021).

Importantly, marine plastic pollution is not only an environmental problem; it is also a developmental problem. An average Least Developed Country (LDC) generates less than 20 per cent of the plastic waste produced by an average Upper Middle Income country. However, many developing countries are challenged with higher levels of mismanagement of plastic waste than the average developed country. Notably, many countries considered to be major contributors of plastic waste were mostly situated in or around Southeast Asia (Jambeck et al. 2015), including parts of the Coral Triangle.

> **"Every year, 11 million tonnes of plastic waste enters the world oceans, and this figure could rise to 29 million tonnes by 2040.**

The environmental, social and economic effect of marine plastic pollution is also more severe for developing countries than for developed countries. In 2021 the United Nations Environment Programme reported that "vulnerable communities disproportionately bear the consequences of environmental degradation caused by plastics pollution from production to waste". Not only does marine plastic pollution affect fishing and other marine sources of food, but it also has a negative impact on industries such as tourism, which is a key source of income for many developing countries and both fishing and tourism are important sectors for the Coral Triangle region.

**The aim is for CTI-CFF to develop and implement scalable action-programmes and management plans to address marine plastic pollution, protect marine ecosystems and livelihoods, and ultimately transition to a circular economy.**

To better understand the dynamics of marine plastic pollution in the Coral Triangle region, with the aim to identify workable solutions, the six member countries of the Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security (CTI-CFF) requested a stocktake on marine plastic pollution to provide information that would guide national actions as well as inform the CTI-CFF Regional Plan of Action (RPOA 2.0).

There are already many initiatives underway to address marine plastic pollution in the Coral Triangle. Governments are introducing policies banning single use plastics, and supporting development of a new global treaty to address marine plastic pollution. In addition, a number of companies are changing their packaging, restaurants are moving away from plastic and polystyrene containers and communities and individuals are taking local action to reduce plastic pollution in their environment.

The current focus of many initiatives and investment opportunities is largely on urban sources of plastic waste from major cities and tourism hotspots in Asia and South East Asia. This is an important focus given the large volumes of plastic that leaks into the oceans. However, for the CTI-CFF to go beyond urban centres will require a strategy that can serve marine protected and conservation priority areas, coastal communities, tourism centres and to tackle other sources of plastic pollution such as sea-based activities.

The stocktake aims to provide information for regional and national level efforts and also coastal communities, MPA/MMA management organizations, tourism centres, municipalities and industry stakeholders. The research has identified global and regional organizations that can provide technical support, reviewed a range of action plans, initiatives and best practice guides to tackle marine plastic pollution and ghost gear, as well as provide examples of potential funding and investment. The aim is for CTI-CFF to develop and implement scalable action-programmes and management plans to address marine plastic pollution, protect marine ecosystems and livelihoods, and ultimately transition to a circular economy.

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## The objectives of the stocktake are to:

### A. Provide information and help address the problem.

Provide information for the CTI-CFF to better understand the scale of marine plastic pollution and its upstream sources in the Coral Triangle to inform regional approaches including the CTI-CFF RPOA 2.0 to help address the problem.

### B. Enable scalable and adaptable solutions for key coastal areas.

Enable the CTI-CFF to assess appropriate scalable and adaptable solutions for priority coastal cities, towns or tourism centres located in areas critical to marine biodiversity.

### C. Assess and adapt existing initiatives and innovations.

Assess applicability of and adapt existing initiatives and innovations addressing plastic pollution and reduction in plastic use including reuse, recycling and replacement of plastic.

### D. Identify sources of capital to inform planning, partnerships and implementation.

Identify sources of capital to tackle plastic pollution to inform planning, partnerships and implementation towards stopping leakage of plastics into nature and our oceans.

# 1

# Marine Plastic Pollution in the Coral Triangle

The stocktake methodology consisted of a desktop review of existing reports and analyses, supplemented by questionnaires sent to MPA management groups, the CTI-CFF's Local Government Network, strategic partners and National Coordination Committees. Over the period of the stocktake preparation, new research and publications have also provided updated information relevant to the Coral Triangle.

## Scope of the Problem

Initial reviews and reports put Asia and South East Asian countries in the Coral Triangle firmly in the spotlight when research results released by Jambeck et al., in 2015 identified Indonesia, Philippines and Malaysia as being in the top 10 major contributors of plastic into the ocean. The figures had been quoted globally and spurred governments to consider strategies to curb the leakage of plastic to the ocean. In 2020, a re-analysis of updated World Bank figures for the US and the European Union, found that these countries were in fact the highest contributors to mismanaged plastic waste due to the volume of plastic waste exported, particularly to countries in Asia and South East Asia (Law et al., 2020).

Despite the reordering of the highest contributing countries, the three South East Asian Coral Triangle countries still contribute significant levels of marine plastic pollution, particularly due to high volumes of mismanaged waste and the many rivers and streams transporting plastic to the oceans. It is estimated that in 2010, the Coral Triangle region produced 6.17 million tonnes of mismanaged plastic waste (see *Table 1*) and that figure is expected to more than double to 14.75 million tonnes in 2025, based on a business-as-usual approach assuming no improvements in waste management services and infrastructure (Jambeck et al., 2015). Further, the Coral Triangle countries combined could be contributing between 0.93 million to 2.47 million tonnes of plastic into the ocean annually based on 2010 estimates and by 2025 this could be as high as 5.9 million tonnes. (Jambeck et al., 2015 Supp. Mat).

A major factor contributing to the leakage of plastic into the oceans has been identified as mismanaged waste and this is attributed to challenges with solid waste management in most of the Coral Triangle countries and that vulnerable communities often lack the resources to pursue alternatives to plastic or to manage plastic waste more effectively.

### Table 1. Waste generation and mismanaged waste for the six Coral Triangle countries

| Country | Waste generation [kg/day] | Plastic waste generation [kg/day] | Mismanaged plastic waste [kg/pers/day] | Mismanaged plastic waste in 2010 [tonnes] | Mismanaged plastic waste in 2025 [tonnes] | 15% MMPW to Ocean 2010 | 40% MMPW to Ocean 2010 | 15% MMPW to Ocean 2025 | 40% MMPW to Ocean 2025 |
|---|---|---|---|---|---|---|---|---|---|
| Indonesia | 97,356,208 | 10,660,505 | 0.05 | 3,216,856 | 7,415,202 | 482,528 | 1,286,742 | 1,112,280 | 2,966,081 |
| Malaysia | 34,793,183 | 4,505,717 | 0.11 | 936,818 | 1,765,977 | 140,523 | 374,727 | 264,897 | 706,391 |
| Papua New Guinea | 2,170,536 | 281,084 | 0.09 | 89,835 | 242,328 | 13,475 | 35,934 | 36,349 | 96,931 |
| Philippines | 41,723,431 | 6,237,653 | 0.06 | 1,883,659 | 5,088,394 | 282,549 | 753,463 | 763,259 | 2,035,358 |
| Solomon Islands | 488,756 | 63,294 | 0.09 | 20,394 | 176,589 | 3,059 | 8,158 | 26,488 | 70,635 |
| Timor-Leste | 528,312 | 68,416 | 0.08 | 20,690 | 64,205 | 3,103 | 8,276 | 9,631 | 25,682 |
| Coral Triangle | | | | 6,168,251 | 14,752,696 | 925,238 | 2,467,300 | 2,212,904 | 5,901,078 |

Source: Jambeck et al., 2015

More recent information on the role rivers play in transporting plastic pollution into the ocean has confirmed that the Coral Triangle is a major contributor of leaked plastics through the many smaller rivers in the South East Asian countries. The modeling results released in 2021 found that, contrary to previous belief that the bulk of marine plastic pollution in the ocean came from 10 large rivers, it is now believed that many smaller rivers play a major role with more than 1000 of the biggest emitting rivers account for 80 per cent of plastic inputs to the ocean (Meijer et al., 2021) (*Figure 1*).

This new research by Meijer et. al. 2021, has taken into account climate, terrain, land use, and distance to the ocean "which affects the probability of plastics not only reaching the river but then also reaching the ocean play a much more important role than the size of the river basin itself. This means many smaller rivers play a bigger role than we thought" (Ritchie, 2021). The total annual amount of mismanaged plastic waste emitted to the Ocean by rivers alone in the six Coral Triangle countries is estimated at 444,226 tonnes per year based on 2019 data. The country that contributed the most plastic to the ocean from its rivers is the Philippines with 4820 rivers emitting 323,294 tonnes a year. The Pasig River has been identified as a major contributor of plastic into the ocean. Malaysia was also cited as a top contributor with 66,313 tonnes plastic per year through 1070 rivers, and Indonesia at 51,104 tonnes per year via 5540 rivers (Meijer, 2021). By comparison, Papua New Guinea contributed 2,775 tonnes, Timor-Leste 649 tonnes and the Solomon Islands was one of the lowest contributors at 90.7 tonnes per year (See *Table 2*). However, in terms of probability of plastic emitted to the ocean, of the Coral Triangle countries, the Solomon Islands has the highest at 10.34 per cent probability and Timor-Leste was the lowest with 3.68 per cent probability of plastic reaching the ocean.

There are several factors that lead to countries in Asia being major contributors of riverine plastic pollution including poor local waste management practices, proximity to cities and the coast, and high levels of rainfall. By way of example, "the Ciliwung River basin in Java is 275 times smaller than the Rhine river basin in Europe and generates 75 per cent less plastic waste. Yet it emits 100 times as much plastic to the ocean each year," (Ritchie, 2021).

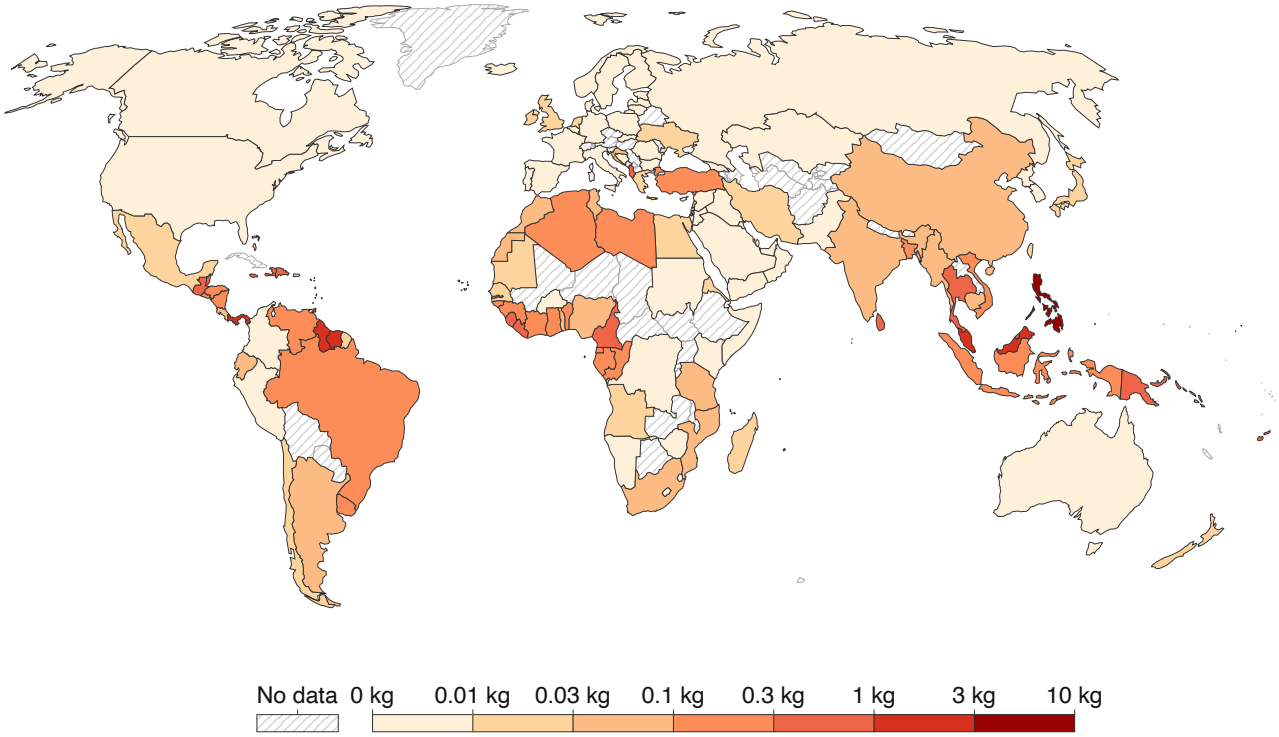


**Figure 1. Plastic Waste Emitted to the Ocean, 2019**

Source: Meijer et al., 2021.

**Table 2. Volume of riverine plastic emitted to the ocean by Coral Triangle countries**

| Country | Mismanaged plastic waste to Ocean per Capita (Kg/yr) (2019) | Mismanaged plastic waste emitted to the ocean (Metric ton /yr) (2019) | Share of global plastics emitted to the Ocean (2019) | Probability of plastic being emitted to Ocean (2019) |
|---|---|---|---|---|
| Indonesia | 0.21 | 56,333 | 5.75 | 4.45 |
| Malaysia | 2.29 | 73,098 | 7.46 | 4.38 |
| Papua New Guinea | 0.35 | 3,059 | 0.31 | 4.39 |
| Philippines | 3.30 | 356,371 | 36.38 | 7.17 |
| Solomon Islands | 0.15 | 100 | 0.01 | 10.34 |
| Timor-Leste | 0.55 | 715 | 0.07 | 3.80 |

Source: Meijer et al., 2021.

Whilst the Pacific Islands countries, such as Papua New Guinea and Solomon Islands are minor sources of marine litter at the global scale, the estimated quantity of mismanaged plastic waste generated per inhabitant is relatively high and the amount of marine litter entering the ocean in the South Pacific region is expected to triple by 2025 (Hardesty et al., 2016).

According to the Secretariat of the Pacific Regional Environment Organization (SPREP), Pacific Island countries also face challenges in managing locally generated plastic waste and pollution. These include differing (or non-existent) laws and policies that address plastics and other pollution; difficulty in accessing affordable

alternatives to plastic; large quantities of imported material and packaging due to limited local manufacture and production; limited options to dispose of waste, particularly single-use plastics; unnecessary amounts of waste produced by tourism; and economic constraints, including constraints to recycling (SPREP, 2018). In addition, these countries are impacted by marine plastic pollution from external sources "disproportionate to their land area and domestic contributions" due in large part to the "offshore sources of marine plastic debris including abandoned, lost or otherwise discarded fishing gear (ALDFG)" (Farrelly et al. 2021).

Models developed by Hardesty et al., (2016) suggest that plastic particles released from Australia and New Zealand plus a range of Pacific countries including the Solomon Islands and Papua New Guinea, will travel to the North and South Pacific oceans, the Indian Ocean and the South Atlantic Ocean with Australian waters north of the Great Barrier Reef and also the Gulf of Papua identified as "potential regional hotspots for accumulation" of marine litter (Hardesty et al., 2016). The model also predicted that marine litter from South Pacific islands will usually circulate at tropical latitudes within the first year, pushed by trade winds towards the Coral Sea and Australia. "Some particles travel south to the Tasman Sea and the South Pacific subtropical convergence zone" whilst "other particles drift north towards the Southeast Asian archipelago and eventually entering the Indian Ocean or the North Pacific Ocean" (Hardesty et al, 2016).

The extent of the challenge of marine plastic pollution is becoming evident on the coasts, in the ocean and on the reefs of the Coral Triangle. In 2018, a study of nearly 160 coral reefs in the Asia-Pacific region including in Sulawesi, Bali and West Papua in Indonesia estimated that more than 11 billion plastic items were entangled in the reefs and the likelihood of stress and disease increased 20-fold once a coral was draped in plastic (Lamb et al. 2018). This figure is expected to increase by 40 per cent over the next 5 years and could have serious consequences for the Coral Triangle which is so heavily dependent on its marine ecosystems and with reef systems already under stress from factors such as climate change, overfishing, and other forms of pollution (*Figure 2*).

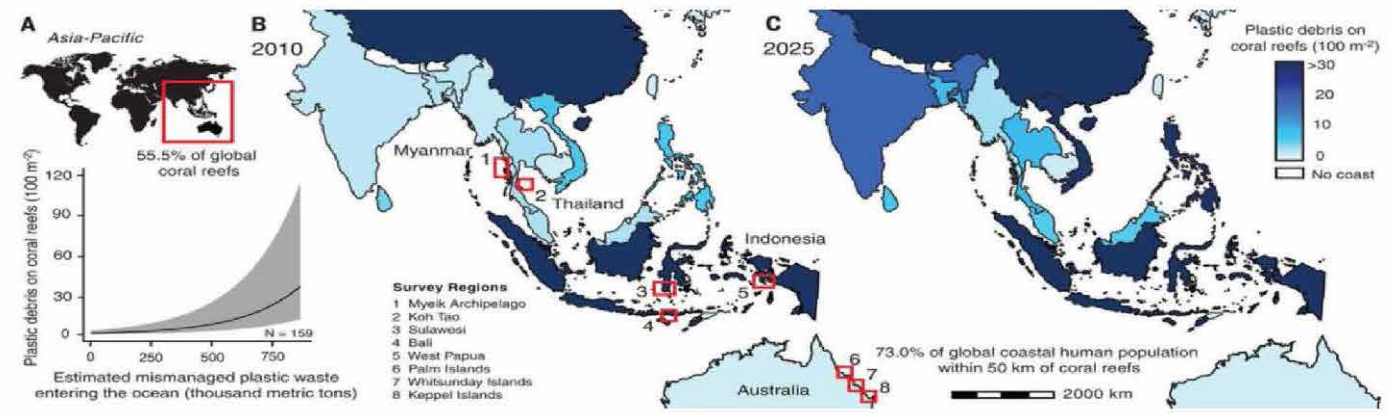


**Figure 2. Estimated Plastic Debris Levels on Coral Reefs**

Source: Joleah B. Lamb et al. Science 2018; 359:460-462 Copyright © 2018, The Authors, some rights reserved; exclusive licensee American Association for the Advancement of Science. No claim to original U.S. Government Works

## Global Trade in Plastic

In the Coral Triangle, the plastic waste situation is further complicated for those countries, specifically Malaysia and Indonesia, that receive significant levels of imported waste either illegally or in the form of material for recycling from other countries. This is due largely to China banning imports of plastic waste in 2018 to protect its environment and develop its own domestic recycling capacity. It has led to a "significant redirection of plastic waste shipments to other countries that are not equipped to safely and securely manage it" (Basel Action Network, Feb. 2021).

According to Interpol (2020), in the first quarter of 2018, US waste exports to Malaysia rose 330 per cent and more than 191 per cent to Indonesia, presenting both new business opportunities and possibly pollution challenges due to a lack of infrastructure to manage their own domestic waste. The overwhelming increase in waste exports to those countries resulted in stricter regulations and strengthened border control in major Asian destinations including Malaysia and Indonesia (Interpol, 2020).

In 2020, plastic waste exports continued at high levels to a number of countries including Malaysia and Indonesia from Europe, UK and the US. In October 2020, the largest exporters to Non-OECD countries were the E.U. (84,000 tonnes per month), Japan (82,000 tonnes per month), U.S. (33,000 tonnes per month) and U.K. (9,000 tonnes per month) (Basel Action Network, Feb. 2021).

In April 2021, the US alone exported about 22,000 tonnes of plastic waste to Asian countries of which 1,750 tonnes was sent to Indonesia and 10,000 tonnes to Malaysia (*Figure 3*) (The Basel Action Network, Feb. 2021).

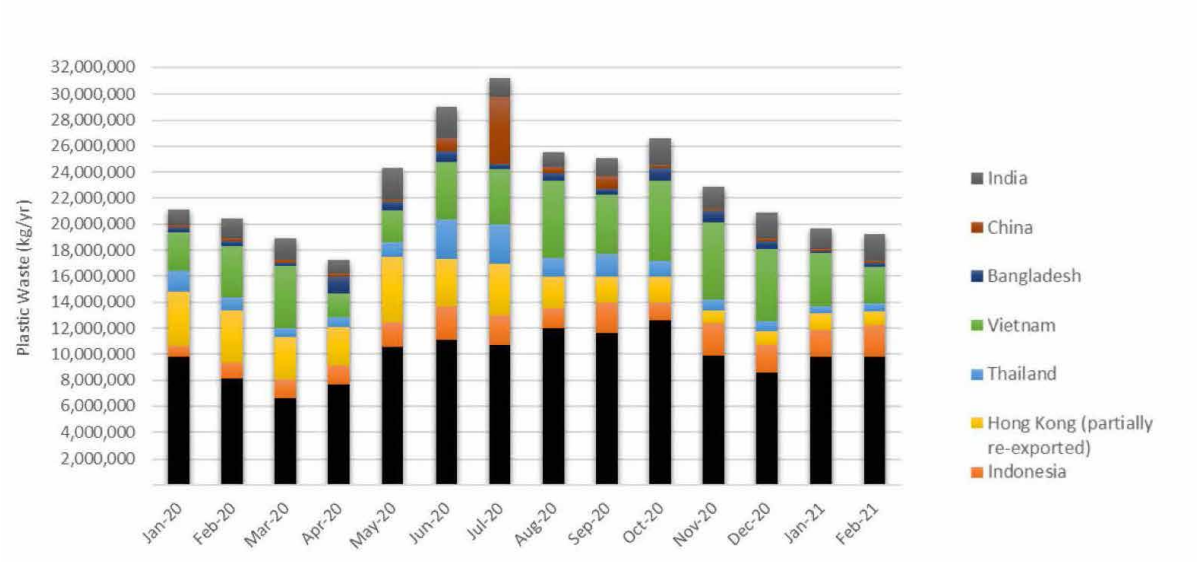


**Figure 3. US Plastic Waste Exports to Asia**

Source: US Import/Export - Census Bureau

## Illegal Trade in Plastic Waste

The 2020 Interpol report on emerging criminal trends in the global plastic waste market since January 2018 revealed that there had been a significant increase over the previous two years in illegal waste shipments, mainly rerouted to South East Asia via multiple transit countries to camouflage the origin of the waste shipment. Other findings included an increase in illegal waste fires and landfills in Europe and Asia, a rise in the use of counterfeit documents and fraudulent waste registrations (Interpol, August 2020).

Illegal trade in plastics is also seeing waste crime as a rising threat with roots in a more fundamental problem: the inability to manage our plastic use and production (WWF, Media Release, August 2020). From 1992 to 2018, China imported a cumulative 45 per cent of the world's plastic waste. During that period of time, the global plastic waste market was dependent on access to the Chinese recycling sector. However, following China's move to restrict plastic waste imports in 2018, the re-routing of shipments has overwhelmed alternative countries, opening the doors for opportunistic crime (WWF, Media Release, August 2020).

According to Interpol, developing countries, especially those with limited waste management and enforcement capacities are increasingly targeted. As regulations on waste imports are continuously changing and are not standardized across destination countries; exporters and enforcers face challenges in ensuring that plastic waste exports comply with import regulations. As a result, paired with the lack of traceability of plastic waste – individuals or crime groups could take advantage of loopholes, information gaps, and new trade routes in the plastic waste market that are not entirely monitored (Interpol, 2020).

In January 2021, amendments to the Basel Convention came into effect to regulate the global trade of mixed plastic waste. Under the new amendments, approval is required from environmental agencies of both importing and exporting country, and prior informed consent from the receiving party of the contents of the container. Each country' customs agency has the power to determine its own contamination levels.

Further Interpol reports that as illegal plastic waste exports towards South-East Asian countries have grown, so have the requests from those countries to repatriate illegal shipments back to their exporter with Indonesia declaring 45 per cent of the 1,095 plastic waste containers imported into the country and all manually inspected in 2019 were illegal (contaminated waste) and to be repatriated to their source location (MoEF, 2019). In May 2020, Malaysia initiated the costly and extensive process of repatriating 3,737 metric tons (3,390 tonnes) of plastic waste – equivalent to 150 shipping containers – to 13 different countries of origin (Interpol, 2020).

## National Summary: Indonesia

Indonesia has a population of 250 million people and is the most populous of the six Coral Triangle countries. It has been identified in the group of countries that contribute significant volumes of plastic leaking into the Ocean. Whilst the quantities of waste generated and plastic leakage from Indonesia vary according to different researchers and studies, there is general consensus that a major factor is the challenge with solid waste management (SWM) leading to significant amounts of mismanaged and unhandled waste polluting the land, rivers, and findings its way into the ocean.

In 2017, Indonesia's total solid waste generation was estimated at 65.8 million tonnes, and that figure will grow at a significant rate beyond the capacity of the country's solid waste management infrastructure, possibly reaching 87.96 million tonnes by 2030 and 118 million tonnes by 2050 (Kaza et al. 2018). The National

Plastic Waste Reduction Strategy reports that this waste included between 6.8 million and 9.2 million tonnes of plastic and this is projected to increase to 13.6 million tonnes in 2040. Plastic represents 14–15 per cent in terms of mass of Indonesia's municipal solid waste. Flexible mono- materials are the most common type of plastic waste (45 per cent), followed by multi-material plastics (29 per cent), and rigid plastics (26 per cent). Approximately 10 billion plastic bags, equal to 85,000 tonnes, are released into the local environment each year (Ministry of Environment and Forestry – MOEF, 2020).

Further, in 2017 an estimated 650,000 tonnes of plastic waste was leaked into lakes, rivers and the ocean and this could more than double to 1.6 million tonnes in 2040 if Indonesia does not add additional solid waste management capacity (MOEF, 2020). However, based on the 2015 Jambeck study, the amount of plastic leaking to the ocean could be as high as 2.97 million tonnes by 2025 if there is no change in the level of mismanaged plastic waste (Jambeck et al., 2015 Supp. Mat.). In 2021, researchers released a global report focusing on the role of rivers in transmitting plastic to the ocean, and it estimated that 51,104 tonnes per year is transported to the ocean due to the role of 5540 rivers in Indonesia (Meijer, 2021). According to Indonesia's national plan to address plastic pollution, despite the sharp growth in foreign waste imports in 2018, more than 95 per cent of plastic pollution comes from waste generated within Indonesia.

## Solid Waste Management (SWM)

To support Indonesia's response to the growing crisis of plastics, a Marine Debris Hotspot Rapid Assessment of 15 coastal cities in Western and Central Indonesia was conducted with the World Bank in 2018, to "provide an informed and focused analysis of land-based leakage of solid waste, particularly plastics, to the marine environment". The 15 target cities included Denpasar on Bali Island; Mataram on Lombok; Jakarta, Semarang, Surabaya, Yogyakarta on Java Island; Balikpapan, Pontianak on Kalimantan; Bitung, Makassar, Manado on Sulawesi Island; and Bandar Lampung, Batam, Medan, Padang on Sumatra. The assessment found that "plastics is a significant portion of debris extracted from waterways in all cities, ranging from 20 to 38 per cent", with the most prevalent type of plastics found in the samples being plastic bags, at an average across all cities of 16 per cent and up to 21 per cent was disposable diapers (World Bank, 2018)

The hotspot assessment also reported that the common elements across the cities that contributed to the problems of SWM in Indonesia included "poor access to, and infrequent solid waste collection; inadequate and ill-functioning waterways infrastructure; deficiencies in community and household awareness and waste management behaviours; and lack of appropriate financing and institutional mechanisms". It recommended that to address Indonesia's marine debris challenge, actions would need to include "national level policy and investment" as well as "city specific actions". The World Bank report recommendations included system changes which "should be part of the overall solid waste management strategy (revolving around improved collection, recycling, source segregation, and final disposal options)". The Hotspot report also included recommendations to reduce institutional fragmentation, policies and strengthened legislation to address upstream sources of waste; improve the metrics for measurement; target city level investments; utilize technology; innovative financing and to strengthen education and public awareness (World Bank, 2018).

According to the National Plastic Waste Reduction Strategy 2020, the collection rate for plastic waste is 39 per cent (31 per cent by the formal sector and 8 per cent by the informal sector). However, 99 per cent of waste collected by the formal sector goes directly to landfills or dumpsites and the remaining 1 per cent goes into temporary landfills (TPS3Rs) and waste banks. Waste pickers have a significant role in recovering plastics supplying 1 million tonnes of plastic waste to recyclers. However, mismanagement and insufficient sorting of the plastics leads to losses resulting in only about two thirds of the plastic waste recovered is recycled, putting the overall nationwide recycling rate of plastic at 10 per cent. Of the waste that is collected through formal channels 58 per cent is disposed of in semi-engineered landfills and 20 per cent in dumpsites.

Most uncollected waste (59 per cent) is openly burned by households, 33 per cent is dumped into the environment on land and 8 per cent is dumped into lakes and rivers (MOEF, 2020).

## Legal Framework

The Indonesian government has committed to reduce waste from its source by 30 per cent and handle waste properly by 70 per cent by 2025, to reduce marine litter by 70 per cent in 2025 and eliminate plastic pollution by 2040. In response to this ambition, the government has adopted a number of Decrees and developed national waste and plastic reduction strategies (see: g20mpl.org/partners/indonesia).

- National Policy and Strategy on Solid Waste Management 2018-2025 (regulated by Presidential Regulation No. 97/2017), which includes actions implemented at provincial and city/regency levels
- Acceleration of controlling and restoring Citarum River pollution and degradation (Regulated by Presidential Regulation No. 15/2018)
- Acceleration of Waste-to-energy projects in 12 cities (Regulated by Presidential Regulation No. 35/2018)
- National Plan of Action for Combating Marine Litter 2018-2025 (Regulated by Presidential Regulation No. 83/2018)
- Solid Waste Disposal Support Fund (Regulated by Ministry of Environment and Forestry Regulation No. P.24/2019)
- Roadmap of Waste Reduction by Producers 2020-2029 (Roadmap of EPR in Indonesia). Ministry of Environment and Forestry Regulation No. P.75/2019.
- National Plastic Waste Reduction Strategic Actions for Indonesia launched June 2020.

The key government agencies involved in waste management include the Ministry of Environment and Forestry (MoEF) which is responsible for policy formulation and the development of regulations on the management of waste, including pollution control. Also, the Ministry of Public Works and Housing (MPWH) which provides technical advice, promotes pilot projects, and constructs and/or supervises large-scale off-site solid waste facilities (landfills). There are also sectoral and inter-departmental collaborations across ministries with overlaps in their mandates and institutional responsibilities (WWF, 2019).

The Municipal Planning Agency and the Cleansing Services Unit are the main local government agencies responsible for the planning and implementation of SWM while local government authorities are responsible for the implementation of waste management policies and strengthening mobilization and financing of waste management, infrastructure management and the building of human resource capacity (WWF, 2019).

## Trade of Plastic Waste

Recent figures on the exports of plastic waste to Indonesia show that in 2020, approximately 150,000 tonnes of plastic waste was exported by the EU, Japan, UK, US and Canada (*Figure 4*). Further, in the period January to April 2021, the US alone exported an additional 86,000 tonnes of plastic waste to Indonesia (*Figure 5*).

Illegal plastic waste exports to South-East Asian countries have also found their way to Indonesia. According to the 2020 Interpol report, in 2019, out of 1,095 plastic waste containers imported into Indonesia and all manually inspected, 433 (45 per cent) were declared illegal by Indonesian authorities (contaminated waste) and would be repatriated to their source location. A total of 280 containers have been repatriated from Indonesia to their country of origin up until March 2020 (Interpol, August 2020).

Indonesia has imposed strict laws on managing plastic waste imports by limiting imports to only recyclable plastics, and banned non-recyclable plastic waste. See: www.unesco.or.id/publication/SC_Retreat/4_MarineDebrisIndonesia.pdf

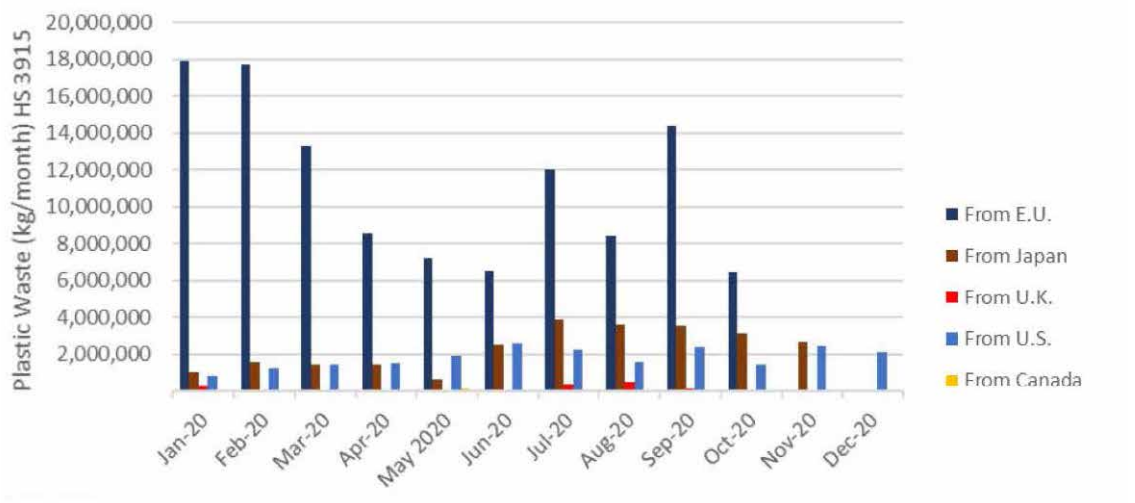


**Figure 4. 2020 Plastic Waste Exports to Indonesia**

Source: US Import/Export - Census Bureau, UK Trade Info, Eurostat, Statistics Canada, UN Comtrade. Updated Feb 11, 2021.

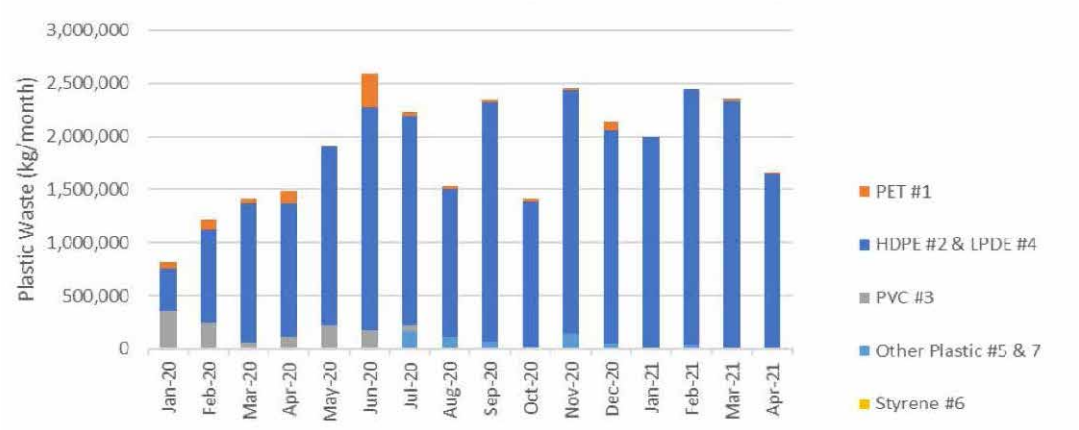


**Figure 5. 2020-21 US Plastic Waste Exports to Indonesia**

Source: US Import/Export - Census Bureau

## National Plastic Industry

The MOEF reports that Indonesia's plastics industry is growing, however, the present plastic consumption of 22.54 kg/capita/year is less than the consumption rates of 60 Kg/capita/year in other South East Asian countries including Malaysia, Singapore, and Thailand. Indonesia imports plastic goods to meet its internal demand which is 5.63 million tonnes per year. The nation's production capacity is 2.66 million tonnes per year whilst annual production is 2.31 million tonnes. The volume of plastic imported is 1.67 million tonnes per year and the amount recycled annually is 1.66 million tonnes. The total number of small, medium and large companies producing plastics is 1,580 with 1,367 (87 per cent) on Java Island and 213 (13 per cent) located elsewhere. At 60 per cent of plastic production, the major plastic user is the food and beverage sector (MoEF, 2020).

The government supports plastic industries to fulfil the supply of goods or services for the public needs and interests, and to increase competitiveness, employment, and country's income. Measures include a range of regulations, duty, tax and Anti-Dumping Import Duty for the plastic industry implemented by the Ministry of Industry (MoEF).

With regards to plastic recycling, in June 2021, the Ministry for Industry reported it remains committed to encouraging the development of green industries that are efficient, environmentally friendly, and reusable, apart from waste management as an alternative energy source. It also reported that Indonesia has 1,300 plastic recycling industries, comprising 600 large and 700 small industries, with an investment value of Rp7.15 trillion (US$500 million) and an annual production capacity of 2.3 million tons (2.08 million tonnes), with added value of over Rp10 trillion (US$700 million) per year. (See: Plastic waste management drives development of circular economy: govt – ANTARA News, 30th June 2021).

## Multilateral Environmental Agreements (MEAs)

Indonesia is a party to a number of MEAs that have an element of plastics waste intervention:

- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (Basel Convention);
- Stockholm Convention on Persistent Organic Pollutants (Stockholm POPs Convention);
- Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (Rotterdam Convention);
- Minamata Convention on Mercury (Minamata Convention)
- United Nations Convention on the Law of the Sea (UNCLOS, Convention and Agreement)
- International Convention for the Prevention of Pollution from Ships (MARPOL) (Annex I, II and V)

# National Summary: Malaysia

Malaysia's population in 2021 was approximately 32.7 million (July, 2021 Dept. of Statistics, Malaysia (see: www.dosm.gov.my) making Malaysia the third most populous country in the Coral Triangle after Indonesia and the Philippines.

Estimated waste generation for Malaysia in 2016 was at 13.5 million tonnes while projected to reach 16.2 million tonnes in 2030 and 18.9 million tonnes in 2050.

These estimated waste generations are based on the Estimated Per Capita Generation Rate multiplied by the Malaysian Population. (Data for the Malaysian population was forecasted by Dept. of Statistics, Malaysia).

Plastic was estimated to be 24 per cent of the total municipal solid waste (Lyons et al.,2020). The global study by Jambeck et al. in 2015 estimated that in 2010, Malaysia's daily production of plastic waste was 4,505 tonnes of which 2,476 tonnes per day were inadequately managed; resulting in nearly 1 million tonnes of mismanaged plastic waste per year and this was predicted to rise to 1.76 million tonnes in 2025. It was also estimated that 0.14 to 0.37 million tonnes of plastic waste generated in Malaysia may enter the ocean annually and this could be as high as 0.71 million tonnes by 2025 if there is no action to reduce mismanaged plastic waste (Jambeck et al. 2015).

More recent research, which looked at the impact of smaller rivers on the contribution of plastic pollution to the ocean estimates that in 2019, a total of 66,313 tonnes leaked into the ocean per year through 1070 rivers in Malaysia (Meijer et al. 2021).

## Solid Waste Management (SWM)

The following information on Malaysia's solid waste management and legal framework is provided in the 2020 WWF-Malaysia assessment of packaging waste. It reported that waste management in Malaysia is constantly challenged by increasing waste generation and the limited resources and infrastructures. Solid waste, especially municipal solid waste management, is handled by the respective local government authorities, under the purview of the Federal Ministry of Housing and Local Government. However, due to the unique political structure within Malaysia, the Federal Ministry of Housing and Local Government only has jurisdiction over the Peninsular States (Local Government Act 1976). The Borneo states of Sabah and Sarawak have their own ministries that oversee housing and local government issues. (WWF-Malaysia, 2020).

