Ending Plastic Pollution in Small Islands and Remote Coastal Areas

In Pursuit of Circularity

PREVENT
Waste Alliance

www.prevent-waste.net

This publication was produced with the financial support of the PREVENT Waste Alliance and the Alliance to End Plastic Waste (AEPW). It was developed by Waste Recycling Environment Network (WREN) in consultation with the members of the PREVENT Waste Alliance Sub Working Group on Small Islands and Remote coastal areas. The views and opinions expressed in the study are those of the authors and do not necessarily represent those of GIZ or of the members of the PREVENT Waste Alliance and AEPW.

Members of the PREVENT Waste Alliance Sub Working Group on Small Islands and Remote Coastal Areas include Adelphi (Germany,) AEPW (International), Chumbe Island (Tanzania), Cyclos (Germany), Hydra Marine Science (Germany), ISOE (Germany), IUCN (Switzerland), Making Oceans Plastic Free (Germany), Searious Business (Netherlands), Soceo (Germany), Triple Benefit (Netherlands), WWF (International).

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PREVENT Waste Alliance

Launched in 2019, the PREVENT Waste Alliance serves as a platform for exchange and international cooperation for circular economy practitioners worldwide. It brings together more than 500 organizations from the private sector, academia, civil society, and public institutions.

The PREVENT members contribute to minimizing waste, eliminating pollutants, and maximizing the re-utilization of resources in the economy worldwide. They strive to reduce waste pollution in low- and middle-income countries and work together for the prevention, collection, and recycling of waste, as well as the increased uptake of secondary resources. The alliance focuses on three material streams: plastics, electrical and electronic equipment and organic waste. More information available at: prevent-waste.net.

About the Alliance to End Plastic Waste

The Alliance to End Plastic Waste (Alliance) is a global non-profit organization with the mission to end plastic waste in the environment and to advance a circular economy for plastics.

The Alliance convenes more than 70 companies across the plastic value chain with local communities, civil society groups, intergovernmental organizations, and governments. The collective know-how, experience and resources of this global network enable the current portfolio of more than 50 projects. Together, the partners work toward economically viable, environmentally beneficial, and socially responsible solutions. Find out more: endplasticwaste.org.

Abbreviations

ABD	Asian Development Bank
ADUPI	Indonesian Plastic Recycling Association
AEPW	Alliance to End Plastic Waste
BMZ	German Federal Ministry for Economic Cooperation and Development
CDS	Container Deposit Scheme
CRDC	Center for Regenerative Design & Collaboration
CROP	Council of Regional Organizations in the Pacific
CSR	Corporate Social Responsibility
EEZ	Exclusive Economic Zone
EPR	Extended Producer Responsibility
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
HP	Hewlett Packard
IUCN	International Union for Conservation of Nature
IWP	Indonesian Waste Platform
KOICA	Korea International Cooperation Agency
LDPE	Low Density Polyethylene
LMC	Luganville Municipal Council
LPB	Liquid Paperboard
MARPLASTICC	Marine Plastic and Coastal Communities
MOU	Memorandum of Understanding
MTP	Moana Taka Partnership
OECS	Organization of Eastern Caribbean States
PAYT	Pay As You Throw
PC	Polycarbonate Plastic
PET	Polyethylene terephthalate (plastic polymer type)
PICs	Pacific Islands Countries
PP	Polypropylene Plastic
PRIF	Pacific Regional Infrastructure Facility
PS	Polystyrene Plastic
PVCC	Port Vila City Corporation
PWFI	Plastic Waste-Free Islands
RRE	Ranong Recycle for Environment
SACEP	South Asia Cooperative Environment Program
SICs	Small Islands and Remote Coastal Communities (this paper)
SIDS	Small Island Developing States
SIDA	Swedish Government Development Agency
SMILO	Small Islands Organization
SPREP	Secretariat of the Pacific Regional Environment Program
SUP	Single-use Plastic
UN	United Nations
UNDP	United Nations Development Program

Table of Contents

Foreword

Disclaimer: Ms. Asha Challenger, Antigua and Barbuda, was requested to provide some perspective for the paper. The section below, in quotes, are the views of Ms. Asha Challenger, reproduced as provided. The authors note that the focus of this paper is beyond SIDSs and includes small islands and remote coastal communities as defined in the glossary (SICs).

"Approximately 11 million tons of plastic waste leaks into the marine environment annually. Small Island Developing States (SIDS) are geographically situated in close proximity to ocean currents that naturally accumulate floating material, including marine plastic litter. As SIDS economies depend on ocean-based industries such as tourism and fisheries, this has far-reaching disproportionate impacts on sustainable development. Therefore, it is critical to ensure that the special circumstances of SIDS are recognized in the context of the new legally binding instrument to end plastic pollution.