## Legal Framework

Municipal solid waste management is handled by the respective local authorities, under the purview of Federal Ministry of Housing and Local Government. However, due to the distribution of legislative powers in the Federal Constitution between the federal and the states laws [Subject 74 (1) and (2)] stated that cleanliness related matters are listed in the Concurrent List in Ninth Scheduled of Federal Constitution. This Concurrent List gives flexibility to the states in Peninsular Malaysia not to adopt Act 672. Thus, at the moment Act 672 only applies to the states of Perlis, Kedah, Pahang, Negeri Sembilan, Malacca, Johor and Federal Territories of Kuala Lumpur and Putrajaya. (WWF-Malaysia, 2020).

Malaysia's national recycling rate refers to all recognised solid waste namely plastics, papers, aluminium, glasses, metal/iron, plumbum acid battery and others. The data for recyclable plastic was not solely referred to plastic packaging. National recycling rates for recyclable plastic in 2021 are 22.9%.

## National Plastic Industry

According to Malaysia's Roadmap Towards Zero Single-Use Plastics, 2018-2030 the country has about 1,300 plastic manufacturers and in 2016, its exports amounted to RM30 billion (US$7.16 billion) which saw 2.26 million tonnes of resin utilized to produce plastics.

## Trade of Plastic Waste

According to Interpol (August, 2020), Malaysia became the leading destination for the world's plastic trash after China banned imports in 2018 and together with Thailand "is where the biggest increase in illegal imports occurred". Imports of plastic waste to Malaysia increased three-fold from 288,000 tonnes in early 2016 to 873,000 tonnes at the end of 2018 including an estimated 195,000 tonnes from the US (Lyons et al. 2020). In 2020, approximately 680,000 tonnes of plastic waste was exported to Malaysia from the EU, Japan, UK, US and Canada combined (*Figure 6*). In the first four months of 2021, the US alone had exported nearly 40,000 tonnes of plastic waste to Malaysia (*Figure 7*).

Malaysia is committed to legally govern the transboundary movement of hazardous waste. In May 2019, Malaysia and 186 other countries consensually decided to govern the movement of trade for plastic waste across countries to help address the improper disposal of plastic waste and to reduce its leakage into the environment. As a result, transboundary shipments of dirty and non-recyclable waste are now controlled; regulated under the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal treaty, effective as of 1st January, 2021.

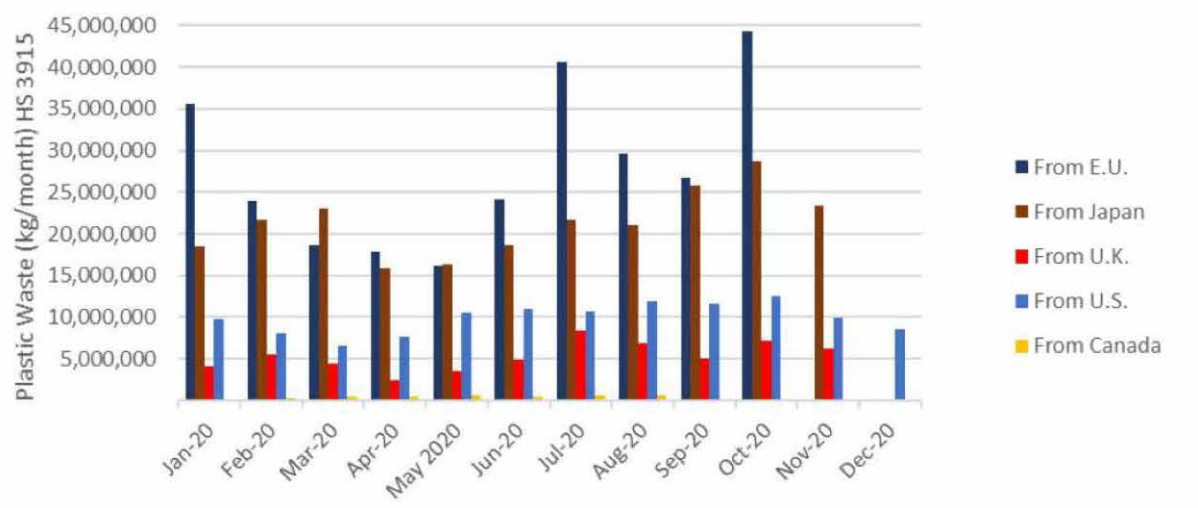


**Figure 6. 2020 Plastic Waste Exports to Malaysia**

Source: US Import/Export - Census Bureau, UK Trade Info, Eurostat, Statistics Canada, UN Comtrade. Updated Feb 11, 2021.

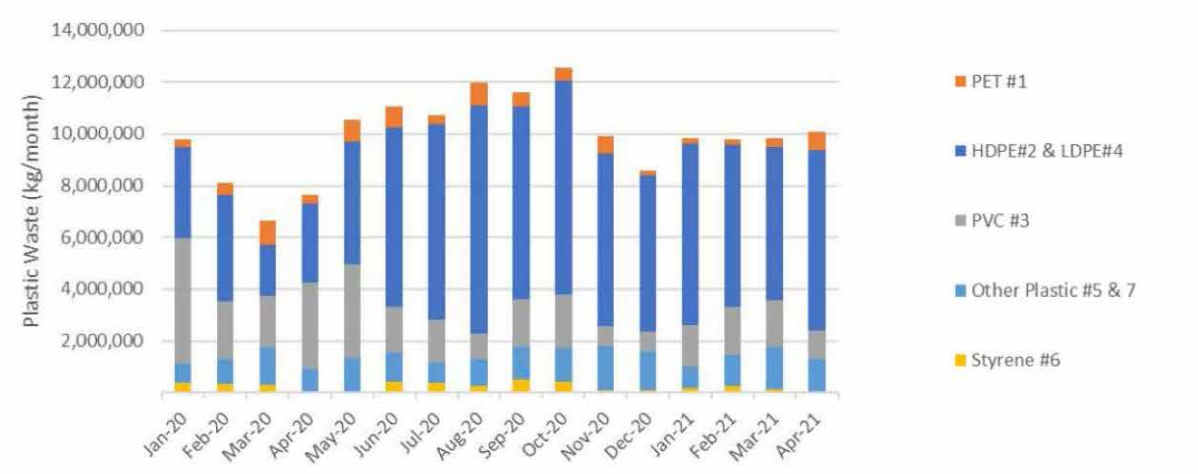


**Figure 7. 2020-21 US Plastic Waste Exports to Malaysia**

Source: US Import/Export - Census Bureau.

Starting from 1st January 2021, plastic wastes that fall under Annex II were to be subjected to Prior Informed Consent (PIC) procedure and must require Approved Permits (AP) from the National Solid Waste Management Department which lists 18 requirements for importers to fulfil before the plastic waste can enter Malaysia.

## Multilateral Environmental Agreements (MEAs)

Malaysia is a party to a number of MEAs that have an element of plastics waste intervention:

- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (Basel Convention);
- Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (Rotterdam Convention);
- United Nations Convention on the Law of the Sea (UNCLOS, Convention and Agreement)
- International Convention for the Prevention of Pollution from Ships (MARPOL Annex I, II and V)

# National Summary: Papua New Guinea

Papua New Guinea (PNG) has an estimated population of 8.78 million (Statista.com, 2020) with approximately 383,000 living in Port Moresby, the capital city. It is the largest country in the Pacific Islands in terms of population and landmass and has the fourth highest population of the six Coral Triangle countries.

According to an Asian Development Bank (ADB) snapshot of solid waste management in PNG in 2014 (ADB, June 2014), as reliable data is not available on the amount and composition of municipal solid waste (MSW) in PNG, the per capita household MSW generation rate was estimated to be 0.45 kilograms (kg) per day based on Pacific Islands country figures. The snapshot reported that the rate will vary across the country particularly between the larger cities and small villages; where in Port Moresby, Lae, and other cities, the MSW generation rates are likely higher, and in rural areas probably considerably lower. PNG's national municipal waste generated in 2016 was estimated to be 1.05 million tonnes per year and by 2030 PNG is expected to generate 1.6 million tonnes annually, potentially reaching 2.84 million tonnes per year by 2050 (Kaza et al., 2018).

In terms of plastic waste, the 2015 Jambeck report estimated that nationally 13 per cent of PNG's waste stream consists of plastic and that in 2010, PNG produced 281 tonnes of plastic waste per day, of which about 240 tonnes per day was inadequately managed with a total of approximately 89,835 tonnes of mismanaged plastic produced over the year. Further, it is estimated that between 13,475 and 35,934 tonnes of this mismanaged plastic leaked into the ocean and the amount of mismanaged plastic could increase to 242,328 tonnes per annum by 2025 resulting in up to 96,911 tonnes of marine plastic pollution leaking into the ocean without preventative action to reduce mismanaged waste (Jambeck et al., 2015).

## Solid Waste Management (SWM)

In 2018 the Pacific Regional Infrastructure Facility (PRIF) conducted a profile of solid waste management and recycling in PNG looking at the current technologies, material flow, logistics, public policies, institutional framework, financial mechanisms and initiatives that are being designed or have been implemented to strengthen recycling systems. It reported that the local government is responsible solely for the supply of waste management services, although environmental management is shared between local and central governments. Since waste management services are not funded through the national government, local governments may levy local taxes and charges, which could account for a large share of revenue. However, only a limited amount of revenue is collected from households resulting in poorly run services that render many communities lacking efficient and regular collection services (PRIF, 2018).

The ADB snapshot reported that the MSW collection system of Port Moresby is carried out by private contractors under arrangements with the Waste Management Division of the National Capital District Commission (NCDC). The service includes collection of household waste, public markets, settlements, schools, commercial waste and medical institutions. "Illegal dumping and burning of waste are common due to the lack of public awareness and education, lack of adequate waste collection services in certain areas including the city's large informal settlement areas, and insufficient funding for adequate enforcement; and the relatively low level of fines imposed." (ADB, 2014).

Using figures from a waste composition survey conducted by the NCDC of Port Moresby in 2011, the PRIF assessment found that the urban household waste generation rate was 0.36kg per day, comprising over 18.5 per cent plastic waste and that the average annual amount of recyclable materials included 1,484 tonnes of polyethylene terephthalate (PET) beverage containers; 961 tonnes of plastic shopping bags and 319 tonnes of end-of-life (EOL) tyres.

The PRIF estimated that if PNG took measures to address recycling, such as implementing a container deposit scheme that recovers 40 per cent of high-density poly ethylene (HDPE) and PET plastic bottles, this could lead to a reduction of 506 tonnes in floating plastic; 2784 tonnes in sunken plastic and 596 tonnes in beach plastic. In addition, the reduced levels of marine plastic pollution are likely to bring economic and social benefits to industries such as fishing and tourism (PRIF, 2018).

PNG has over 21 unregulated disposal sites and two controlled sites located in Lae and Port Moresby. As a participant in the Japanese (JICA) funded programme 'Promotion of Regional Initiatives on Solid Waste Management in Pacific Island Countries' (J-PRISM project), PNG's focus was on improving waste management in Port Moresby with the Baruni landfill site as the focus of infrastructure and environmental monitoring initiatives. This project also aimed to improve collection services, solid waste management planning, data and contract management, and capacity building. The Reduce, Reuse and Recycle (3R HEART) community awareness and SWM training programmes were implemented by JICA between 2011 and 2016 (PRIF, 2018). The government does not provide formal recycling services other than two recyclers that collect and export ferrous and nonferrous waste. A local registered company provides hazardous waste management and recycling services to commercial and industrial clients throughout PNG. Waste oils are refined and recycled in Port Moresby, while plastic bottles and e-waste are exported to Asian and Australian markets (PRIF, 2018).

In November 2021, plans were announced for an Integrated Waste Management Facility in PNG. This hub which would be operated by the PNG owned company, TWM Group, "aims to provide a future solution for the wider Pacific island's region, assisting with waste management solutions through controlled handling, treatment and disposal as well as recycling and recovery of waste resource products." (SPREP, 22 November, 2021). The facility will expand TWM's existing process to include additional "waste types and complexities to process, reuse, recover and treat waste and will be able to handle up to 150,000 tonnes of commercial and industrial waste over a facility life of 50-plus years." See: SPREP, 22 November 2021.

## Legal Framework

The following information on the governance and legal framework in PNG is also sourced from the 2018 PRIF assessment. It reported that responsibilities for waste and environmental management exist within a range of acts and regulations, although no single point of control exists to regulate planning and operation. The government has identified the need for policies and strategies to rectify this and to effectively implement its commitments under the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, the 1995 Waigani Convention, and the Stockholm Convention on Persistent Organic Pollutants. Relevant Acts include:

- The Environment Act 2000 is the principal legislation for environmental protection, providing for constitutional requirements and regulating the environmental impacts of development activities and the management of national water resources. It is implemented through multiple environment regulations through the Conservation and Environment Protection Authority (CEPA). The Act empowers provincial and local governments to develop environmental legislation, policies, and by-laws for waste management and requires the development of national policies and a national Solid Waste Management strategy with associated regulations.

- Environment (Control of Biodegradable Plastic Shopping Bags) Regulation 2010 controls the manufacture and importation of biodegradable plastic bags through the issuance of an environment permit. Bags are required to be labelled and must meet the standards of the Department of Environment and Conservation.

- Public Health Act (Amalgamated) (Amendment) 1974 and the Public Health (Sanitation and General) Regulation are administered by the Department of Health. They relate to practices of scavenging and waste disposal, as well as fines for illegal dumping.

- Organic Law on Provincial and Local-Level Governments 1995 and Local-Level Governments Administration Act 1997 empower local governments to formulate waste management policies, legislation, and by-laws. National Capital District Commission Act 2001 provides for public welfare protection in relation to waste and environmental management.

- Dumping of Waste at Sea Act 1979 gives effect to the 1972 International Convention on the Prevention of Marine Pollution by the Dumping of Wastes and Other Matter. It also relates to the issuance of permits to vessels to do so, and penalties for noncompliance.

- Prevention of Pollution of the Sea Act 1979 and Prevention of Pollution at Sea Regulation 1980 relate to oil and other substances. They also give effect to a number of relevant international conventions.

## Multilateral Environmental Agreements (MEAs)

PNG is a party to the following multilateral environmental agreements and conventions:

- Stockholm Convention on Persistent Organic Pollutants
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal
- 1995 Waigani Convention – to ban the Importation of Hazardous and Radioactive Wastes into Forum Island Countries and to Control the Transboundary Movement and Management of Hazardous Waste within the South Pacific Region
- MARPOL 73/78: International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978 (Annexes I, II, III, IV, and V)
- London Convention on the Prevention of Marine Pollution by the Dumping of Wastes and Other Matters 1972
- The Convention for the Protection of Natural Resources and Environment of the South Pacific Region (1986) – the SPREP Convention or Noumea Convention.
- Protocol for the Prevention of Pollution of the South Pacific Region by Dumping constitutes the instrument for the contracting Parties to meet the obligations of the Noumea Convention and the IMO Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter (1972).
- The Protocol Concerning Co-operation in Combating Pollution Emergencies in the South Pacific Region is part of the legal framework for the protection of the natural resources and environment defined with the Noumea Convention.

## National Summary: The Philippines

The Philippines is the second most populous country in the Coral Triangle with more than 109 million people, according to the latest census (Philippine Statistics Authority, 2020). The National Capital Region has nearly 13.5 million people which include 1.846 million in the City of Manila and 2.96 million in Quezon City.

In 2016, the Philippines generated an estimated 14.6 million tonnes of municipal solid waste (MSW) with a projection of reaching 20.0 million tonnes in 2030 and 29.3 million tonnes in 2050 (Kaza et al., 2018). The estimated amount of plastic in the country's solid waste is 14 per cent (2012, World Bank). The 2015 global study by Jambeck et al., estimated that the Philippine's daily production of plastic waste was 6,237 tonnes

of which 5,035 tonnes was inadequately managed. This resulted in 1.88 million tonnes of mismanaged plastic waste generated per year, potentially rising to 5.088 million tonnes in 2025 without intervention in addressing the waste management. As a result, between 0.28–0.75 million tonnes of plastic is estimated to leak into the ocean and this could reach as high as two million tonnes by 2025 (Jambeck et al., 2015 Supp. Mat.) The figures for plastic leakage into the open environment vary according to a number of subsequent reports. According to an Extended Producer Responsibility (EPR) scheme assessment for plastic packaging waste in the Philippines (WWF Philippines, 2020), the estimated plastic leakage amount at 760,000 tonnes per year in 2019, is relatively lower as compared to the results of the study of Jambeck et al. in 2015. This may be due to "the assumptions made, data sources, used methodology (WWF's bottom-up analysis using locally derived data vs. Jambeck' top-down analysis), and potentially improved collection and recycling in 2019 compared to 2010."

In 2021, modeling on the role of small rivers in transporting plastic pollution to the oceans identified that seven rivers in the Philippines were in the 50 top rivers responsible for contributing plastic pollution to the ocean with the Pasig River responsible for an estimated 6 per cent of the plastics leaking to the ocean globally each year (see *Table 3*). The Philippines rivers account for more than one-third (36 per cent) of plastic inputs due in part to the many small islands on which the majority of the population lives near the coast. The modeling estimated that the rate of mismanaged plastic waste entering the ocean from 4820 rivers in the Philippines is 323,294 tonnes per year (Meijer et al. 2021).

## Trade of Plastic Waste

Data from the Philippine Statistics Authority shows that export and import of plastic waste, parings and scrap increased significantly from 2016 to 2019. In 2019, the country recorded 117,000 tonnes of exported plastic wastes and 15,000 tonnes of imports. A large amount of the imported scrap plastic materials that are processed in the country are exported to various countries as raw materials or sold to local plastic recyclers and manufacturers.

In addition, the Philippines has enough local plastic recyclers to deal with the material. One of the requirements for the issuance of an Importation Clearance is a valid contract or MOA with local recyclers that have the capacity to process such material. (Correspondence from Department of Environment and Natural Resources, Environmental Management Bureau, 10 May 2022).

As with other Coral Triangle counterparts Indonesia and Malaysia, the Philippines also receive illegal plastic waste. Since 2018, the Philippines seized illegal plastic waste and re-exported them to their country of origin and in 2019, it returned 69 containers of plastic waste that had been illegally imported from Canada. See news reported by Reuters.

## Production of Plastic in Philippines

According to the World Bank, as of 2019, the total virgin resin production capacity in the Philippines was 900,000 tonnes of HDPE/LDPE, PP, PVC and PS resins, however, it does not have PET resin production capacity and is entirely dependent on imports. For PET, HDPE, LDPE and PP, the Philippines is a net importer of resins, with 66 per cent of the total plastic conversion based on imported sources. Due to this dependence on imports, there are plans to increase local virgin resin production capacity by at least 360,000 tonnes from 2021 onwards. Packaging makes up more than half of the industry application of resins (53 per cent) of the local plastics market (World Bank, 2021).

**Table 3. Top 10 share of global plastics emitted to the ocean by top 50 rivers**

| No | River | Share of global plastics emitted to ocean in 2019 (%) |
|---|---|---|
| 1 | Pasig (Philippines) | 6.43 |
| 2 | Klang (Malaysia) | 1.33 |
| 3 | Tullahan (Philippines) | 1.33 |
| 4 | Ulhas (India) | 1.33 |
| 5 | Meycauayan (Philippines) | 1.23 |
| 6 | Pampanga (Philippines) | 0.95 |
| 7 | Libmanan (Philippines) | 0.72 |
| 8 | Ganges (India) | 0.63 |
| 9 | Rio Grande de Mindanao (Philippines) | 0.54 |
| 10 | Agno (Philippines) | 0.47 |

Source: Meijer et al., 2021

## Solid Waste Management (SWM)

A 2020 assessment of plastic packaging waste in the Philippines looked at the potential for an extended producer responsibility programme. The report commissioned by WWF-Philippines, found that the Philippines produces 15.43kg per capita per year of plastic waste and that insufficient recycling capacities for high value recyclables and the high volume of low value plastics (including sachets) are factors that affect the country's low plastic recycling rate. Out of the 2.15 million tonnes of plastic that are available for local recycling annually, 0.76 million tonnes or 35 per cent are leaked to the open environment, approximately 0.71 million tonnes or 33 per cent are disposed to landfills and dumpsites, 0.35 million tonnes or 16 per cent are stored and in-use and approximately 0.18 million tonnes or 9 per cent are considered recycled (WWF-Philippines, 2020).

Single-use plastics including shopping bags and food packaging, as well as sachet consumption make up a significant proportion of MSW. The Global Alliance for Incinerator Alternatives (GAIA, 2019) estimates almost 164 million pieces of sachets are used in the Philippines daily, equating to around 59.7 billion pieces of sachets yearly. Every day, almost 57 million shopping bags are used throughout the Philippines, or roughly 20.6 billion pieces a year and 16.5 billion Plastic labo bags used annually. In addition, around 1.1 billion diapers are discarded annually (GAIA, 2019).

The WWF assessment reports that "the Philippines' waste management legal framework mandates segregation, proper handling and storage, recycling, and disposal in sanitary landfills. However, the country lacks the physical capacity for handling and recycling the amount of waste generated and current laws and policies on waste management are not being adequately and properly implemented. There is no uniformity in implementation of national regulations, and responsibilities are dispersed among all government levels." (WWF-Philippines, 2020).

The Philippines government itself has stated its key challenges for waste management include: harmonizing initiatives across different stakeholders in the absence of a coordinating body; the lack of long-term resources (particularly in terms of funding and manpower) to ensure sustainability of marine litter interventions; the need for baseline data and standardized methods for collection, monitoring, and assessment of marine litter and microplastics; and the need for capacity building for collection, monitoring, assessment and the conduct of laboratory analysis of marine litter and microplastics (Osaka Blue Ocean Vision).

## Legal Framework

The National Solid Waste Management Commission (NSWMC), led by the Department of Environment and Natural Resources (DENR), is the main government entity in charge of solid waste management policy making and monitoring implementation of law and national and local SWM plans. The Philippines Government reports (Osaka Blue Ocean Vision) that:

- The leading policy on waste management is the Republic Act 9003 (or the Ecological Solid Waste Management Act of 2000) and its Implementing Rules and Regulation (DAO 2001-34).
- National Ecology Center under the DENR maintains a database on SWM and is mandated to provide technical support for Local Government Units (LGUs) on the implementation of RA 9003.
- Clean Water Act RA 9275 applies to water quality management in all water bodies and covers abatement and control of pollution from land based sources and prohibits transport or dumping into sea waters of sewage sludge or solid waste.
- The Philippines Coast Guard Law of 2009 includes the protection of marine environment and resources from offshore sources, or pollution within the maritime jurisdiction of the Philippines.

At the local level, the WWF assessment report provides a summary of the role of LGUs, particularly cities and municipalities, which are the primary responsible units in the implementation of RA 9003. It reports that LGUs prepare local SWM plans, draft waste reduction policies, manage the collection and disposal of various wastes within their jurisdiction, maintain materials recovery facilities (MRFs), and adopt revenue generating measures to support local SWM. Waste segregation and its disposal at landfills are under the jurisdiction of cities or municipalities which are subdivided into barangays, mandated to manage all waste segregation, sorting, recovery, recycling, and composting activities within its area. Cities and municipalities coordinate the activities of barangays and provinces to coordinate and integrate SWM plans and efforts of LGUs within the provincial boundaries (except for highly-urbanized cities). Along with national level offices, provinces provide administration, legislation, and financial support (WWF-Philippines, 2020).

## Multilateral Environmental Agreements (MEAs)

The Philippines is a party to a number of MEAs that have an element of plastics waste intervention:

- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (Basel Convention);
- Stockholm Convention on Persistent Organic Pollutants;
- Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (Rotterdam Convention);
- Minamata Convention on Mercury (Minamata Convention);
- United Nations Convention on the Law of the Sea (UNCLOS, Convention and Agreement)
- International Convention for the Prevention of Pollution from Ships (MARPOL)
- London Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matters.
- London Protocol

# National Summary: The Solomon Islands

The Solomon Islands population was estimated at 694,619 in 2020 (www.Statistics.gov.sb), making it the smallest of all six Coral Triangle countries. The capital city of Honiara has an estimated 90,441 people.

In 2016 the country produced 0.19 million tonnes of municipal solid waste and this was projected to rise to 0.29 million tonnes by 2030 and 0.54 million tonnes by 2050 (Kaza et al., 2018). In terms of volumes of plastic, according to the 2015 Jambeck report, in 2010, the Solomon Islands produced 63.3 tonnes of plastic waste per day of which 54.6 tonnes per day was inadequately managed. This was calculated to be 20,394 tonnes per year of plastic waste mismanaged and could have resulted in between 3,059 and 8,158 tonnes of plastic leaked into the ocean. The amount of mismanaged plastic could reach 176,589 tonnes per year in 2025 (Jambeck et al. 2015) if there is no intervention to reduce mismanaged plastic waste.

## Solid Waste Management (SWM)

The Solomon Islands government reports (Osaka Blue Ocean Vision) that a lack of waste management supporting infrastructure has been a major challenge over the years. The provinces do not have sanitary landfills, but use unmanaged dumpsites. In Honiara, there is a need for a new landfill site due to the increasing waste generated and the only managed landfill is running out of space. Land issues and a shortage of technical and financial capacity to develop landfill sites are contributing factors to the lack of managed landfill sites in provincial towns. Honiara and the provincial towns have limited budget allocations and face significant costs to provide effective and efficient waste management systems, particularly for storage, collection, and transportation to final disposal sites.

There is a lack of recycling facilities with aluminium cans and scrap metals being the main recyclables exported overseas. Other recyclable materials are either dumped in landfills or into the environment or stockpiled in various locations. The country also faces an ongoing challenge of limited human resources and capacity linked to the lack of funding to recruit and finance new positions. The number of government staff being recruited is insufficient to deal with all the waste and pollution issues in Honiara and the provinces.

The Solomon Islands *National Waste Management and Pollution Control Strategy (2017-2026)* reports that provincial governments have identified that their key challenges to solid waste management include a lack of available land for a proper landfill, limited financial and human resources, poor collection systems, lack of relevant regulations or ordinances, lack of technical capacity and a lack of appropriate basic infrastructure e.g. incinerators for healthcare waste, public waste bins.

A waste characterization study in 1990 was the first to be undertaken for the capital city's landfill and found that already at that time the proportion of plastics was over 16 per cent. In 2017, an analysis of plastic waste data collected in the Solomon Islands found that the plastic wastes consist of an estimated 65.3 tonnes of plastic shopping bags and 100.7 tonnes of PET (ADB, July 2017).

In 2018, the PIRF regional study reported that approximately 60 per cent of households in Honiara have access to collection services, except the settlement areas around the capital where waste is dumped directly into drains, eventually finding its way to the ocean. Only 12 per cent of the rest of the population across the Solomon Islands have access to collection services. The PRIF study reported that in Honiara, there are no household recycling collection services and no waste segregation at the landfill. However, waste pickers recover scrap metals and other materials of value, and at the site there is a warehouse and baler to compress

and store PET plastic under the responsibility of the Honiara City Council. Local initiatives to reuse waste include vehicle tyres for garden beds; PET bottles for selling drinks and making arts and crafts for sale at local markets; and some PET bottles are used for growing vegetables.

The *National Waste Management and Pollution Control Strategy (2017-2026)* presents the example of the Mataniko river cleanup and rehabilitation project in Honiara to tackle continuous dumping of waste into the river system, which has contributed to major pollution in the river and extending to the coastal sea front of Honiara city. This is due in part to uncontrolled waste disposal by the communities and poor road infrastructure impacted the garbage collection within the river catchment. An assessment of the waste collected in Mataniko River has found that 27 per cent was film-like plastic, 13 per cent soft plastic, 10 per cent plastic bags, 9 per cent hard plastics, PET bottles and disposable nappies each at 8 per cent, and polystyrene foam made up 5 per cent.

The 2018 PRIF study modelled the potential recovery of 15 materials types using a defined set of recovery rates applied to the urban, rural, and outer island population distribution to calculate the Solomon Islands potential waste recovery tonnage. The forecast for the average annual amount of recyclable materials was 111 tonnes of PET beverage containers; 72 tonnes of plastic shopping bags and 33 tonnes of end-of-life (EOL) tyres. It also identified that importation rates of PET beverage containers for fruit juice and flavoured drinks steadily increased from 2009 to 2016 with a similar trend for other beverage containers (PRIF, 2018).

Looking at the potential for reducing mismanaged plastic waste through a container deposit scheme (CDS), the PRIF study found that using an average reduction rate of 40 per cent in mismanaged waste with a CDS in place, approximately 2.47 tonnes of PET and high density polyethylene (HDPE) could be recycled each day and may result in a reduction of marine debris of as much as 135 tonnes in floating plastic; 632 tonnes in sunken plastic and 135 tonnes in beach plastic each year and could return economic and social benefits to local communities as well as fisheries and tourism industries (PRIF, 2018).

## Legal Framework

The 2020 SPREP review of the Solomon Islands legislative frameworks governing waste management which was supported by the Australian government through the Pacific Ocean Litter Project, reported that the lead agency on waste and pollution is the Ministry of Environment, Climate Change and Disaster Management and Meteorology (MECDM) and has national and provincial level responsibilities under the Environment Act 1998. The Act provides for the protection and conservation of the environment by regulating the discharge of pollutants to air, water, and land; the transport, collection, treatment, storage, and disposal of waste; and the promotion of economically viable recycling, reuse, and recovery (PRIF, 2018). However, the devolution orders of the Provincial Government Act give powers to the provinces to manage issues relating to waste and pollution.

The review found that "no single point of control exists to regulate planning and operation" and the legal framework "does not appear to meet many of the legislative objectives, largely due to severely limited resources for funding many waste services, the pressures of increasing urbanization, together with the challenges facing the nation's economy" (SPREP, 2020). It found that while wastewater treatment and sanitation services are being extended across the nation, "many areas are left un-serviced, allowing solid wastes, including plastics and human wastes, to pollute land and waterways". The report highlights shortfalls in waste management, such as rubbish collection, which were caused by "very limited funding and the inability of many in the community to pay for or have access to these services," (SPREP, 2020).

The Solomon Islands *National Waste Management and Pollution Control Strategy (2017-2026)*, is a guiding strategy for MECDM. It applies a set of overarching principles such as sustainable development; extended producer (importer) responsibility for the environmental impacts of their products; and acknowledges and promotes the Waste Hierarchy principle that includes the 4R concept: Reduce, Re-use, Recycle, Return which aims to achieve waste minimization through reduction, separation at source, reuse and recycling prevents the creation of wastes and reduces the quantity and the impacts of waste that is generated. The government is also looking to have "stringent measures in place and a highly visible coordinated campaign implemented to reduce waste and pollution in rivers, lagoons, lakes, waterways and the marine environment" (MECDM, 2017–2026).

Other national policies include the National Implementation Plan for Stockholm Convention; the National Biodiversity Strategic Action Plan and the National Ocean Policy which "recognizes marine pollution as an ocean threat and stated its strategic action to develop proper sanitation and waste management systems throughout the country's coastal catchments and shipping industry," (Osaka Blue Ocean Vision).

Other legal instruments include the Environmental Health Act 1980; Maritime Safety Administration Act 2009 and Shipping (Marine Pollution) Regulations 2011; Solomon Islands Maritime Authority Act 2018; and the Biosecurity Act 2013.

## Multilateral Environmental Agreements (MEAs)

The Solomon Islands is a party to various multilateral environmental agreements and conventions, except for the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal.

- Stockholm Convention on Persistent Organic Pollutants
- 1995 Waigani Convention – to ban the Importation of Hazardous and Radioactive Wastes into Forum Island Countries and to Control the Transboundary Movement and Management of Hazardous Waste within the South Pacific Region
- Montreal Protocol
- International Convention for the Prevention of Pollution from Ships (MARPOL)
- London Convention on the Prevention of Marine Pollution by the Dumping of Wastes and Other Matters 1972
- The Convention for the Protection of Natural Resources and Environment of the South Pacific Region (1986) – the SPREP Convention or Noumea Convention
- Protocol for the Prevention of Pollution of the South Pacific Region by Dumping constitutes the instrument for the contracting Parties to meet the obligations of the Noumea Convention and the IMO Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter (1972).
- The Protocol Concerning Co-operation in Combating Pollution Emergencies in the South Pacific Region is part of the legal framework for the protection of the natural resources and environment defined with the Noumea Convention.

# National Summary: Timor-Leste

Timor-Leste has a population of 1,053,971 people, the second smallest of the Coral Triangle countries. The capital city Dili has 228,559 people (Source: GoTL, 2010).

It is estimated that Timor-Leste produced approximately 64,000 tonnes of municipal solid waste in 2016 and this is projected to rise to 91,000 tonnes by 2030 and 160,000 tonnes by 2050 (Kaza et al., 2018). In terms of plastic, the 2015 Jambeck report estimated that Timor-Leste produced 68.4 tonnes of plastic waste daily of which 56.6 tonnes per day is inadequately managed. Based on these figures it also estimated that in 2010, the country produced an annual total of 20,690 tonnes of mismanaged plastic waste of which between 3,104 and 8,276 tonnes could have leaked into the ocean. Timor-Leste's generation of mismanaged plastic waste may increase to 65,205 tonnes per year by 2025 and the amount leaking into the ocean could reach as high 25,682 tonnes if no action is taken to address levels of mismanaged plastic waste (Jambeck et al. 2015). Timor-Leste has declared its ambition to become the first plastics-neutral country in the world.

## Solid Waste Management (SWM)

The 2018 PRIF regional study on solid waste management and recycling in Timor-Leste looked at the infrastructure and services available in the capital Dili. The following is a summary from the study. It found that villages around the city have access to municipal solid roadside containers or skip bins that are placed on public sites and in neighbourhoods. The waste is manually emptied by collectors and transferred to waste collection vehicles. However, the equipment was in a poor state and likely to be inefficient to deal with the waste. The Municipality provides a collection service, transferring waste to the Tibar dump using private contractors. Other private waste collection companies account for approximately 10 per cent of the waste that enters Tibar dump which is managed by the Dili District Administration. Dili has two companies which reprocess plastic bottles that are shredded and baled for export and one additional company is seeking to remanufacture plastic within Timor-Leste using molding equipment to produce plastic chairs. Used engine oil and vehicle tyres are recycled by another two firms. The PRIF study also looked at the potential recovery of 15 materials types. It estimated that the average annual tonnages that could be recovered for recycling included 279 tonnes of (PET) beverage containers; 181 tonnes of plastic shopping bags; and 61 tonnes of end-of-life (EOL) tyres (PRIF, 2018). An estimated 13 per cent of Timor-Leste's waste stream is made up of plastic (Jambeck et al., 2015).

The 2018 PRIF study reported that 7.5 tonnes of plastic waste may comprise PET or HDPE plastic that is eligible for recycling under a container deposit scheme (CDS). Based on an average reduction rate of 40 per cent in mismanaged waste with a CDS in place, approximately 2.51 tonnes of PET and HDPE plastic could be recycled each day and may reduce marine debris each year by 137 tonnes in floating plastic; 641 tonnes in sunken plastic; and 137 tonnes in beach plastic. Further, economic benefits may also accrue to coastal communities, and the fishing and tourism industries in Timor-Leste (PRIF, 2018).

## Legal Framework

A 2021 SPREP assessment of Timor-Leste's legislative framework reported that the governance of waste management "is divided between the Secretary of State for the Environment, which has a policy-setting and awareness-raising function, and the Ministry of State Administration, which is responsible for waste management, collection, dump-site management, as well as developing plans and policies for waste management". However, the main functions and operations relating to solid waste management appear

to be consolidated around the Ministry of State Administration, and as delegated to Municipal Authorities for neighbourhood/ household waste collections and have responsibilities under *Decree-Law 33/2008* (SPREP, 2021).

The legislative review also reported that Timor-Leste "appears to be at the very early stages of establishing and implementing a legislative framework for waste management". Also, Timor-Leste has a "low to medium level of capacity" for administration of its waste legislative framework, "with the greatest needs arising in respect of support for implementation, compliance, and enforcement of laws" (SPREP, 2021). However, it also reported on developments in the country's legal framework that may have the potential to "contribute more strongly to improved outcomes on waste management and related environmental protection goals into the future".

The assessment referred to Timor-Leste's Strategic Development Plan 2011-2030 (Plano Estratégico de Desenvolvimento 2011-2030) "which sets a pathway to improve the protection of the environment, to control pollution and to introduce urban waste management guidelines" (SPREP, 2021). It also noted *Decree-Law 26/2012* the Basic Law on the Environment, the urban solid waste management system provided for under *Decree-Law 2/2017*, and relevant Organic Decree-Laws. However, the assessment also reported that "development of institutional infrastructure and physical facilities to support these legislative priorities" would be needed and that a new Decree-Law on plastics will support Timor-Leste's ambition to become plastics-neutral (SPREP, 2021). An important element of Timor-Leste's legal framework, reported by SPREP, is the involvement of customary law (Tara bandu) in the implementation of waste management. This law, which is acknowledged by the government, is used to prohibit activities and guide behaviour at a village community level and can help to regulate waste management within the community.

"Older laws, such as *Decree-Law 33/2008* adopt a basic model of prohibitions, based on securing hygiene and public order, rather than a broader system of waste management. *Decree-Law 2/2017* articulates key elements for a modern waste management system, such as collection and disposal requirements, and coverage of a range of wastes, including newer waste categories such as recyclables and e-wastes. Once fully implemented, the law should provide a reasonably effective legislative basis for ensuring that the state's goals regarding waste management, environmental protection and promotion of recycling are taken forward." (SPREP, 2021).

## Multilateral Environmental Agreements (MEAs)

Unlike most of the other Coral Triangle countries, Timor-Leste is not a party to the Basel, Stockholm, Rotterdam, Minamata and Waigani Conventions. However, it is a party to the Vienna Ozone Convention and the Montreal Protocol on Ozone Depleting Substances and to UNCLOS.

According to the 2021 SPREP legislative assessment, "Timor-Leste's experience with the Montreal Ozone Protocol suggests that the country has been proactive in harnessing support from the treaty's secretariat and multilateral fund to build capacity for its implementation of obligations under the Protocol. A similar approach to utilizing international funding and capacity-building support might be applied if the nation joined international waste-related conventions to improve capacity for implementation of, and reporting under these Multilateral Environmental Agreements (SPREP, 2021).

## Coral Triangle National Plans of Action

A snapshot of the Coral Triangle National Plans of Action (NPOAs) as part of the stocktake, identified that the countries acknowledge that land-based pollution and anthropogenic wastes are a threat to the marine ecosystems. Whilst not all NPOAs specifically cite plastic, several do include marine debris as a threat, and all include actions to address threats to the marine ecosystems and wildlife and several plans specifically mentioned waste management, integrated planning and strengthening policies and legislation to reduce these threats. Most of the NPOAs were developed more than 10 years ago (Solomon Islands was updated in 2018), when plastic pollution was not in the spotlight and little was understood about the volume of marine debris nor its impacts on marine wildlife and ecosystems. The CTI-CFF RPOA 1.0 goals and regional priority actions were not specifically targeting waste management nor addressing marine plastic pollution. Mostly it has been actions to address land-based threats generally and climate change adaptation specifically through integrated coastal management or MPAs and the countries themselves are parties to a range of global multilateral environmental agreements of which some are focussed on pollution from land and ships.

The CTI-CFF RPOA 2.0 does include specific actions towards tackling marine debris as a threat particularly to threatened marine species. However, the NPOAs and RPOA 2.0 could be strengthened given the information sourced during the stocktake. A brief summary of the NPOAs' actions that include threats such as marine debris or anthropogenic wastes follows:

### Indonesia NPOA

- ✓ Aims to assess key local and global threats to MPAs and marine resources, and implement strategies and improved MPA planning and management to address the threats;
- ✓ Establish and strengthen the national system of MPAs and integrate them into regional and global networks.
- ✓ Indonesia will maintain the on-going management of existing seascapes for improved quality of marine and coastal resources and will develop standards for environmentally-friendly fishing gear.

### Malaysia NPOA

- ✓ Sets out 12 guiding principles which include integrated management of coastal and marine ecosystems; where appropriate,
- ✓ Support international and regional commitments already made under relevant legal instruments and multilateral processes;
- ✓ internalization of resource use and environmental costs, taking into account the polluter pays principle;
- ✓ Develop an NPOA for seabirds addressing the severity of marine debris on seabirds; and introducing fishing net retention and recycling schemes to minimize the disposal of fishing gear at sea and on beaches.

### The Philippines NPOA

- ✓ References marine debris impacting turtle nesting and egg hatcheries; it has a strategy to remove threats and address solid waste management under the Local Early Action Plan to address climate

change. This includes the implementation of laws on prevention of marine pollution by garbage, sewage, oil and other harmful substances and biota from land and ship-based sources.

- ✓ An integrated approach is applied to planning wherein lessons learned and best practices in managing MPAs and implementing Integrated Coastal Management (ICM) will be considered. Land and water use plans will be integrated along with sectoral and regional plans. Watershed management, wildlife conservation and management, disaster and risk management, pollution control and waste management, and population and health management will be integrated into one framework under ICM.
- ✓ Adaptive management strategies for the private sector will be included, as well as management of tourism impacts.
- ✓ Fines for the Marine Pollution Law will be reviewed and revised accordingly. The NPOA also includes actions to adopt and enforce pertinent fishery and environmental policies – i.e. strengthen monitoring and surveillance of industrial and domestic waste water discharge and research on fisheries/ aquaculture will tackle biophysical impacts of fishing gears that should lead to appropriate policy recommendations.

## Papua New Guinea NPOA

- ✓ Acknowledges that anthropogenic debris, toxic chemicals, land-based sources of pollution such as sewage, sedimentation, nutrient loads etc. that are being dumped into the sea are major causes of pollution in PNG and pose a serious threat to marine habitats and species.
- ✓ The PNG Marine Programme will address current and potential threats to minimize impacts on the coastal and marine habitats and associated resources and adopt as its major organizing principle 'that management of marine resources must be for creation of jobs, economic growth', leading to the provision of poverty reduction and food security outcomes.
- ✓ PNG's NPOA aims to ensure delivery and achievement of environmentally sustainable economic growth in the marine sector through the identification, design and implementation of appropriately scaled pilot projects in partnership with a wide range of relevant stakeholders including provincial and local level governments as well as local communities.

## The Solomon Islands 2018 NPOA

- ✓ Includes a strategy for special urban management areas to reduce community pollution through integrated urbanisation management plans implemented at larger community sites to reduce local pollution (e.g. in the capital city of Honiara) and development of policy legislation, inter-institutional partnerships and other strategies and guidance to rehabilitate the Honiara urban foreshore marine ecosystem.

## Timor-Leste NPOA

- ✓ Strategy to strengthen its laws and regulations providing the required enabling environment for coastal and marine spatial planning and management of coastal and marine priority areas and integrated coastal-marine spatial planning for priority management area i.e. Jaku Island – Lore Forest; Ataúru Island; Batugadé.

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# 2

# Plastic from Land-based and Sea-based Sources

There has been significant reporting over the past few years on land-based sources of marine plastic pollution getting into our oceans. It can travel from inland and coastal sources through rivers, drains, by rain, runoff, by the wind and by dumping. It is estimated that 80 per cent of marine pollution litter originates on land. However, the level of monitoring of the amount of plastic waste generated on land varies from country to country and the volume of mismanaged waste entering the oceans is based on estimates which vary with new research and modelling globally, including for the Coral Triangle. As reported in the Future Scenarios of Global Plastic Waste Generation and Disposal (Lebreton, et al. 2019), "The magnitude and timing of plastic waste displacement on land is poorly known and may be a function of topography, land use, climate, vegetation and, particle shape and size (e.g., microplastics may be more easily transported than larger, more complexly shaped debris)."

## Land-based Sources

Land-based plastic pollution entering rivers is usually as a result of mismanaged plastic waste i.e. "waste that doesn't make its way to proper receptacles, either intentionally or accidentally and tends to be higher in developing countries lacking municipal waste-collection systems that deliver garbage to recycling centres and/or landfills." (Meijer et al. 2021). "Direct dumping contributes a significant portion of plastic litter in rivers, but land-bound trash also can make its way to water" and finds its way into local waterways from rainfall, "which feed into larger tributaries and rivers, which in turn empty into oceans. In this way, plastic from far inland can travel many miles to the coastline." (Meijer et al. 2021).

Previous research had assumed that most of the marine plastic pollution was transported by 10 of the world's largest rivers. However, new data released in 2021 (Meijer et al. 2021) shows that 80 per cent of plastic waste is distributed by more than 1,000 rivers and that "most of that waste is carried by small rivers that flow through densely populated urban areas, not the largest rivers". Modelling also indicates that countries with a relatively small land surface area compared to the length of their coastline and with high precipitation rates are more likely to emit ocean plastics (Meijer, et al. 2021). This has put the spotlight on countries of the Coral Triangle which have generally poor solid waste management and a range of geographic and biophysical features that impact the volume of plastic that rivers carry. For example, cities such as Jakarta and Manila are

drained by relatively small rivers, yet observations and modelling suggest that these rivers contribute more than rivers such as the Rhine or the Seine, for which the municipal plastic waste generation is similar yet located further upstream (Meijer et al. 2021).

In 2021, a study that looked at worldwide inventories of litter across seven major aquatic environments reported that plastic items from take-out food and beverages largely dominates global litter, followed by those resulting from fishing activities (Morales-Caselles et al. 2021). The researchers found that single-use bags, plastic bottles, food containers, and food wrappers are the four most widespread items polluting the seas, making up almost half of the human-made waste. Just 10 plastic products, including plastic lids and fishing gear, accounted for three-quarters of the litter due to their widespread use and extremely slow degradation (Morales-Caselles et al. 2021).

## Sea-based Sources

Marine plastic pollution generated from sources other than from land is also of particular relevance to the Coral Triangle region given the high levels of industrial and small-scale fishing from ships and thousands of vessels. The Coral Triangle is also a major transit area for cruise ships and other maritime activities such as transport, exploration and resource extraction and with the level of interest in oil, gas and seabed mining the level of shipping and infrastructure construction in the region is likely to increase significantly.

Sources of plastic from sea-based activities are generally not well quantified. The Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP), an advisory body that advises the United Nations (UN) system on the scientific aspects of marine environmental protection has established Working Group 43 dedicated to looking at sea-based sources of marine litter from fishing, aquaculture, shipping, ocean dumping and other ocean-based activities. In June 2020, the GESAMP Working Group 43 released its second Interim report *Sea-based Sources of Marine Litter – A Review of Current Knowledge and Assessment of Data Gaps*. It found that sea-based activities and industries contribute to the global burden of marine litter, and that this warrants concern largely because synthetic materials comprise significant portions and components of litter entering the world's oceans and that certain types of sea-based marine litter, such as ALDFG, are known to impact marine resources, wildlife and habitats." (GESAMP WG 43, June 2020).

The information provided in this section of the stocktake report is summarized from the GESAMP Working Group 43 interim report to provide an insight into the multitude of sea-based sources of plastic pollution and also the gaps in knowledge such as the volumes of plastic and the impacts.

**Abandoned, Lost, or otherwise Discarded Fishing Gear (ALDFG)**: There are large knowledge gaps on the amounts and rates of ALDFG on larger regional and global scales, and across many major gear types. The figure of 640,000 tonnes of ALDFG lost annually to the world's ocean is an old figure and a more current and accurate estimate is urgently needed. A 2009 UNEP/FAO report estimated a less than 10 per cent loss rate across all fishing gears; a more recent estimation is that 5.7 per cent of all fishing nets, 8.6 per cent of all traps and 29 per cent of all lines are lost to the world's ocean annually. (GESAMP WG 43, June 2020)

**Aquaculture**: There are no global estimates nor systematic monitoring of the amount of plastic waste generated by the aquaculture sector or aquaculture operations at the farm, regional or national levels. A significant portion of gear in marine and freshwater systems is made of plastic. It is generally assumed that aquaculture operations produce marine litter primarily through normal wear and tear of plastic gear, accidents that damage equipment (e.g. interaction of aquaculture equipment with vessels), catastrophic losses during extreme weather events and improper waste management by aquaculture operators. (GESAMP WG 43, June 2020).

**Marine Litter from Shipping and Boating**: Large shipping vessels with crew members may carry supplies for several months and generate solid wastes daily that may end up as marine litter (GESAMP, 2016) including packaging materials and plastic sheets; and sewage. The shipping industry is also a source of microplastics through cleaning of ship hulls, and mishandling of cargo comprised of plastic items or accidental spills of industrial resin pellets. Similarly, fishing industry vessels such as supply or catch-transport vessels, may deliberately or accidentally release litter items such as gloves, fish boxes, storage drums and personal waste into the marine environment. The distribution of marine litter on shore may correspond to the spatial distribution of plastic debris inputs at sea. These connectivity patterns are important to consider when addressing remote areas or areas around shipping lanes that may be more affected by debris from shipping (GESAMP WG 43, June 2020).

In a study on pollution incidents reported by observers on fishing vessels in the Western and Central Pacific Ocean from 2003-2015, more than 10,000 incidents were observed. Plastics were found to make up the largest portion of total pollution incidents at 37 per cent for purse seine and 60 per cent for pelagic long line fishing vessels, respectively. Expanded Poly Styrene (EPS) and other plastic fish boxes have been identified as one of the major waste types generated by fishing industry vessels, representing more than 80 per cent of marine litter in some fishing and aquaculture areas.

**Dumping at Sea**: There is limited quantitative information on plastics in waste dumped at sea. However, dredged materials are by far the most significant in terms of volumes and tonnages, as dredging is common in all countries with a significant level of sea-based commerce (GESAMP WG 43, June 2020).

**Offshore Oil and Gas**: There is evidence that the use of microplastics in offshore oil and gas activities could be substantial, as they are known to be used in production and drilling processes in oil and gas activities (GESAMP WG 43, June 2020).

**Other potential sources** of marine plastic pollution include shark and 'stinger' beach protection nets, usually made of polyester or nylon mesh, plastic rope, buoys and floats, as well as other various plastic materials. An estimated 65-70 per cent of weather balloons released on land by meteorological services end up in the ocean adding to those released at sea. Artificial reefs using plastic or rubber components potentially degrade creating toxic chemicals and break up into microplastics. The GESAMP interim report identifies gaps in knowledge and data on plastics from sea-based activities including the need to better understand the type, quantity and impact of sea-based sources of marine litter; to further develop capacity for data analysis and quality insurance in all regions using common approaches; understanding pathways of litter generated at sea; and their socioeconomic impacts (GESAMP WG 43, June 2020).

# 3
# Impacts of Plastic Pollution on Marine Protected Areas in the Coral Triangle

The stocktake provides a closer look at how marine plastic pollution is affecting three MPAs in the Coral Triangle: Nusa Penida Marine Protected Area in Bali, Indonesia; Bootless Bay (proposed) MPA in Central Province and the National Capital District, Papua New Guinea; and Batangas Network of MPAs in Batangas Province, the Philippines. Each of these areas of high marine biodiversity is being impacted by marine debris including plastic pollution, and in some cases ALDFG or ghost gear.

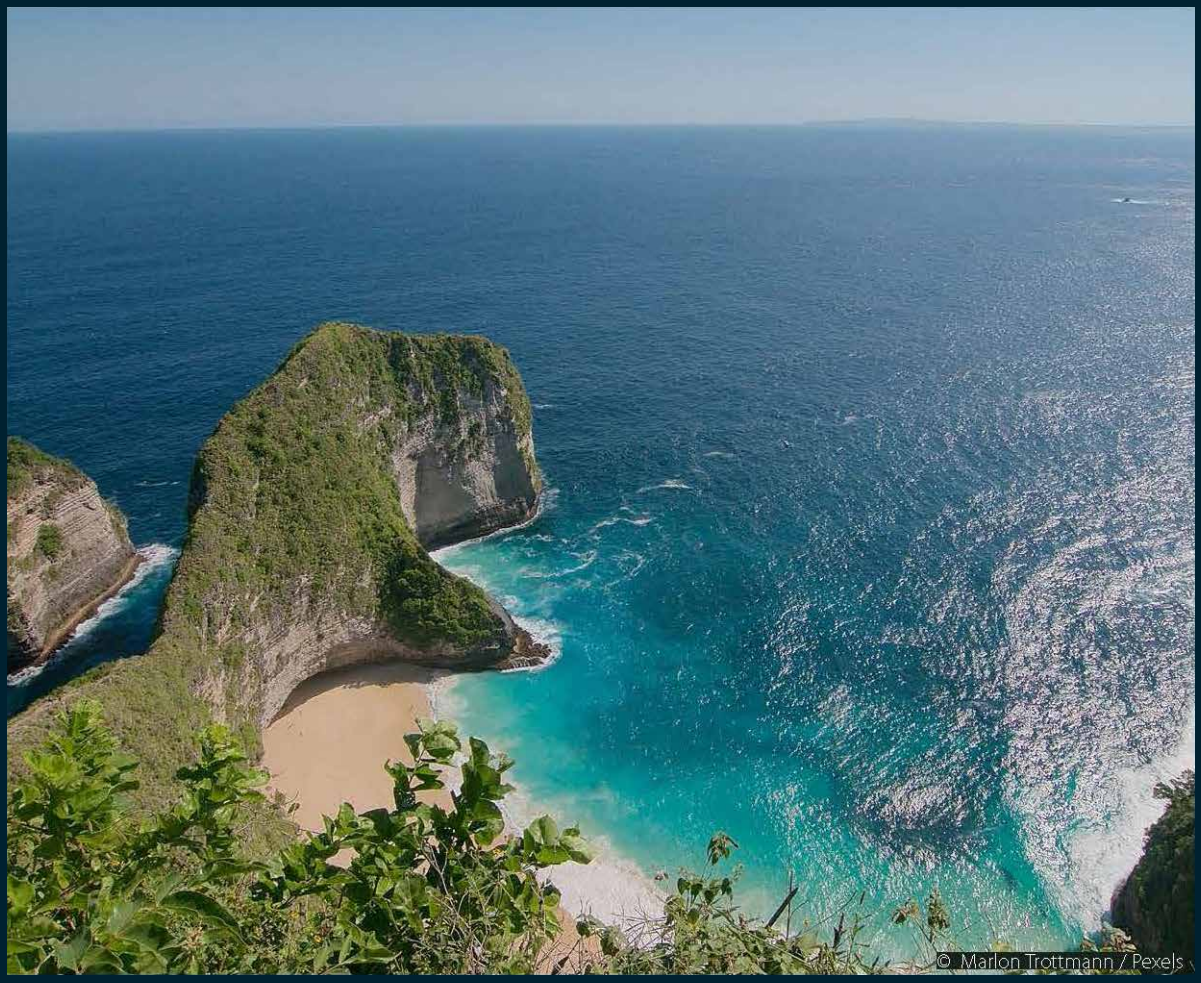
Monitoring and research appears limited in the three case studies. The Nusa Penida management group undertakes monitoring monthly. However, research and identification of marine debris and waste management is not undertaken regularly and the group plans to work with academics and researchers in the future. The incidence of plastic pollution is usually during the rainy season and west monsoon and after the annual garbage event at Bali's Kuta Beach. Limited waste management facilities on Nusa Penida and surrounding regions contribute to the pollution problem.

The Batangas Network of MPAs only undertakes monitoring and data collection once per year as part of the International Coastal Clean-up but is keen to do more. The sources of marine plastic waste are mostly coming from the upland areas due to waste generation and lack of management for solid wastes, industrial and agricultural wastes as well as from shipping and port wastes. In Bootless Bay, no regular monitoring of marine plastic pollution is undertaken within or around the proposed MPA. Several coastal cleanups along the coast of Central Province and waste audits as part of some of the coastal cleanups are the only source of data. The most common types of plastics include plastic shopping bags, PET bottles, food and drink wrappers and containers, styrofoam utensils and disposable baby diapers. The amount is significant.

On Nusa Penida, plastic pollution and other marine debris can impact the marine biota and the Nusa Penida community's livelihoods, food source, health and quality of life particularly as 14 villages out of 16 villages in Nusa Penida, depend on the tourism sector for their livelihoods. In the Batangas MPA network, marine plastic pollution impacts on the MPAs and ecosystems, the species, and biodiversity and leads to diminished aesthetic value which is important for tourism and dive sector, and can impact the local fishing industries in the municipal waters. In Bootless Bay, marine plastic pollution can result in a potential reduction in the recreational and aesthetic values of the marine environment and poses a threat to human health and impact local dive and resort operators in the proposed MPA. Whilst the National Capital District has waste collection and process facilities, collection is irregular and the wastes produced on the other side of the MPA boundary, which is in the Central province, where there is no waste collection or process facility.

case study

# Nusa Penida Marine Protected Area
BALI, INDONESIA




## ABOUT

- **Size**: 20,057 hectares
- **Population**: ca. 57,370 (BPS Klungkung 2021)
- **Location**: South-east of Bali
- **Status**: Marine Protected Area, for the preservation of marine life and sustainable livelihoods
- **Management Plan**: Completed and administered by the Marine and Fisheries Department of Bali Province Management Unit of Bali MPA.

*Note: Nusa Penida MPA includes 3 islands which are Nusa Penida, Nusa Lembongan and Nusa Ceningan.*

## What's in the Soup: Understanding Plastic Waste in the MPA

Marine debris in Nusa Penida MPA is almost a yearly occurrence during the rainy season from November to February brought on by the southwest monsoon. Types of waste include driftwoods and organic matter but also feature plastic consisting of food wrappers, sachets, plastic bags, sandals, styrofoam, among others. Estimates based on the amount collected are around 20-25 kg of plastic.

Based on visual observations and monitoring of the occurrence of plastic waste during the rainy season, it is estimated that some marine plastic possibly comes from the vicinity of Nusa Penida itself, with others carried by currents from the western part of Nusa Penida's waters. Marine debris in the waters of Nusa Penida usually happens around the same time as the garbage phenomenon around Kuta beach in Bali, which is also brought on by the monsoon.

Routine monitoring and patrolling activities in support of MPA management helps track presence of plastic debris in the MPA but in-depth research and identification is lacking. There is also a lack of routine monitoring for lost and abandoned fishing gear. Notably, however, an incidence in 2019, 80kg of ghost gear found in marine debris noted that the abandoned nets were not the type of net commonly used in Nusa Penida. Looking at the types of plastic waste, which are generally local products, the source of plastic waste in Nusa Penida is likely to have come from Indonesia.

A study in May 2021 was done by WWF-Indonesia to identify waste management in Nusa Penida Regency. The Coral Triangle Center (CTC) and Plastic Free Ocean Network (PFON) supported WWF to collect primary data via a survey that was carried out for eight days and calculated the amount of waste generated from households and waste dumped in temporary and permanent landfills.

The type of waste documented includes organic, masks/PPE, plastic bottles, plastic cups, sachets multilayer plastic-plastic, sachets multilayer plastic-metal, plastic bags, straw, others (Styrofoam, textile, and rubber). Once the data is analysed, the results will be shared with stakeholders.

The Nusa Penida MPA management group plans to collaborate with academics to participate in routine monitoring and support identification of the types and amount of plastic waste in the Nusa Penida MPA.

## Impact of Plastic Pollution

Based on available expert research, the impact of marine plastic pollution in the seas of Nusa Penida will no doubt impact marine life in Nusa Penida such as the Mola (sunfish), manta rays, sea turtles and coral reefs.

If this biota is threatened by plastic waste, it will cause a decrease in population which will lead to reduced tourism and a negative impact on the local livelihoods and economy. Most importantly, it will change the ecological balance of the marine life.

The majority of the communities on the coast, namely 14 villages out of 16 villages in Nusa Penida, depend on the tourism sector for their livelihoods by connection to diving or snorkelling activities, service sector jobs in hotels, restaurants, rental services as well as seaweed farming activities and fisheries. Plastic pollution will also impact local community livelihoods, food source, health and/or quality of life, given a high dependence on tourism for local livelihoods, with the main tourism attractions being diving and snorkelling to see the sunfish (mola), manta and coral reefs. Waste management is not optimally carried out so that it is still often burned and is likely to affect public health.

## Solutions and Opportunities

To address the marine plastic pollution, the Nusa Penida MPA management group is developing policies through the Bali Governor's regulation on plastic waste, the programme of the Regent of Klungkung and the Head of Nusa Penida Subdistrict in waste management as well as joint activities with all on-ground parties in handling waste. Traditional councils in Nusa Penida also play a role in efforts to handle plastic waste by involving local communities in routine clean-up activities and making customary agreements in dealing with plastic waste. However, the efforts made have not been fully able to overcome the existing problems because they are also constrained by the sources of waste originating from various regions.

There are several plastic waste processing facilities on Nusa Penida which are carried out by villages and individuals. The main local government authority regulation that aims to improve waste management and address plastic pollution is the Governor of Bali Regulation No. 97 (2018) concerning the limitation of single-use plastic.

To assist the Nusa Penida MPA management group in addressing marine plastic pollution they require transportation infrastructure for plastic waste collection and processing facilities. In addition they require capacity building and education especially for the community to increase the awareness of plastic pollution.

Key stakeholders including local government, coastal communities and small businesses Nusa Penida understand the impact of plastic waste and have the desire to be actively involved in efforts to overcome it, but due to limited management facilities, this problem has not been resolved. The management group hopes to learn and adopt best practices from other MPAs or small-island communities with similar context and conditions to successfully handle the burgeoning waste challenges.

One of the main partners working in the Nusa Penida MPA is the Coral Triangle Center (CTC) located in Bali. CTC, together with the Bali Provincial Government and partners, jointly promote the effective management of the Nusa Penida MPA. The CTC sees an opportunity in the increasing tourism activities in Nusa Penida, where the tourism sector can get involved in conservation through initiatives such as GreenFins, which has been established to engage the diving and snorkelling tourism sector in reducing their environmental impact and increasing their involvement in conservation activities.

GreenFins members in Nusa Penida show their commitment as evidenced by the lowered negative impact of their activities on the environment through regular GreenFins assessments every year and the increasing number of requests to become GreenFins members.

case study

# Bootless Bay National Marine Sanctuary in Central Province and The National Capital District

PAPUA NEW GUINEA


**ABOUT**

- **Size**: around 13,867.6 hectares
- **Population**: Approximately 50,000 people
- **Location**: Central Province and the National Capital District. The MPA boundary spreads across these two provinces. The MPA also shares the same coastline as Port Moresby, the capital city of Papua New Guinea
- **Status**: National Marine Sanctuary (still a proposed MPA, not fully gazetted)
- **Management Plan**: Developed but not fully implemented yet

*Note: Bootless Bay has a management plan which was developed but it is not fully implemented yet. This is because the MPA is still a proposed MPA and is awaiting endorsement by the National Executive Council (NEC). The document is titled 'Management Plan 2020 –2025, Bootless Bay National Marine Sanctuary' and can be obtained from the Conservation and Environment Protection Authority (CEPA).*

## What's in the Soup: Understanding Plastic Waste in Bootless Bay

Marine plastic pollution is a common and growing problem in the coastal areas of Central Province. It is especially prevalent in areas closer to the capital city, Port Moresby and is also faced by local communities within Bootless Bay.

There is no regular monitoring of marine plastic pollution within or around the Bootless Bay MPA. CEPA has carried out several coastal clean ups along the coastline of Central Province, some of which have contributed data for waste audits. During these simple waste audits, key data collected include general types of plastics against its mass and volume of the plastics, identifiable manufacturers of different plastic products and whether those plastic products were local or imported. The most common types of plastics found include food and drink wrappers/ containers, Styrofoam utensils and disposable diapers, while the highest percentage of the total amount of plastics collected and recorded in both mass and volume are single-use plastic bags and PET bottles.

Based on waste audits that were done in other parts of Central Province (which shares the same coastline as the MPA), most of the plastic products are from local sources. However, there has not been other waste data or audits collected directly from the communities living in and around the MPA.

Although conducted at a limited scale, simple waste audits such as these can help monitor marine plastic pollution over time within and around the MPA.

## Impact of plastic pollution

Bootless Bay is one of the biodiversity hotspots in Central Province and in the country. The main aim of establishing the MPA is to protect important ecosystems such as mangroves, seagrass and coral reefs within the bay, as well as the marine life that depends on ecosystem health. Fish, turtles and other marine animals often mistake plastics for food. Plastics can smother corals and other seabed communities. Marine animals can also get tangled up in them. The impact of marine plastic pollution within the MPA will be significant as it will threaten these ecosystems and the marine life that depend on them.

Marine plastic pollution can result in a potential reduction in the recreational and aesthetic values of the marine environment. Plastic pollution also poses a threat to human health either through direct impact (for instance sharp splinters of broken plastic in the sand) or through ingesting harmful toxins found within microplastics. These toxins have the potential to bioaccumulate throughout the food chain and negatively impact on human health when consumed with seafood. In some coastal communities, plastic waste traps human waste which results in foul smells and poses a health risk to the environment and communities.

Currently there two business establishments within the MPA boundary that have access to the marine resources or use the bay:

## Solutions and Opportunities

PRO Dive PNG, formerly known as "The Dive Centre," is one of the oldest and the most prominent dive operator in Papua New Guinea. They offer courses from novice through to professional level.

Loloata Private Island Resort is housed within the bay. It is the newest retreat just 15 kilometres out of Port Moresby. It is a uniquely designed luxury boutique resort that truly engages with its natural landscape. The resort also offers over 29 dive sites to choose from in Bootless Bay surrounding Loloata Private Island Resort.

The management plan for Bootless Bay National Marine Sanctuary does not specifically look at marine plastic pollution thus there is no strategy to specifically target this problem. However, the plan identifies 'Illegal Trash Dumping' as a threat and the strategy to address that is to develop waste management plans suitable for Bootless Bay. The management plan can be reviewed to include strategies to specifically cater for marine plastic pollution before it becomes a bigger problem.

For the National Capital District (NCD) there is a waste collection and process facility which caters for waste management within the city. The sites of the MPA within the NCD boundary are catered for by this same collection and process facility. The problem is that the waste collection is not regular and sometimes these sites are missed out during collection. For the waste produced on the other side of the MPA boundary which is in the Central Province, there is no waste collection or process facilities to cater for the waste.

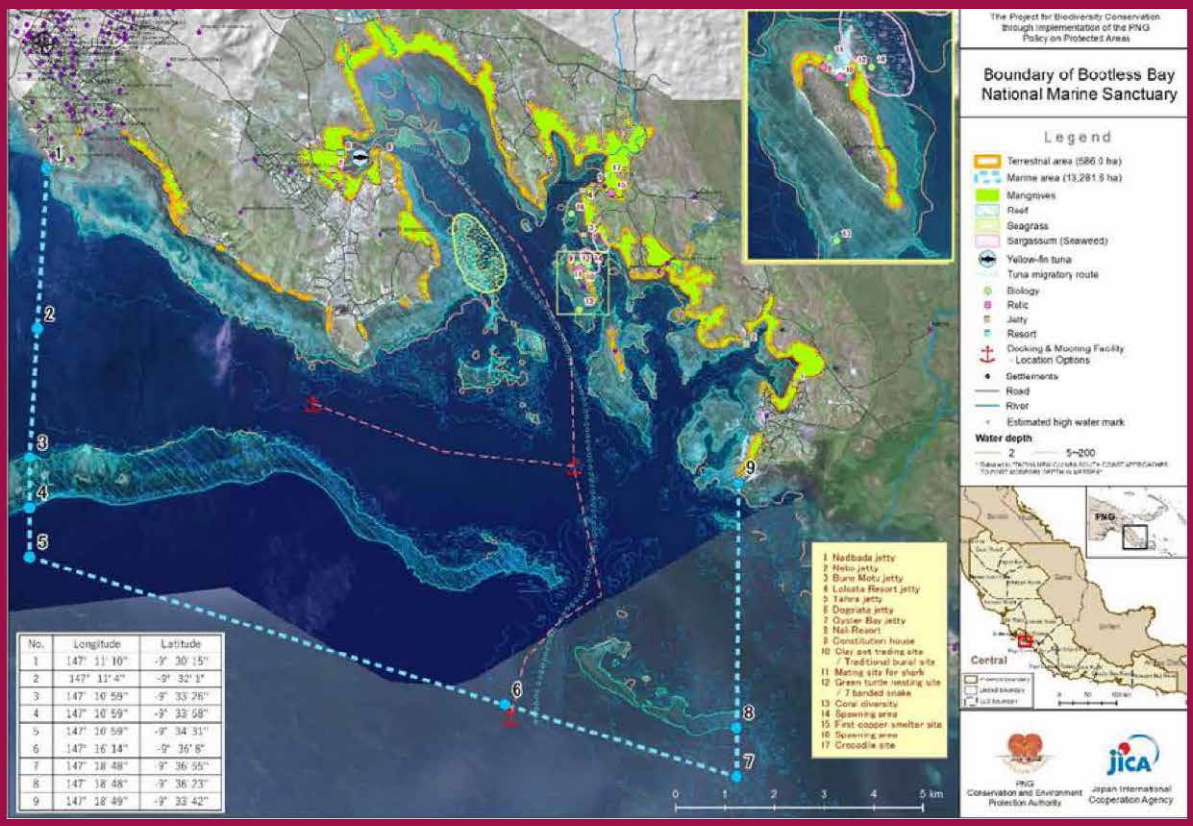



**Figure 8. Map of Bootless Bay National Marine Sanctuary**

Source: PNG Conservation and Environment Protection Authority

The Local Level Government (LLG) does not have any regulations, initiatives or incentives to improve waste management, collection or process facility to cater for the waste, although the provincial government may have a regulation in place. The LLG would require assistance from CEPA or the provincial government (due to the lack of capacity at the LLG level) to develop their own regulations suitable for their own communities/areas.

The MPA management committee would need the following support to address marine plastic pollution:

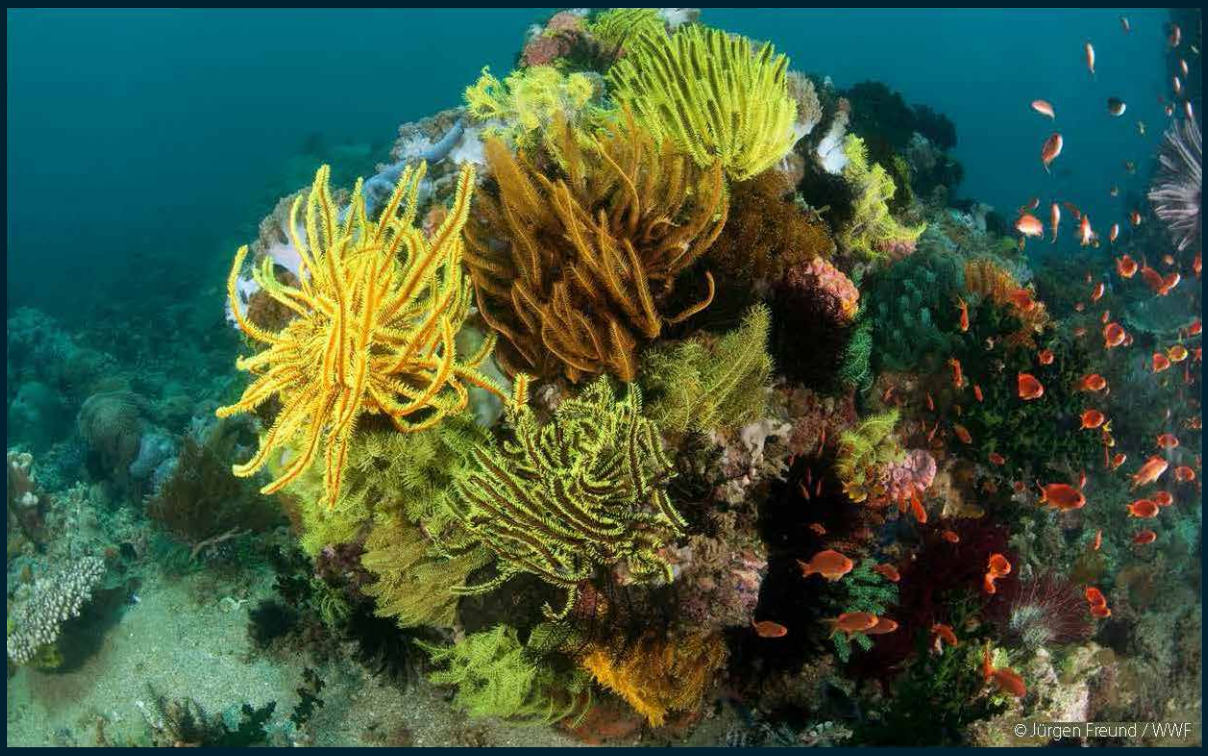
- Continuous awareness to be carried out in the local communities
- Develop strategies which are specific for addressing marine plastic pollution
- Formulation and enforcement of legislations which caters for penalties

Lessons learned or best practices from experience in dealing with marine plastic pollution include:

- There should be more activities to increase community awareness regarding marine plastic pollution
- The awareness should target different audiences at different levels of the community but particularly the youths and youth groups. They should be the champions in their own communities to help address the issue of marine plastic pollution
- There is already a national ban on the use of single-use plastics enacted by CEPA since January 2020. This can be elaborated to support strategies to address the wider issues of marine plastic pollution such as waste reduction, collection, recycling and end-of-lifecycle disposal, e.g. landfills and incinerators etc.
- Incentivize community participation in activities that help address marine plastic pollution.

case study

# Batangas Marine Protected Area Network in Batangas Province
THE PHILIPPINES




**ABOUT**

- **Size**: 2,579.7 hectares
- **Location**: Southernmost part of Batangas Province, part of the Verde Island Passage
- **Status**: Network of 54 MPAs
- **Management Plan**:

*Note: The MPA Network consists of 54 MPAs inside the coastal municipal waters, and is a part of the wider Verde Island Passage MPA Network.*

## What's in the Soup: Understanding Plastic Waste in the MPA Network

Marine plastic pollution (including Abandoned, Lost Discarded Fishing Gear or commonly known as ghost gear) is clearly visible in and around the MPAs. However, there is no established data or estimates available at this time in terms of the type and volumes or source of plastic debris.

Monitoring and data gathering of plastic pollution is conducted yearly during the International Coastal Clean-up (ICC) – in the third week of September. Data forms distributed to participants are consolidated and forwarded to the organisers of ICC (globally coordinated by the Ocean Conservancy). The MPA management group plans to monitor plastic pollution more regularly but needs technical assistance.

Likely sources of the plastic pollution recorded include solid wastes, industrial and agricultural wastes and ship and port wastes which compromise the integrity of surface and marine waters if they are not managed adequately.

**Solid waste:** Data on solid waste generation in 2014 to 2015 shows that the entire province's average waste generation is 874,810 kilogram per day, of which 47.62 % are biodegradable, 27.37% recyclable, 11.09% with potential for diversion and 12.15% are residual with per capita generation of 0.33 kg/day.

The solid waste issue is analyzed in terms of accumulation and inadequacy of waste disposal facilities. Although there are efforts to promote recycling and reuse, the current lack of incentives discouraged the interest and enthusiasm on these waste minimization efforts.

The open and unsanitary dumpsites aggravate the problem of accumulation. Very few controlled disposal facilities exist in the province. The weak technical and financial capability of local governments to support comprehensive waste management as required in Republic Act No. 9003, otherwise known as the Ecological Solid Waste Management Act of 2000, is seen as a significant factor among others affecting solid waste generation, accumulation, and disposal.

Shipping and Port: Shipping activities and expansion of port facilities have generated ship and port-related waste that are eventually illegally dumped in the bay waters. This is more intensely felt in Batangas Bay. Additionally, an increase in ship collisions and oil spills is happening due to increasing vehicle traffic. Illegal discharge of wastes from shipping vessels has also been observed and the port authorities of Batangas noted that the inadequate collection and disposal system of the port cannot cope with the demand of the increasing vessel and passenger traffic. (Strategic Environmental Management Plan 2005–2020).

## Impact of Plastic Pollution

While there is currently no specific data available on the impact of marine plastic pollution on the community's livelihoods, food security, health and/or quality of life, there is a visible impact on the diminished aesthetic value of the MPAs, which are known dive sites and designated for tourism.

Livelihoods and income generating activities that could become adversely impacted (if not already) by marine plastic include hook and line fishing within the municipal waters by small-scale fishers, as well as tourism activities such as diving and snorkelling outside the MPAs' buffer zone.

## Solutions and Opportunities

The Batangas Province has developed a Solid Waste Management Plan (2015-2025) and the Strategic Environmental Management Plan (2020-2045) to improve management of municipal solid waste and industrial and agricultural waste; these plans aim to minimize the pollution impact on the bays and other water bodies in the province.

In terms of plans to develop any marine plastic pollution strategies or initiatives, construction of a common sanitary landfill has been proposed previously. It could be reviewed and studied for future consideration.

Local Government Units have their respective solid waste management practices, some have their own operated sanitary landfill, and others are transporting and disposing their wastes to private sanitary landfills. Local government authority regulations to improve waste management and address plastic pollution include a Municipal Ordinance on Solid Waste Management and an Environmental Code relative to Solid Waste Management.

The Batangas MPA management committee has identified the following areas that need support to address marine plastic pollution:

- Assistance on data gathering for the types, volume, source/origin, initiatives, etc. relative to marine plastic pollution
- Technical and financial assistance for the development of a Management Strategy for Marine Plastic Pollution
- Assistance for the updating and improvement of the Provincial Solid Waste Management Plan

Lessons learned or best practices from experience in dealing with marine plastic pollution include:

- The problem of solid waste management and marine plastic pollution cannot be solved without the cooperation of everyone
- A Ridge-to-Reef approach on dealing with marine plastic pollution is needed, since the sources of marine plastic waste are mostly coming from inland areas. Coordinated action, shared responsibility and an integrated approach are needed to be in place.

# 4

# Action to Address Marine Plastic Pollution

The stocktake approach included analysis of existing available reports, strategies and responses to questionnaires to identify the range of actions planned or being undertaken by the Coral Triangle national governments, local level government, strategic partners and stakeholders.

## National Government Actions

The following is a summary of the respective national-level initiatives and actions.

### National Actions: Indonesia

To achieve Indonesia's 2025 targets, **the National Plan of Action for Combating Marine Litter 2018-2025** outlines five strategies:

1. National Movements for Improving Behavioral Change: Stakeholder awareness for efficient and effective involvement in managing marine plastic debris and co-ownership in solving the problem through nongovernment stakeholders' engagement.

2. Controlling Land-Based Leakage: The improvement of solid waste management by shifting from end of pipe and linear solutions to 3Rs, EPR and circular solutions.