SIDS need a creative instrument that deals effectively with this complex crisis throughout the whole lifecycle of plastic. Antigua and Barbuda wishes to highlight some of the considerations of small island developing states as we approach this new international instrument: urgency, equity, effectiveness, and evolution.

1. The first consideration is urgency. Throughout this process, SIDS have highlighted specific ways plastic pollution is already impacting our countries: our tourism economies, fisheries, health, and culture. These impacts are already happening. We must set ambitious, achievable, measurable goals that allow us to steer our trajectory toward zero plastic pollution.

2. The second consideration is equity. It is counter-productive to only talk about recycling or waste management while leaving the tap of plastic pollution fully open. We must control, reduce, and eliminate the leakage of waste plastic and microplastics into our environment through a full lifecycle approach. However, even with no additional waste, the plastic currently existing in the marine environment could take up to 450 years to break down, resulting in more microplastics in the ocean. Therefore, we emphasize that the scope of the instrument should also include the remediation of existing marine plastic pollution.

3. The third consideration is effectiveness. For small islands, we have little engagement in producing raw materials or the production and design of plastics—most upstream activities. Where we can more significantly contribute to solving this problem is in effective waste management and recycling. With inherent limitations in technology, statistical data, policy, legislation, and infrastructure, SIDS require targeted capacity building and technology transfer to address the issue effectively. Provisions must also be made to mobilize sufficient means of implementation for developing countries.

4. The fourth is evolution. We must ensure that this agreement can evolve to confront changing science and economic realities. Therefore, it is essential that we include all relevant actors and stakeholders in the development of this agreement and its implementation."

Antigua and Barbuda
Perspective provided by Ms. Asha Challenger
Lead Negotiator – Oceans
Alliance of Small Island States (AOSIS)
Permanent Mission of Antigua and Barbuda to the United Nations

1 Executive Summary

Small islands and remote coastal communities (SICs) are in the global spotlight as they are particularly affected by the global plastic pollution crisis and must deal with the combined input of plastics from the sea via ocean currents and from locally used plastics (Phenlan et al., 2020). There is an urgent need to take steps to reduce the current plastic footprint and stem the tide of plastic pollution and its leakage into the environment. This white paper identifies and showcases successful solutions for SICs and assesses them against a range of criteria, ensuring long term sustainability and replication.

Despite the challenges they face, SICs have implemented innovative, fit-for-purpose, local solutions. Many of these can be replicated and customized according to the local conditions. We conclude that success has been achieved through efforts toward improving the enabling environment in the form of improved collection systems, legislative reform, and bans on single use plastics (SUPs). However, challenges remain, such as the lack of viable alternatives to banned plastics, economies of scale for recycling, and logistical solutions for recovery and recycling of plastics, as well as the feasibility of appropriate end of life disposal infrastructure. Research and development efforts continue in the chemical recycling space as well as for energy recovery, but finding existing replicable solutions at the scale of SICs proved challenging. Legacy materials and disaster resilience are often overlooked as solutions are implemented in SICs, and the financing of removal or remedial actions, especially for marine plastics, needs further attention. Research undertaken for this project highlights some key action areas:

1. Enabling environment, such as collection systems, local systems for food and water supply, supportive legislative environment, and sustainable financing are key drivers for success.

2. Bans on avoidable plastics, deposit systems for sustainable financing, and improved waste collection systems are effective tools for prevention of leakage of plastics into the environment.

3. Research and development need to continue to support the development of replicable small-scale solutions for plastic recycling.

4. Legacy plastics currently existing in the environment and plastics accumulating through inputs from ocean currents need to be addressed systematically.

5. Any solutions that are implemented need to include disaster resilience in the program design.

6. Empowering and centering communities and their lived, intergenerationally transmitted knowledge need to be considered.

7. To catalyze global action and transform the way we produce and dispose of plastics, a global, legally binding agreement is currently under negotiation whereby SICs that are especially impacted by plastic pollution should be particularly addressed. Without urgent action, the proliferation of plastics will inundate SICs' environments, industries, and communities. The time to act is now!

2 Introduction

Plastic waste is increasingly a defining feature of life in Small Island Communities (SICs). Research has demonstrated the enormous burden placed on these communities by plastic pollution. For example, in Saint Lucia, the total direct costs of plastic pollution to fisheries and tourism in 2019 were estimated to be between US$654,389 and US$1,356,666, not including the ongoing impact on blue natural capital assets and marine biodiversity (IUCN, 2023). SICs are often a net importer of products rather than a manufacturer or exporter, and the consumption of imported products within all island settings presents challenges for collection and management of this imported material as it becomes waste. The large volumes of plastic litter washing up on even the remotest shores is well documented and creates a disproportionate amount of plastic pollution, given the size of SICs (EIA, 2020). It is estimated that most of the plastic pollution that originates in SICs is sea-bound. Additionally, some plastic originates offshore, from other communities, and is transported to the SICs through ocean currents (UNCRD, 2019). This burden, through its impact on key economic sectors such as tourism and fisheries, has implications for all aspects of life, from livelihood generation to population health and biodiversity. As with climate change, SICs are on the "frontline of plastic pollution."