3. Handling Coastal and Sea-Based Leakages: Monitoring, surveillance and law enforcement on ocean littering to address plastic from ships, fishing and pleasure boats.

4. Enhancing Funding Mechanisms, Policy Reform and Law Enforcement: Funding for the Marine Litter National Plan of Action is expected mainly from regional and national budgets and supported by International organizations and partnering countries.

5. Research and Development: To prevent and solve marine debris problems through handling debris, developing alternative material for plastic and developing an innovation scheme for circular economy.

**Indonesia National Plastic Action Partnership (NPAP): Radically Reducing Plastic Pollution in Indonesia: A Multistakeholder Action Plan** is a roadmap towards reducing the amount of plastic leakage (mismanaged plastic waste) into Indonesia's coastal waters by 70% by 2025, as well as achieving near-zero plastic pollution by 2040 through transitioning to a circular economy for plastics (World Economic Forum, 2020). "The Action Plan compares two possible outcomes for Indonesia: one is the 'business as usual' scenario, in which plastic pollution is projected to increase by one-third by 2025 and more than double by 2040, if no action is taken. The other is the System Change Scenario, which would enact a series of ambitious, society-wide transformations, including the following five key interventions:

1. Reducing or substituting avoidable plastic usage to prevent the consumption of more than one million tonnes of plastics per year;
2. Redesigning plastic products and packaging with reuse or recycling in mind;
3. Doubling plastic waste collection to more than 80% by 2025;
4. Doubling current recycling capacity by 2025; and
5. Building or expanding controlled waste disposal facilities to safely manage non-recyclable plastic waste.

Under the System Change Scenario, Indonesia is expected to prevent 16 million tonnes of plastic entering its coastal waters, curb 20 million tonnes of greenhouse gas emissions per year, create more than 150,000 jobs, and significantly improve public health outcomes". (World Economic Forum, 2020).

Indonesia reports its recent achievements in addressing marine plastic pollution, which include: (ref: Osaka Blue Ocean Vision www.g20mpl.org/partners/indonesia)

- MOEF roadmap of producers' waste reduction programme in line with the Extended Producer Responsibility (EPR) approach. Three sectors regulated in this roadmap include brand-owner manufacturers, retailers, and the food and beverage service industry (hotel, restaurant, cafe and catering). The roadmap is a guide to reduce waste generated from products and packaging.

- Phasing out single-use plastic: Two provincial governments and 19 cities and regencies have banned or have planned to ban plastic shopping bags, plastic straws, and plastic foam (styrofoam).

- Government financial schemes to improve local governments' capacity in waste management for activities including construction and rehabilitation of landfills and solid waste management facilities; subsidies for local governments to support waste to energy facility operations and a national incentive budget for local government for successful prevention and reduction of plastic waste generation.

- Awareness raising that promotes reduction of single-use plastic usage: National and local government collaboration with NGOs, businesses, and civil society for awareness through communication, information, and education activities.

- MOEF and MOEC Program Adiwiyata or Green School applies an environmental way of life in daily school activities including using less waste, waste separation, composting, upcycling packaging waste, greening the school, environmental awareness and waste management in school curricula.

- Research and Development on marine litter through surveys, data collection and data quality improvement e.g.:
  - Survey and monitor marine litter in 18 locations using UNEP Marine Litter Survey and Monitoring Guideline carried out by MOEF;
  - Marine Debris Rapid Hotspot Assessment in 15 locations with financial support from the World Bank;

  - Marine Litter and Microplastics research in plastics waste, water, sediment and marine biotas by Centre for Oceanographic Research Indonesia Institute of Science;
  - Indonesia is the first designated National Plastic Action Partnership (NPAP) as part of the Global Plastic Action Partnership (GPAP), with the vision of averting plastic pollution by 2025 through fast-tracking circular economy solutions.

- Since 2018, the government has been working in collaboration with development partners and research organizations to clean up the Citarum River, the biggest river in West Java and one of the most polluted rivers in the world. The aim of the Citarum Harum revitalization program is to make the Citarum's water drinkable by 2025. It has been supported through the International Monetary Fund and the Asian Development Bank, local universities, environmental agencies and Monash University (Monash Lens, Mirage, 26 August, 2021).

- In September 2021, Ministry of Environment and Forestry (KLHK) announced steps taken by Indonesia for handling marine debris, including the new Center for Marine Hygiene Capacity Development in Bali, as well as the implementation of Extended Producer Responsibility and the start of a circular economy approach. Indonesia also supports the ongoing global framework discussions for dealing with marine debris and plastic pollution. (Minister emphasizes Indonesia's commitment to handle plastic waste – *Antaranews.com*, 3 September 2021)

- In March 2022, Indonesia's Ministry of Education, Culture, Research and Technology and Australia's national science agency, the CSIRO launched "the Plastics Innovation Hub Indonesia (the Hub), to achieve systemic change and transform plastic pollution in Indonesia and the wider region." The Hub will "provide a vehicle for collaboration and a testbed for innovation, bringing together local communities and governments, businesses, and investors with trusted scientific expertise to undertake action-based projects, producing information, tools, technologies and processes for real-world change". In February 2020, the President of Indonesia and Prime Minister of Australia formally committed to address marine plastics as a key bilateral issue through the creation of the Hub to deliver a deep-tech innovation program to design, develop, and scale highly impactful solutions to address plastic waste. See: www.events.csiro.au/Events/2022/February/10/Plastics-Innovation-Hub-Indonesia-Launch

## National Actions: Malaysia

In October 2018, the Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC), released Malaysia's Roadmap towards Zero Single Use Plastic 2018 – 2030. The initial focus for Phase 1 from 2018 to 2021 is on single-use plastic (SUP) items such as plastic bags and straws, how to avoid them or replace them with compostable, more eco-friendly alternatives in the future. Measures include:

- Nationwide implementation of a pollution charge for plastic bags by end of 2021
- Measures to reduce use and replace polystyrene and plastic food packaging
- A review of existing laws and development of a legal framework on single-use plastics, technical guidelines on biodegradable and compostable products for State Governments.

Phase 2 of the Roadmap will include other plastic packaging items such as bottles, containers and flexibles or films, which will cover from 2022 to 2025 starting with the development of a Circular Economy Roadmap (CER). To support this effort, in 2019, the MESTECC announced the setting up of "Malaysia Plastic Pact" (MPP), a multi-stakeholder platform for public and private stakeholders in the plastic value chain to commit

to actions and goals to shape a circular plastics economy by building a national plastics collaboration network. Phase 2 includes:

- Looking into improvement of plastic products design to make them more recyclable and increase recycled content
- Adoption of an effective plastic waste collection, sorting and recycling system and extended producer responsibility (EPR) schemes
- Building a research and development agenda for circular plastics. An EPR working group of MPP has been established
- Malaysia Plastic Sustainability Roadmap 2021–2030. The policy was launched on 10th December 2021 shifting the whole plastic value chain to sustainable practice, adopting circular economy principles. This sustainable circular ecosystem covers the whole range of elements from design innovation, supply chain collaboration, high-value recycling industry, resource efficiency through manufacturers and brand owner's accountability in managing end-of-life impacts of their products to ensure the circularity of plastics value chain. The objectives of this roadmap are to address plastic pollution in Malaysia sustainably, to guide and promote sustainable business practices, and harmonize actions along life cycle approach. See: www.kasa.gov.my/ms/mpsr
- National Marine Litter Policy and Action Plan 2021–2030. The policy aims to reduce marine plastic pollution in Malaysia through strategic actions along the value chain of plastic life cycle. It outlines five pillars: Policy Adoption and Implementation; Deployment of Technologies, Innovation and Capacity Building; Improve Monitoring and Data Collection on Marine Litter; Communication, Education & Public Awareness and Outreach; and Whole- Of-Nation and Multi-Stakeholders Approach. The Policy is substantiated with 17 action plans and 103 activities to be implemented in tandem with the Plastic Sustainability Roadmap 2021-2030 and the Roadmap Towards Zero Single-Use Plastic 2018-2030. See: www.kasa.gov.my/resources/alam-sekitar/national-marine-litter-policy/
- 12th Malaysia Plan. The effort to address plastic pollution has been highlighted in 12th Malaysia Plan under Chapter 6 (Improving Regional Balance and Inclusion), focusing on strengthening the waste management and Chapter 8 (Advancing Green Growth for Sustainability and Resilience) which concentrated on transitioning the linear economy to circular economy, to create a more sustainable and responsible plastic economy. Extended Producer Responsibility (EPR) was highlighted in the document as a policy approach where producers are held responsible for the treatment and disposal of post-consumer products, either through self-undertaking or financial contribution. Assigning such responsibility will incentivise producers to reduce waste at source and promote the production of environment-friendly products.
- 12th Malaysia Plan Projects-Development of Plastic Circular Economy Framework (Pembangunan Kerangka Tindakan Ekonomi Kitaran Plastik). The objective of this 12th Malaysia Plan project is to address plastic pollution in Malaysia in a sustainable manner, by ensuring a balance between economic development, environmental conservation and community well-being. This is in line with SDG 12: Sustainable Consumption and Production. The scope of this project includes the development of EPR governance framework, identifying problematic single use plastics in the local context, social impact analysis of polluter-pays-principles, feasibility study on manufacturing levy, and alternatives products for plastics.

- Technologies and Solutions to Manage Plastic Waste in Small and Remote Islands. The Technology Options for Plastic waste in Island Contexts (TOPIC) Toolbox for Islands in Malaysia is a mechanism for island policy- and decision-makers to identify appropriate technologies and solutions to address plastic waste. TOPIC Toolbox recommendations are tailored to the unique context of each island based on specific characteristics such as population, solid waste volume, waste collection rates, composition of plastic in waste, seasonal changes (e.g., tourism), the offtake prices of recyclables and waste transport costs. To demonstrate the practical applications, this project used the framework and the TOPIC Toolbox to identify potential solutions and technologies for managing plastic waste on five islands in Malaysia which are Tioman, Perhentian, Mabul, Pom Pom and Mataking/Timba Timba.

## National Actions: Papua New Guinea

PNG is a signatory to the Pacific Regional Waste and Pollution Management Strategy (Cleaner Pacific 2015-2025). In 2018, the PNG government announced it would be introducing a ban on single use plastic bags with a two-year grace period. The CEPA regulates the import, manufacture and distribution of all plastics in the country and has tried to take action to support the initiative through its permitting restrictions on manufacturing and importing of single plastic shopping bags for retail outlets from March 2020. See: www. islandsbusiness.com/images/2020content/February/Ads/PNG%20Conservation%20&%20Environ.pdf

The ban is on the import of biodegradable plastic shopping bags to allow for local production of plastic. According to CEPA four local companies are producing plastic (The National, 30 July 2021, see: www. thenational.com.pg/plastic-pollution-highlighted)

In 2021, Papua New Guinea signed the 'Ocean Day Plastic Pollution Declaration' presented by the Alliance of Small Island States on the occasion of the High Level Meeting on Oceans on 1 June 2021. The signatories committed to "work for a decision at UNEA 5.2 to establish an Intergovernmental Negotiating Committee recommending starting negotiations of a global legally binding agreement to combat plastic pollution, with the aim of concluding this as soon as possible." See: plasticdeclaration.aosis.org.

## National Actions: The Philippines

The Philippines government has been developing strategies to address the challenges it faces with marine plastic pollution and waste management. Details on these are outlined below:

- National Solid Waste Management Strategy (NSWMS) for 2012-2016 included medium-term plans to materialize the National SWM Framework, implement the provisions of RA 9003 and its rules and regulations, and mainstream policies into the Philippine SWM sector.

- Philippine Development Plan for 2017-2022 targets a national solid waste diversion rate of 80 per cent by 2022. In 2015 the waste diversion rates in Metro Manila and outside Metro Manila were reported at only 48 per cent and 46 per cent, respectively. A key strategy is to enforce the compliance of LGUs to RA 9003; promote the practice of 3Rs and proper waste management; strategic clustering of sanitary landfills and

SWM technologies and promote sustainable consumption and production through measures such as a "polluters pay" policy, developing a sustainable market for recyclables and recycled products; and incentives for eco-friendly technologies, systems, and practices in the public and private sectors. (WWF, 2020).

- National Plan of Action on Marine Litter (NPoA-ML), November 2021, promotes shared responsibility, accountability and participatory governance in addressing marine litter and aims to achieve the goal of zero waste in Philippine waters by 2040 (DENR, 28 Sept, 2021). The plan has 10 strategies including establishing science- and evidence-based baseline marine litter data that will help identify appropriate interventions to address the problem, mainstreaming circular economy and sustainable consumption and production initiatives to help reduce waste, enhancing waste recovery and recycling coverage and markets, preventing leakage from collected or disposed waste, reducing maritime sources, as well as managing litter that is already existing in riverine and marine environments. Other strategies include enhancing policy support and enforcement for prevention and management, a strategic and targeted social marketing and communication campaign, enabling sufficient and cost-effective financing and other institutional resource requirements for NPOA-ML's implementation as well as strengthening capacities of local government units and local-level implementation of NPOA (DENR, 28 Sept 2021).

- Other government actions include Phase 1 (Cleanup/Water Quality Improvement) of the Manila Bay Rehabilitation (Battle for Manila Bay) e.g. closure of dumpsites near Manila Bay, assistance for LGUs to develop SWM Plans, clean-ups of Manila Bay river ways, installation of trash traps along creeks and other tributaries, Adopt an Estero/Water body Program of DENR to clean up the polluted water bodies/ waterways that drain into Manila Bay. (See 'river warriors' and their fight to clean the Pasig River: www. ow.ly/xdo650FU98s).

- At least 316 LGUs have passed resolutions that ban, control, or regulate the use of Single Use Plastics (Ref. Oskar Blue Ocean Vision platform. Whilst there is no nationwide regulation or ban on plastics there are efforts underway to introduce Bills into the legislative process to address single-use plastics and other plastic products are at various stages of the legislative process and propose the implementation of an EPR system. (WWF, 2020).

- Initiatives by the government to increase the level of recycling include establishment of MFRs for sorting of mixed wastes, recycling and composting. At the barangay level, recyclables collected are sold to larger recycling facilities for further processing or used as feedstock for its own recycling initiative such as pavers. Other LGUs coordinate with private companies to organize recyclable collection events, for wastes brought by local residents, shops and small factories. (WWF, 2020).

- The Department of Trade and Industry has published a guide for the recycling industry. The Bureau of Product Standard has started to put a coding system on some of the manufactured plastic packaging, which will allow for faster segregation between seven types of plastics. The Department of Science and Technology's Industrial Technology Development Institute (ITDI), is developing technologies including recycling of aluminium laminated film packaging wastes (composites) which can be made into sandals and shopping bags; and recycling of styrofoam wastes which can be included with cement-based mixtures to make light weight blocks, tiles, bricks and boards (ITDI, 2020/WWF, 2020).

- In 2021, the Philippines signed the *'Ocean Day Plastic Pollution Declaration'* presented by the Alliance of Small Island States on the occasion of the High Level Meeting on Oceans on 1 June 2021. The signatories committed to "work for a decision at UNEA5.2 to establish an Intergovernmental Negotiating Committee recommending starting negotiations of a global legally binding agreement to combat plastic pollution, with the aim of concluding this as soon as possible." See: www.plasticdeclaration.aosis.org.

## National Actions: The Solomon Islands

The Solomon Islands government has commenced a range of initiatives towards addressing waste management and marine plastic pollution. The following information has been sourced from the website Solomon Islands Actions and Progress on Marine Plastic Litter: (Towards Osaka Blue Ocean Vision – g20mpl.org/partners/solomonislands).

Prevention and reduction of plastic waste generation:

- Single Use Plastic ban. Solomon Islands has initiated the process to ban single use plastics since November 2019 through initial stakeholder consultation. The timetable and strategy for the proposed Ban on Single Use Plastics is currently under development.

- Container Deposit Legislation. Through the EU funded PacWaste PLUS regional project implemented through SPREP, the government plans to review an existing feasibility study on a Container Deposit Scheme for Solomon Islands and to develop technical guide note for the drafting of a legal framework on Container Deposit Legislation.

- Support Provincial Governments to develop Provincial Waste Management Plans. MECDM continues to assist provincial governments to develop their Waste Management Plans by conducting consultation workshops and waste audits to collect information and data and assessments for suitable landfill sites.

- Promotion of waste minimization through 4R (Refuse, Reduce, Reuse, Recycle) initiative. This includes waste segregation at source and introduction of home composting of organic wastes. Eco-school programme and eco-bag pilot projects were implemented as part of this promotion.

- Sharing scientific information and knowledge: Research, Development and Monitoring. The Commonwealth Litter Programme (CLiP), is led by the UK through the Centre for Environment Fisheries and Aquaculture Science (Cefas). CLIP supported the Solomon Islands to take action on plastics entering the oceans including an assessment of the land waste production rates and waste management performances. The article "Occurrence and abundance of meso and microplastics in sediment, surface waters, and marine biota from the South Pacific region", based on the microplastics survey conducted in the Solomon Islands and Vanuatu) has been published in the Marine Pollution Bulletin. Refer to the article link: authors.elsevier.com/sd/article/S0025-326X(20)30690-1.

- Promotion of international cooperation. The Ministry of Environment has been collaborating with a number of development partners such as JICA, EU, and UNDP through regional projects on waste management. These include:
  - JPRISM II – A JICA funded regional project implemented by SPREP in 9 Pacific countries. The objectives are to strengthen waste management capacity in the region through implementing the Cleaner Pacific 2025 strategy at both national and regional levels.
  - PacWaste PLUS Programme – This initiative is funded by the European Union (EU) and implemented by SPREP to sustainably and cost effectively improve regional management of waste and pollution. The programme is being implemented in 15 countries including the Solomon Islands which has prioritized focusing on solid waste (recyclables and organic waste) and hazardous waste (e-waste).

- In 2021, the Solomon Islands signed the 'Ocean Day Plastic Pollution Declaration' presented by the Alliance of Small Island States on the occasion of the High Level Meeting on Oceans on 1 June 2021. The signatories committed to "work for a decision at UNEA5.2 to establish an Intergovernmental Negotiating Committee recommending starting negotiations of a global legally binding agreement to combat plastic pollution, with the aim of concluding this as soon as possible." See: plasticdeclaration.aosis.org.

Achievements:

- Completion of **Honiara City Council Waste Management Plan**
- Establishment and launching the **Solomon Islands Recycling and Waste Management Association** in November 2019.
- **Multi-stakeholder involvement and awareness raising**: Successful clean up campaigns conducted over the years which contribute to increasing knowledge and awareness of the importance of proper waste management practices. This is usually done during international event commemorations.
- **Promotion of international cooperation**: Includes development of the National Implementation Plan under the Stockholm Convention; Data collection, development and design of in-country projects through collaboration with PacWaste Plus Project; and strengthening of institution and technical capacity through the JICA funded J-PRISM Project which resulted in the newly established Waste Management Division under the Honiara City Council.

## National Actions: Timor-Leste

In September 2020, Timor-Leste approved Decree-Law No. 37/2020 which prohibits the introduction into the national market of non-recyclable, non-oxo-biodegradable or non-oxo-degradable single-use plastic packaging or objects, as well as a general prohibition on making available to the public plastic objects such as bags, cutlery, cups or straws for single use (except for those that are compostable or biodegradable). The new statute also provides for internationally recognized principles of Environmental Law, such as the principle of Extended Producer Responsibility, see www.mirandalawfirm.com/en/insights-knowledge/publications/legal-news/timor-leste-legal-news-september-through-november-2020

As part of its goal to become the world's first plastic neutral country, in 2019 Timor-Leste and Australian company Mura Technology, entered a partnership to establish a Catalytic Hydrothermal Reactor (Cat-HTR) plant, "a patented hydrothermal upgrading technology that uses water under high temperature and pressure to chemically recycle waste plastic back into oil" (Waste Management Review, 2019). The chemical recycling plant has the potential to convert Timor-Leste's entire plastic waste stream into petrochemicals.

The Centre of Environmental Education and Information (CEEI) was established two years ago under the Secretary State for Environment. CEEI is responsible for conducting research regarding environmental issues, undertaking public awareness and developing environmental curricula. Prior to the establishment of CEEI, the government had limited environmental data. CEEI plans to conduct research regarding microplastics and to understand the condition of marine and coastal areas in Timor-Leste regarding marine

litter. In addition, the Secretary State for Environment has implemented socialization on the Decree Law on the Elimination of Plastic and a Zero Plastic Policy in various districts through public awareness and social media. Furthermore, CEEI has established 300 Environmental Brigades to protect coastal areas. In addition, CEEI runs a Green School Programme for public awareness and encouraging communities to protect marine and coastal areas. (CEEI, August 2021 pers. coms.)

Timor-Leste is part of the GEF funded Arafura and Timor Seas Ecosystem Approach Program (ATSEA-2) Program, implemented by the United Nations Development Programme (UNDP) and jointly coordinated with the Timor-Leste Ministry of Agriculture & Fisheries (MAF). It is aimed at addressing five primary environmental concerns – unsustainable fisheries, habitat degradation, pollution, loss of biodiversity and the impacts of climate change. It supports stakeholders who depend on the Arafura and Timor Seas region for their livelihoods, through sustainable development initiatives. See: atsea-program.com

Under the ATSEA Phase 2 program, activities have included beach clean-ups in the South Coast municipalities of Viqueque, Manatuto, Manufahi and Covalima where marine debris is washed ashore by strong currents and storm surges. A study of the area in 2021 identified the types and sources of marine pollution originating from the land or the sea. "Preliminary findings show that around 80% of ocean debris came from land and is made up of plastic, rubber and glass, transported to sea via river discharge. An average of 17.5% was offshore fishing debris – a large part of which came from illegal international fishing vessels operating in the Timor Sea. In some municipalities, however, sea-based pollution was as high as 66% (Manatuto) and 22% (Viqueque). On average, the study reported finding 11 grammes of plastic per square metre surveyed, with hotspots concentrated around river mouths. Sedimentation from soil erosion was another major source of south-coast marine pollution impacting fisheries, ecosystems and livelihoods." (*Preliminary Study Shows Livelihoods Vulnerable to Marine Pollution* ATSEA Q2 Newsletter | April – June 2021 – See: atsea-program.com/wp-content/uploads/2021/07/ATSEA-Q2-Newsletter-2021_1.pdf)

In addition, ATSEA-2 is providing training and awareness to communities to improve waste management. In 2021, MAF and UNDP held a three day training for the Uma Boco coastal village in the Barique Administrative Post of the Manatuto Municipality. It included learning about waste and impacts on ecosystems; plastic waste management at the household level, identification of types of plastic and demonstration on how to upcycle plastic waste into products of greater value. This training and awareness is part of a broader approach to raise awareness on conserving marine biodiversity to ensure sustainable development and resiliency in coastal areas, while protecting coastal and marine ecosystems. (*"Upcycling Plastic Waste to Minimise Pressures on Ecosystems and Biodiversity in Manatuto"*. ATSEA Q3 Newsletter | July – September 2021. See: atsea-program.com/wp-content/uploads/2021/10/E-Newsletter-Q3-2021.pdf

In 2021, Timor-Leste signed the 'Ocean Day Plastic Pollution Declaration' presented by the Alliance of Small Island States on the occasion of the High Level Meeting on Oceans on 1 June 2021. The signatories committed to "work for a decision at UNEA5.2 to establish an Intergovernmental Negotiating Committee recommending starting negotiations of a global legally binding agreement to combat plastic pollution, with the aim of concluding this as soon as possible." See: plasticdeclaration.aosis.org

## Solid Waste Management in Local Governments

The following section is a snapshot of what two LGAs in the Coral Triangle region face in terms of dealing with marine plastic pollution and waste management. Presented here is a summary of information provided through a survey of the Coral Triangle Local Government Network for Kupang City in Indonesia and Alotau town in Papua New Guinea.

The two local authorities face similar challenges in terms of waste management and marine plastic pollution. Both have taken the decision to participate in global initiatives which provide support for cities and local authorities to address issues of waste management – Kupang is part of the Zero Waste Cities project and Alotau is engaged in the J-PRISM II project supported by the Japan International Cooperation Agency and SPREP. The two authorities are planning to develop waste management strategies which will include options for managing plastics waste and recycling.

In Kupang and Alotau, the collection services are not able to cover 100 per cent of waste generated and as a result, uncollected waste becomes mismanaged and ends up being dealt with by communities, or finds its way into rivers, streams, in the ocean and in the local environment. Collected waste is mixed, not segregated and there are no plastic recycling facilities in Alotau. Each local authority operates a landfill where the collected mixed waste is dumped, while medical waste is managed by the local health authorities or hospitals and is incinerated.

The two local authorities are considering incentives and policies needed to reduce the amount of waste generated including plastic wastes especially single use plastic; and are considering segregation, recovery and recycling of materials and innovations in packaging and alternatives to plastic. There is a strong focus on community engagement and awareness in minimizing waste and use of plastic and in the case of Alotau, the community groups and private sector are supporting local initiatives to replace imported plastic bags.

For further details please see the case studies on Kupang (see page 55) and Alotau (see page 56).

CASE STUDY

## KUPANG CITY
## INDONESIA

**Kupang** is the capital of the Indonesian province of East Nusa Tenggara on the island of Timor. Kupang has a population of 442,758 and is the largest city and port on Timor Island.

The Kupang Local Government Authority (LGA) is a member of the Coral Triangle Local Government Network (LGN) and is also participating in the Zero Waste Cities programme which was established by the Global Alliance for Incinerator Alternatives (GAIA), the Break Free from Plastic movement and the Plastic Solutions Fund.

Kupang's Department of Environment and Cleanliness is the agency responsible for the city's waste management activities which covers: issuance of regional and mayoral regulations regarding the use of single-use plastics; TPA (final waste facility) transmission from open dumping to sanitary landfills, plastic-free market and implementation of Zero Waste Cities project activities.

The city is planning to develop a waste management strategy which will include the issuance of regional regulations. Regional regulations regarding plastic waste restrictions that have been issued are:

1. Mayor Regulation No. 33 of 2019 on Reduction of Plastic Bags Use;
2. Mayor Instruction No. 071/DLHK.188.45.5.660/VIII/2019 of 2019 on Reduction of Plastic Waste in Schools and Places of Worship.

Waste management services for city residents and households are provided for free.

Volume of mixed waste produced per day in the LGA is about 885.516 $m^3$. The LGA collects approximately 68 per cent of the waste, and the amount that is plastic is estimated to be 20.5 per cent. There is no waste separation and the final waste disposal facility is a TPA local dump which is managed by the LGA. The waste not collected is processed by the community, the provincial government, or by hospitals that have an incinerator.

There is a plastic waste recycling facility managed by the community (Mutiara Timor Waste Bank).

The Kupang LGA does intend to develop incentives to avoid and reduce the amount of waste generated including plastic wastes especially single-use plastic; and to encourage the recovery and recycling of materials. It is also considering policies that support and facilitate innovations such as redesign of plastic packaging, while increasing local awareness to reduce the use of plastics and to improve waste management and recycling with a focus on communities and local groups through training and behaviour change campaigns.

CASE STUDY

## ALOTAU URBAN LOCAL GOVERNMENT, MILNE BAY PROVINCE PAPUA NEW GUINEA

**Alotau town** is the capital of the Milne Bay Province in the South East of Papua New Guinea. It has a population of approximately 16,000 people.

The Alotau Urban Local Level Government is also a member of the Coral Triangle LGN and is participating in the *Japanese Technical Cooperation Project for Promotion of Regional Initiative on Solid Waste Management, Phase II (J-PRISM II)* which is a partnership with waste management agencies of target countries and with SPREP.

Under the J-PRISM II Project and in partnership with the PNG Conservation and Environment Protection Authority (CEPA), Alotau Urban LLG is developing a town-level waste management strategy following a waste characterization study in March 2021.

Alotau Urban LLG collects mixed waste as there is no segregation. This includes all types of plastics, e-waste, organic, paper and pharmaceuticals. Approximately 80 per cent of waste generated is collected of which approximately 50 per cent is plastics. The Milne Bay Provincial Health Authority manages the medical (infectious and hazardous) wastes. The Huhu Rural LLG manages waste generated at the Alotau town market while businesses and commercial enterprises deal with their own wastes.

The final waste disposal facility for the mixed waste is Gehua open dump site managed by the Alotau Urban LLG, and medical waste is also incinerated at Gehua. The remaining 20 per cent of waste which is uncollected is dumped in backyards or in rivers and creeks by illegal settlements. Most of the uncollected waste ends up in the ocean via rivers and streams during flooding and heavy rains or eventually ends up being covered by soil.

One privately owned recycling facility is catering for scrap metal and aluminium cans in Alotau town, however, there are no facilities for plastic recycling. The new waste management strategy will consider options for plastics recycling depending on the analysis of the types and volumes of plastic waste generated.

Alotau Urban LLG is encouraging households to segregate wastes and provides waste bins for the separated materials. Other measures to address waste management issues include enforcement of plastic bans at provincial level, improving the Gehua dump site with better control measures, improving waste collection service in the collection areas, strengthening awareness of the general public on waste minimization practices and encouraging recovery, reuse and recycling options. Policies to encourage innovation such as redesign of plastic packaging will be considered in the development of the new waste management strategy.

Community-level initiatives to reduce plastic pollution include community groups that produce woven traditional shopping bags that are used instead of plastic bags. Businesses can purchase these bags for use in their shops thereby supporting local small to medium enterprises rather than importing plastic bags.

Alotau Urban LLG aims to learn from other provinces and Pacific Island countries that have also developed innovative solutions to reduce the level of plastic used. It encourages the Coral Triangle LGN to engage with the JICA J-PRISM II project to see how it complements the LGN efforts to address marine plastic pollution in the Coral Triangle region.

# Initiatives by CTI-CFF Strategic Partners

CTI-CFF strategic partners are engaged in programmes that either directly or indirectly support the effort to reduce marine plastic pollution, whether it is tackling waste management and infrastructure; engaging with communities on local solutions in waste reduction and recycling or beach clean-ups and citizen science, partnering with the private sector to encourage innovation and reduced use of plastic packaging and single-use plastics; or working with governments at all levels on policies and enabling conditions to reduce the amount of plastic being produced and used. The following is a summary of activities which provide models, best practices or solutions to support the Coral Triangle address the crisis in marine plastic pollution.

## Asian Development Bank (ADB) – Regional Technical Assistance Program

Promoting Action on Plastic Pollution from Source to Sea in Asia and the Pacific (Indonesia, Philippines, Thailand Viet Nam, with region-wide knowledge activities, US$12.8 million). Key features of this programme include support to strengthen enabling policy and fiscal environments to reduce plastic pollution; prepare city action plans and plastic pollution reduction investments for example in circular business models that reduce or reuse plastics, high-quality recycling, and integrated solid waste management; implement community demonstration projects with a strong focus on engagement and behaviour change; and enhance partnerships, financing, and knowledge for plastic pollution solutions in South East Asia. Knowledge themes of the program include financing solutions, technology and innovation, and green jobs and women's economic empowerment.

In Indonesia, the programme will support the creation of a circular business hub in Cirebon, a port city in Java, and promote innovative solutions to transition to a circular economy. The proposed circular business hub in Cirebon will host: (i) a Circular Economy Knowledge Hub, which will manage and facilitate Collaborative Forums for inclusive and participatory knowledge-sharing and capacity-building on themes related to building a circular plastics economy; (ii) a Circular Economy Test Facility to develop and incubate solutions for plastic waste reduction; and (iii) a Social Inclusivity Platform to support engagement of women, the informal sector and vulnerable groups. Link to the RETA on promoting action to reduce plastics pollution: www.adb.org/projects/53068-001/main#project-documents

The ADB is also a development partner to the **Pacific Regional Infrastructure Facility: PRIF** is a multi-partner coordination and technical assistance facility established in 2008 to help improve the quality and coverage of infrastructure in the Pacific. See: www.theprif.org

## Australian Government

Several key Pacific regional programmes are supported by the Australian Government including:

- Pacific Ocean Litter Partnership (POLP): A six-year project which aims to complement existing waste management projects to support the delivery of the SPREP Pacific Regional Action Plan on Marine Litter 2018. POLP's project design initially addressed key marine litter threats and proposed actions identified through the Marine Litter Action Plan under the original four-year, AUD $8 million funding commitment by the Australian government. In July 2019 Australia expanded this commitment to support a six-year, AUD $16 million project

investment. The project predominantly works through national government systems and responds to national priorities. POLP will also support regional initiatives targeting problematic single-use in the Pacific, mainly through support for partnerships with relevant industry groups (i.e. tourism, food and beverage manufacturers or distributors), as well as developing coastal marine litter survey standards, assessing the availability and viability of alternative products and working with other regional organizations (i.e. the Pacific Tourism Authority) to undertake studies and trials of such alternative products.

- POLP is a contributor to the Pacific Waste Audits which are being delivered progressively across all 14 Pacific island countries (plus Timor-Leste), by the EU-funded PacWaste Plus project, the ADB and World Bank via the Pacific Region Infrastructure Facility (PRIF), and by UNEP's GEF ISLANDS project. This group of donors and regional bodies has adopted a common methodology for the delivery of detailed household, commercial and landfill waste audits in each country, with the intention of developing standardized country data regarding solid waste production, collection, treatment and disposal. See: www.sprep. org/news/pacific-ocean-litter-project-polp-to-strengthen-pacific-action-against- plastic-pollution

- ANZPAC Plastics Pact (ANZPAC): A regional cross-sector initiative launched in 2021 providing a platform for businesses and civil society to drive progress on plastic reduction and recycling across the Pacific region. ANZPAC is a collaborative solution that brings together key players behind a shared vision of a circular economy for plastic, where plastic never becomes waste or pollution. Together through shared knowledge, investment and industry led innovation we will implement solutions tailored to Australia, New Zealand and the Pacific Islands region. See: anzpacplasticspact.org.au

- Australian government is also a development partner to the Pacific Regional Infrastructure Facility (PRIF). See: www.theprif.org

## Conservation International (CI)

CI is a member of the Trash Free Seas Alliance®, dedicated to finding solutions that reduce the amount of plastic entering the ocean. CI has identified pollution, including plastics, as a major threat that could cause widespread destruction of marine and coastal ecosystems, and adversely affect the lives, health and livelihoods of the communities that depend on them. CI has also worked with the organisation Verra to create a plastics credit mechanism under the Verra **Plastic Waste Reduction Program (Plastic Program)**. Projects that enable plastic to be collected from the environment may be issued Waste Collection Credits (WCCs) and projects that enable plastic to be recycled may be issued Waste Recycling Credits (WRCs), collectively known as Plastic Credits. See: verra.org/project/plastic-program

In the Coral Triangle region, CI has supported efforts on the ground in Bali and Raja Ampat to address marine plastic pollution. Through the Raja Ampat programme CI has provided a small-grant to help Bank Sampah (Garbage Bank) to collect, reuse, and recycle macroplastics in coastal areas and small-islands of Southern Raja Ampat (Missol). The Bank Sampah is a local small social entrepreneur that needs to build its capacity to improve operations. In CI's campaign program to improve MPA management both in Birds Head Seascape and Bali (now becoming LSS), the problem of plastic littering and dumping is also addressed, though not a special program.

About three years ago, CI introduced a tool called a garbage-bin or plastic-trap which is deployed in river mouths (estuaries) in Bali. It was piloted with local communities living along the banks for a year and has been praised by both the communities and local government. CI has tried to secure additional funding to expand and deepen the trial across rivers in Bali. However, at this time they have not been able to secure the necessary funds. Beyond these efforts, CI is committed to working with government and NGO partners to promote a circular economy and is open to expanding efforts in this area.

Since 2020, CI in collaboration with Yayasan Kaki Kita Sukasada (YKKS) and Youth Conservation Initiative (YCI) Bali have been establishing a place to recycle plastic waste called "Bengkel Plastik" as part of the Surf Protected Area Networks (SPAN) program in Bali. Working with local board riders from two villages with surfing spots, plastic waste is collected from the beach and recycled to make useful (valuable) products promoting a circular economy.

CI Timor-Leste has supported the State Secretary of Environment to establish the first Environment Brigade in Timor-Leste, launched in June 2021. The brigades are Timorese volunteers coming from different universities in Dili with a total of 100 brigades. Those brigades received two days training on different topics related to environment protection and conservation. One of their main tasks is to control plastic waste and free coastal areas from plastic.

In the Philippines CI has engaged in several areas as described below:

- Verde Island Passage (VIP) – CI facilitated the development of the Strategic Management Plan for the VIP and a major focus is on marine pollution. One of the targets is to regulate plastics, especially single use, and several local government units (LGUs) already passed ordinances to ban such usage. Other LGUs started recycling plastics and make them into small chairs and as stepping blocks for use in the garden. The Philippine Coast Guard together with constituent LGUs also focuses on the compliance of shipping companies plying the VIP to make use of port facilities to dispose of their solid waste.

- Visayan Sea – CI is implementing the strategy *Green Grey Solutions in Northern Iloilo* in the Municipality of Concepcion and is a major partner of LGUs in the province. One of the major advocacies that are being focused on by the Visayan Sea Inter-LGU coalition is how to address marine pollution – not only the domestic pollution but the rubbish discarded from ships cruising in the Visayan Sea. The Iloilo Provincial Government has been advocating for zero plastics in the province. Read more here: www.conservation.org/docs/default-source/publication-pdfs/ggi_bechtel_fact_sheet_191114.pdf?sfvrsn=f411f406_2

- Manila Bay – related to addressing threats to olive ridley marine turtles in Manila Bay, CI through the USAID *Protect Wildlife Project* looked at the issues in the Municipality of Mariveles, Bataan Province where half of their 27 nesting sites for olive ridleys are located in Manila Bay. There are two major threats identified, i.e. solid waste/marine debris and oil pollution. Trash, mostly plastic waste and discarded fishing nets were documented among the litter along the coastline. Solid wastes and marine debris are threats to all stages of marine turtles in Mariveles. In the *Enhancement of Marine Turtle Conservation in Manila Bay: Mariveles, Bataan (USAID Protect Wildlife Project, November 2020)* relevant recommendations were made as follows:
  - Development of a Marine Turtle Conservation Action Plan, reducing causes of turtle mortality, e.g. pollution reduction as part of the objectives
  - Incorporation of the turtle action plan in a comprehensive ICM or CRM plan
  - Addressing local policy gaps, e.g. to regulate and manage solid wastes in nesting beaches

  Read more here: www.oceanconservancy.org/about/partner/conservation-international

## Coral Triangle Center (CTC)

The CTC's extensive engagement to address marine plastic pollution includes programmes in waste management and recycling, Marine Protected Areas; education and awareness; and industry and private sector engagement.

- **Waste Management**

  - ✓ *Women-led Waste Recycling in Atauro Island, Timor-Leste*: Two members of the CTI-CFF Women Leaders Forum in Timor-Leste implemented a household solid waste management program that trained and empowered women in Atauro Island to collect re-usable waste and turn these into upcycled products such as bags. Read more here: www.coraltrianglecenter.org/2018/03/08/coral-triangle-women-leaders-protecting-coral-reefs-in-atauro-island/

  - ✓ *Workshop of Waste Management in the Banda Islands MPA Network*: The workshop included representatives from government (DKP Maluku, Banda sub-district), head of villages, adat-community leader, Pokmaswas and local community in Banda, Neira, Hatta, Ay and Rhun islands, Youth leader and Yayasan Cahaya Samudera Indonesia (YSCI). The workshop developed a waste management strategy and follow-up action on integrated waste management in Banda islands. Read more here: www.dkp.malukuprov.go.id/2021/04/06/lokakarya-pengelolaan-sampah-di-kawasan-konservasi-pulau-ay-rhun-dan-kepulauan-banda/

- **Marine Protected/ Managed Areas**

  - ✓ *Conduct environmental education activities to schools in Nusa Penida*: This activity is focused on the impact of plastic on marine ecosystems and community participation in its reduction and management. This activity is carried out by conducting roadshow programs to schools and making posters in public areas. Read more here: www.coraltrianglecenter.org/2019/03/19/ctc-supports-nusa-penida-marine-protect-area-mpa-joint-surveillance-and-outreach-activities/

  - ✓ *Conduct routine plastic waste collection and management in Ay and Rhun islands*: This activity is part of Pokmaswas (surveillance community group) activities undertaken on a monthly basis. The plastic waste is collected and sent or sold to Yayasan Cahaya Samudera Indonesia (YSCI) which has a program to manage plastic waste which is sent to a vendor in Surabaya. CTC has provided a plastic crushing machine to the Pokmaswas at Ay Island. The group is now able to send the crushed plastic waste to YCSI in Neira Island.

- **Industry/ Private Sector engagement**

  - ✓ *Green Fins*: This involves dive operators in Nusa Penida MPA, Bali Island and several dive operators in Ambon, Banda and Komodo. One of the Green Fins programs is to conduct an assessment of the efforts and role of dive operators in the management of waste including plastics and other chemicals. Read more here: www.coraltrianglecenter.org/2018/02/05/responsible-diving-and-snorkeling-the-green-fins-way/ and www.greenfins.net/blog/history-of-green-fins-indonesia/

  - ✓ *Blue Green 360 Awards*: The Awards celebrate businesses and individuals in the marine tourism industry dedicated to inspiring and championing sustainable solutions to plastic pollution and other environmental issues in their day-to-day operations. Read more here: www.adex.asia/2019/blue-green-360-awards-year-3/

- **Communication / Awareness/ Campaigning**

  - ✓ *Escape Room SOS Plastic Danger*: Dedicated to raise awareness on ocean plastic pollution, the Escape Room is an interactive experience located at CTC's Center for Marine Conservation in Bali. Link: www.sosfromthedeep.com

  - ✓ *Wayang Samudra*: CTC is using the thousand-year old traditional Indonesian shadow puppets to highlight marine conservation issues such as plastic pollution and showcase the interrelationship between culture and nature. Link: www.savingoceansnow.com/wayang-samudra

  - ✓ *Baruna Murthi*: A giant sculpture made entirely of waste materials and inspired by the Balinese tradition of Ogoh-ogoh. The art piece was launched to mark World Environment Day 2018 and as part of UN Environment's multi-city art installation carrying the theme "Beat Plastic Pollution." Link: www.coraltrianglecenter.org/2018/06/05/baruna-murthi-samudera-bebas-plastic- unveiling-a-monumental-sculpture-to-beat-plastic-pollution

- **River/Beach Clean up**

  - ✓ *Surveillance activities in Nusa Penida MPA:* Conducted once a month the activities include collecting plastic waste in the waters, and beach clean-ups with the parties in Nusa Penida. Link: diskelkan.baliprov.go.id/kegiatan-pengawasan-monitoring-sumberdaya-dan- sosisal-ekonomi-kawasan-konservasi-perairan-nusa-penida-bali/

- **ALDFG/ Ghost Gear**

  - ✓ *SEANET Waste Net Project*: CTC's SeaNet project collaborated with fishers in Kamahedoga Village in Merauke, Papua Province, the Zoological Society of London, and materials recycling company Aquafil, to implement a recycling program for discarded fishing net based on the Net-Works model. www.youtube.com/watch?v=zpAe-M2rnPY&t=4s

## The Nature Conservancy (TNC)

- TNC and YKAN in Indonesia have two plastic initiatives – in Wakatobi national park, YKAN is helping the community of Kulati Village to monitor the volume, types, and source of plastics stranded on their sea turtle nesting beach; assisting in recycling the plastics for various products (art installation, eco-brick, convert to fuel); awareness campaign (installed awareness billboard and recycle bin in tourist hotspot area, developed interactive environmental-module and organized a waste-themed poster competition for 18 elementary schools); also helping the community develop village regulations about waste management, and utilization of domestic/ organic waste for fertilizer. Currently, YKAN and the local community group in Kulati Village explore and conduct pyrolysis trials to alter some domestic plastic waste into fuel. YKAN also conducts a national study (on-going) about plastic waste and lost gear in snapper-grouper fisheries. The study aims to investigate the use of plastic and plastic-based fishing gear by fishers; and to investigate and map the use of plastic in the fisheries supply chain, including buyers, processing companies, to the form of the final product being marketed.

- In the Solomon Islands, whilst TNC does not have a dedicated project on plastics, it has assisted the Environment Division of Isabel Provincial Government through a grant from another organization to do community awareness on Solid Wastes – which include plastics. Also, at

the Arnavon Islands turtle sanctuary and where plastics are very detrimental to the well-being of turtle population, TNC has been incorporating the dangers that plastic poses to the turtle population, as part of awareness programmes in the communities and media outlets. As inter-island travel by island boats is the common mode of travel, plastics that are thrown overboard and from rivers and streams end up in the oceans which have negative effects on the marine resources which people depend on.

## The United States Agency for International Development (USAID)

- The Save Our Seas Initiative is USAID's new flagship global initiative to combat the growing threat of ocean plastic pollution and is designed to support implementation of the landmark Save Our Seas Act 2.0 of 2020. The Save Our Seas Initiative, launched in June 2022, will build on and incorporate USAID's ongoing ocean plastics programs, including Clean Cities Blue Ocean and the blended finance partnership with Circulate Capital, while scaling these approaches within key countries and to additional geographies for greater impact. USAID focuses on preventing plastic from getting into the natural environment in the first place. USAID is combating ocean plastic pollution by creating inclusive circular economies together with local and national governments, communities, and the private sector. The Save Our Seas Initiative builds on successes and lessons from USAID's six years of experience in improving solid waste management systems and strengthening policies and practices for the 3Rs (reduce, reuse, recycle), while scaling these approaches within key countries and to additional geographies for greater impact: www.usaid.gov/news-information/press- releases/jun-22-2022-usaid-announces-save-our-seas-initiative

- USAID Municipal Waste Recycling Programme is aimed at reducing land-based sources of ocean plastics pollution. It provides grants and technical assistance to eligible organizations, for innovative, scalable SWM approaches and increased municipal waste recycling investment in coastal cities, by supporting local businesses, women's associations, municipalities, and others to reduce ocean plastics pollution. See further details under funding section: urban-links.org/resource/municipal-waste-recycling-program-usaid-mwrp-fact-sheet/

- USAID's Clean Cities, Blue Ocean (CCBO) Initiative for combatting ocean plastic pollution targeting ocean plastics directly at their source, focusing on rapidly urbanizing areas that contribute significantly to the plastic that flows into the ocean each year. The program works globally to target ocean plastics directly at the source, focusing on rapidly urbanizing areas that contribute significantly to the plastic that flows into the ocean each year. CCBO works to reduce ocean plastic pollution by:
  - ✓ **Incentivizing plastic recycling** through policies and partnerships with the private sector, while empowering women and protecting workers
  - ✓ **Building capacity** of local and national governments for improved solid waste management and a circular economy
  - ✓ **Promoting innovation and investment** in locally appropriate business models, technology, and infrastructure
  - ✓ **Building social and behavior change for the 3Rs**: Reduce, Reuse, Recycle.

- Across its initiatives, CCBO also works with a focus on gender equality and women's economic empowerment, seeking to advance and address the challenges of women working throughout the solid waste and recycling sectors. Learn more about CCBO's Program Approach. CCBO is currently working in the Coral Triangle – (Philippines and Indonesia). See: urban-links.org/project/ccbo

- USAID is also a development partner to the Pacific Regional Infrastructure Facility (PRIF)

PLASTIC SMARTCITIES WWF
Working with cities worldwide to keep plastic out of nature by 2030

## WWF's No Plastic in Nature Initiative (NPIN)

WWF's NPIN initiative aims to achieve an economy and a society that has zero tolerance for plastic pollution and all harm caused to the environment from such pollution — No Plastic in Nature works across the life cycle of plastic to reduce the amount of new plastic produced; increase the reuse of plastic already in circulation; and eliminate leakage of plastic into nature. It is built on the following:

- Global Governance – To accelerate progress toward a circular economy and stop plastic entering the natural world, WWF is supporting global advocacy for a legally binding UN treaty on plastic pollution.

- Business Engagement – Just 100 top companies could prevent the generation of 10 million tons of plastic waste – and action across sectors and supply chains could triple the impact. Engaging with these businesses through platforms such as ReSource: Plastic, the Plastic Action (PACT) and the growing network of national Plastics Pacts around the world, WWF is aiming to transform the plastic value chain focusing on reducing unnecessary use; redesigning packaging; increasing reuse and recycling; and using sustainable alternative materials. WWF is also working with many governments and businesses on extended producer responsibility (EPR) programs that hold manufacturers financially accountable for managing their plastic products and packaging's end-of-life impacts.

- Plastic Smart Cities (PSC) – WWF is working with cities across Asia and Europe to improve policy and governance, facilitate industry roundtables, and support entrepreneurial solutions that reduce plastic waste and increase collection, separation and recycling at the city level. The programme is designed to become a city-led movement that aims to engage 1,000 cities to commit to zero plastic leakage into nature by 2030. Particularly in the Philippines, Indonesia, China, Vietnam and Thailand, cities are engaged to commit to and work towards a 30 per cent reduction in plastic waste leakage by 2025, with lessons learnt being documented as part of its aim to scale local solutions through knowledge sharing. The *Plastic Smart Cities platform* was developed to share lessons and showcase the growing range of solutions for onboarding cities to address plastic pollution. It includes best practices in Financial Instruments, Prevention, Collection, Reuse, Recycling and Disposal. Read more here: plasticsmartcities.org

- Plastic Smart Cities Bootcamp – the Philippines: A 60-day challenge for five start-ups to prepare for presenting their accomplishments, challenges, learnings, and next steps to a selection panel which assesses the entrepreneurs' progress, learning agility, entrepreneurial mindset, and commitment to determine which of the entrepreneurs would go through to the Sprints stage of boot camp which consist of modules on the basics of doing business in the Philippines, finance and accounting, and designing a pilot. The innovations include: developing packaging made from agricultural waste to replace single-use plastic packaging; creating a trading ecosystem for sustainable community projects, anchored on an ecobrick that is earth-friendly and budget-friendly; transforming and upcycling plastic waste into high value home and garden items; developing various nanotechnology applications with the use of plastic waste; and reducing packaging waste by offering accessible and fair-priced refills for everyday products and providing SMEs with an easy to adopt system to transition to sustainable packaging materials.

# 5

# Innovations, Initiatives and Solutions in Action

Across the globe a range of stakeholders are working on ways to address marine plastic pollution and the greater plastics pollution problem. Many are standalone innovations or actions that have an important role in various stages of the plastics waste lifecycle. However, no one solution or intervention can deal with the global plastic crisis that is threatening ecosystem health and human well-being, when enormous quantities of new plastics are being produced and where excessive volumes of plastic waste being generated are mostly mismanaged or not recycled. There is no silver bullet. Rather a suite of scalable and coordinated solutions is necessary to counter plastic pollution from various angles.

## Addressing the Plastic Pollution Problem

A 2020 analysis of potential solutions to environmental plastic pollution reported that there is no single approach that will address the problem. The report did find that urgent and coordinated actions could be effective and advocated moving towards a "circular economy in which resources are conserved, waste generation is minimized, and GHG emissions reduced" (Lau et al. 2020). However, a significant amount of plastic pollution will continue to accumulate in the environment and plastic production and unsound waste management activities will continue to emit large quantities of GHGs. The study highlights that "further innovation in resource-efficient and low-emission business models, reuse and refill systems, sustainable substitute materials, waste management technologies, and effective government policies are needed" (Lau et al. 2020).

The study reported that substantial commitments from businesses, governments and the international community will be needed to achieve near-zero input of plastic to the environment, and "redirecting existing and future investments in virgin plastic infrastructure" could help to finance the innovation and restructuring away from "business as usual" (Lau et al., 2020).

The following selection of innovations or actions is a sample of the potential suite of interventions already being implemented at global, regional and local scale. These are either being undertaken in the Coral Triangle or have relevance to the region with potential for scaling or supporting the scaling of effective actions.

## Global Focus

- **The GEF Marine Plastics Project – Addressing Marine Plastics: A Systemic Approach**: UNEP in collaboration with the New Plastics Economy, Ocean Conservancy, and GRID-Arendal, with the catalytic assistance of the GEF, are working together to pilot key interventions and to lay out a strategic roadmap for marine plastics. Building on available science and existing stakeholder networks, solutions to ocean plastics and microplastics pollution must simultaneously: create enabling conditions for systemic change in the medium- to long-term (e.g. few years and longer) towards a circular economy where plastics remain at their highest value and never become waste, through cross-value chain collaboration, innovation, re-design, definition of product standards and the engagement of consumers for sustainable consumption; and implement in the immediate-term efficient, locally appropriate integrated waste management. To achieve these objectives, the project will use the intergovernmental stakeholder platforms of the Global Partnership on Marine Litter (of the Global Plan of Action for the Protection of the Marine Environment from Land-Based Activities) and the UNEP Regional Seas Programme, among others, to ensure broad representation in identifying strategic guidelines of a strategic roadmap to help guide the transition to circular plastic economies at local, national and global scales, and stem the flow of plastic waste to the ocean.

- **The New Plastics Economy** is an ambitious, three-year initiative to build momentum towards a plastics system that works. Applying the principles of the circular economy, it brings together key stakeholders to rethink and redesign the future of plastics, starting with packaging. The initiative is led by the Ellen MacArthur Foundation in collaboration with a broad group of leading companies, cities, philanthropists, policymakers, academics, students, NGOs, and citizens. The New Plastics Economy leads Component 1 of the GEF Marine Plastics Project.

- **GRID-Arendal** was established in 1989 to support environmentally sustainable development by working with UN Environment and other partners. GRID communicates environmental knowledge that strengthens management capacity and motivates decision-makers to act. It transforms environmental data into credible, science-based information products, delivered through innovative communication tools and capacity building services. GRID leads Component 4 of the GEF Marine Plastics Project.

- **IUCN Plastic Waste Free Islands**: A part of IUCN's global Close the Plastic Tap Programme, supported by the Norwegian Agency for Development Cooperation (Norad). In collaboration with national governments and the private sector, the initiative seeks to provide practical solutions that add value to plastic waste based on local knowledge, best practices and the understanding of volumes and quality of plastic waste available. The planned solutions focus on addressing plastic waste at the source whilst unlocking financial opportunities for the tourism, fisheries and waste management sectors in Small Island Developing States (SIDS) of the Caribbean and Oceania. Nine solution concepts have been identified, including waste to product, net-to-net and bottle-to-bottle recycling. Island working groups have been established to guide the development of prototypes and implement pilots in their local setting. The long-term vision is to create a Blueprint for Plastic Waste Free Islands so that all solutions can be scaled up and rolled out to other islands across the globe. The Blueprint will outline how to implement lasting change in three sectors: tourism, fisheries and waste management. plastics@iucn.org. Tourism Industry Tool Kits have been developed for Plastic Waste-Free Hospitality; Tours and Cruising – *details on the toolkits, contact Rosemarie Wuite:* rosemarie@seariousbusiness.com

- **Ellen MacArthur Foundation**: A charity committed to creating a circular economy, a new economic system that designs out waste and pollution, keep products and materials in use, and regenerate natural systems to deliver better outcomes for people, and the environment. The Foundation creates original research on the benefits of a circular economy, and how it can contribute to solving global challenges

like climate change and biodiversity loss. It explores the opportunities across stakeholders and sectors, and highlight examples of how circular economy principles are being put into practice today. The Foundation supports organizations and individuals with formal learning opportunities through its circular economy courses and creates resources for teachers and academics. See publications. It creates resources, publications and tools to help stakeholders set effective policies, find new ways to do business and design better products; brings together industry leading corporations, emerging innovators, affiliate networks, government authorities, regions and cities and more. Through the Circular Economy Network, the goal is to build circular capacity, address common barriers to progress, understand the necessary enabling conditions, and pilot circular practices. The Foundation has concentrated on areas where shifting to a circular economy can have the biggest impact – Plastics, Food, Fashion, Finance and Cities.

**The Ellen MacArthur Foundation's Plastic Pact Network** connects national and regional initiatives around the world to implement solutions towards a circular economy for plastic. Each Plastics Pact is led by a local lead organization and brings together businesses, governments, NGOs and others in a specific nation or region behind a set of 2025 plastics circular economy targets, with annual public reporting on progress, to:

- ✓ Eliminate unnecessary and problematic plastic packaging through redesign and innovation;
- ✓ Move from single-use to reuse where relevant;
- ✓ Ensure all plastic packaging is reusable, recyclable, or compostable;
- ✓ Increase the reuse, collection, and recycling or composting of plastic packaging and increase recycled content in plastic packaging.

- **The Ocean Conservancy – Trash Free Seas Ocean** – aims to stop the flow of trash from entering the waters by working with everyone from individuals to businesses to change the products, practices and behaviours that lead to ocean trash. This is carried out via practical solutions that: empower people to stop the flow of trash before it hits reaches the water; Strengthen the science by leading scientific work with business and academic partners to improve knowledge of the ocean trash issue; engage everyone in solutions and bringing together leaders from industry, government, NGO partners and the scientific community through the Trash Free Seas Alliance® . The aim is to bring systemic, durable solutions to the ocean trash issue; promote good policies; mobilize the International Coastal Cleanup™—the world's largest volunteer effort on behalf of ocean health; research and share key details about what's trashing the ocean with the public, the scientific community and decision makers. Ocean Conservancy leads Component 2 of the GEF Marine Plastics Project.

- **The Ocean Cleanup**: Its mission is to rid the world's oceans of plastic. To achieve this, the organization has a two-pronged strategy: remove plastic from rivers and waterways that flow into the ocean, and extract legacy debris from the ocean. Intercepting plastic in rivers is the fastest and most cost-effective way to stop the inflow of plastic to the oceans. However, it is equally essential to clean up the legacy pollution that has accumulated in the oceans.

- **Zero Waste Cities**: Established by the Global Alliance for Incinerator Alternatives (GAIA) in collaboration with other Break Free from Plastic movement members supported by the Plastic Solutions Fund. The initiative aims to promote and propagate Zero Waste models in Southeast Asia. GAIA and nine other organizations have committed to help local governments implement Zero Waste systems. Zero Waste Cities partners have conducted waste assessments that provided data for their respective waste management plans and enabled Break Free from Plastic—1,500-strong movement campaigning against plastic pollution—to engage companies that produce single-use plastic. The Zero Waste Cities project has expanded to 25 cities and opened more opportunities to amplify Zero Waste solutions across the region.

Participating cities and municipalities in the Coral Triangle region include: Bandung, Denpasar, Cimahi, Soreang, Surabaya, and Medan in Indonesia; mainland Penang, and Penang Island in Malaysia; San Fernando-Pampanga, Malabon, Navotas, Tacloban, Quezon City, Batangas City, Dumaguete City, Siquijor, Nueva Vizcaya Province, Marikina, General Mariano Alvarez, Tagaytay City, Mendez, Indang, Trece Martires City, Tanza, and Naic in the Philippines The Philippines has institutionally embraced Zero Waste, through Presidential Proclamation No. 760, declaring January as Zero Waste Month.

- **SEA of Solutions** is an annually occurring partnership event towards solving plastic pollution at source, convened by UNEP and the COBSEA, through the SEA circular Project supported by the government of Sweden. The virtual event held in November 2020 had more than one hundred speakers, including Ministers from 10 countries in Asia, over 1000 participants from over 100 countries, including more than 250 delegates from the private sector. A shift from linear to circular systems involving businesses, governments, and civil society, using digital technologies and people-centred solutions was seen as critical, and necessary to leverage public and private investments along the plastic value chain. Coming from private sector companies, environmental organizations and dedicated individuals alike, pledges included commitments to develop reuse models and plastic alternatives, to enhance marine research, and to foster local solutions and youth engagement.

- The following is a selection of the pledges on SEA of Solutions relevant to the Coral Triangle region:

  - ✓ **Healthy Oceans and Clean Cities Initiative** is a regional project funded by the government of Japan and implemented by UN-Habitat. It aims to enable cities and communities in the Philippines to reduce marine plastic pollution. This will be achieved through strengthened institutional capacity to support the localization of the Philippines' National Plan of Action on Marine Litter (NPOA-ML) and the development of improved data collection and waste management systems.
  - ✓ **InOff Plastic** fosters local solutions developing reuse models and plastic alternatives and supports large corporations in achieving their commitments on plastic reduction. They pledge to accelerate the transition to a world without plastic waste by launching at least 5 new innovative delivery models free of single-use plastic by 2025. In Bali, InOff Plastic supported a food producer in designing a reuse model for its products sold to restaurants. Once empty, the containers were collected at the next delivery and then transported to the production site to be cleaned and reused in next deliveries.
  - ✓ **Environmental Preservation and Innovation Centre** – the (EPIC) training centre in Siliau, Malaysia is committed to maintaining a cleaner and more habitable environment on an ongoing basis. EPIC will work consistently to address the issue of plastic pollution by creating a broad reach to raise awareness of marine waste and solutions for better plastic value chain management.
  - ✓ **Circular Economy Club Malaysia** will continue to implement pilot projects in its five city chapters from 2021–2030 and support the implementation of Malaysia's Circular Plastics Economy Roadmap 2020–2030.
  - ✓ **SEA of Solutions 2021** – In November 2021, the Ministry of Environment and Water of Malaysia, together with UNEP, COBSEA and the Government of Sweden conducted the annual virtual SEA of Solutions event. The project aims to inspire market-based solutions and encourage enabling policies to prevent marine plastic pollution. The 2021 theme called upon plastic value-chain stakeholders to unite in "Accelerating solutions to reduce plastic waste" by exploring policies, partnerships, innovative technologies and financing that help address present challenges and mitigate the potential impacts of future disruptive global events. Session highlights and discussions include:
    - » Consumer awareness and outreach to combat plastic pollution across different industries;
    - » Innovations in sustainable packaging and its value chain;
    - » City-level actions through policymaking, partnerships and community engagement;
    - » Corporate commitments and leadership in addressing plastic waste;
    - » Transition towards a circular plastics economy; and
    - » Financing pathways for a waste-free future

## Regional Focus

- **ASEAN Smart Cities Network (ASCN)**: A collaborative platform where cities from the 10 ASEAN Member States work towards the common goal of smart and sustainable urban development. There are 26 ASCN Pilot Cities including: Makassar, Banyuwangi, DKI Jakarta in Indonesia; Johor Bahru, Kuala Lumpur, Kota Kinabalu, Kuching in Malaysia; and Cebu City, Davao City, Manila in the Philippines. The ASCN aims to facilitate cooperation on smart cities development, catalyse bankable projects with the private sector, and secure funding and support from ASEAN's external partners. To this end, 33 partnerships have been established thus far.

- **PEMSEA Network of Local Governments for Sustainable Coastal Development (PNLG) Marine Debris Prevention Initiative** developed by a network of coastal cities of the East Asian Sea to share practical experience, to strengthen inter-city cooperation, and to work together for the prevention and control of marine debris and the realization of a cleaner and healthier ocean. The PNGL network recognizes the "importance of strengthening marine debris prevention and management, emphasize the implementation of urban marine debris management policies, plans and actions, attach importance to promoting citizens to continuously reduce waste generation, practice garbage classification, strengthen scientific and technological support in marine debris prevention and control, and effectively improve the effectiveness of various industries, enterprises and institutions in the prevention and reduction of debris into the sea." (PNLG, 2019).

- **Pacific Tourism Organization (SPTO) – Pacific Tourism Waste Action Initiative** is a collaborative effort between the SPTO and Fiji based artisan Warwick Marlow. The initiative promotes strong community engagement in repurposing plastic waste to maintain cleaner communities and provide participants with alternative income streams. A second component will centre on a partnership between SPTO and Rosie Academy, whereby a series of virtual training programmes will be delivered to 11 Small Island States to address key tourism components linked to post pandemic tourism opportunities.

- **Searious Business**: an impact-driven company helping businesses to create a circular use of plastic with a competitive advantage, and help bring plastic pollution back to zero. They help brand owners accelerate through cooperation and innovation focusing on three sectors: packaging, furniture and consumer electronics. Searious Business applies knowhow and partner networks in the whole plastics value chain to think of innovative solutions with dedicated experts. With this holistic approach, their solutions reach further than the scattered approach of solo companies. The organization offers novel innovation projects to global companies in high volume markets where plastics are involved. It helps clients to rebuild their business model towards a sustainable one with increasing margins, creating a lasting change – seariousbusiness.com/what-we-do. Searious Business has partnered with IUCN on the Norad funded *Plastic Waste Free Islands Project* creating Tourism Industry Tool Kits for Plastic Waste- Free Hospitality; Tours and Cruising – rosemarie@seariousbusiness.com.

- **The Plastic Collective**: A network of remote community projects turning plastic waste into a recycling profit. It offers education programs that encourage plastic to be seen as a valuable recyclable resource and not rubbish; provide machinery and training to operate a sustainable plastic recycling micro-enterprise; and provide a marketplace for communities to sell their valuable recycled plastic. In the Coral Triangle, the Plastic Collective works in communities in Kei islands, Ambon, North Sipora on Mentawai Island West Sumatra, Peripih Dora and Gili Air on Lombok, Les Village and Sanur in Bali; Mantanani in Sabah, Mabul and Tioman Islands in Malaysia; Atauro Island in Timor-Leste and Gizo in the Solomon Islands.

- **Clean Planet Energy and Riverrecycle Partnership**: UK-based Plastic-to-fuel startup and the riverine waste NGO Riverrecycle have partnered to build a combined floating debris-to-fuel value chain using plastic waste from waterways and turning it into fuel for ships. Riverrecycle has offices in seven countries, including Indonesia and the Philippines, where removal of plastic litter from Manila's Pasig River has commenced. Clean Planet Energy will construct a plastic-to-fuel plant in Manila. Clean Planet's ecoPlant uses patented pyrolysis and oil-upgrading technology to convert waste plastics into clean fuels. The fuels produced can be used as a direct replacement in fossil-fuel engines, and the company estimates that it reduces net $CO_2$ emissions by about 75 per cent. (*Startup Aims to Turn Waterborne Plastic Waste Into Fuel The Maritime Executive*, 30 July 2021. See: maritime-executive.com/article/startup-aims-to-turn-waterborne-plastic-waste-into-fuel)

## National Focus

### Initiatives in Indonesia

- **Pilot programmes launched to address marine plastic waste in the ocean**: In June 2021, the Center for Southeast Asian Studies Indonesia, Destructive Fishing Watch, Indonesia, Greeneration Foundation Indonesia, and Making Oceans Plastic Free, announced they will carry out four pilot activities to manage plastic marine waste. The four pilot activities cover the development of local capacity in waste management for the implementation of the expanded producer responsibility (EPR) scheme in Malang District, development of a clean fishing port in Tegal City, implementation of an EcoRanger Program: Fishing for Litter Scheme, and a program for making schools free of single-use plastic. The pilots are a part of the Rethinking Plastics Project: Circular Economy Solution to Marine Litter which aims to accelerate the implementation of sustainable plastic consumption and production in order to tackle plastic waste in oceans in the East and Southeast Asia region. The project has been financed by the EU and German government, and is being implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) in collaboration with various stakeholders, governments, and civil society and private organizations. (See: Four social institutions launch pilots to tackle marine debris – ANTARA News 30 June 2021).

- **Seven Clean Seas (SCS)**: An Ocean cleanup organization and certified social enterprise to preserve the marine environment by ridding the ocean of plastic. It works closely with local coastal communities to create waste management infrastructure in some of the worlds' worst affected places. It aims to develop the first efficient plastic collection, sorting and plastic recycling infrastructure in Bintan, Indonesia and plans to recover mixed plastics via community level collection, marine environmental interception and recovery. SCS has also developed a scalable funding mechanism through plastic offsetting. It works with companies to pull plastic out of the ocean on their behalf. Plastic offsetting income is used to improve and/or build collection and recycling infrastructure in rural and island communities. SCS has also developed a river clean-up system to help stem the flow of the plastic that enters the ocean from the world's rivers and is due to launch at the end of 2021. See: www.sevencleanseas.com

- **Octopus waste management application to efficiently collect & connect valuable waste to recycling industry**: Sulawesi-based Octopus is a circular economy platform that manages waste collection in Makassar and Bali. Octopus provides a real-time data dashboard for brands/fast moving consumer goods producers to track and collect their waste while giving incentives to local waste stakeholders via their platform. This helps improve the livelihoods of waste collectors via an application platform that connects collectors to high quality PCP materials for efficient pick-up, while ensuring fair remuneration via an ethical, transparent pricing model. Built on four pillars, the foundation offers

environmental, social, educational and economic benefits – namely waste segregation, job security and income provision, financial institution access for informal workers, job training and benefit to the circular economy by involving local stakeholders. Octopus is running in Makassar with a total of 1524 registered waste pickers, 9431 users, 436 checkpoints and more than 5000 daily transactions. The effort, built around 1000 collection points, has collected over 9 million pieces of plastic, has created over 100 jobs for former hotel employees and increased the livelihoods of local waste collectors. See: www.crunchbase.com/organization/octopus-cb84

- **Packaging and Recycling Association for Indonesia's Sustainable Environment (PRAISE)**: The PRAISE business members initiated the Packaging Recovery Organization (PRO) to seek ways to speed up implementation of the circular economy, from waste collection to recycling. The group's mission is to promote the Extended Stakeholder Responsibility (ESR) model and bring to life circular economy; to strengthen collaboration and network with all stakeholders; and as a reference model based on best practices to support government in integrated waste management. See: www.indonesiacef.id/en/presentation/packaging-recovery-organization

- **Rethinking Recycling Academy**: McKinsey launched the Rethinking Recycling Academy, which trains and empowers government and village leaders to reimagine their local waste management systems. In October 2021, Delterra, an independent environmental nonprofit was formed, with Rethinking Recycling as the flagship initiative. .The program provides digital training and on-the-ground support to drive community behaviour change, increase collection of recyclables and create financially stable systems that will help keep plastic and waste away from the ocean and beaches. With the support of local government, partners and communities, the goal is to keep beaches like Sanur Beach in Bali pristine. They are tackling the waste crisis by mobilizing every player in the process – from waste pickers to global multinational companies, from village leaders to state governors – to work together to formalize the recycling marketplace. In Bali, the transformation of an unused waste center into a recycling enterprise has delivered good jobs to essential waste workers with a 200 per cent increase in wages, along with the ability to obtain healthcare and safety equipment. The Rethinking Recycling Academy has launched an education and behaviour change campaign in Bali's pilot area Ubung Kaja. This is one of the critical phases of improving recycling rates, along with close coordination with the informal waste collection sector in the TPS3R to integrate collection and management plans. The aim is for all 20,000 people living in the village to be serviced by scheduled collection. See: www.McKinsey.org

- **Bali's largest integrated waste management site established**: Danone-Aqua, Indonesia's largest bottled water company, has launched Bali's largest integrated waste management site (TPST) in Jimbaran Bali. The facility has the capacity to process 109 tonnes of used plastic bottles and organic waste per day. In the past, only 48 per cent of the waste was disposed of in landfills, while the rest went on polluting the seas. Bali Province and Badung District governments have made plastic waste management q main agenda and have issued several new policies, including limiting single-use plastics. See: Danone-Aqua opens Bali's largest waste management facility —*Jakarta Globe*, 12 September 2021)

Individual and collective initiatives are being implemented across Indonesia to help address the country's marine plastic pollution crisis. Initiatives include:

- **Bye Bye Plastic Bags**: Started in Bali by two women to address the plastic problem, it is now a global movement. The not-for-profit group helps educate children in Bali on the environmental harm of plastic (See: www.byebyeplasticbags.org) and has co-created the YOUTHOPIA, which aims to provide space that brings young people together, ignites their passions and grows their skills to become active changemakers. They is done by creating short and meaningful peer to peer programmes off and online, made and shared by the frontline young changemakers.

- **Sungei Watch**: A community river cleanup organization that has the mission to protect waterways, starting in Indonesia. See: makeachange.world/sungaiwatch

- **Waste4Change**: A social enterprise providing education and awareness on sorting and sustainably managing waste.

- **Waste Banks**: Local communities are setting up waste banks, promoted by Ministry of Environment and Forestry as a strategic program to involve informal community-based efforts to collect sorted inorganic waste that has economic value.

- **Beach cleanups**: Mobilizing thousands of people across communities to help raise awareness on the critical issue of marine plastic pollution, and also contribute to citizen science data collection.

- **Minderoo Foundation's programme "Sea the Future Indonesia"**: Partnership with the government supports plastics recycling; and through the Global Plastic Watch platform, the Foundation uses satellite imagery to map plastic with the aim to stop it before it gets into the ocean. See: www.minderoo.org/no-plastic-waste/news/indonesia-and-minderoo-foundation-share-clear-vision-to-reduce-plastic-waste

- **The Plastic Collective** is developing a network of remote community projects turning plastic waste into a recycling profit including communities in Bali, Lombok, West Sumatra, Kei Island and Ambon. See: www.plasticcollective.co

- **The Coral Triangle Center** has an extensive engagement across Indonesia to address marine plastic pollution which includes programmes in waste management, recycling, MPAs, education and awareness; and industry and private sector engagement. See:www.coraltrianglecenter.org

**Case study in Indonesia**: The City of Banjarmasin in South Kalimantan is the first Indonesian city to ban plastic shopping bags at modern markets. This local policy has been implemented since July 2016 and has achieved the two main targets i.e. to reduce potential waste generation of plastic waste by 52 million pieces of plastic bags (equivalent to 233 tonnes of plastic bags) a month; and to change the behaviour of citizens of the city to shop without plastic bags and bring their own reusable bags. This example has been followed by other cities such as Balikpapan East Kalimantan, Bogor West Java, and Denpasar Bali. Since early 2019, the Province of Bali has banned three types of single-use plastic including plastic shopping bags, plastic straws, and plastic foam containers (styrofoam). The potential reduction of plastic waste is still under investigation, there is no data available yet. See: g20mpl.org/partners/indonesia.

## Initiatives in Malaysia

Across Malaysia there has been significant engagement by NGOs, civil society and academia in action to address marine plastic pollution. Several research institutions are developing their capacity on plastics solutions. This includes existing clusters of academics (e.g. Microplastics Research Interest Group) and the plastic pollution interest groups (e.g. Ocean Pollution and Ecotoxicology of Universiti Malaysia Terengganu) (Lyons et al. 2020). Environmentally focused NGOs are also tackling plastic waste collection and recycling or community mobilization for beach and neighbourhood clean-ups to raise awareness and address plastic waste challenges. Civil society and private sector actors include:

- **The Plastic Collective** which is working with communities in Mabul Island in Sabah and Tioman Island as part of a network of remote community projects turning plastic waste into a recycling profit.

- **The Trash Hero**: Aims to bring communities together to clean and reduce waste through awareness and education for children and adults, long-term programmes that help communities to reduce and better manage existing waste, strategies that will prevent future waste; by motivating people to break free from plastic and become Trash Heroes; and remove the barriers to change and normalize a vision of a zero-waste world.

- **WWF No Plastic in Nature Initiative**: WWF is supporting the development of Extended Producer Responsibility (EPR) schemes across the region. WWF-Malaysia is one of the founding members of the Malaysia Plastic Pact (MPP) and co-leads the EPR working group, which will inform the development of the Circular Economy Roadmap and potential additional EPR- related regulation

- **Reef Check Malaysia** is working towards sustainable management of coral reefs and brings together stakeholders to collaborate on coral reef monitoring, management, research and conservation, and advocacy. It is also a member of the MPP and together with WWF is co-lead of the Circular Economy working group.

- **Community Recycling: Taiwan Buddhist Tzu-Chi Foundation Malaysia** has four regional headquarters in Malaysia: the Central (Kuala Lumpur, Selangor and Pahang), the South (Negeri Sembilan, Malacca and Johor), the North (Penang, Perlis, Perak, Kedah, Terengganu and Kelantan), and East Malaysia (Sabah and Sarawak). The foundation operates around 160 permanent recycling centres and 980 temporary recycling points across Malaysia.

- **Case study examples in Malaysia**: Petaling Jaya City Council was the first local authority in Malaysia to introduce and implement the Assessment Tax Rebate Scheme for Eco-Friendly House Owners in Malaysia (the rebate scheme) in 2011. In collaboration with Nestlé Malaysia Berhad, a door-to-door recycling pilot was launched that resulted in a continued increase in the volume of recyclables collected and diverted from landfills. A Phase 2 is being launched to expand collection areas. In Penang, the Waste Segregation at Source (WSAS) Policy was implemented in 2016 where residents are required to segregate their waste into two streams – recyclables and general waste before collection by the local authorities. Working with local Environment Resource Centres, two pilot communities participated in the Planting Green Community model to improve circular economy practices. A future scenario for 2030 has been developed under the assumption that both communities, having successfully adopted the Planting Green Community model, set targets to reduce plastic waste by 10% annually and divert 90% of plastic waste away from the landfill.

- **SEA of Solutions 2021**: In November 2021, the Ministry of Environment and Water of Malaysia, together with UNEP, COBSEA and the Government of Sweden conducted the virtual SEA of Solutions 2021, an annual flagship event of the SEA circular Project. The project aims to inspire market-based solutions and encourage enabling policies to prevent marine plastic pollution. This 2021 theme called upon plastic value-chain stakeholders to unite in "Accelerating solutions to reduce plastic waste" by exploring policies, partnerships, innovative technologies and financing that help address present challenges and mitigate the potential impacts of future disruptive global events. Session highlights and discussions include:
  - Consumer awareness and outreach to combat plastic pollution across different industries;
  - Innovations in sustainable packaging and its value chain;
  - City-level actions through policymaking, partnerships and community engagement;
  - Corporate commitments and leadership in addressing plastic waste;
  - Transition towards a circular plastics economy; and
  - Financing pathways for a waste-free future

## Initiatives in Papua New Guinea

- **Bank South Pacific**: As part of its environment strategy, Bank South Pacific (BSP) supports organisations and initiatives that foster an understanding of environmental issues and provide practical support to building sustainable communities. BSP seeks innovative new ways to decrease its environmental impact in its operations by reduction of resources and materials used wherever possible. BSP has committed to a re-use and recycling programme in branches and adopted more sustainable work practices across all areas of its operations. The bank also supports a 'Go Green' campaign aligned with the major annual 'Clean Up the World' Day as well as World Earth Day, Earth Hour and the Go Green Annual School Clean-Up day, utilizing its network of 35 branches. The bank mobilizes the entire community, schools, churches, corporates / business houses, CBOs / CSOs and Government (CEPA and the Climate Change Department) and local partners for regular beach and community clean ups. It provides Clean Up Kits and merchandise as part of the campaign to support groups to organize beach clean-ups and regular cleanathons. Go Green Events supported by BSP include Go Green Campaign – Bank of South Pacific – PNG (bsp.com.pg)

- **Walindi Island Resort and Dive**: The resort undertakes the usual clean ups and staff are always cleaning if they come across rubbish. Business houses in Kimbe Town are often organising town clean up days and this helps to reduce the amount of rubbish into the ocean. The company is also mindful about packaging and using bio-degradable plastic where possible. Walindi attempts to reduce the amount of waste produced through the concepts of reduce, reuse and recycle. Buying much of its fruits, vegetables and meat locally eliminates the use of packaging and plastic bags. The company uses natural woven baskets and bilums as well as re-usable shopping bags. Currently there is a lot of popularity in Kimbe for street sellers to make up quite large, strong plastic bags out of bulk rice, fertilizer bags etc., with a handle for PGK 2 per bag. Many items no longer needed at the resort (such as old towels, bed sheets and furniture) are collected and donated to staff and the local community to reuse. Glass, plastic and aluminium waste from the bar and kitchen is separated and recycled.