Geography, demography, and economics pose significant challenges for SICs to effectively manage plastic waste. These geographies are separated from regional and global markets. They are often ocean-rich, with large maritime dominions, but land-poor. The tyranny of distance dramatically increases the costs of accessing conventional markets (Lachmann et al., 2017). Meanwhile, limited site availability, combined with the proximity of water bodies, disincentivizes land-based solutions. Populations tend to be small and dispersed, ruling out solutions that rely on economies of scale. Most technical know-how needs to be externally sourced at a comparatively high cost. These factors also shape economic activity. Infrastructure can be limited and costly, with low industrial complexity. Viable activities tend to center around the blue economy, i.e., fisheries and tourism, or subsistence livelihood activities (UNEP, 2019). For SICs, solutions that require high volumes of material, low per unit cost structures, or complex technical solutions will prove challenging (Adeoti et al., 2020). Finally, small island communities are particularly vulnerable to the impacts of climate change, including sea-level rise, extreme weather events, and coastal erosion (Mycoo et al., 2022). Plastic pollution exacerbates these vulnerabilities by contaminating fragile ecosystems and compromising the resilience of island communities. However, small island and remote coastal communities, particularly in developing countries, also enjoy advantages: their remoteness and isolation has delayed the introduction of industrially processed food and bottled drinking water into the local market, thus of single use plastic packaging materials and utensils. This presents unique opportunities to design economic policies and regulatory measures that prevent the introduction and proliferation of plastics use, especially of single use plastic in the local economy, with particular emphasis on the public water supply sector.

In March 2022, representatives from UN member states endorsed a historic resolution at the UN Environment Assembly (UNEA-5) in Nairobi to end plastic pollution and forge an international, legally binding agreement by the end of 2024. The resolution addresses the full lifecycle of plastic, including its production, design, and disposal. At INC-2, in June 2023, the Alliance of Small Island States (AOSIS) called for a way forward that focuses on solutions, just transitions, and knowledge exchange for improved capacity and noted the considerations needed for small island communities.

This white paper, through a preliminary repository of solutions, seeks to consolidate existing and recent knowledge on solutions that prevent and manage plastic waste in small island communities worldwide. The solutions highlighted in this paper acknowledge the opportunities and difficulties faced by small island communities and provide a modest step toward putting a solution-based approach at the heart of the global attempts to end plastic pollution.

Plastic pollution is not just an environmental crisis; it is a pervasive threat to living and nonliving systems (Thushari & Seneirathna, 2020). The conclusions and recommendations arising from this paper are a call to action, supported by practical actionable solutions, to take a meaningful step toward plastic pollution-free SICs. By uniting our efforts, we can create lasting change and ensure that small island communities can thrive.

3 Scope of the White Paper

This white paper serves to highlight the challenges plastic waste pose to the unique geographies of SICs and seeks to promote measures that limit the introduction and prevent the proliferation of plastics use, especially of SUPs in the local economy, as well as to promote circularity in plastic waste management for these isolated communities. It presents potential solutions, responding to the differing contexts as well as considering technological advancements, local initiatives, policy platforms, and investment options. Drawing on examples from existing practices in diverse yet similar communities, the paper shares successes, lessons, challenges, opportunities, and recommendations to aid decision-makers in designing projects, programs, and investments addressing plastic pollution.

3.1 Analyzing Gaps and Developing Realistic Solutions

The intent is not only to showcase existing practices but also to provide a robust analysis of gaps in current approaches. By doing so, the white paper aims to support the development of practical and lasting solutions. The identified measures can be leveraged to encourage coordinated action among stakeholders, including decision-makers, development partners, the plastics industry, including retailers and brands, civil society, and consumers.

3.2 Tailoring Solutions for Diverse Island Communities

Recognizing the diversity among island communities, the paper emphasizes that there is no one-size-fits-all solution. The uniqueness of these communities means that novel solutions will need to be found and tailored to the local environment. The white paper provides an analytical framework to assist decision-making when designing and deciding upon potential solutions, providing examples of solutions across the hierarchy of actions.

3.3 Best-practice Plastic Waste Management – Case Studies

Despite these challenges, several island communities have implemented innovative and effective solutions. This white paper seeks to highlight these successes through case studies presented in the proceeding sections. It emphasizes the role of community, traditional knowledge, and collaboration in driving effective plastic waste management solutions.

The solutions are presented and analyzed following the hierarchy of actions presented by the Plastic Waste Free Islands Project (PWFI) (IUCN, 2023). It emphasizes the importance of applying the principles of refuse, reduce, and reuse before recycling or disposal to ensure efficient use of resources. The case studies presented below follow this hierarchy of actions supported by enablers (Figure 1).