- **Mahonia Na Dari (MND)**: Mahonia Na Dari means "Guardian of the Sea" in the local Bakovi language of the Talasea Peninsula in West New Britain Province (WNBP), Papua New Guinea. MND was started in 1997, through co-operative efforts between The Nature Conservancy, the European Union Islands Regional Environmental Program and Walindi Plantation Resort. It is an independent NGO formed to provide Marine Environment Education Program (MEEP) to the local population in West New Britain Province and the New Guinea Islands region. MND operates from the Walindi Nature Centre (Walindi NC). Its Marine Environment Education Program (MEEP) runs as four programs targeting secondary school students (Intensive MEEP), Grade 9 primary school students (Junior MEEP), primary school teachers (Teachers MEEP) and Elementary school students (Baby MEEP). Sections of the MND MEEP manual have been incorporated into the mainstream provincial primary school curriculum and developments are underway to make this a digitally downloadable resource. The marine education programs also include components about plastic pollution and are taught to a range of ages.

- **Sports for Sustainability UN Programs**: PNG Olympic Committee via the Sports Programs in PNG has delivered "Love Your Coast'" over the years and links with UNDP SDGs for their Sustainable Community Sports Programs Public Awareness via Sporting Heroes and Sheroes. Regular Cleanathons activities are held with Sports National Federations for key environment days.

- **Dive Operators: Scuba Ventures Kavieng** has organised regular in water Kavieng cleanathons and Youth Cleanathons; and Pro Dive PNG carries out regular cleanathon activities with groups of divers.

## Initiatives in the Philippines

A range of private sector initiatives have been started in the Philippines:

- **Philippine Alliance for Recycling and Materials Sustainability (PARMS)**: established by private sector actors across the waste value chain to increase resource recovery and reduce landfill dependence towards zero waste. PARMS has launched its roadmap *Zero Waste to Nature: Ambition 2030* and has secured the pledge and buy-in of locally operating FMCG companies.

- **Adoption/Use of Refill Stations** (e.g. Human Heart Nature Refill Stations, NutriAsia Bring-Your-Own-Bottle (BYOB) Kiosks, and Wala Usik Sari-sari Store Program for Small to Medium Enterprises);

- **Community-based Plastic Waste Recovery Initiatives** (e.g. Unilever's Kolek Kilo Kita para sa Walastik na Maynila and Nestle's May Balik! Sa Plastik! Program w/ Valenzuela City); and

- **Product Redesign** such as Coca-Cola's shift to clear sprite plastic bottles to increase local recycling recovery rates for their bottle packaging.

- **WWF-Philippines partners with Nestlé to improve community waste management in Donsol**: Preparations are complete for NAKAMOTO – a local waste collection pilot via motorcycle and push carts to support barangays that are not serviced by the municipal waste collection service. Supported by Nestlé Philippines and co-created with KALIPI, a for-women entrepreneurship group, as well as other community members, NAKAMOTO aims to improve waste segregation for six pilot *barangays* and increase collection capacity in Malinao – the assigned *barangay* for a Material Recovery Facility (MRF) in Donsol. By supporting KALIPI and other community groups, NAKAMOTO aims to scale ground-up community-based solutions to support the local government's goal in reducing plastic waste and end plastic leakage in nature. Read more.

A number of non-government organizations (NGO) that engage in actions to encourage plastic waste reduction and management include:

- **The Break Free from Plastic Movement** – a global movement that focuses on tackling plastic pollution within its value chain, and emphasize the need to prevent plastic pollution instead of trying to address it at the end of pipe. One of their projects is in San Fernando, Pampanga where 80 per cent of the waste has been diverted due to their programs and partnerships. See: www.breakfreefromplastic.org

- **The Ecological Waste Coalition of the Philippines** encourages a Zero Waste goal through the promotion of environmental justice and stewardship in their network of communities, churches, schools and other groups. The Ecowaste Coalition is aiming to reduce plastic waste leakage into Manila Bay. See: www.urban-links.org/resource/mwrp-philippines-manila-bay-better-information-for-tackling-plastic-waste

- **The Mother Earth Foundation** has programs that are working towards Zero Waste Cities with their waste assessment and brand audits, SWM training, MRF construction and operation, and community information and education campaigns. See: www.motherearthphil.org

- **Greenpeace Philippines** encourages consumers to call on large multinational companies to stop the production of single-use, non-recyclable plastics as they are what commonly leaks out and pollutes bodies of water, and to shift to more sustainable alternatives. See: www.greenpeace.org/philippines

- **The Save Philippine Seas** has been active in pushing for citizen action through their Reduce and Reuse campaigns, advocacy material and toolkits for assessing stakeholder compliance to RA 9003. See: www.savephilippineseas.org

- **Pure Oceans**: A marine conservation social enterprise working on marine plastic litter in the Verde Island Passage to divert coastal plastic waste into the circular economy (www.pureoceans.co). Pure Oceans has entered into a partnership with Nestlé Philippines to design, procure, and operate a prototype boat called *Basura Bangka* to transport plastic waste from coastal and island communities in Batangas to recycling facilities. See: www.nestle.com.ph/media/news/pure-oceans-partnership

- **WWF-Philippines** is part of the No Plastic in Nature Initiative – WWF's global initiative to stop the flow of plastics entering nature by 2030 through elimination of unnecessary plastics, doubling reuse, recycling and recovery, and ensuring remaining plastic is sourced responsibly. Through this initiative, WWF- Philippines has been working with cities on plastic leakage, with policy makers to advocate for a global treaty on plastic pollution, with businesses to transition to circular business models, and with the general public to campaign and act. See: www.wwf.org.ph

## Initiatives in the Solomon Islands

- **Plasticwise Gizo**: A grass roots group which works with women to turn plastic waste into marketable goods. The women of Gizo use their remarkable weaving skills to turn single use plastic packaging into a variety of products which are sold in the local markets and to tourists. This group was established to help decrease plastic wastes in Western Province. The initiative is to educate communities on waste management that also turns plastic waste into handicrafts. See: www.worldbank.org/en/news/feature/2019/06/05/meet-the-innovators-battling-plastic-waste-in-solomon-islands-rendy-solomon

- **Solomon Islands Recycling and Waste Management Association** has been formulated to promote recycling activity with the aim to create a circular economy society through public and private cooperation with their next five years' strategy to overcome the challenges facing Solomon Islands' recycling industry. See: www.solomons.gov.sb/govt-supports-recyclers-waste-management-association

- **Friends of the City**: A volunteer initiative which has brought together hundreds of people to participate in clean-ups across the capital city of Honiara and raise awareness of the importance of maintaining healthy and sustainable local environments. They have worked with the government on the 'Battle against Plastic Pollution campaign', organizing and participating in clean-ups across the city on 'World of Environment Day', 'World Ocean Day' and 'Coral Triangle Day'. See: www.theislandsun.com.sb/mayor- commends-friends-of-the-city-initiative

- **World Environment Day, World Oceans Day and Coral Triangle Day Celebrations**: Commemoration of these international events is usually a platform used to raise awareness on the importance of waste management. Clean up campaigns are usually organized during these events as well.

## Initiatives in Timor-Leste

Examples of actions by non-government organizations and business undertaken in Timor-Leste include:

- **Coral Triangle Center (CTC)**: As a strategic partner to the CTI-CFF, the CTC has a number of programmes in waste management and recycling, MPAs; education and awareness; and industry and private sector engagement. As part of its engagement with the Women Leaders Forum, CTC has supported the initiative *Women-led Waste Recycling in Atauro Island, Timor-Leste*. Two members of the Women Leaders Forum in Timor-Leste implemented a household solid waste management program that trained and empowered women in Atauro Island to collect re-usable waste and turn these into upcycled products such as bags. See: www.coraltrianglecenter.org/2018/03/08/coral-triangle-women-leaders-protecting-coral-reefs-in-atauro-island

- **The Plastic Collective**: A network of remote community projects turning plastic waste into a recycling profit. It offers education programs that encourage plastic to be seen as a valuable recyclable resource and not rubbish; provide machinery and training to operate a sustainable plastic recycling micro-enterprise; and provide a marketplace for communities to sell their valuable recycled plastic. The Plastic Collective work also includes Atauro Island. See: www.plasticcollective.co/

# Long-Term Solutions to the Plastic Pollution Challenge

Many innovations or proposed solutions to dealing with plastic pollution may appear to remove the obvious plastic waste. Over the past several years, significant innovation and effort has gone into attempting to clean up the ocean by physically removing marine debris such as around the Pacific gyre. Removal of plastic once in the ocean is important but has major challenges such as dealing with the enormous volumes of plastic already in the oceans as well as the degradation into microplastics which can sink, making it harder to extract.

End-of-pipe initiatives are part of the actions needed to address marine debris. However they do not address upstream root causes of the plastic crisis. Other solutions such as incineration and plastic waste-to-energy conversion contribute large volumes of greenhouse gases and fail to meet circular economy principles.

There are many innovations and processes in use to deal with plastic waste. However, some approaches may not necessarily be cost effective and some can even have long-term, unintended negative environmental and health impacts. Additionally, many do not contribute to a circular economy for plastic which is necessary to stop plastic pollution and offers strong economic, social, and climate benefits.
See: www.ellenmacarthurfoundation.org/topics/plastics/overview

The following are some examples of innovations or approaches that are considered problematic as long term solutions (Ref: WWF Position Paper NO PLASTIC IN NATURE, February 2020 – www.worldwildlife.org/publications/wwf-position-biobased-and-biodegradable-plastic; and GAIA www.no-burn.org/resources/false-solutions-to-the-plastic-pollution-crisis).

- **Bio-based and Biodegradable Plastic (WWFUS, 2020)**

  As more research and attention is devoted to plastic and its impacts, there is an increasing demand for materials that are perceived as solutions to the plastic pollution crisis, including biobased plastic and biodegradable plastic. However, like all materials, these plastics are limited in what they can and cannot achieve as pieces of a larger, holistic solution.

A bioplastic is generally defined as plastic that is biobased, biodegradable, or both. This definition is problematic because these are independent factors. Not all biobased plastics are biodegradable and not all biodegradable plastics are biobased.

- ✓ Biobased plastic is plastic derived from plants or other biomass.
- ✓ Biodegradable plastic is plastic that will degrade completely into substances found in nature. The definition of biodegradable does not include a specific timeframe or specific environmental conditions for breakdown.
- ✓ Compostable plastic is a subset of biodegradable plastic. Compostable plastic breaks down and becomes usable, non-toxic soil conditioner under controlled conditions, in a timeframe comparable to that of other compostable materials.

Biobased plastics may offer environmental advantages over their fossil-based counterparts, but they must be sourced and managed responsibly to realize this potential. Metric-based decision making should be used to assess biobased plastic on a case by case basis.

Biodegradable plastic – WWF believes that materials should not be designed to end up in nature. As part of a circular economy, materials should be designed with the intention that they will be recaptured and not littered into natural ecosystems. Biodegradable plastic can be valuable when coupled with proper infrastructure, but it is not a solution to litter or marine debris. WWF does not accept any solution where plastic is leaked into nature, even biodegradable plastic. WWF believes that compostable plastic may be appropriate for specific uses, but it will only be advantageous if collection and processing is sufficient to recover the material. (WWF Position Paper NO PLASTIC IN NATURE, February 2020. See: www.worldwildlife.org/publications/wwf-position-biobased-and-biodegradable-plastic

- **Oxo-degradable plastic**

Oxo-degradable additives are substances added to conventional plastics to promote oxidation. Oxidation brittles and fragments the material with the intention to be digestible by microorganisms, but evidence shows that this desired effect is not achieved. There is no credible evidence that these additives result in environmentally advantageous outcomes. WWF does not support the use of oxo-degradable materials, as they do not result in better environmental outcomes and contribute to microplastic pollution." (WWF Position: Biobased and Biodegradable Plastic, February 2020. See: www.worldwildlife.org/publications/wwf-position-biobased-and-biodegradable-plastic

- **Incineration**

"Waste-to-energy," co-incineration in cement kilns and other industrial boilers, refuse-derived fuel (GAIA, www.no-burn.org/resources/false-solutions-to-the-plastic-pollution-crisis)

- *Not climate-friendly*: burning one tonne of plastic creates nearly 3 tonnes of $CO_2$. (Materials Economics, 2018)
- *Toxic hazard*: emits toxicants including cancer-causing, endocrine and immune-disrupting dioxins and furans; heavy metals including mercury, cadmium and lead; particulate matter (GAIA, 2019)
- *Incineration is more expensive than landfilling* (World Bank, 2018); aging incinerators require significant additional public funds for upgrades (The New School, 2019)
- *Socio-economic and racial injustice*: facilities are disproportionately sited in low-income and marginalized communities (The New School, 2019)
- *Competes with and undermines mechanical recycling* (Nordic Council of Ministers, 2019)

- **Plastic-to-fuel**

  Gasification, pyrolysis, and plasma arc:
  - *High costs and low returns*: has a track record of major failures and lost more than $2 billion as of 2017 (GAIA, 2017)
  - *Not climate-friendly*: emits $CO_2$ in both production and burning of plastic-derived fuel, which is another fossil fuel (GAIA, 2020)
  - *Toxic hazard*: releases pollutants in gaseous emissions and by-products in a similar way to waste incineration (GAIA, 2020)

- **Chemical recycling (plastic repolymerization):**

  - *Unproven technology*: few projects are operational and claims are largely inflated (Hindenburg Research, 2020)
  - *Often, outputs are burned due to low quality and high levels of contamination* (GAIA, 2020)
  - *Not climate-friendly*: processing 1tonne of plastic in a pyrolysis facility emits nearly 3 tonnes of $CO_2$ (GAIA, 2020)
  - *Toxic hazard*: releases toxicants in plastic into the environment as air emissions and residues (GAIA, 2020)

- **Downcycling ("plastic-to-road,""plastic-to-brick"):**
  (GAIA, www.no-burn.org/resources/false-solutions-to-the-plastic-pollution-crisis)

  - *Toxic hazard*: hazardous chemicals can leach when downcycled materials are exposed to heat, UVs, and water (Oropeza, 2019)
  - *Resulting microplastics can attract more pollutants like polychlorinated biphenyls* (PCBs) (Oropeza, 2019)
  - *Turns plastic waste into materials with lower quality or value* – products become no longer recyclable (Greenpeace, 2019)
  - *Plastic-based construction materials are a significant fire hazard* (Easton, 2020)

# 6

# Abandoned, Lost, Discarded Fishing Gear (ALDFG)

One of the most damaging types of marine plastic pollution is abandoned, lost or discarded fishing gear (ALDFG) also known as ghost gear. With a rising population, there is an increased demand for fish, and therefore the use of fishing gear. Gillnets, traps and pots, fish aggregation devices, and other gear types are compounding the problem of plastics in our ocean as they end up abandoned, lost or discarded. Ghost gear can continue to catch target and non-target species unselectively for years, potentially decimating important food resources as well as endangered species, such as marine mammals, seabirds, and turtles. It is the most deadly form of marine plastic debris which damages vital ocean habitats, and poses dangers to navigation and livelihoods.

According to a WWF report released in 2020, it is estimated that ghost gear makes up at least 10 per cent of marine litter. That means somewhere between 500,000 and 1 million tonnes of fishing gear gets left in the ocean every year. Nets, lines and ropes from fishing and shipping make up 46 per cent of the 45,000-129,000 tonnes of plastic floating in the North Pacific Gyre. Ghost gear is the most deadly form of marine plastic debris. It impacts 66 per cent of marine mammals, 50 per cent of seabirds and all species of sea turtles – and across all species groups, ghost gear is the type most likely to prove lethal (WWF, 2020).

ALDFG also damages valuable marine habitats and can undermine the sustainability and economic returns from fisheries as part of their harvest is lost – some studies estimate that over 90 per cent of species caught in ghost gear are of commercial value. It also poses a navigation hazard, threatening the safety of mariners and can affect tourism by spoiling an area's natural beauty (WWF, 2020).

In the Western Central Pacific Ocean, it is estimated that 5 per cent (>1300 in 2016–2017) of the 30,000 drifting FADs deployed there each year are abandoned and wash up onto near shore habitats (Escalle et al. 2019). In 2021, the Secretariat of the Pacific Community (SPC) reported that an assessment of plastic waste generation from the different tuna fishing fleets in the Western and Central Pacific Ocean estimated that for the 1700 active long line vessels between 402 and 935 tonnes of plastic lines on bait bags and between 241 and 560 tonnes of plastic waste from bait alone from purse-seine vessels is being dumped at sea every year (SPC Fisheries, Jan-April 2021 Newsletter #164).

There are major gaps and challenges in global, regional and subregional frameworks to address and monitor the extent and impact of ALDFG. However, fishers, fishing industry partners, and ports, NGOs, governments and intergovernmental organizations like FAO, UNEP, IMO, are collaborating to address the problem. This includes the Global Ghost Gear Initiative (GGGI) established in 2015 and the development of two important guidance documents designed specifically to address ghost gear on a global scale (WWF, 2020).

The GGGI is a global cross-sectoral alliance with more than 100 members from the private sector, academia, governments, and intergovernmental and non-governmental organizations. It has developed the GGGI Best Practice Framework for the Management of Fishing Gear (BPF) for stakeholder groups throughout the seafood supply chain. A second important guidance document is the FAO 2018 Voluntary Guidelines for the Marking of Fishing Gear (VGMFG) to combat, minimize and eliminate ghost gear and to identify and recover lost fishing gear. (WWF, 2020).

In 2019, FAO and GGGI held a series of regional workshops including one for the Southwest Pacific and one for Southeast Asia. The Southwest Pacific group identified the need for FAO to support a comprehensive risk assessment and gap analysis of ALDFG at regional and national levels; that the guidelines and the Best Practice Framework be incorporated into relevant regional mechanisms including in the fisheries management organization-level measures and regulations for the Western and Central Pacific Fisheries Commission and be included in regional marine litter plans, or a separate plan focusing exclusively on ALDFG (FAO, 2019).

The South East Asia group identified that all gear types created ALDFG but gillnets, traps or pots and fish aggregating devices (FADs) were most discussed. Trawls were most mentioned in the context of partial gear damage and end-of-life cycle disposal but also as a cause of loss of other gears. Traditional, small-scale fisheries were mentioned as perhaps the most significant source of ALDFG in the region, as well as a lack of education on the consequences of ALDFG, weather and sea conditions, entanglement with bottom habitats, difficulty of retrieval, discarding to avoid enforcement of illegal fishing activity, and lack of disposal facilities for recovered gear or end of life disposal (FAO, 2019). The workshops resulted in a number of recommendations which will be incorporated into an umbrella programme of work on *Responsible practices for sustainable fisheries and reduction of impacts of fishing operations*.

Another important initiative is the Global Partnerships for Marine Litter programme (GloLitter) through which the IMO and FAO are assisting developing countries to prevent and reduce marine plastic litter from the maritime transport and fisheries sectors; and to identify opportunities for the reduction of plastic uses in both industries. The first phase will address many challenges identified during the regional workshops including: development of knowledge products and capacity building tools in dealing with sea-based sources of marine plastic litter; preparation of national status, policies and action plans as a basis for undertaking legal, policy and institutional reforms; capacity building on enforcement of MARPOL and relevant FAO instruments as well as port waste management and port reception facilities. It will also include regulatory and best practice guidelines and tools to prevent and reduce ALDFG; public-private partnerships for development of cost-effective marine plastic litter management solutions, and promotion of women's empowerment in dealing with sea-based plastic litter. (FAO, 2019).

# case studies

**In the Coral Triangle, there have been several examples of pilot projects and studies to better understand ADLFG. The following examples are case studies from the Coral Triangle:**

## SOLOMON ISLANDS

In 2018, the Solomon Islands was part of a Pacific project that developed a model to help understand some of the types and amount of gear that may be contributing to marine plastic pollution. The World Animal Protection project, funded by the Commonwealth Litter Programme (CLiP) developed a probability model that predicts where derelict fishing gear will likely occur in Vanuatu and Solomon Islands. The study report found that high probability areas in Solomon Islands occur around Choiseul, New Georgia and Santa Isabel islands. However, the lack of empirical data related to fishing effort by gear type by area remained the primary gap in data (Giskes, 2019). The study reported that while some of the Solomon Islands fisheries management practices are consistent with the GGGI Best Practices Framework, there are no specific management policies and practices designed to prevent, mitigate, or eliminate harm from ALDFG. Current measures are limited to the marking of anchored FADs deployed by the government to ensure they are identified as property of the Ministry of Fisheries and Marine Resources. The Parties to the Nauru Agreement (PNA) requires satellite tracking of all drift FADs deployed in the EEZs of its member states, including the Solomon Islands. However, once the drift FADs are no longer being fished, there is no requirement to continue tracking or to retrieve them (Giskes, 2019).

## INDONESIA: JAVA

In 2018, Indonesia participated in an FAO project to explore the feasibility of fishing gear marking, particularly in developing countries, and ghost gear retrieval. Indonesia was proposed as a pilot project given the abundance of ALDFG and increasing threat of Illegal Unregulated and Unreported (IUU) fishing in Indonesian territorial waters coupled with a strong commitment by the Indonesian government to take steps towards addressing both issues (FAO, 2018). The project was led by the Ministry of Marine Affairs and Fisheries together with World Animal Protection, and supported by FAO and the Dutch government.

The project focused mainly on gillnets due to their prevalence and impact as ALDFG. Two pilot sites were selected in Java to test gear marking methods outlined in FAO's Draft Guidelines. In Pekalongan, low rates of gear loss were reported due to favourable weather conditions and a sandy, muddy substrate which reduces the possibility of snagging. In the second pilot site in Sadeng where the fishers operate in deeper waters in the Indian Ocean in less favourable weather conditions, higher rates of gear loss were reported, with one study estimating 35,000 pieces of gillnet being lost in the spiny lobster fishery each year (FAO, 2018).

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The FAO reported that initial feedback from the communities participating in this pilot project was positive, as gear marking was viewed as an effective tool in achieving better fisheries management that benefit the communities. However, a need exists to build greater understanding of the benefits of gear marking and further work should be done on related issues, particularly the ability to retrieve the gear when lost and the need for environmentally-friendly tags. The low value of gillnets and a government subsidy providing nets to fishers offers limited incentive to retrieve lost nets although repair and reuse of damaged nets was commonly reported. Further, small-scale fishers in Indonesia, use flashlights and flags for visibility of fishing gear, but more could be done to aid identification. Marking gear during manufacturing and adding value to end-of-life gear were recommended approaches to address current challenges (FAO, 2018).

## INDONESIA: PAPUA PROVINCE

In 2017, the Coral Triangle Center commenced a two year SeaNet Waste Net Recycling Program in collaboration with fishers in Kamahedoga Village in Merauke, Papua Province, the Zoological Society of London, and materials recycling company Aquafil, based on the Net-Works model. The model is also being used to recycle ghost nets in the Philippines into reusable products. CTC worked with a fishers group, named Nokennagol or 'for all of us' in local language, who were responsible for collecting and cleaning 10 tons of discarded nets over 10 months. The fishers received a direct benefit in the form of cash when they cleaned and delivered the nets to the collection point. CTC's SeaNet project staff organized the baling and shipping of the nets to Surabaya and then internationally to Aquafil's processing plant in Slovenia.

The nets were shipped from Indonesia in November 2018 and arrived at Aquafil's facility in Slovenia, marking the first time that ghost nets were exported outside Indonesia where they are processed into reusable materials to become regenerated nylon and turned into useful products, such as carpets and apparel, contributing to a circular economy and reducing threats to the marine environment. See: www.youtube.com/ watch?v=zpAe-M2rnPY&t=4s

## THE PHILIPPINES

In Bohol in the Philippines, a similar net recycling project was implemented by Coast 4C (previously Net-Works). Coastal communities in the Philippines have limited access to solid waste management mechanisms, so the majority of old fishing nets are discarded directly into the ocean. According to Coast 4C, most fishing nets in the Philippines are made from an engineering grade plastic with the highest recycling value which can be integrated into products that have a negative carbon footprint and can be fed into the circular economy. Coast 4C establishes a value chain within coastal communities that diverts old fishing nets from the ocean for recycling into carpet tiles. Leveraging the special purpose cooperatives that they establish in each community for both seaweed

*continued on next page*

and nets, they provide technical support and outreach to encourage fishers to sell nets at the end of life, and to encourage community action to collect nets from the beaches and the sea. Coast 4C buys the old fishing nets from partner communities, and processes it for sale into responsible global markets.

Central to the Net-Works model are the local community banks it helps to set up. These Village Savings and Loan Associations, locally known as CoMSCAs, are run by community members. They enable people to save the money they earn from selling used nets, and to take out small loans to do things like invest in a new business or pay for a family member to go to college. In a new innovation introduced by the Net-Works Philippines team, CoMSCAs are also proving to be effective conservation partners. In 2015 the team started introducing the concept of an Environment Fund as a way to create a sustainable source of financing for local conservation work. With an Environment Fund, members of the CoMSCA agree to contribute a small amount of money into a dedicated fund on a regular basis. They then invest this money in local conservation projects such as the management of MPAs, or the rehabilitation of mangrove forests. Sourced from www.coast4c.com/products/

## PAPUA NEW GUINEA

The Fishing Industry Association (FIA) of PNG has been developing new requirements to safeguard marine ecosystems and ocean health. Recognising that marine debris and fishing gear loss in the tuna purse seine industry are less well understood than other offshore and coastal operations, the FIA developed a Responsible Sourcing Policy (RSP) that includes a marine litter and fishing gear mitigation procedure and audit tool for the tuna fisheries. Through multi-stakeholder collaboration, including with NGOs and industry, terms of reference for the project were produced and a gap analysis carried out in 2019. The RSP aims to ensure FIA PNG policies and procedures take into account all perspectives and the knowledge in the industry and beyond. These include:

- Best practices for Tropical Tuna Seiners with emphasis on FADs. International Seafood Sustainability Foundation – ISSF
- Best Practices Framework for fishing gear, Global Ghost Gear Initiative –GGGI
- Voluntary Guidelines on the Marking of Fishing Gear 2019 – FAO
- Directive for Single Used Plastic (SuP), European Commission – EU
- Non-Entangling and Biodegradable FADs Guide, ISSF
- Prevention of Pollution by Garbage MARPOL, IMO

This robust due diligent process started with internal audits in July 2021 of the FIA PNG fishing company-members. The participating companies' data performances have been published on the FIA PNG website (www.fia-png.com). In addition, FIA PNG members are increasingly making awareness in the reduction of Single used Plastic (SuP) on the FIA PNG website. FIA PNG will also make its marine litter and fishing gear mitigation procedure available on its website.

# 7

# Global and Regional Action Plans and Strategies

The following section provides a summary of examples of key regional and global action plans and strategies developed to address marine plastic pollution and the broader challenges from plastics production, consumption and disposal. They are guides to the Coral Triangle countries which participate in the various regional government organizations that have driven the development of regional plans which support national level actions and implementation. They are also valuable strategies for guiding the CTI-CFF to leverage the expertise and depth of consultation that has contributed to the plans and roadmap and aid CTI-CFF in facilitating cross and inter-regional collaboration. For further information on each document refer to Appendix 1.

- **Addressing Marine Plastic Pollution: Roadmap to a Circular Economy**

  The 2019 roadmap was developed by UNEP, the GEF, Ocean Conservancy and GRID-Arendal (Wang et. al., 2019). It acknowledges that marine plastic pollution "needs to be addressed along the entire value chain (including production, distribution, consumption, reuse, collection and recycling, as well as final disposal of plastics), by making a systemic and fundamental shift from a linear to a circular economic model for plastics." The roadmap considers actions required at global, regional and national/local scales and takes a systemic approach to address marine plastics by tackling the issue at the source to achieve a circular economy for plastics. See: www.gefmarineplastics.org/roadmap

- **The Plastics Policy Playbook: Strategies for a Plastic-Free Ocean (2019)**

  The report identifies four key themes to improve the economics of collection across the value chain: 1) Financing the collection via Extended Producer Responsibility measures; 2) Reducing the production and use of problematic single-use plastics; 3) Designing for circularity; and 4) Increasing the demand for post-consumer plastics. Produced by Ocean Conservancy, Trash Free Seas Alliance and Accenture. See: www.oceanconservancy.org/wp-content/uploads/2019/10/Plastics-Policy-Playbook-10.17.19.pdf

- **ASEAN Regional Action Plan for Combating Marine Debris in the ASEAN Member States (2021–2025)**

  This Plan will help support regional policies, platforms and programs, while providing support and guidance to national level plastics actions. It proposes the phased implementation of a systematic and

integrated response to guide regional actions in addressing the issue of marine plastic pollution in ASEAN over the next five years. It also highlights the current status and challenges faced by Member States and identifies potential solutions along the value chain to overcome unsustainable plastic consumption, waste management and marine debris pollution. Its four components include Policy Support and Planning; Research, Innovation and Capacity Building; Public Awareness, Education and Outreach; and Private Sector Engagement. See: www.asean.org/book/asean-regional-action-plan-for-combating-marine-debris-in-the-asean-member-states-2021-2025-2

- **COBSEA Regional Action Plan on Marine Litter 2019 (RAP MALI)**

  Provides an overarching regional framework for addressing marine litter in the East Asian Seas as a transboundary issue. It promotes consolidation, coordination and facilitation of efforts towards integrated management of marine litter, comprising actions in relation to preventing and reducing marine litter from land-based as well as sea-based sources, monitoring and assessment, and creating enabling conditions. A Working Group on Marine Litter was established to provide strategic and technical support and to facilitate information exchange and regional cooperation towards the implementation of the RAP MALI. It comprises the following main actions: Preventing and Reducing Marine Litter From Land-Based Sources; Preventing and Reducing Marine Litter from Sea-Based Sources; Monitoring and Assessment of Marine Litter; and Supporting the Implementation of RAP MALI. See: www.unenvironment.org/cobsea/events/intergovernmental-meeting/twenty-fourth-intergovernmental-meeting-coordinatingbody-seas and www.bit.ly/COBSEArapmali

- **Pacific Marine Action Plan: Marine Litter 2018–2025 (MLAP)**

  Developed by SPREP in partnership with UNEP and the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities. It is part of the Regional Seas Programme and the Global Partnership on Marine Litter. The MLAP is a subset of the Pacific Regional Waste and Pollution Management Strategy 2016-2025 (Cleaner Pacific 2025) and the Pacific Oceans Pollution Prevention Programme (PACPOL) 2015-2020. It sets out the key actions to minimize marine pollution across Pacific Island countries and territories under the auspices of the Noumea Convention and the Cleaner Pacific 2025 Strategy. It includes establishing a comprehensive policy and regulatory framework for marine waste management; proposed actions on key sources of marine litter for each year of implementation; a frame of reference for priority regulatory and policy initiatives for marine litter; and practical considerations to implement and measure the progress of the plan. See: www.sprep.org/publications/pacific-regional-action-plan-marine-litter

# 8

# Potential Funding and Investment Sources

Governments have a number of ways of funding initiatives, programmes, and infrastructure and services to address marine plastic pollution. These include:

- National budget allocations – i.e. taxation, fee for service systems, container deposit / return schemes and extended producer responsibility schemes to generate income to support waste management strategies and other programmes to reduce use of plastic and increase recycling and systemic changes towards circular economy.
- Public Private Partnerships
- Corporate Social Responsibility sources
- Bilateral and Regional Cooperation including multilateral banks
- International Organization Support (WB, GEF, UNEP)
- Philanthropic, NGO, Volunteer, and Communities Support
- Impact Investment and Blended Finance, Green/Blue Bonds

This section identifies potential sources of external funding, investment and technical support towards helping countries tackle marine plastic pollution. The funds may be either grants, loans, investment type funds and may come from multilateral development banks, government overseas aid and infrastructure programmes, foundations and the private sector.

## World Bank

The World Bank Group is supporting governments and businesses on plastic-smart solutions to #BeatPlasticPollution, promote a circular economy, and improve livelihoods for countries and communities across the region. It also provides support to development projects, via traditional loans, interest-free credits, and grants and operates the following instruments:

- **International Bank for Reconstruction & Development**: IBRD provides financial development and policy financing. It lends to governments of middle-income and creditworthy low-income countries.

- **International Development Association**: IDA provides zero-to low-interest loans and grants to governments of the poorest countries.

- **International Finance Corporation**: IFC mobilizes private sector investment and provides advice. Focused exclusively on the private sector, the IFC provides advice to businesses and governments, and contributes debt and equity financing to commercial companies.

- **The Multilateral Investment Guarantee Agency**: MIGA provides political risk insurance (guarantees) to investors and lenders to promote foreign direct investment into developing countries.

- **PROBLUE: Supporting integrated and sustainable economic development in healthy oceans.** PROBLUE is an umbrella Multi-Donor Trust Fund housed at the World Bank that supports healthy and productive oceans and is fully aligned with the World Bank's twin goals of ending extreme poverty and increasing the income and welfare of the poor in a sustainable way. PROBLUE is part of the World Bank's overall Blue Economy program, which takes a multi-pronged, coordinated approach to ensuring the protection and sustainable use of marine and coastal resources. PROBLUE focuses on four key themes: i) the management of fisheries and aquaculture, ii) threats posed to ocean health by marine pollution, including litter and plastics; iii) sustainable development of key oceanic sectors such as tourism, maritime transport and off-shore renewable energy; and iv) building the capacity of governments to manage their marine and coastal resources in an integrated fashion to deliver more and long-lasting benefits to countries and communities, including the role of nature-based solutions to climate change. The initiative will focus on East Asia, South Asia, Africa and Small Island Developing States (SIDS) from 2019 to 2026. To apply for PROBLUE for support, interested parties within the country such as municipal or provincial governments need to reach out to their federal ministry directly, who in turn will work with the World Bank to apply for PROBLUE support. PROBLUE does not accept unsolicited proposals from the private sector, NGOs or academia. See: www.worldbank.org/en/topic/environment/brief/the-world-banks- blue-economy-program-and-problue-frequently-asked-questions and www.norad.no/en/front

## Asian Development Bank

A major actor in the funding and investment space is the Asian Development Bank (ADB):

- **Action Plan for Healthy Oceans and Sustainable Blue Economies**: launched in 2019, which aims to catalyse sustainable investments in Asia and the Pacific by committing to invest and provide technical assistance of at least US$5 billion by 2024. It is part of ADB's strategy to expand the necessary support for its developing member countries (DMCs) to invest in healthy oceans, ensure the achievement of SDG 14, which addresses "life below water" and contribute to the security and prosperity of the region. The Action Plan for Healthy Oceans and Sustainable Blue Economies is expanding financing and technical assistance for ocean health and marine economy projects to US$5 billion from 2019 to 2024, including co-financing from partners. It focuses on four areas: i) creating inclusive livelihoods and business opportunities in sustainable tourism and fisheries; ii) protecting and restoring coastal and marine ecosystems and key rivers; iii) reducing land-based sources of marine pollution, including plastics, wastewater, and agricultural runoff; and iv) improving sustainability in port and coastal infrastructure development. As a part of the action plan, ADB launched the Oceans Financing Initiative to create opportunities for the private sector to invest in bankable projects that will help improve ocean health. The initiative will provide technical assistance grants and funding from ADB and other donors to reduce the technical and financial risks of projects. This will be done through instruments such as credit risk guarantees and capital market "blue bonds". See: www.adb.org/news/adb-launches-5-billion-healthy- oceans-action-plan

- **The Oceans Financing Initiative**: will be piloted in Southeast Asia in collaboration with the ASEAN Infrastructure Fund and the Republic of Korea. The new facility provides loans and necessary technical assistance for sovereign green infrastructure projects such as sustainable transport, clean energy, and resilient water systems. It aims to catalyse private capital by mitigating risks through innovative finance structures. The Oceans Financing Initiative will mobilize a total of US$1 billion including US$75 million from the ASEAN Infrastructure Fund (AIF), US$300 million from ADB, €300 million (US$336 million) from KfW, €150 million from the European Investment Bank, and €150 million from Agence Française de Développement. The Organization for Economic Co-operation and Development and the Global Green Growth Institute will support knowledge sharing and capacity building on green finance. The Overseas Private Investment Corporation has expressed interest in potential financing for emerging projects. The facility is part of a new "Green and Inclusive Infrastructure Window" under the AIF, a regional financing initiative established by ASEAN governments and ADB in 2011 and administered by ADB. Since its establishment, the AIF has committed US$520 million for energy, transport, water, and urban infrastructure projects across the region. The ASEAN Catalytic Green Finance Facility will support ASEAN governments in developing green and climate-friendly infrastructure projects that will contribute to fighting climate change, improving the quality of air and water, and reducing environmental degradation across the region. See: www.adb.org/news/new-facility-mobilize-1-billion-asean-green-infrastructure

- **Green and Blue Bond Framework**: In September 2021 the ADB issued its first ever dual-tranche blue bonds denominated in Australian and New Zealand dollars that will finance ocean-related projects in Asia and the Pacific. The A$208 million (around US$151 million) 15-year issue and the NZ$217 million (around US$151 million) 10-year issue are part of the ADB's expanded Green and Blue Bond Framework. ADB's blue bonds are replicable, scalable, and aim to grow the ocean economy across Asia and the Pacific. The proceeds will finance projects that enhance ocean health through ecosystem restoration, natural resources management, sustainable fisheries and aquaculture, reduction of coastal pollution, circular economy, marine renewable energy, and green ports and shipping. At the same time, these investments will support sustainable economic growth and jobs for the future. Developing member countries (DMCs) can adopt ADB's approach and issue sovereign blue bonds to finance important ocean health projects that will both protect vital ocean resources and provide a much-needed economic boost. See: www.adb.org/news/adb-issues-first-blue-bond-ocean-investments

Australian Government

## Australian Government

- **Pacific Ocean Litter Partnership**: (POLP) aims to complement existing waste management projects to support the delivery of the Secretariat of the Pacific Regional Environment Programme (SPREP)'s Pacific Regional Action Plan on Marine Litter 2018. The project design initially addressed key marine litter threats and proposed actions identified through the Marine Litter Action Plan under the original four- year, AUD$8 million funding commitment. In July 2019 Australia expanded this commitment to support a six-year, AUD$16 million project investment. The project predominantly works through national government systems and responds to national priorities. POLP will also support regional initiatives targeting problematic single-use in the Pacific, mainly through support for partnerships with relevant industry groups (i.e. tourism, food and beverage manufacturers or distributors), as well as developing coastal marine litter survey standards, assessing the availability and viability of alternative products and working with other regional organizations (i.e. the Pacific Tourism Authority) to undertake studies and trials of such alternative products. See: www.sprep.org/news/pacific-ocean-litter-project-polp-to-strengthen-pacific-action-against-plastic-pollution

- **Regional waste and marine plastic litter initiatives**: POLP will also act on behalf of SPREP to coordinate efforts by major donors and organizations to address marine plastic litter in the Pacific, as there are presently bilateral and regional plastic waste analysis and reduction activities being supported by Australia, IUCN (*Plastic Waste Free Islands project*), UNEP (*GEF ISLANDS project*), the UK (*Commonwealth Clean Oceans Alliance Technical Assistance Facility and the Commonwealth Litter Project – 'CLiP'*), and France (*Agence Française de Développement – Sustainable Waste Actions in the Pacific 'SWAP' project*), amongst others.