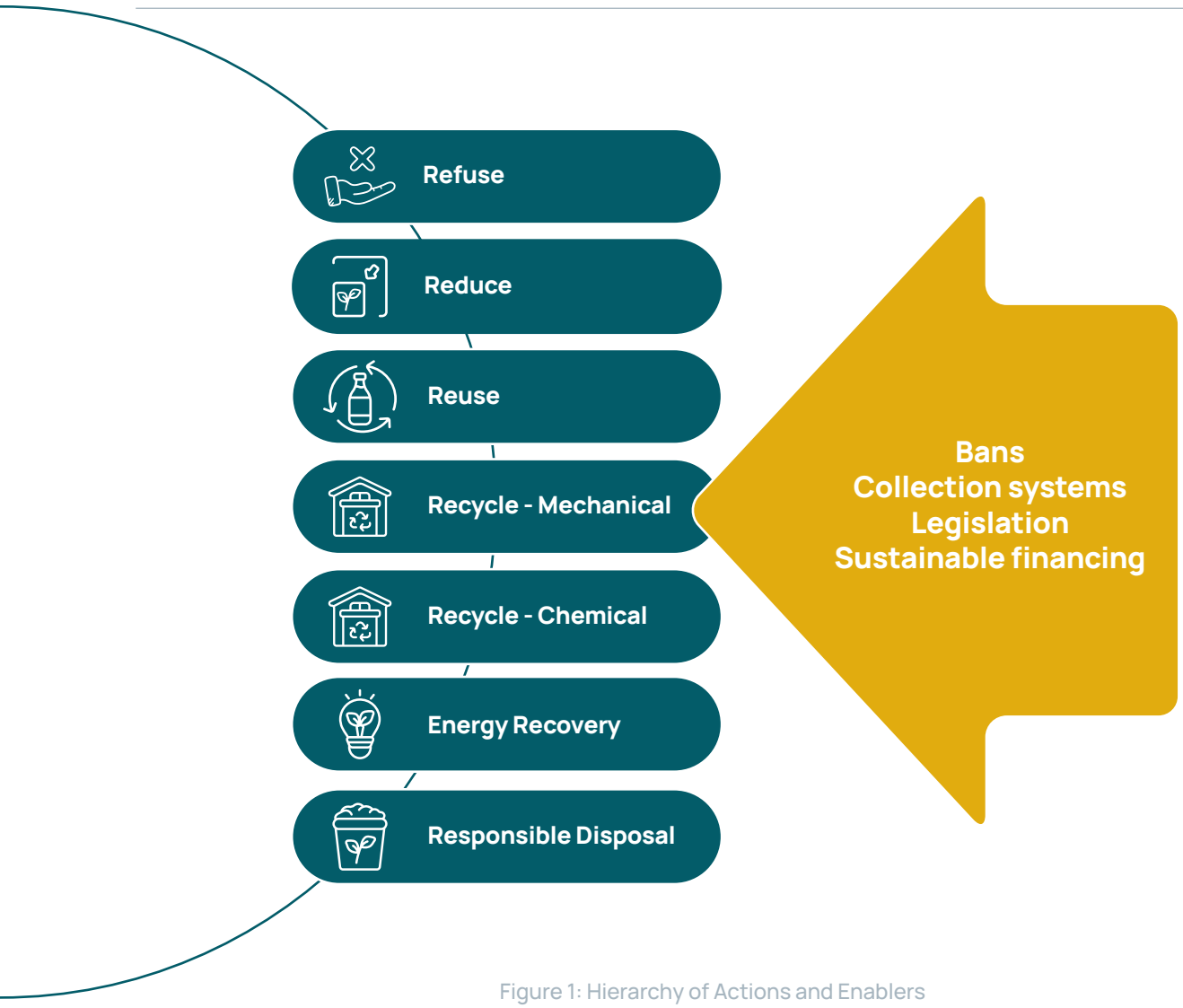


Figure 1: Hierarchy of Actions and Enablers
*Adapted from "Plastic Waste Free Islands: Blueprint – A Journey to Zero Plastic Waste" by IUCN, 2023. https://www.iucn.org/sites/default/files/2023-03/iucn_blue-print-report_final.pdf

This white paper acknowledges the importance of the hierarchy of actions as a framework that needs to be followed to ensure challenges and solutions can be systematically documented and addressed. However, a robust enabling environment is crucial for any of the solutions to be implemented successfully. Creating an enabling environment requires a multifaceted approach that involves policy intervention, infrastructure development, innovation, education, collaboration, and international cooperation. By establishing the right conditions for change, long-term impact can be ensured. To that effect, this white paper also highlights projects that work toward creating an appropriate enabling environment.

4 Framing the Challenges of Island Communities

4.1 Defining Remote Coastal Areas and Small Island Communities

Disparate geographies have differing attributes and influence the suitability of different solutions, as well as the approach and scale to be employed. For example, an appropriate response for a remote coastal region in Greece or Turkey will almost certainly differ from one in Indonesia or Kiribati. The criteria requisite for an accurate, although not overly burdensome, analytical framework, therefore, depends on the definitions adopted.

Small island communities (SICs) are populations residing on islands characterized by limited land area, lower population size, and often a distinct cultural identity. These communities may face specific challenges related to plastic pollution, including a reliance on the ocean for livelihoods, limited waste management infrastructure, and vulnerability to the impacts of marine plastic litter. SICs can be further categorized based on factors such as governance/autonomy, economic development, and access to resources.

Remote coastal communities are regions that are situated along coastlines (while being part of a larger landmass) and are characterized by their significant distance from major population centers or urban areas. These areas are often isolated, with limited access to infrastructure, services, and economic opportunities. Remote coastal areas may face challenges in waste management, including the accumulation of plastic pollution due to their geographic isolation and limited waste management capacity.

This white paper defines SICs as those that are either communities residing on small islands or remote coastal communities (as defined above). It is important to note that the definition of small island communities can vary based on factors like population size, land area, and economic indicators. The provided definitions offer a broad characterization based on the context of plastic waste management challenges. This paper, therefore, defines SICs as follows:

Category 1: Developing Regions

These are islands and remote coastal communities in developing countries, which can then be divided further based on their degree of autonomy (noting this is not necessarily delineated).

- Primarily autonomous SICs. Land-poor but ocean-rich, often with large Exclusive Economic Zones (EEZs) and low levels of industrialization. Examples include the Pacific Island Countries (PICs), Caribbean islands, Mauritius, and Timor-Leste as well as most of the rural coastal areas of Sub-Saharan Africa.

- Externally governed/resourced SICs. These are remote coastal areas or outer islands. They are distinct geographies within a larger nation, lacking the infrastructure, services, and technical knowhow available to the mainland communities. For example, the outer islands in Indonesia, Thailand, Philippines, Vietnam, Malaysia, Cambodia, Myanmar, Laos, etc.

Category 2: Industrialized Island and Remote Coastal Communities

These include island communities and remote coastal areas with more developed economies and greater levels of industrialization. For example, developed island nations like Singapore, the outer islands of some developed nations (Greece, Croatia), or the main islands of some developing nations (Indonesia, Philippines, etc.). A scorecard has been developed to define the characteristics of the two island categories as shown in Appendix A.

4.2 Pushing the Envelope on Solutions in Small Island Communities

Efforts to manage and prevent plastic waste in small islands and remote coastal areas face similar constraints to those that shape their economic profile. Geographic isolation and population dispersion stretch logistical chains, often across challenging terrains (Lachmann et al., 2017). This drives up per unit costs as well as leakage rates. Small total populations and poor state or community finances exacerbate these challenges. Financing remains a key challenge to setting up competitive and sustainable viable solutions for recyclable materials (Busch, 2022).

While the origins of these challenges may lie, again, in geography and demographics, they are exacerbated by factors unique to SICs, namely, the limited availability of land, inadequate funding mechanisms, remoteness from supporting architecture, infrastructure challenges, and human capital constraints. The challenges are longstanding, and over time, significant quantities of legacy waste have accumulated, requiring a solution to be urgently addressed. Appendix B summarizes the key challenges.

A well-organized and efficient plastics management ecosystem allows the local resource-recovery sector to emerge while simultaneously strengthening trade ties for materials exchanged on the international commodity market. It is supported by a renewed focus on prevent, reduce, and reuse options. It creates significantly more local jobs than those generated by sending equivalent amounts of waste to landfill or for incineration.

Despite the range of challenges that Category 1 islands have faced, there have been innovative, fit-for-purpose, local solutions, including the creation of an enabling environment implemented across small island communities around the world. Many of these can be replicated and customized according to the local conditions in the island communities.

A call for case studies for projects and programs in SICs was put out, and all responses were collected and curated against an analytical framework. The IUCN PWFI blueprint suggests a prioritization list to assess and evaluate solutions following the steps in the blueprint. The analytical framework presented in this paper (Table 1) uses the PWFI prioritization criteria as its guiding principles but distills it to a format that's more precise and easier to analyze. Each case study example was scored against the criteria within the framework. The full scoring criteria is presented in Appendix C.