## The United States Agency for International Development (USAID)

**USAID's Municipal Waste Recycling Program (MWRP)** aims to reduce land-based sources of ocean plastics pollution in four Asian countries that are among the largest polluters: Indonesia, the Philippines, Sri Lanka, and Vietnam. Through grants and technical assistance to eligible organizations, MWRP has introduced innovative, scalable solid waste management (SWM) approaches and increased municipal waste recycling investment in coastal cities, by supporting local businesses, women's associations, municipalities, and others to reduce ocean plastics pollution. MWRP's grants strengthen local stakeholders' capacity to effectively manage solid waste and expand recycling through mechanisms that promote social inclusion, empower women and youth, support independent waste collectors, and generate jobs and economic growth. USAID's funding has supported applied research to identify locally appropriate technology and improve decision-making processes for urban SWM and recycling. MWRP bolsters the private sector to implement market-driven solutions to reduce ocean plastics pollution and to strengthen the recycling value chain. See: www.urban-links.org/resource/municipal-waste-recycling-program- usaid-mwrp-fact-sheet

## Pacific Regional Infrastructure Facility (PRIF)

A multi-partner coordination and technical assistance facility established in 2008 to help improve the quality and coverage of infrastructure in the Pacific. It provides an interface between development partners and its Pacific member countries to improve the quality and coverage of infrastructure and service delivery. It works to enhance coordination of PRIF partner investments in the Pacific and provide technical advice on infrastructure development and sustainable infrastructure management to PRIF partners and member countries. PRIF partners are the Asian Development Bank, Australian Department of Foreign Affairs and Trade, European Union, European Investment Bank, Japan International Cooperation Agency, New Zealand Ministry for Foreign Affairs and Trade, United States Department of State and the World Bank Group. See: www.theprif.org/

## United Nations Environment Programme

(UNEP) is the leading global environmental authority that sets the global environmental agenda, promotes the coherent implementation of the environmental dimension of sustainable development within the United Nations system, and serves as an authoritative advocate for the global environment. Its mission is to provide leadership and encourage partnership in caring for the environment by inspiring, informing, and enabling nations and peoples to improve their quality of life without compromising that of future generations. UNEP works under the umbrella of the UN 2030 Agenda for Sustainable Development, identifying and addressing the most relevant environmental issues of our time. The Environment Fund is the core source of flexible funds, providing the bedrock of UNEPs work worldwide. For example, it supports the implementation of its

programme of work, which is endorsed by the 193 Member States. In addition, earmarked funds (funds given or "earmarked" to a specific project, theme, country etc.) enable UNEP to expand and replicate its programme in more countries and with more partners. Main providers of earmarked funds include the Global Environment Facility, the Green Climate Fund and the European Commission. Around the world, UNEP works in partnerships with governments, the scientific community, the private sector, civil society, and other United Nations entities and international organizations including through the UN Environment Assembly.

## The Global Environment Facility (GEF)

- **GEF-7** will explore the important synergies between the International Waters and the Chemicals and Waste focal areas to address specifically the challenge of marine litter and microplastics. Waste consisting of plastics can contribute to the POPs challenge as POPs contained in plastics can be released in the environment including oceans, if not properly managed. Marine litter in the form of microplastics to a significant extent derives from land-based activities and should also be seen in the context of waste management issues dealt with under this focal area. Recognizing the need to transform the entire life cycle of plastics to reduce marine plastic pollution, the GEF will invest in a few strategic Circular Economy initiatives to promote the adoption of closed loop production and consumption patterns instead of traditional linear take-make-waste approaches. Investments will be focusing on public/ private investments to transform the plastic life cycle. See: www.thegef.org/topics/chemicals-and-waste

- **GEF 8**: In June 2021, the GEF Council endorsed a roadmap for long-term complementarity with the Green Climate Fund which will be launched at the COP26 Climate Summit in November 2021. The Council also approved new projects supported by the GEF and Least Developed Countries Fund for urgent climate change adaptation work including a project for Timor-Leste. This signals a new collaborative approach for the GEF to work across the key international conventions recognizing the many connections between those agendas with chemicals and waste, including from the poor management of landfills, plastic waste in the ocean, land pollution, forest loss, and more. GEF calls for an ambitious replenishment for the GEF-8 funding cycle that allows for high-impact integrated work across the conventions and their overlapping agendas. See: www.thegef.org/news/gef-council-approves-new-funding-backs-collaborative-approach

- **Least Developed Countries Fund (GEF)**: The LDCF is enabling Least Developed Countries to prepare for a more resilient future and helps recipient countries address their short-, medium- and long-term resilience needs and reduce climate change vulnerability in priority sectors and ecosystems. LDCF backing helps countries implement the National Adaptation Programmes of Action (NAPAs) and the Least Developed Country work program under the UNFCCC. The LDCF works with partner agencies to bolster technical and institutional capacity at the national and local level, to create a policy environment that encourages investment in adaptation solutions, to reduce systemic barriers to progress, and to promote innovation and private sector engagement. Priority funding areas include agriculture and food security; natural resource management; water resources; disaster risk management and prevention; coastal zone management; climate information services; infrastructure; and, climate change induced health risks. Nature-based adaptation solutions – such as restoring mangrove forests to help protect exposed coastal areas – are another focus of the fund. See: www.thegef.org/topics/least-developed-countries-fund-ldcf

- **Sustainable Cities**: Recognizing the centrality of cities as key climate actors, the GEF launched the Sustainable Cities Integrated Approach Pilot in 2016, as part of the GEF-6 phase (2014-2018).

The program is now in implementation, supporting 28 cities in 11 countries with integrated urban solutions for green mobility, clean energy, climate adaptation, and solid waste and chemicals management. Along with these country projects, the operational Global Platform for Sustainable Cities is facilitating city-to-city exchange and knowledge creation. Building on the GEF-6 phase, the Sustainable Cities Impact Program (SCIP) in GEF-7 (2018-2022) advances the integrated approach of urban planning and implementation. The program brings together global, national, and local stakeholders to work towards a common vision of sustainable, low carbon, inclusive, gender sensitive and resilient development, and is supporting 24 cities in nine countries. The SCIP focuses on both infrastructure and nature-based solutions for urban sustainability, engages with city-based organizations and the private sector, and integrates gender and inclusion into planning and investment decision-making in cities. Coral Triangle cities engaged in the Sustainable Cities programme include Bitung, Balikpapan, Palembang, Jakarta and Semarang in Indonesia and Melaka in Malaysia. See: www.thegef.org/topics/sustainable-cities

- **The GEF Small Grants Programme (SGP)** provides financial and technical support to communities and Civil Society Organizations to meet the overall objective of global environmental benefits secured through community-based initiatives and actions. The SGP provides assistance to 125 countries and believes that community-driven and civil society-led initiatives can generate environmental benefits, while supporting sustainable livelihoods, gender equality and civil society empowerment. These are actions needed at the local and regional level to address global environmental challenges and complement other areas where the GEF works. The SGP, through a decentralized, national-level delivery mechanism, finances community- led initiatives to address global environmental issues. It is currently implemented by UNDP on behalf of the GEF partnership. The program is specifically designed to mobilize bottom-up actions by empowering local civil society organizations, and poor and vulnerable communities, including women and Indigenous Peoples. The Programme funds grants up to a maximum of $50,000. In practice, the average grant has been around $25,000. In addition, the SGP provides a maximum of $150,000 for strategic projects. These larger projects allow for scaling up and cover a large number of communities within a critical landscape or seascape. See: www.thegef.org/topics/gefsgp

## Mohamed Bin Zayed Species Conservation Fund

Provides small grants to boots-on-the-ground, get-your-hands-dirty, in-the-field species conservation projects for the world's most threatened species. Through innovative micro-financing, the MBZ Fund empowers conservationists to fight the extinction crisis instead of bureaucracy and red-tape. It is a philanthropic endowment established to: provide targeted grants to individual species conservation initiatives; recognize leaders in the field of species conservation; and elevate the importance of species in the broader conservation debate. It is open to applications for funding support from conservationists based in all parts of the world, and will potentially support projects focused on any and all kinds of plant, animal and fungus species, subject to the approval of an independent evaluation committee. Grants will be awarded based on criteria pre-determined by the Species Fund, and are for a maximum of $25,000 for each project. See: www.speciesconservation.org

## Norwegian Agency for Development Cooperation (Norad)

In 2018, Norad launched a development programme to combat marine litter and microplastics. The main objective is to prevent and greatly reduce the extent of marine litter from large sources in developing countries. Funding is focused on four outcomes: i) Management of plastic waste in

partner countries is improved; ii) Selected coastal areas and rivers are cleared of waste and the waste is sustainably managed; iii) Private sector performance regarding sustainable production and use, and responsible waste management, is improved; and iv) Global commitments and national and regional instruments to prevent marine litter are strengthened. Projects supported by the Norwegian Development Programme to Combat Marine Litter and Microplastics include:

- **Building Partnerships to Assist Developing Countries to Address the Issue of Marine Plastic Litter from Sea-based Sources (GloLitter Partnerships)**: Implemented by the International Maritime Organization (IMO)/FAO) to enable developing countries to effectively implement and enforce international regulatory frameworks, as well as best practice for prevention, reduction and control of Sea Based Marine Plastic Litter through capacity building, policy making, action planning, practical steps in reducing dumping of fishing gear and legislative developments. 2020 to June 2023. See: www.imo.org/ en/OurWork/ PartnershipsProjects/Pages/GloLitter-Partnerships-Project-.aspx

- **Countering Illegal Hazardous Waste Trafficking through the UNODC-WCO Container Control Programme**: United Nations Office on Drugs and Crime (UNODC) and the World Customs Organization (WC) aim to improve the capacity of partner countries to detect and suppress illicit trade in hazardous waste, such as plastic and scrap waste, e-waste and chemicals. The project includes training to enhance the technical skills of customs and law enforcement officers in ports, as well as inter-agency cooperation – Malaysia, the Philippines, Cambodia, Thailand and Vietnam. April 2020 to December 2023. See: www. unodc.org/unodc/en/ccp/index.html

Federal Ministry for Economic Cooperation and Development

## German Federal Ministry for Economic Cooperation and Development (BMZ)

BMC committed EUR 30 million in 2017 to the implementation of development projects under the "Ten-point Plan of Action for Marine Conservation and Sustainable Fisheries". This includes supporting the efforts of partner countries to reduce marine pollution and funding for projects which serve the implementation of the G20 Action Plan on Marine Litter.

- **The Blue Action Fund – (BAF)** was established by BMZ and KfW Entwicklungsbank in 2016. Since then the BMZ has contributed Euro 80 million to the Fund. Other national funding partners are Sweden and France: since 2019 the Green Climate Fund (GCF) has also contributed. The aim of the Blue Action Fund is to improve protection of the world's oceans and coasts and thereby stem the dramatic loss of marine biodiversity. Local development will be fostered and sustainable livelihoods in coastal communities will be promoted. It makes grants to non-governmental organizations and local actors to enable them to significantly expand their activities aimed at conserving the oceans' biological diversity and using it sustainably. See: www. bmz.de/en/development-policy/biodiversity/marine-conservation

- **Sustainable Oceans Alliance (SOA)**: The SOA announced EUR4.27 million (US$5 million) for the launch of the SOA Ocean Solutions Accelerator, a global program created to help young entrepreneurs build and scale ocean-focused start-up companies. The program gives young entrepreneurs access to skill-building workshops, funding opportunities, introductions to field experts, partners, mentors, and investors, as well as a platform to showcase their ventures on a global scale. The mission is to bring next-gen leaders, entrepreneurs, advocates, mentors, and partners together to create solutions for the largest challenges facing our ocean. See: www.soalliance.org

# 9

# Recommendations

## Discussion

According to the World Bank, countries in East Asia and the Pacific are at the centre of the marine plastics crisis – with some countries in the region representing some of the biggest contributors and others disproportionately affected by the impacts of marine plastic debris on their shores.

The Coral Triangle countries being central to this region are important stakeholders to help address the crisis. However, the challenge for the region and the global community is enormous. This region faces ever increasing demand for plastics packaging and products, there are large investments expected in virgin plastic production capacity, a large influx of plastic waste continues from Europe and the US, both legal and illegal. This is compounded by a lack of domestic capacity and infrastructure to cope with the escalating volumes of land- and sea-based waste generated and the growth in global fisheries which is contributing to dangerous abandoned, lost, discarded fishing gear in the ocean.

The article *Mopping Up or Turning Off the Tap? Environmental Injustice and the Ethics of Plastic Pollution*, discusses how plastic pollution has become something that is largely seen as a developing world problem, while wealthier countries and companies continue to knowingly place products and waste exports on these markets which may have limited or no responsible end-of-life solutions (Owens & Conlon, 2021). It warns against a single-minded focus on waste management as a solution to the plastic pollution problem and that while increasing recycling will remain an element of the solution, effort must continue for better upstream policies and approaches which eliminate the creation of waste altogether i.e. through reduction and reuse (Owens & Conlon, 2021).

Meanwhile, figures released in September 2021, estimated the lifetime cost to society, the environment and the economy of plastic produced in 2019 alone to be US$3.7 trillion and unless action is taken, these costs are set to double to US$7.1 trillion for the plastics produced in 2040 (DeWit et al., 2021). The report points to fragmented regulatory approaches, misplaced incentives as well as lack of coordinated technical resources, financial support and a lack of consistent data on plastic leakage as contributing to these costs. Further, under a 'business-as-usual' scenario it estimates that by 2040, there will be a doubling of plastic production and a tripling of plastic pollution entering the ocean, increasing the total

stock of plastic in the ocean to 600 million tonnes with greenhouse gas (GHG) emissions from the plastic lifecycle, accounting for up to 20 per cent of the entire global carbon budget, and accelerating the climate crisis. (DeWit et al. 2021).

Further, the COBSEA Regional Action Plan on Marine Litter (RAP MALI, 2019) reports that marine litter is a transboundary challenge rooted in unsustainable production and consumption patterns, poor solid waste management and lack of infrastructure, lack of adequate legal and policy frameworks and poor enforcement, including on interregional cross-border trade of plastic waste, and a lack of financial resources. However, tackling plastic pollution requires significant changes in the way we produce, consume, and dispose of plastic. This requires "further innovation in resource-efficient and low-emission business models, reuse and refill systems, sustainable substitute materials, waste management technologies, and effective government policies" (Lau et al. 2020).

Existing international conventions—concerning dumping at sea, environmental conservation, species protection, regulation of hazardous substances, as well as marine pollution more generally—all have a bearing on marine plastic pollution, but do not provide a comprehensive or effective framework to achieve the objective of a world free from ocean plastics. Voluntary action and initiatives by individuals, organizations and business can serve to catalyse that change, but regulatory improvements are also needed, both at the global and national level. Currently the plastics value chain remains largely unregulated at the global level. With this growing recognition, the mandate to start negotiations of a new global legally binding agreement to combat plastic pollution was secured at the Fifth session of the United Nations Environment Assembly in February 2022. UN Member States adopted a decision to convene an intergovernmental negotiating committee (INC), to develop an international legally binding instrument on plastic pollution, including in the marine environment. Subsequently, Pacific Islands countries have confirmed their commitment in the 2021 'Pacific Regional Declaration on the Prevention of Marine Litter and Plastic Pollution and its Impacts.

For the Coral Triangle region, there is much at stake – the world's most diverse and pristine marine ecosystems anywhere in the world, which sustain more than 360 million people. As we have seen from the MPA and Local Government Network case studies, the management of these high biodiversity conservation areas is threatened by marine plastic debris, often from external sources that are beyond the control of the local MPA management committees and coastal communities. However, the lack of solid waste collection and effective management in nearby towns or local government authorities is also contributing to the waste that is impacting the marine ecosystems and potentially on communities. We've learned from these case studies that coastal communities and businesses rely on the MPAs and the marine resources for fishing, tourism and livelihoods. Yet the local government authorities are also struggling to manage their municipal and rural wastes.

Whilst coastal communities, tourism centres and MPA management groups can try to manage the influx of plastic debris through coastal clean ups and other initiatives such as waste banks and recycling of fishing nets, the problem of plastic waste requires a whole of plastic lifecycle approach. The end-of-pipe approach to cleaning up the plastic once it reaches the ocean and the reefs is necessary but limited in its effectiveness while the volume of mismanaged plastics continues to grow. It will require the actions of regional and international platforms, national and local governments, industry, innovators, researchers and consumers to support the very local to the global efforts necessary to address the problem.

Given there are a plethora of different programmes and initiatives aimed at addressing plastic pollution, coordination, harmonisation and as much of an upstream focus on the problem as possible is needed to

avoid duplication of efforts and waste of investment and funds through more cohesive monitoring and evaluation efforts.

The CTI-CFF has the momentum, built from more than a decade of working together on a shared vision for the region, to tackle this global challenge. It will require broadening the existing collaboration to engage new strategic partnerships particularly with other regional organizations such as ASEAN, COBSEA and SPREP and with international and regional initiatives to leverage the significant effort already channelled into global and regional strategies and action plans to address marine plastic pollution and the wider issues associated with plastic production, use and disposal.

"Ideally, addressing the problem as far upstream as possible, from point of manufacture and throughout the entire supply chain, long before waste enters the coastal and marine environments will yield the best outcomes and see the least waste lost to the environment." (Hardesty et al. 2021). This requires a system change from a linear to a circular economy "where plastic never becomes waste" (Ellen MacArthur Foundation, 2018).

## Recommendations

The CTI-CFF provides a unique platform that can help to bridge the various regional action plans and frameworks that have been developed over the past several years to address marine plastic pollution. Through the CTI-CFF, the value-added benefits of these regional strategies can be shared across ASEAN and Pacific through cross learning and collaboration. For example, the ASEAN, COBSEA and SPREP plans provide regional actions that aim to meet the needs of their various member states and support the national level plans of action being developed or already implemented by the Coral Triangle countries. The CTI-CFF can facilitate collaboration and cross sharing of existing knowledge, best practices and resources developed through the regional platforms that can be shared across the Coral Triangle government and non-government stakeholders including civil society, academia, research institutions and the private sector.

The following recommendations are aimed at supporting the Coral Triangle countries to move towards circular economy approaches that both reduce the creation of new plastics and contribute to closed systems where waste is reduced and valued. The aim is to provide additional sources of information that can enhance actions to address marine plastic pollution in the CTI-CFF Regional Plan of Action 2.0 by tapping into the foundational work undertaken through ASEAN, COBSEA, SPREP and others such as UNEP, IUCN and CTI-CFF strategic partners.

The recommendations also aim to support the CTI-CFF towards achieving its policy and capacity building ambitions to develop institutional capacity to protect 30 per cent of the coastal and marine waters in the CT region effectively, by 2030 (30x30). The stocktake aims to provide guidance on approaches to tackle the marine plastic pollution that currently affects the coastal and marine habitats and the priority threatened marine species of the Coral Triangle. These efforts will also contribute to the Coral Triangle countries' commitments to the SDGs, particularly Goal 14, Life Below Water.

An important consideration is to ensure information is available to national and local governments as well as the coastal communities, tourism centres and the marine protected and managed areas and their management groups to ensure access to knowledge, capacity, technical support, funding and resources to address marine plastic pollution.

## REGIONAL LEVEL RECOMMENDATIONS

The **CTI-CFF Regional Secretariat** is encouraged to:

1 

**Engage with academia, NGOs, Strategic Partners and other regional governmental organizations** (e.g. ASEAN, COBSEA and SPREP) which have established partnerships with key resource and technical agencies to identify potential areas of collaboration such as but not limited to:

- Sharing of knowledge and resources that can support the Coral Triangle countries implement national action plans to address marine litter and build circular economies
- Develop a common research agenda for data collection and monitoring to address gaps in knowledge on plastics n the marine environment;
- Support regional baseline and monitoring with standardized or comparable measures that include microplastics in the water-column, seabed and sub-soil and sensitive habitats;
- Standardization of definitions for plastic products and biodegradability;
- Harmonized policies and regulations i.e. Solid waste management, extended producer responsibility requirements.
- Information sharing on innovations and technology for circular economy and implementing the 5 "R's" – Refuse, Reduce, Reuse, Recycle and Return;
- Innovating and scaling up environmentally sound alternatives to plastic;
- Leveraging private sector and corporate compliance with commitments to sustainable consumption and production in packaging and plastics use;
- Financial support and investment in managing plastic pollution;
- Regional/global cooperation to stop illegal shipments of plastic waste to Coral Triangle countries.

2 

**Build into the CTI-CFF 10 year capacity-building road map knowledge management and sharing of regional and local initiatives and solutions** that address marine plastic pollution to scale successful models, pilots and demonstration projects through the CTI-CFF networks and regional exchanges.

3 


**Join the Global Ghost Gear Initiative** to facilitate knowledge sharing with the CTI NCCs, CTMPAS, TWG, LGN and WLF on best practices in preventing and addressing abandoned, lost and discarded fishing gear (ALDFG).

## NATIONAL LEVEL ACTIONS FOR CONSIDERATION

1 

Where necessary, **develop /adapt existing National Waste Management and Marine Litter Action Plans** to include circular economy approaches;

2 

**Develop national level policy and investment plans** as part of solid waste management including improved collection, recycling, source segregation, and final disposal options;

3 

**Reduce institutional fragmentation and strengthen legislation** to address upstream sources of waste and implement circular economy solutions;

4 

Encourage **zero waste businesses models** that aim to replace plastic with reusable packaging or provide services that eliminate the need for plastics;

5 

**Facilitate integration of local level government in the development and implementation of national plans and strategies** addressing marine plastic pollution and circular economy approaches in order to support coastal communities, MPA/MMA management groups and tourism centres deal with marine debris (and contribute to meeting effective management of 30% of marine areas by 2030);

6 


**Encourage integration of the Global Ghost Gear Initiative's (GGGI) Best Practice Framework for the Management of Fishing Gear (BPF) and the FAO Voluntary Guidelines on the Marking of Fishing Gear (VGMFG)** in national fisheries policies and regulations, where appropriate; and

7 

Following UNEA Member States' adoption in February 2022 of Resolution UNEP/EA.5/Res.14, titled 'End plastic pollution: Towards an international legally binding instrument', Coral Triangle countries are urged to **support and actively participate in the Intergovernmental Negotiating Committee (INC) processes** and ensure that the adopted treaty maintains the highest level of ambition with a transformative approach to addressing the full lifecycle of plastics to end plastic pollution.

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# Appendix 1
# Global and Regional Roadmaps, Action Plans & Strategies

## Addressing Marine Plastic Pollution – Roadmap to a Circular Economy

The 2019 roadmap was developed by UNEP, the GEF, Ocean Conservancy and GRID-Arendal (Wang et. al., 2019). It acknowledges that marine plastic pollution "needs to be addressed along the entire value chain (including production, distribution, consumption, reuse, collection and recycling, as well as final disposal of plastics), by making a systemic and fundamental shift from a linear to a circular economic model for plastics." The roadmap considers actions required at global, regional and national/local scales and takes a systemic approach to address marine plastics by tackling the issue at the source to achieve a circular economy for plastics. It advises:

- Systemic change should involve all stakeholders to rethink and redesign an entire economic system. This systemic thinking needs to take into account the entire value chain, and propose strategic intervention points at the design, production, consumption, waste management, or mitigation phases. The interventions need to be coordinated and synergistic, involving all actors of the value chain: governments, companies, research institutions, waste sector, finance sector, consumers, at multiple scales.

- Such a systemic approach needs to exclude chemicals of concern in the production and recycling of plastics to ensure there is no damage to humans and ecosystems, and to enable higher degree of recyclability. It would ultimately ensure a toxin-free circular economy of plastics.

- Solutions and actions should follow life cycle thinking and adhere to the 'Reduce, Reuse, Recycle' hierarchy.

The roadmap highlights the actions in specific life cycle stages, as well as the cross-cutting solutions to link upstream and downstream stakeholders of the value chain to avoid actions done in isolation. It incorporates key upstream interventions including designing products for maximum durability and reusing products which can contribute to reducing plastic waste generation. It integrates downstream actions that address waste streams generated by the current business-as-usual linear economy. The roadmap identifies four building blocks to achieve a circular economy for plastics, including:

1. Create cross-cutting enabling conditions including institutions in terms of legal arrangements and policy, research and knowledge, stakeholder engagement and dialogue, financing and capacity development.

2. Eliminate all problematic and unnecessary plastic products, including toxic additives;

3. Innovate design, production and business models to ensure that the plastics we do need are reusable, recyclable, or compostable, and free of toxic additives;

4. Circulate all plastic products at their highest value within the economy to keep them out of the environment.

More: www.gefmarineplastics.org/roadmap

## The Plastics Policy Playbook: Strategies for a Plastic-Free Ocean (2019)

The report identifies four key themes to improve the economics of collection across the value chain: i) Financing the collection via Extended Producer Responsibility measures; ii) Reducing the production and use of problematic single-use plastics; iii) Designing for circularity; and iv) Increasing the demand for post-consumer plastics. Produced by Ocean Conservancy, Trash Free Seas Alliance and Accenture.

The framework of public-private measures is divided into four themes to improve the economics of collection:

- Finance the collection: Measures that increase the provision of funding to improve waste collection Extended Producer Responsibility (EPR), implemented using packaging material fees, is the biggest opportunity to improve collection funding. An eco-modulated EPR fee can also incentivize and accelerate the transition away from non-recyclable materials. Financial modeling shows that an EPR fee has the highest potential—up to 75% or more—in closing the value chain financing gap

- Reduce problematic and unnecessary single-use plastics: Measures that reduce the supply of plastic and reduce the quantity of plastic waste produced by shifting away from the production and use of problematic single-use plastics (SUPs). Effectively enforced bans on defined problematic and unnecessary single-use plastics will be part of the solution across the focus countries. They can help to reduce the supply of these plastics to the waste management system as well as reduce their per capita consumption in the long-term.

- Design for circularity: Measures that improve the quality of plastic in the waste stream and reduce dependence on virgin materials by adopting eco-design principles to improve reusability, recyclability and the use of recycled content Eco-design standards can address challenges around non-recyclable or difficult to recycle plastics. National level policy, combined with private sector commitments, can standardize inputs, improve the quality of plastic entering the recycling stream and drive collection. Designing to reintegrate recycled content in plastic applications has private sector momentum that can be supported by policy.

- Develop recycling and treatment markets: Measures that increase the demand for post-consumer plastics, including recycling and sustainable solutions for non-recyclable and non-recoverable waste Incentives to scale recycling infrastructure, with an initial focus on highly recycled plastics, can complement collection of post-consumer recyclable plastic. Coupled with the development of flexible end-market solutions for non-recyclable plastics, this can increase collection of such plastics and prevent resource loss.

Five guiding principles for success: Five guiding principles must be in place for the measures discussed in this playbook to have a positive impact in reducing ocean plastic:

1. Combine measures across the value chain: Real value lies in combining measures along the value chain, by both the public and private sectors, in new and innovative ways.

2. Engage and invest in the informal sector: Measures must support the human rights and livelihoods of those on the front line of collection efforts. Dignified employment with improved working conditions and leveraging the expertise of independent waste collectors can drive improvements in collection quantity and efficiency.

3. Drive consumer awareness and behavior change: Consumer buy-in is a critical enabler of a successful plastic waste management framework, and focus countries need targeted awareness campaigns to engage key audiences and spark behavioral change.

4. Inspire political will: Leaders at the national and local levels should be motivated and empowered to support solutions to reduce ocean plastic waste.

5. Improve enforcement at a national and local level: Measures are only as good as the ability to enforce them. Strong national policy requires a clear direction and rule of law. Policy, however, has to be enforced at the local level, which requires improved capacity for action." (Ocean Conservancy, 2019). See: www. oceanconservancy.org/wp-content/uploads/2019/10/Plastics-Policy-Playbook-10.17.19.pdf.

## ASEAN Regional Action Plan for Combating Marine Debris in the ASEAN Member States (2021-2025):

This Plan supports regional policies, platforms and programs, while providing support and guidance to national level plastics actions. It proposes the phased implementation of a systematic and integrated response to guide regional actions in addressing the issue of marine plastic pollution in ASEAN over the next five years. It also highlights the current status and challenges faced by Member States and identify potential solutions along the value chain to overcome unsustainable plastic consumption, waste management and marine debris pollution.

Implementation of the plan is coordinated through the ASEAN Working Group on Coastal and Marine Environment (AWGCME).

Component I: Policy Support and Planning

1. Develop Regional Guidebook on Financial Mechanisms for Investments in Plastic Waste Management
2. Develop Guiding Principles for Phasing out select Single-use Plastics (SUPs)
3. Develop a Regional Guidebook on Standards for Responsible Plastic Waste Trade, Sorted Plastics Waste, and Recycled Plastics
4. Elaboration of Best Practice Manual for Development of Minimum Standards and Technical Requirements for Plastic Packaging and Labelling
5. Undertake Regional Stocktaking of Green Public Procurement
6. Develop Best Practice Manual for Reducing, Collection and Treatment of Sea-Based Litter

Component II: Research, Innovation and Capacity Building

7. Develop Guidebook for Common Methodologies for Assessment and Monitoring of Marine Litter
8. Strengthen ASEAN Regional Knowledge Network on Marine Plastics
9. Conduct a Regional Study on Microplastics
10. Coordinate Regional Training Programs on Plastics and Waste Management

Component III: Public Awareness, Education and Outreach

11. Develop a Behavioral Change Communication Strategy Playbook
12. Enhance Regional Awareness for Consumers of Labeling of Plastics and Packaging

Component IV: Private Sector Engagement

13. Establish a Regional Platform for EPR Knowledge and Implementation Support
14. Establish a Regional Platform to Support Innovation and Investments in Plastics and Plastic Waste Management

More: www.asean.org/book/asean-regional-action-plan-for-combating-marine-debris-in-the-asean-member-states-2021-2025-2/

**COBSEA Regional Action Plan on Marine Litter 2019: (RAP MALI)** provides an overarching regional framework for addressing marine litter in the East Asian Seas as a transboundary issue. It promotes consolidation, coordination and facilitation of efforts towards integrated management of marine litter, comprising actions in relation to preventing and reducing marine litter from land-based as well as sea-based sources, monitoring and assessment, and creating enabling conditions. A Working Group on Marine Litter was established to provide strategic and technical support and facilitate information exchange and regional cooperation towards the implementation of the RAP MALI.

RAP MALI comprises the following main actions:

- **Preventing and Reducing Marine Litter From Land-Based Sources.** COBSEA efforts to prevent and reduce marine litter from land-based sources can be developed and implemented working closely with UNEP and Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities (GPA) coordination office, including joint funding and/or implementation of projects where appropriate.
  - Legal and economic instruments
  - Integrated waste management
  - Removal of existing litter and its disposal

- **Preventing and Reducing Marine Litter from Sea-Based Sources.** With extensive fisheries and shipping operations as well as regulatory challenges and prevalence of Illegal, Unregulated and Unreported (IUU) Fishing, sea-based sources of marine litter are of concern in the East Asian Seas region. However, the status, impacts and associated costs and losses are not well quantified. In addressing sea-based sources of marine litter, COBSEA will work closely with relevant competent agencies in the UN system as well as with relevant regional organizations.
  - Legal and economic instruments
  - Removal of existing marine litter and its disposal

- **Monitoring and Assessment of Marine Litter.** There is a need to improve knowledge on the main types, sources and amounts of litter that enter the marine and coastal environment, to enable assessment of

marine litter status and trends, the impact of marine litter on the marine and coastal environment and human health, as well as the socio-economic aspects of marine litter. Sound marine litter monitoring and reporting is also required to track progress towards the SDGs, including target 14.1, and contribution to other relevant SDGs and associated targets.
  - Establish a Marine Litter Monitoring Expert Group under the COBSEA Working Group on Marine Litter
  - Regional and National Marine Litter Monitoring Programmes

- **Activities Supporting the Implementation of COBSEA RAP MALI.** Implementation of RAPMALI requires enabling conditions for success, including adequate cross-sector, and regional and international cooperation; filling knowledge gaps through targeted research, efficient and inclusive involvement of stakeholders, and adequate training, information sharing, outreach and public awareness. COBSEA will catalyse actions that support regional and national delivery of the RAP MALI and provide the regional mechanism for supporting planning, tracking and reporting on RAP MALI including its contribution to relevant SDGs.
  - Regional and international cooperation and reporting
  - National planning and policy frameworks
  - Research Activities
  - Information, education, outreach and involvement of stakeholders

- More: www.unenvironment.org/cobsea/events/intergovernmental-meeting/twenty-fourth-intergovernmental-meeting-coordinatingbody-seas and www.bit.ly/COBSEArapmali

## The Pacific Marine Action Plan: Marine Litter 2018–2025 (MLAP)

MLAP was developed by SPREP in partnership with UNEP and the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities. It is part of the Regional Seas Programme and the Global Partnership on Marine Litter. The MLAP is a subset of the Pacific Regional Waste and Pollution Management Strategy 2016-2025 (Cleaner Pacific 2025) and the Pacific Oceans Pollution Prevention Programme (PACPOL) 2015-2020.

This MLAP sets out the key actions to minimize marine pollution across Pacific Island countries and territories under the auspices of the Noumea Convention and the Cleaner Pacific 2025 Strategy. It includes establishing a comprehensive policy and regulatory framework for marine waste management; proposed actions on key sources of marine litter for each year of implementation; a frame of reference for priority regulatory and policy initiatives for marine litter; and practical considerations to implement and measure the progress of the plan.

### Actions

1. Building a Policy and Regulatory Framework
   - 1.1 Support the development of a global legal framework to address marine litter and microplastics
   - 1.2 Develop a regional framework to address marine litter and microplastics possibly through scope of Noumea Convention
   - 1.3 Ratification of the Cape Town Agreement 2012
   - 1.4 Ratification of the MARPOL Annex V

2. Shipping and Vessel Operations
   - 2.1 To resource and assist in MARPOL compliance through Port and Flag state control measures. Also assist and support MNZ coordinated IMO Pacific Coordination meetings preparatory meetings.

2.2 Conduct national training on litigation, enforcement, compliance, monitoring and prosecution of illegal discharges from vessels (CP2025-11.16)

3. Fishing Vessel Waste
   - 3.1 To resource and assist in applying, monitoring and then enforcing the 2017-04 Conservation Management Measure on Marine Pollution
   - 3.2 Evaluate options to identify lost fishing gear in order to allocate clean-up costs (CP2025-5.9)
   - 3.3 Convene a regional workshop to consider options to reduce the amount of abandoned and lost fishing gear, such as through tagging of fishing gear (CP2025-5.10)

4. Cruise Ship Waste
   - 4.1 To develop and then apply draft cross compliance MARPOL provisions for Pacific Island Cruise Company access licence

5. Transboundary Waste
   - 5.1 Same as 3.1 above

6. Take-Away Food and Beverage Containers
   - 6.1 Develop model legislation to ban single use plastics, Styrofoam and plastic packaging, based on Marshall Islands and Vanuatu examples.
   - 6.2 Apply model legislation to ban single use plastics, Styrofoam and plastic packaging, based on Marshall Islands and Vanuatu examples
   - 6.3 Demonstrate and make available recyclable and biodegradable options – preferably biodegradable with short term subsidies if needed for local businesses to make the transition
   - 6.4 Reinvigorate prior customs and processes for food storage and transport including hand woven natural fibre bilums in Melanesia, and coconut baskets in Polynesia

7. Plastics and other Waste materials generally addressed through CP2025 activities
   - 7.1 Implement solid waste management initiatives and actions as outlined in the Cleaner Pacific 2025 moving from a linear economy to a circular economy of Reuse, Reduce, Recycle and Return. Applying Resource Recovery Schemes and Extended Producer Responsibility schemes (CP2025-6.1 & 6.4)
   - 7.2 Support PICTs expand user-pay waste collection services (CP2025-8.1 to 8.4)
   - 7.3 Implement the Moana Taka Partnership agreement with Swire 2018 to 2021 and beyond.
   - 7.4 Identify and disseminate market information for recyclables, and appropriate transboundary disposal facilities for hazardous waste (CP2025-9.3)
   - 7.5 Support PRIF Regional Recycling Network

8. Awareness and Action
   - 8.1 Develop a regional model communication, awareness and education action plan and implement in countries (CP2025-12.1)
   - 8.2 Develop and implement 'Clean schools' and 'Clean Campus' programmes to encourage adoption of waste reduction and recycling best practices in schools and educational institutions (CP2025-6.7)
   - 8.3 Implement a standardized marine litter and microplastics data collection system and app for the Pacific
   - 8.4 Support community based cleanup activities to raise awareness of marine litter
   - 8.5 Support 2 major regional activities raise awareness of marine litter and plastics
   - 8.6 Implement awareness rising for domestic/ regional shipping, fishing and recreational vessel sectors.

9. Tourist Focused Awareness and Action
    - 9.1 Inclusion of waste management and no disposal overboard ethos to any Cruise Ship 'welcome aboard' and safety videos
    - 9.2 Inclusion of waste management and collection ethos to any familiarisation videos for Tourist Resorts
    - 9.3 Fostering greater awareness among Cruise Ships and resort staff through ecotourism certification schemes
    - 9.4 Tourist operators to add waste control messages for any new print of their brochures + websites facilitated through providing model electronic copy of simple graphics

10. Tourist Enterprise Waste
    - 10.1 Develop, adopt and implement cross compliance provisions as part of Pacific Island Tourist Resort access licences are renewed or new developments approved

11. Disaster Waste
    - 11.1 Improve national dumpsites (when appropriate) according to regional and exiting guidance, and incorporate best-practice sustainable financing measures (CP2025-9.9)
    - 11.2 Implement National Disaster Waste management plans (CP2025-2.10)
    - 11.3 Conduct national and regional disaster waste management training (CP2025-11.13)

More: www.sprep.org/publications/pacific-regional-action-plan-marine-litter

# Appendix 2
# Resources

## Guides and Toolkits

- 3R Policy Indicators Factsheets Series (Institute for Global Environmental Strategies (IGES). See: www.pub.iges.or.jp/pub/by/tags/3r-policy-indicators-factsheets-series

- ASEANO Project: LGU Toolkit for Marine Litter: Dealing with plastic pollution requires locally specific actions, tailored to specific conditions, in addition to larger scale and even transboundary agreements and arrangements. Waste management is complex, and requires ongoing and iterative approaches. This toolkit seeks to provide some documents that can assist local governments in their approaches. In an attempt to ensure utility, relevant documents are included only if they are written in English, publicly available, and easily accessible. Published July 2022 – available only online: www.pemsea.org/publications/manuals-guides-and-webinars/aseano-project-lgu-toolkit-marine-litter. The ASEAN – Norway local capacity development project is a three year project that aims to enhance local capacity on monitoring and understanding the source, flow and nature of riverine waste. It aims to strengthen local enforcement and provide practical solutions to tackle problems at the local level. The project uses an integrated solid waste management approach and focuses on the city and municipal level through two pilot sites: the Citarum River in Indonesia and the Imus River in the Philippines. For more information, email PEMSEA ASEANO Project Manager Thomas Bell at TBell@pemsea.org and info@pemsea.org

- Consumers Beyond Waste City Playbook: The City Playbook offers guidance for a successful transition away from single-use and toward reuse on a local scale. Municipal officials and local actors can use the action-oriented framework to design and implement reuse systems that can thrive in their communities. Local governments have an important role to play in the transition to reuse; their ability to establish policies that enable reuse to succeed, secure buy-in from the public, and build the necessary local infrastructure are critical for reuse systems to work.