Table 1: Assessment framework used to evaluate case studies

Criteria	Definition
Economic Sustainability	This criterion assesses projects based on their ability to maintain economic sustainability by covering CapEx (capital expenditures) and OpEx (operating expenses) and takes into consideration a project's financial resilience to market changes.
Replicability/Ease of implementation	This criterion assesses project design, focusing on success in SICs while addressing challenges such as remoteness and limited access to markets. Projects requiring minimal modifications in areas like access to markets, physical infrastructure, technical capacity, institutional structures, and social acceptance score highest, as they are deemed more readily replicable and are easier to implement.
Duration impact	This criterion assesses the longevity of a project's impact. Prioritizing sustainability, this criterion assesses each project's potential for long-term effectiveness. Strategies emphasizing reduce-reuse-regulatory measures score higher than one-off or short-term measures like one-time cleanups and events.
Range and type of plastics	This criterion assesses projects based on the range of plastics impacted, identified through the percentage of the plastic waste stream avoided/ reduced/recycled/ recovered/managed. Projects avoiding and replacing single use plastic and those recovering a broader range of waste streams score higher compared to those focusing solely on high value waste streams that only recover a small percentage of the waste stream (Geyer et al., 2017).

Criteria	Definition
Social impact	This criterion assesses a project's impact on Gender Equality, Disability, and Social Inclusion (GEDSI) engagement. Projects aiming to address discrimination barriers, and result in direct benefits for disadvantaged and socially vulnerable communities affected by poor waste management and pollution, score highly. The scoring progressively increases with more active and considered engagement of GEDSI.
Environmental impact	This criterion evaluates the impact of the project on the environment, championing a full life cycle assessment of environmental impacts. Projects enhancing the environment and promoting a transition to sustainable blue economy score highest, while those with long-term detrimental environmental impacts score lowest.

One of the pressing challenges for SICs is their vulnerability to disasters. The impacts of disasters can destroy or disrupt local and traditional food production and water supply systems and exacerbate waste management challenges through the creation of disaster waste, increased single-use plastics (SUPs) load that occurs with the provision of aid, and disruption of potentially successful collection and recycling programs and projects (Brown et al., 2011). Even enablers like bans might require special provisions for disasters. While an important consideration, it was not included in the scoring criteria as none of the case studies presented made explicit provisions for disaster resilience and response. This has emerged as a key gap.

The assessment framework highlights the examples of successful initiatives that are strong candidates for replication. Secondly, it provides agencies working in this space with an analytical framework to help guide decisions about design of future activities, projects, and programs at all levels of the hierarchy of actions and enablers.

The scoring highlights strengths and gaps within each project or program and indicates risk and success factors for each of the projects for potential investors or agencies considering adoption. The scores are presented as spider grams within the case study cards presented in section 4. A full breakdown of case studies is presented in Appendix E. The detailed case studies provide an assessment of the available information against the framework in table 1 as well as the availability of data.

While this white paper focuses on project-based solutions, it also acknowledges the importance of a supportive enabling environment in the form of service provision, technical capacity building, a strong legislative environment, data, and the role that such an environment can play in ensuring the success of any intervention. There are numerous examples of good programs and projects initiated in small islands that were discontinued due to lack of funds or technical expertise. Sustainable financing and an appropriate enabling environment are, therefore, key to ensuring projects with useful outcomes can continue and mature. Promising interventions may include upgrading of local and traditional food and water supply systems as well as packaging materials and technologies, all of which provide job opportunities and increase the attractiveness of destinations in the growing ecotourism markets that many SICs depend on (WRI, 2022).

Having a portfolio of local solutions can be leveraged to gain support from development partners. This white paper acts as a repository of such solutions, presented as case studies in the following section. The authors of this paper trust that as more solutions are implemented, case studies can be expanded and placed in an accessible central database. Although the authors have knowledge of numerous examples, it was decided to showcase a selected number to offer a manageable but insightful glimpse into potential solutions. This repository serves as a valuable resource for decision-makers, practitioners, and development partners, showcasing successful initiatives that can be adapted to specific local conditions.

5 Case Studies

5.1 Interpreting the Case Studies

Case study cards presented below highlight and summarize the key takeaways for each case study. The spider grams present the case study score against each criterion in a visual format. The enabler necessary for the success of each project is highlighted as well. Good data for the assessment of the case studies, objectively, against each criterion was difficult to obtain; therefore, cautionary messages are provided under each spider gram to note the criterion for which assumptions were made.

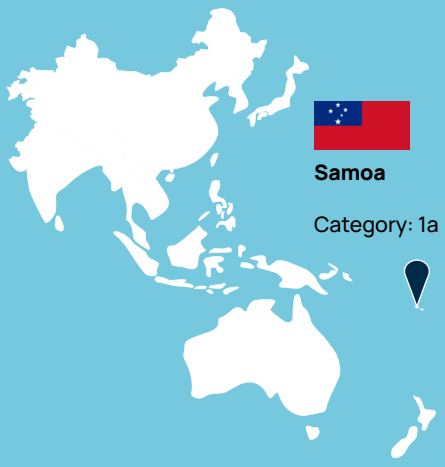
The full details of each case study can be found in Appendix E, including available information, a contact person, reason for scoring, as well as a data availability score. Please note that a data availability score is independent of the scoring against each criterion. For example: We can interpret (without the provision of data) that a managed landfill is able to accommodate all types of plastic. Therefore, a case study presenting a managed landfill will score high on the "type of plastic" covered, even though we do not have data to provide details like tons of plastic managed. In this instance, the case study would be given a low data availability score.