- The City Playbook is an essential tool for cities at varying stages of their reuse transition. By breaking down a phased approach based on reuse maturity, the playbook recommends different levels of intervention that can meet the specific needs of each city—whether that be guidance to develop new systems from scratch or to strengthen the impact of an already well-established system. The City Playbook provides these key audiences with guidance across the following areas: reuse strategy and program development; social, environmental and public health imperatives; stakeholder engagement; policy instruments; infrastructure; and procurement. The City Playbook also provides a discussion of current challenges and opportunities, serving as a starting point to inspire collaborative action on the local scale. For more on how cities can enable diverse and equitable participation in reuse programs, see "Social equity" in the Consumers Beyond Waste City Playbook.

- For specific information on global indicators of success for reuse, see *"Analyzing the entire reuse system – global indicators for success"* in the Consumers Beyond Waste Design Guidelines.

- As reuse systems are implemented and expanded, safety considerations for collection, cleaning, handling, and storage are of the utmost importance; reusable packaging must meet the same health and safety standards as single-use, and the public must trust the system to consistently deliver across these dimensions. For more on the important safety considerations of reuse, see the Consumers Beyond Waste Safety Guidelines.

- Data Collection Tool for Municipal Solid Waste management (CCAC MSW Initiative by World Bank) See: www.waste.ccacoalition.org/document/data-collection-tool-full-version

- Diving Deep: Finance, Ocean Pollution and Coastal Resilience. United Nations Environment Programme (2022): www.unepfi.org/news/themes/ecosystems/new-guidance-on-finance-ocean-pollution-plastics-and-coastal-resilience

- FAO Voluntary Guidelines for the Marking of Fishing Gear (VGMFG): At its thirty-third Session, the FAO Committee on Fisheries (2018) endorsed the Voluntary Guidelines for the Marking of Fishing Gear (VGMFG). The Committee also supported the development of a comprehensive global strategy to tackle issues relating to ALDFG and to support implementation of the Guidelines. FAO responded to this mandate by developing a series of actions to be taken in the context of its work on Responsible Fishing Operations. See: www.fao.org/responsible-fishing/marking-of-fishing-gear/aldfg/en

- Fact Sheet False Solutions to the Plastic Pollution Crisis – Global Alliance for Incinerator Alternatives (GAIA). See: www.no-burn.org/false-solutions

- Global Ghost Gear Initiative Best Practice Framework: The GGGI has developed several resource and guidance documents, including the Best Practice Framework for the Management of Fishing Gear (BPF). These documents have been prepared by a global team of experts on ghost gear prevention, recycling and removal. See: www.ghostgear.org/resources

- Osaka Blue Ocean Vision: The global 'Osaka Blue Ocean Vision' aims to reduce additional pollution by marine plastic litter to zero by 2050 through a comprehensive life-cycle approach that includes reducing the discharge of mismanaged plastic litter by improved waste management and innovative solutions while recognizing the important role of plastics for society. A portal site was developed for efficient information-sharing and updating, as well as possible outreach and to promote national policies and measures through peer learning from best practices based on the agreement of the framework. Several Coral Triangle countries have included national information on this portal. See: www.g20mpl.org/about

- Plasticsmartcities.org Best Practice Case Studies and Policy Guides for Government and Industry: WWF catalogue of Best Practices, as categorized in the following six collections: Financial Instruments, Prevention, Collection, Reuse, Recycling and Disposal. These collections are aligned with the internationally recognized Waste Hierarchy, with Prevention as a first priority placed at the top of the hierarchy, and with Disposal at the bottom of the hierarchy, considered only as a last resort.
See: www.plasticsmartcities.org/

- Regulating plastics in Pacific Island Countries: a guide for policymakers and legislative drafters. SPREP has produced a guide that contains the policy foundations and high level policy settings for key areas of plastics regulation. Policymakers and legislative drafters can use this guide to inform, develop and

expand on laws to regulate the production, use and disposal of plastics. The key priority areas for plastics regulations covered are: Single-Use Plastic Products; Microplastics in Personal Care Products; Marine Plastic Pollution: Garbage from Ships and Dumping at Sea; Container Deposit Schemes; Visitor Environmental Levies; and Statutory Environment Funds. See: www.sprep.org/sites/default/files/documents/publications/Plastics%20Digital.pdf

- **Reuse Portal** – The World Economic Forum, UNEP and WWF US have developed a Reuse Portal which will host key Reuse guidelines (see here). The World Economic Forum's working group *Consumers Beyond Waste* has developed the 3 foundational sets of guidelines that integrate all the major considerations for reusable containers and systems into one place. Reuse designers and practitioners should use these guidelines as guardrails for success. *The City Playbook; Design Guidelines*; and *Safety Guidelines* each provide specific recommendations for the implementation of reuse systems and together offer a framework for the integration and scaling up of reuse projects around the world. Additionally, reuse strategies can promote business growth – according to the Ellen MacArthur Foundation, replacing just 20% of single-use plastic packaging with reusable materials represents a $10 billion opportunity (Ellen MacArthur Foundation 2019). Adopting new reuse business models help to shift where the economic value lies within the packaging system – value will be spread out across the lifecycle of a reusable package rather than all value being concentrated at the extraction and manufacturing stages of the lifecycle. This provides new economic opportunities with a positive net economic value for the system as a whole (for more analysis on how economic value will shift across the system as reuse scales up, see the Platform for Shaping the Future of Consumption's Insight Report, Future of Reusable Consumption Models.)

- **SEA Circular**: SEA circular is an initiative of the UN Environment Programme and the Coordinating Body on the Seas of East Asia (COBSEA) to inspire market-based solutions and encourage enabling policies to prevent marine plastic pollution and less plastic wasted in South-East Asia. See: www.sea-circular.org

- **The Ocean Clean Up Interactive Map – River Plastic Emissions To The World's Oceans**. See: www.theoceancleanup.com/sources/

- **Tourism Industry Tool Kits for Plastic Waste-Free Hospitality; Tours and Cruising** – Developed under the **Plastic Waste Free Islands**, an initiative supported by Norad, managed by IUCN and co-implemented by Searious Business, December 2020 – available through *Rosemarie Wuite*. rosemarie@seariousbusiness.com

- **Toolkit for plastic waste-free hospitality** – Hygiene and safety for businesses in leisure without the need for single-use plastics! The package provides tips & tricks on how to be hygienic and environmentally-friendly in hotel/restaurant/bar and how to effectively combine forces with business partners/suppliers

- **Toolkit for plastic waste-free tours** – Hygiene and safety for businesses in tourism without the need for single-use plastics! Focuses on Tour operators and Destination managers. The kit includes tailor-made guidelines on how to reduce single-use plastics and provides tips and tricks on how to run environmentally conscious tours, in collaboration with business partners.

- **Toolkit for plastic waste-free cruising (Policy Guideline and Toolkit)** – Hygiene & safety on board and ashore without the need for single-use plastics! Provides concrete suggestions for plastic-waste free cruising, with tips and tricks on how to be hygienic and environmental-friendly on board, and in collaboration with staff, customers, and business partners

- **WWF** No Plastic in Nature: A Practical Guide for Business Engagement offers practical guidance for companies looking to drive systemic change through strategic collaboration, design and innovation. See: www.worldwildlife.org/publications/no-plastic-in-nature-a-practical-guide-for-business-engagement

## Training and Learning

- **ESCAP Closing the Loop eLearning course, Cities and Marine Plastic Pollution: Building a Circular Economy.** Includes technical but accessible information about measuring, monitoring and preventing marine plastic. Contact: escap-edd-suds@un.org. Course Registration: www.sdghelpdesk-elearning.unescap.org/thematicarea/detail?id=25. Course Brochure: www.unescap.org/sites/default/d8files/2021-06/CTL-eLearningbrochure-English_0304.pdf

- **WWF EPR MOOC, Going Circular: The EPR Guide** – A free, open-access online course produced by the WWF EPR team in collaboration with numerous experts on EPR worldwide. It equips learners with the tools to promote locally adapted EPR schemes for packaging. See: www.wwf-akademie.de/catalog/view/course/id/215).

## Reports and Analyses

- **A study on the Establishment of the Regional Recycling Network for the Pacific**: In July 2021, the Pacific Regional Infrastructure Facility (PRIF) announced it will consider options for a Pacific regional recycling network and undertake a pre-feasibility assessment of the most favourable option. The recycling network is expected to include local processing centre/s, trans-shipment and recycling facilities and cater for all or some recycling materials in one or more locations in the Pacific region. The work will include undertaking a demand analysis for recycled wastes and potential markets and identifying possible solutions. A prefeasibility assessment will be undertaken for the most favourable option for a regional recycling facility based on technical, environmental, social, financial, and economic assessments.

- **Assessment of small-scale technology suitable for waste management in the Pacific and Timor-Leste**. Apia, Samoa: SPREP, 2020. 60 p. 29 cm. ISBN: 978-982-04-0920-0 (ecopy). See: www.sprep.org/publications/assessment-of-small-scale-technology-suitable-for-waste-management-in-the-pacific-and-timor-leste

- **Discarded: Communities on the Frontlines of the Global Plastic Crisis: GAIA**. See: www.wastetradestories.org/

- **Global Plastics Policy Inventory**. A coordinated digital response to plastic wastes: Nicholas Institute for Environmental Policy Solutions at Duke University. More details about the Inventory and the OIC in Exposure: www.oceaninnovationsandactions.exposure.co/a-coordinated-digital-response-to-plastic-wastes-the-global-plastics-policy-inventory

- **Islands of Opportunity: Toward a Global Agreement on Plastic Pollution for Pacific Island Countries and Territories**; April 2020 (EIA). See: www.eia-international.org/report/islands-of-opportunity-toward-a-global-agreement-on-plastic-pollution-for-pacific-island-countries-and-territories/

- **Legal aspects of abandoned, lost or otherwise discarded fishing gear.** Rome, FAO and IMO. Hodgson, S. 2022. See: doi.org/10.4060/cb8071en

- **Ocean Pollutants Guide – Toxic Threats to Human Health and Marine Life**, prepared by Mariann Lloyd-Smith, PhD and Joanna Immig B.App.Sc October 2018. See: www.ipen.org/sites/default/files/documents/ipen-ocean-pollutants-v2_1-en-web.pdf

- **Pacific Plastic Waste studies** – In 2018, the UK's Commonwealth Litter Project (CLiP) supported Solomon Islands and Vanuatu undertake scientific coastal monitoring at beaches in urban and rural locations in Vanuatu and Solomon Islands. Associated databases were created about land waste in Vanuatu (See: doi.org/10.14466/CefasDataHub.77) and the Solomon Islands (See: doi.org/10.14466/CefasDataHub.78).

- **Plastic & Climate: The Hidden Costs of a Plastic Planet (May 2019) Center for International Environmental Law (CIEL).** See: www.ciel.org/reports/plastic-health-the-hidden-costs-of-a-plastic-planet-may-2019. Amidst growing concern about the impacts of plastic on the oceans, ecosystems, and human health, there's another largely hidden dimension of the plastic crisis: plastic's contribution to global greenhouse gas emissions and climate change. This report examines each of these stages of the plastic lifecycle to identify the major sources of greenhouse gas emissions, sources of uncounted emissions, and uncertainties that likely lead to underestimation of plastic's climate impacts. The report compares greenhouse gas emissions estimates against global carbon budgets and emissions commitments, and it considers how current trends and projections will impact our ability to reach agreed emissions targets. It also compiles data, such as downstream emissions and future growth rates that have not previously been accounted for in widely used climate models. This accounting paints a grim picture: plastic proliferation threatens our planet and the climate at a global scale.

- **Plastic & Health: The Hidden Costs of a Plastic Planet (February 2019). Center for International Environmental Law**. See: www.ciel.org/reports/plastic-health-the-hidden-costs-of-a-plastic-planet-february-2019. Despite being one of the most pervasive materials on the planet, plastic and its impact on human health is poorly understood. Human exposure to it grows with increasing plastic production and use. Research into the human health impacts of plastic to date have focused narrowly on specific moments in the plastic lifecycle, from wellhead to refinery, from store shelves to human bodies, and from disposal to ongoing impacts as air pollutants and ocean plastic. Individually, each stage of the plastic lifecycle poses significant risks to human health. Together, the lifecycle impacts of plastic paint an unequivocally toxic picture: plastic threatens human health on a global scale.

- **Plastic Pollution is a Threat to Global Security**. A study which demonstrates the significant compounding effects of plastic pollution with a lens of how these implications affect global security. This report explores the issues of plastic pollution and discusses the need for binding global emergency measures that have resulted in other similar environmentally focused threats to security. See: www.oceanlegacy.ca/plastic-pollution-is-a-threat-to-global-security

- **Plastic Pollution Prevention in Pacific Island Countries: Gap analysis of current legislation, policies and plans**. Environmental Investigation Agency, August 2020. See: www.reports.eia-international.org/wp-content/uploads/sites/6/2020/09/Plastic-Prevention-Gap-Analysis-2020.pdf

- **Plastic Waste Management Hazards – Waste-to-Energy, Chemical Recycling and Plastic Fuels**. Takada, H. and Bell, L. Plastic Waste Management Hazards. International Pollutants Elimination Network (IPEN), June 2021. See: www.ipen.org/sites/default/files/documents/ipen-plastic-waste-management-hazards-en.pdf

- **PRIF Solid Waste 'profiles'**: PRIF is conducting profiles for each of the Pacific countries including Timor-Leste. See: www.theprif.org/document/regional/solid-waste-management-and-recycling/pacific-region-solid-waste-management-and

- Stop Ghost Gear: The Most Deadly Form of Marine Plastic Debris, WWF, 2020. See: wwf.org.ph/wp-content/uploads/2020/10/Stop-Ghost-Gear_Advocacy-Report.pdf

- The Business Case for a UN Treaty on Plastic Pollution from WWF, Ellen MacArthur Foundation and Boston Consulting Group that finds a new international treaty on plastic pollution would benefit both the environment and businesses, and accelerate global efforts to tackle plastic pollution (link).

- The Global Plastic Navigator world map shows which countries have a particularly high amount of plastic waste entering the environment, which rivers transport the most plastic waste into the oceans and how widespread plastic is on the surfaces of the oceans. The interactive map is available free of charge at plasticnavigator.wwf.de

- United Nations Environment Programme (2021). Neglected: Environmental Justice Impacts of Marine Litter and Plastic Pollution. Nairobi. See: wedocs.unep.org/xmlui/bitstream/handle/20.500.11822/35417/EJIPP.pdf

- Webinar Summary Report: Laying the Pacific Building Blocks for a Global Agreement to Combat Plastic Pollution, hosted by the Environmental Investigation Agency, in partnership with the Secretariat of the Pacific Regional Environment Programme (SPREP), WWF and the Centre for International Environmental Law, 20 August 2020. See: reports.eia-international.org/wp-content/uploads/sites/6/2020/10/Report-Pacific-Webinar-Global-Agreement-Plastics.pdf and eia-international.org/news/were-not-drowning-were-fighting-webinar-airs-views-on-a-global-plastic-pollution-convention/

# Appendix 3
# Initiatives & Organizations: Action on Marine Litter

The CTI-CFF is the only regional initiative that includes all six Coral Triangle countries. However, there are numerous global as well as other regional organizations and platforms that engage across sub-groupings of Coral Triangle countries that have initiatives addressing marine plastic pollution, circular economy or waste management. The following information has been sourced from searches on Google and utilizing websites for relevant organizations and programmes as well as information from a report by the National University of Singapore and COBSEA looking at research and legal and policy on marine plastics (ref: Lyons, et al., 2020).

## Global Focus

- Clean Seas Campaign: Launched by UNEP in 2017 with the aim of engaging governments, the general public and the private sector on marine plastic pollution and to develop education and provide outreach on this topic. This campaign focuses on: Establishing national and regional marine litter action plans; Educating and engaging citizens; Collaborating with governments and the private sector; and Replicating and scaling up efforts around the world. In the Coral Triangle, Indonesia and the Philippines take part in this campaign, with 57 countries currently participating globally. See: www.cleanseas.org/resources. An outcome of this initiative is the 'Massive Open Online Course on Marine Litter' available at: www.ou.nl/-/unenvironment-mooc-marine-litter. Japan and UNEP have joined efforts to boost information and know-how to develop countermeasures against marine plastic litter in Southeast Asia. See: www.cleanseas.org/impact/japan-and-un-environment-announce-new-cooperation-boost-knowledge-marine-litter-southeast.

- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ): Rethinking Plastics: Circular Economy Solutions to Reduce Marine Litter, Commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ) and Co-funded by: European Union (EU) implemented 2019-2022 in China, Indonesia, Japan, Philippines, Singapore, Thailand, Viet Nam. The objective is that a circular economy for plastics in East and South-East Asia reduces plastic waste in the oceans. The project is based on cooperation between the EU and seven countries in East and South-East Asia. It helps countries in the region reduce plastic waste and improve its collection and recycling, thereby promoting a circular economy for plastics in order to reduce plastic waste leakage into the sea. The objective of the circular economy is to use resources more efficiently and sustainably

according to the principle of reduce, reuse and recycle. The project advises and supports the partners in matters relating to the circular economy and marine litter reduction. It is being realised jointly with Expertise France and implements measures with the following focal points:

  - Improving the management of plastic waste according to the waste hierarchy, for example through Extended Producer Responsibility (EPR) and return and deposit systems for packaging and plastic products.
  - Promoting the sustainable consumption and sustainable production of plastics, for example through improved design for reuse and recyclability, and by using alternative materials.
  - Reducing marine plastic litter, for example through improved waste disposal for ships in harbours and 'Fishing for Litter' programmes in which fishers take waste they find in their nets to land for disposal.
  - See: www.giz.de/en/worldwide/94003.html and rethinkingplastics.eu

- Global Environment Facility (GEF) was established on the eve of the 1992 Rio Earth Summit to help tackle our planet's most pressing environmental problems. Since then, the GEF has provided over $17 billion in grants and mobilized an additional $88 billion in financing for more than 4000 projects in 170 countries. Today, the GEF is an international partnership of 183 countries, international institutions, civil society organizations and the private sector that addresses global environmental issues. GEF provides the core financial support for a range of projects including the GEF Marine Plastics Project. See: www. gefmarineplastics.org/

- Global Partnership on Marine Litter (GPML): Established by UNEP in 2012, GMPL is a multi-stakeholder partnership of state and non-state actors working to prevent marine litter with the aim of sharing knowledge and experience and advancing solutions. Its mission is to protect the global marine environment, human well-being and animal welfare by primarily enhancing international coordination and cooperation to combat the global problem of marine litter. UN partners include the IMO, FAO and UNESCO-IOC. The FAO provides technical advice to the GPML on the impacts of marine pollution on fisheries and aquaculture. Indonesia, Philippines and Malaysia have members engaged in the partnership. A GPML platform was created as a database on all measures such as treaties, decisions, action plans and projects relating to marine litter worldwide. The GPML functions as a network with regional nodes and includes a web-based platform designated to facilitate collaboration among supporting partners. See: www.marinelitternetwork.com

- Global Plastic Tourism Initiative: Promotes a circular plastic economy and sustainability in the tourism sector. Developed by the Sustainable Tourism Programme of the One Planet Network, a multi-stakeholder partnership to implement SDG Goal 12 on sustainable consumption and production, it is led by UNEP and the World Tourism Organization in collaboration with the Ellen MacArthur Foundation. The initiative requires tourism organizations to make a set of concrete commitments by 2025, including pledges to eliminate problematic or unnecessary plastic packaging and other items and to move from single-use to reusable alternatives. This initiative is the tourism sector interface of the New Plastics Economy Global Commitment, which currently has over 450 signatories from businesses, governments, and other organizations, with the common objective of reducing plastic pollution through ambitious targets. See: www.oneplanetnetwork.org/sustainable-tourism/global-tourism-plastics-initiative

- INTERPOL – Illegal Trade of Plastic: The INTERPOL Environmental Security Programme and Pollution Crime Working Group, in cooperation with several other key stakeholders, has shown coordinated global effort in tackling the illegal trade of plastic worldwide through global law enforcement. The

focus is on offshore pollution, land-based and river pollution and waste trafficking through ports. INTERPOL recognizes the need to tackle illegal plastic waste trade as there has been a clear trend of this illegal trade, with 80 per cent of the illegal goods making their way to the region of the seas of East Asia. INTERPOL also helps train customs officers on how to recognize illegal shipments according to international and domestic law. See: www.interpol.int/en/How-we-work/Capacity-building/NCB-and-police-training.

- United Nations Environment Programme (UNEP): the leading global environmental authority that sets the global environmental agenda, promotes the coherent implementation of the environmental dimension of sustainable development within the United Nations system, and serves as an authoritative advocate for the global environment. UNEP's Economy Division in collaboration with the Ecosystem Division, leads Component 3 of the GEF Marine Plastics Project. See: www.unenvironment.org

- UNEP Diving Deep: New Guidance on Finance, Ocean Pollution, Plastics and Coastal Resilience: In March 2022, UNEP launched its new guidance report which "provides banks, insurers, and investors with a science-based, actionable toolkit to align their decision-making with a healthy ocean and accelerate the sustainable transformation of critical marine sectors". The guidance focuses on the problem of solid waste pollution—including plastics—and coastal infrastructure projects. It provides easy-to-follow recommendations on where to challenge companies to adopt clear sustainable practices, to avoid financial transactions with companies that have no sustainable transition plan in place and to seek out opportunities in ocean-related sectors where there is evidence of sustainable practice, for example designing product for reuse, repair, and recycling at end of life. See: www.unepfi.org/news/themes/ecosystems/new-guidance-on-finance-ocean-pollution-plastics-and-coastal-resilience

- UNEP Regional Seas Conventions and Action Plans provide inter-governmental frameworks to address the degradation of the oceans and seas at a regional level, initially focusing on pollution at sea, such as oil spills and movement of hazardous waste, as well as land-based sources of pollution, for example plastics, wastewater and excess nutrients. Now, many have embraced the ecosystems approach to managing marine resources and have protocols on protected areas, marine litter, combating oil spills, pollution from ships, transboundary movement of waste including their disposal, integrated coastal zone management and land-based sources of pollution through which disaster reduction, climate change adaptation and sustainable consumption and production issues can be addressed. The focus is on promoting regional oceans governance to deliver the global oceans agenda and respond to emerging issues, new policies and initiatives such as the Blue Economy. The individual Regional Seas Conventions and Action Plans provide an expression of common regional priorities, including those in the delivery of global mandates such as the 2030 Agenda, provisions of Multilateral Environmental Agreements (MEAs) and United Nations Environment Assembly (UNEA) resolutions. They provide platforms for taking action, including through integrated assessment, policy development, capacity building and exchange, and implementation of projects. Around the world, the Regional Seas programmes are working to strengthen laws that prevent industries and individuals from dumping trash into oceans. It also works on capacity building to help national governments enforce these laws. See: www.unep.org/explore-topics/oceans-seas/what-we-do/regional-seas-programme

- UNESCO Green Citizens Platform: As part of its global commitment to biodiversity, UNESCO is launching this new initiative to support and highlight local citizen projects that are shaping new ways of inhabiting the world, in harmony with nature. This platform offers opportunities for partnerships

and shares best practices, innovations and ideas. UNESCO Green Citizens will bring to light selected initiatives yearly. The Organization's teams want to recognize, and support, local, innovative, duplicable citizen projects with an informed impact on their community, to help them and inspire the dissemination of these new ideas elsewhere. Companies, media, volunteers, everyone can now help them through the platform. See: www.unescogreencitizens.org/

- World Bank Group: Tackling marine plastic pollution and keeping oceans healthy is directly linked to the group's mission of alleviating extreme poverty as billions of people, especially the poorest, rely on oceans for jobs and food. The World Bank supports countries in all regions in their efforts to address plastic pollution, at every stage of the plastic life cycle, from stopping leakages to the environment to enabling a circular economy. Examples of support to countries of the Coral Triangle include:

  - Indonesia: *The Improvement of Solid Waste Management to Support Regional and Metropolitan Cities Project* will improve solid waste management services for urban populations in selected cities across Indonesia. The project includes: institutional strengthening and capacity building of central government agencies responsible for various technical and administrative aspects of solid waste management services; integrated planning support and capacity building for local government and communities to design and manage solid waste service improvements; solid waste infrastructure in selected cities including for Citarum watershed cities; and (ii) supporting integrated solid waste management systems in selected cities, other than Citarum watershed cities. See: documents.worldbank.org/en/publication/documents-reports/documentdetail/781051510608417715/environmental-and-social-management-framework

  - Timor-Leste: The *Water Supply and Sanitation Project* aims to increase access to safely managed drinking water and sanitation services in the municipality of Baucau. The Project includes: construction of the centralized water supply system in the municipal capital of Baucau; construction of a septage treatment plant and three simplified, community-based decentralized sewerage network and treatment systems; and institutional strengthening and project management through technical, environmental, and social supervision of subproject implementation. See: www.worldbank.org/en/news/loans-credits/2020/04/22/timor-leste-water-supply-and-sanitation-project

## Regional Organizations in South East Asia

- ASEAN Centre for Biodiversity: Pollution from marine plastic has become an important item on the ASEAN agenda and the centre is positioned to be a driver or repository of research on the impact of marine plastics on marine biodiversity. See link to a joint project on marine litter with PEMSEA: www.pemsea.org/news/pemsea-and-acb-sign-letter-cooperation.

- Association of Southeast Asian Nations (ASEAN): A regional cooperative intergovernmental organization that has institutionalized wide-ranging cooperation among ten Southeast Asian states including Indonesia, Malaysia and the Philippines. ASEAN also facilitates cooperation between its Member States and extra-regional nations/organizations through its ASEAN-Plus mechanisms. The issue of marine plastics is addressed by different bodies within each mechanism. The ASEAN and ASEAN-Plus mechanisms have issued a number of policy statements on marine plastics, including the 2019 Bangkok Declaration on Combating Marine Debris in the ASEAN Region, and the 2018 EAS Leaders' Statement on Combating Marine Plastic Debris. ASEAN and the ASEAN Plus Three have developed marine plastic-specific action plans, such as the 2019 Framework of Action on Marine

Debris, the 2019 ASEAN+3 Marine Plastics Debris Cooperative Action Initiative and the ASEAN Regional Action Plan for Combating Marine Debris in the ASEAN Member States (2021-2025). See: www.asean.org

- ASEAN Plus Three (ASEAN+3/APT): In 2018, the Heads of State and Government of the ASEAN+3 (i.e. ASEAN + China, Japan and Republic of Korea) issued the ASEAN+3 Marine Plastics Debris Cooperative Action Initiative to develop capacity for monitoring plastic waste in the ocean, enhance cooperation in preliminary research, and share best practices in each country. See: www.mofa.go.jp/files/000419527.pdf

- ASEAN Working Group on Coastal and Marine Environment: is the main body dealing with coastal and marine environment issues within ASEAN. Its functions are to ensure that ASEAN's coastal and marine environment are sustainably managed and that its representative ecosystems, pristine areas and species are protected.

- ASEAN Working Group on Chemicals and Waste: established to serve as a consultative platform among ASEAN member states to further strengthen regional coordination and cooperation in addressing chemicals-related issues under relevant multilateral environmental agreements such as the Basel Convention, the Rotterdam Convention, the Stockholm Convention and the Minamata Convention on Mercury.

- Bangkok Declaration (The): affirmed ASEAN member states commitments to combatting marine debris through: (i) the strengthening of actions at the national level, as well as through collaborative actions at the regional level; (ii) encouraging an integrated land-to-sea approach; (iii) promoting inter-sectoral, multi-stakeholder coordination and private sector engagement; and (iv) strengthening and promoting innovation, research, education and public awareness: asean.org/storage/2019/06/2.-Bangkok-Declaration-on-Combating-Marine-Debris-in-ASEANRegion-FINAL.pdf and (FAMAD) asean.org/storage/2019/06/3.-ASEAN-Framework-of-Action-on-Marine-DebrisFINAL.pdf). See also: asean.org/chairmans-statement-34th-asean-summit/.

- COBSEA Coordinating Body on the Seas of East Asia: established by the 1981 East Asian Seas Action Plan as its policy coordination and intergovernmental decision-making body. It promotes compliance with existing environmental treaties based on member countries' goodwill. The COBSEA Intergovernmental Meetings is the decision-making body that determines the content of the EAS Action Plan, reviews its progress and approves its programme of implementation. It has nine members including Indonesia, Malaysia and the Philippines. The aims of the EAS Action Plan are: (i) Assessment of the state of the marine environment; (ii) Management of those marine and coastal development activities which may have an impact on environmental quality or on the protection and use of renewable marine resources on a sustainable basis; and (iii) Development of suitable coordinating measures for the successful implementation of the Action Plan. See: unep.org/cobsea

- COBSEA Knowledge sharing and capacity building To support participating countries' efforts to strengthen evidence-based marine litter planning and to build capacity to assess, monitor and address sources, flows and fate of marine pollution, COBSEA is further developing its institutional mechanisms, knowledge sharing platforms and initiatives in line with the Regional Action Plan on Marine Litter (RAP MALI). The East Asian Seas Regional Node of the GPML was established to support implementation of the RAP MALI by providing a regional marine litter knowledge management and networking mechanism engaging a range of stakeholders. The Regional Node will facilitate access to scientific evidence, tools, methodologies, training and peer learning, and will seek to catalyse

research and development and leverage funding and project development opportunities to address regional needs and priorities. COBSEA countries further requested the Secretariat to explore the establishment of the new Regional Capacity Centre for Clean Seas (RC3S) in Bali, Indonesia, as a COBSEA Regional Activity Centre to offer regional capacity building services toward reducing and preventing marine litter.

- East Asia Summit (EAS): In 2018, the Heads of State/Government of the EAS (i.e. ASEAN + Australia, China, India, Japan, New Zealand, RO KOREA, Russia and the USA) issued the EAS Leaders' Statement on Combating Marine Plastic Debris. The statement emphasized that regional cooperation is necessary to encourage prevention and management of marine plastic debris, including buoys for aquaculture and ghost nets. See: cil.nus.edu.sg/wp-content/uploads/2019/02/2018-Manila-POA-to-Advance-PPDecl-1.pdf and cil.nus.edu.sg/wp-content/uploads/2019/02/2018-EAS-Stm-Marine-PlasticDebris.pdf. In 2017, the EAS adopted the Manila Plan of Action to Advance the 2012 Phnom Penh Declaration on the East Asia Summit Development Initiative (2018-2022). The Plan of Action promotes "cooperation on combating marine plastic pollution to effectively establish and implement a coherent and coordinated regional approach, focused on prevention and management of waste and litter and promotion of investments in waste management infrastructure also through cooperation with the private sector". See: www.indonesianwaste.org/6-7-september-2017-eastasia-summit-conference-on-combating-marine-plastic-debris/

- Partnerships in Environmental Management for the Seas of East Asia (PEMSEA): originated in the GEF/UNDP Prevention and Management of Marine Pollution in the East Asian Seas project, with the IMO as an executing body. It is a partnership including state and non-state parties, to address identified threats to the environment and sustainable development of the Seas of East Asia. See: iwlearn.net/documents/legal-frameworks/partnerships-in-environmental-management-forthe. PEMSEA has 11 country partners including Indonesia, the Philippines, and Timor-Leste; with Malaysia as an observer. Combating marine plastics is one of the key areas of work under the Pollution Reduction and Waste Management Programme of the Sustainable Development Strategy for the Seas of East Asia. Much of PEMSEA's work is focused on local governments and communities. In 2019, the PEMSEA Network of Local Governments (PNLG) announced a Marine Debris Prevention Initiative.

- Regional Centre of the Basel and Stockholm Conventions for Southeast Asia: The center is based in Jakarta and works with the ASEAN. The main activity has been organization of workshops, i.e. the Asian Network for Prevention of Illegal Transboundary Movement of Hazardous Wastes (Nov, 2019) and the Asia Pacific Regional Consultations for the meeting of the Conference of the Parties to the Minamata Convention on Mercury (Oct, 2019).

- SEA Circular: An initiative implemented jointly by COBSEA and the UNEP Regional Office for Asia and the Pacific, with support from the Swedish International Development Cooperation Agency. It is aimed at reducing and preventing marine litter in South-East Asia through better management of the plastic value chain, strengthened scientific evidence, and improved marine litter monitoring, planning, outreach and coordination. This 2018–2023, US$6.3 million project promotes a people-centred value chain approach across four outputs: Market-based solutions towards 'less plastic wasted'; Strengthening the scientific basis for decision-making; Outreach on marine litter and plastic pollution; and Regional networking and multi-stakeholder constituency engagement. See: www.seacircular.org

## Regional Organizations for the Pacific Islands

- ANZPAC Plastics Pact: A regional cross-sector initiative launched in 2021 to provide a platform for businesses and civil society to drive progress on plastic reduction and recycling across the Pacific region including Australia, New Zealand and the Pacific Islands. ANZPAC is the first in the Oceania region and second regional Plastics Pact to become part of the Ellen MacArthur Foundation's global Plastics Pact network. Plastics Pacts address the transnational nature of the issues related to managing plastic by providing a consistent approach for global supply chains dealing with plastic waste travelling across our borders, moving from a linear approach to a circular economy for plastic, in which it never becomes waste or pollution. ANZPAC's 2025 regional plastics targets are:

  - Eliminate unnecessary and problematic plastic packaging through redesign, innovation and alternative (reuse) delivery models.
  - 100 per cent of plastic packaging to be reusable, recyclable or compostable packaging by 2025.
  - Increase plastic packaging collected and effectively recycled by at least 25 per cent for each geography within the ANZPAC region.
  - Average of 25 per cent recycled content in plastic packaging across the region. See: anzpacplasticspact.org.au

- Japanese Technical Cooperation Project for Promotion of Regional Initiative on Solid Waste Management in Pacific Island Countries Phase II (J-PRISM II) – 2017–2022: Since 2000, the Japan International Cooperation Agency (JICA) has assisted Pacific Island countries in terms of solid waste management in collaboration with SPREP. Under the Pacific Regional Solid Waste Management Strategy (2016-2025) as Cleaner Pacific 2025, JICA is conducting J-PRISM II in partnership with waste management agencies of target countries and SPREP. The objective of J-PRISM is to develop or increase the capacity of the counterparts and the recipient countries through implementing strategic actions listed in the Cleaner Pacific 2025, in order to respond to any issues and challenges and provide better solid waste management. See: www.sprep.org/j-prism-2/home

- Pacific Hazardous Waste Management (PacWastePlus): implemented by SPREP with funding assistance from the European Union, PacWastePlus seeks to improve waste management activities and the capacity of governments, industry and communities to manage waste. It is one of several regional initiatives to deliver the *Cleaner Pacific 2025: Pacific Regional Waste and Pollution Management Strategy 2016–2025*. This strategy is a comprehensive long-term approach for integrated sustainable waste management and pollution prevention and control in the Pacific region. It provides a strategic management framework to address waste, chemicals and pollutants that will reduce associated threats to sustainable development of the region. In September 2021, the new website for the PacWastePlus programme was launched and will assist countries share their experiences and best practices. See: pacwasteplus.org

- Pacific Regional Framework: There are several regional frameworks and strategies in the Pacific that are relevant to the protection of the environment with respect to plastic pollution. These include:

- The Convention for the Protection of the Natural Resources and Environment of the South Pacific region, 1986 (Noumea Convention). The Convention seeks to protect, manage and develop marine and coastal environments in the South Pacific. It obligates parties to protect, manage and endeavour to take all appropriate measures to prevent, reduce and control pollution and to ensure sound environmental management and development of natural resources, using the best practicable means at their disposal and in accordance with their capabilities (Article 5).

- Cleaner Pacific 2025 Pacific Regional Waste and Pollution Management Strategy sets out the policy context and key actions to minimize marine litter across the Pacific Island Countries and Territories. This guide draws on the four strategic goals of the *Cleaner Pacific 2025*, adapting and applying them to plastics regulation in order to:

  - *Prevent the generation of wastes and pollution* to eliminate risks to human health and the environment, and reduce overall management costs;
  - *Recover resources* from waste and pollutants, and other measures, in order to reduce residual waste and to contribute to national economic and social development;
  - *Improve management of residual wastes, chemicals and pollutants*, from which resources cannot be recovered, appropriate storage, collection, treatment and disposal to minimize the risks to human health and the environment; and
  - *Improve monitoring of the receiving environment* to increase understanding and support informed decision- making on appropriate measures to protect public health, the environment and support remediation.

- Cleaner Pacific Round Table: a 'flagship' waste management event hosted by SPREP every two years since 2016 in response to the need identified by Pacific island nations for greater advocacy, collaboration and a platform for innovation to highlight the challenges and opportunities for improved waste management in the Pacific.

- Secretariat of the Pacific Regional Environment Programme (SPREP): Established by the governments and administrations of the Pacific to protect and manage the environment and natural resources of the Pacific. SPREP is based in Samoa, with over 90 staff recruited from around the Pacific region and abroad. Its mandate is to promote cooperation in the Pacific region and provide assistance in order to protect and improve its environment and to ensure sustainable development for present and future generations. SPREP has 21 Pacific island member countries and territories including Papua New Guinea and Solomon Islands and 5 developed countries (Australia, France, New Zealand, United Kingdom and United States of America). The strategic direction for SPREP is set out in the 2017-2026 SPREP Strategic Plan with priority focus on Climate Change Resilience; Island and Ocean Ecosystems; Effective Waste Management and Pollution Control; and Environmental Governance. See: sprep.org

coraltriangleinitiative.org

panda.org/coraltriangle

CORAL TRIANGLE INITIATIVE
ON CORAL REEFS, FISHERIES AND FOOD SECURITY

**Coral Triangle Initiative on Coral Reefs, Fisheries, and Food Security (CTI-CFF)**

The CTI-CFF is a multilateral partnership of six countries working together to sustain extraordinary marine and coastal resources by addressing crucial issues such as food security, climate change and marine biodiversity.

CTI-CFF adopted the CTI Regional Plan of Action (RPOA) 2.0 for 2021–2030, which is a strategic action plan with two main goals: (1) By 2025, coastal communities and coastal and marine ecosystems are enabled to cope with the impacts of climate change, natural and anthropogenic threats, in the Coral Triangle region, due to measurable increased regional collaboration between the CT6 and our partners, for the implementation of the RPOA 2.0 facilitated through a strong and effective CTI-CFF; and (2) By 2030, coastal communities and coastal and marine ecosystems in the CTI region are more resilient/able to adapt to impacts of climate change, natural and anthropogenic threats, by improving food security, sustainable fisheries and coastal livelihoods.