5.2 Case Studies along the Hierarchy of Actions

5.2.1 Refuse

Even though "refuse," or limiting the availability of certain materials, is the first step, in some cases this is not possible. For example, medical services and vaccination campaigns depend on single use plastic products like syringes and sterile packaging of instruments and drugs that have few alternatives. And while beverage bottles are one of the most littered items in SICs, they are often essential to ensure clean drinking water is available to remote communities. But poor maintenance and pollution of traditional and public urban and rural water supply systems may have resulted in consumer preference for bottled drinking water. This need is felt even further during natural disasters and disaster relief efforts. In this instance, reduction in use or reduction on reliance of these products in a sustainable manner while maintaining the community access to the product that they are offering is required. In the case of food and water provision, interventions may then focus on restoration and upgrading of traditional and local production and supply systems alongside the delivery of emergency aid.

Greening the XVI Pacific Games



Summary

When Samoa was chosen to host the 2019 Pacific Games, the government and organizers saw a chance to shift attitudes toward single-use plastics among sports enthusiasts. Athletes received reusable water bottles, and refill stations were set up for athletes, officials, and spectators. Moreover, reusable bags were provided while food was served in compostable containers. Spectators were urged to bring their own reusable water bottles and food containers, further reducing single-use plastic consumption.

Challenges

- Altering perceptions to encourage participation.
- Maintaining the adequacy of the refilling stations.
- Ensuring compliance required intensive planning and monitoring.
- Encouraging spectators' participation.

Gaps

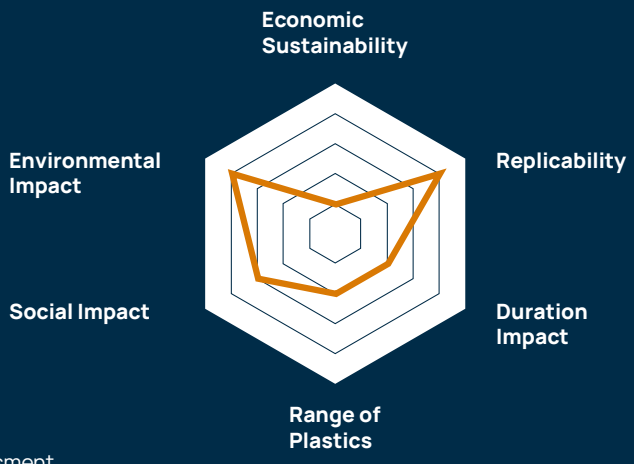
- Provision of reusable food container options.
- Incentive measures to encourage spectators to participate.

Economics

UK Environmental Program, the Australian, French, New Zealand and UK Government contributed USD $153,000 to support the event related project. Waste generation was half of usual per capita generation, resulting in waste management cost saving measures.

Outcomes

9,000 reusable bags, 350 water refill stations and 8,000 1 liter reusable water bottles were provided. A sustainability report for replication was created. 150 of the refill stations were donated to schools post event.



*Caution: Scoring for assessment is conducted using the most reliable information available.

Refuse

Chumbe Island Coral Park LTD.

Zanzibar, Tanzania

Category: 1b

Summary

Chumbe Island Coral Park Ltd (CHICOP), located in Zanzibar, Tanzania, is a pioneering social enterprise that manages a privately-owned island nature reserve. The park operates an eco-lodge based on a minimal impact ecotourism model, aiming to preserve the delicate marine and terrestrial ecosystems of the park. One of CHICOP's notable initiatives includes the implementation of a zero single-use plastics policy on the island, reflecting its commitment to reducing waste generation at its source.

Challenges

Lack of enabling regulatory support and fiscal incentives to promote plastic avoidance and related community education.

Gaps

Supportive legislation targeted at waste avoidance and prevention.

Economics

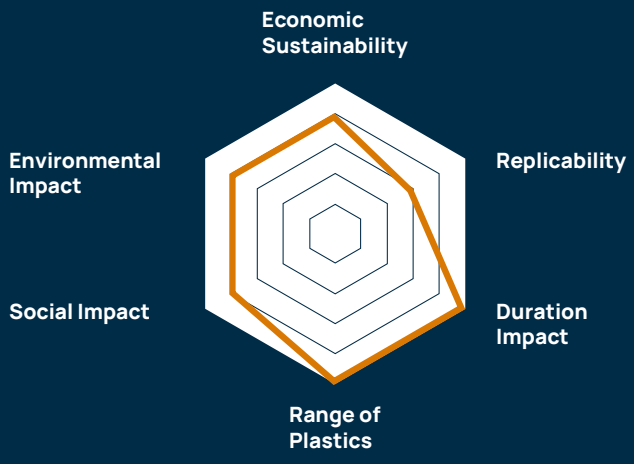
About USD $1.2 million in private and donor financing contributed to develop CHICOP's infrastructure.

CHICOP generates revenue from ecotourism activities. An average of USD $570,000 per year supports management of the marine park and forest reserve, as well as comprehensive environmental education programs.

Outcomes

90% of goods supplied are sourced locally, so they are fresh and unprocessed.

All beverages are provided in glass containers and food served with reusable plates and utensils.



*Caution: Scoring for assessment is conducted using the most reliable information available.

5.2.2 Reduce

Even though "refuse," or limiting the availability of certain materials, is the first step, in some cases this is not possible. For example, medical services and vaccination campaigns depend on single use plastic products like syringes and sterile packaging of instruments and drugs that have few alternatives. And while beverage bottles are one of the most littered items in SICs, they are often essential to ensure clean drinking water is available to remote communities. But poor maintenance and pollution of traditional and public urban and rural water supply systems may have resulted in consumer preference for bottled drinking water. This need is felt even further during natural disasters and disaster relief efforts. In this instance, reduction in use or reduction on reliance of these products in a sustainable manner while maintaining the community access to the product that they are offering is required. In the case of food and water provision, interventions may then focus on restoration and upgrading of traditional and local production and supply systems alongside the delivery of emergency aid.

There are examples of countries like Tuvalu that have banned PET bottles less than 1 Liter in size, thereby limiting the quantity of possible waste produced. Education and awareness emerge as the most important enablers, considering that communities need to understand the cost of continuing the use of a certain material vs reducing its use and, consequently, reliance on it.

The case studies selected within this level of the hierarchy support the reduction in the use of a plastic material or product while promoting a strong social dimension. Minimizing the quantity of material utilized promotes the use of renewable materials and incorporation of recycled content in new products. Actions under reduce also work toward removing the need for management of end-of-life plastics, therefore effectively preventing the issue from arising in the first place.

Ecofiltro

Guatemala, Belize, Haiti & Honduras

Category: 1a & 1b

Summary

Ecofiltro is a social enterprise distributing reusable water filtration units across urban and rural areas in over 18 countries. It has implemented a pricing model whereby luxury models sold to urban consumers subsidize the sale and donation of more affordable basic units to rural households. The prohibition of single use plastics established through Guatemala's federal law contributed to the implementation of this initiative in Guatemala. Ecofiltro distributes filters to SIDS such as Belize and Haiti, as well as rural coastal communities in countries like Honduras, Guatemala, and El Salvador.

Challenges

- Production limitations due to manual labor.
- Rural payment non-compliance and exploring payment programs.

Gaps

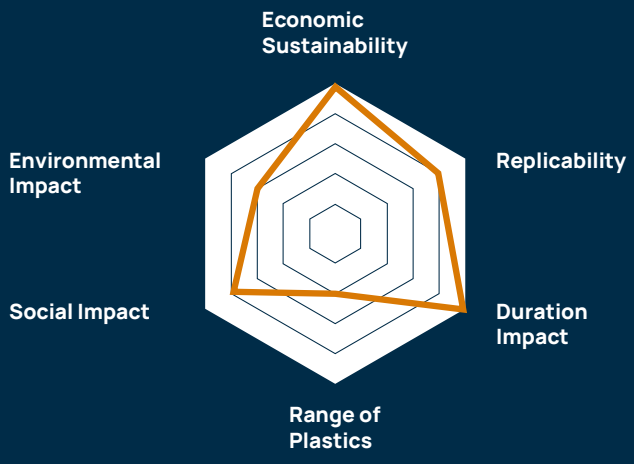
- Recycling program for plastic housing for filters.
- Educational programs related to water
- hygiene, sanitation, and impact of single use plastics.

Economics

The cost of the most economical filters include: purifier for about USD $28.40 and housing for USD $42.60.
A family foundation funded Ecofiltro's initial 20 year operations. Current funding is generated from filter sales, carbon credits and external philanthropy.

Outcomes

Use of Ecofiltro prevents the usage of more than 8,000 1-liter bottles or 400 liter bottles for a 7-person family annually.
In 2023, approximately 270,000 units were sold.



*Caution: Scoring for assessment is conducted using the most reliable information available.

Rappo Women Empowerment

Untia, Makassar, Indonesia

Category: 1b

Summary

A project in coastal areas near Untia, Makassar, with 'Rappo', equipped 26 women with sewing skills to craft reusable bags from cotton and single use plastic bags. By incorporating single-use plastics into the reusable bag design, the project diverts waste from landfills. Rappo partnered with stores to sell the bags online and in stores within and outside city limits. Revenue from sales supports the project's participants. Rappo has participated in product exhibitions and talk shows to promote its work and the use of reusable bags.

Challenges

- Funding restrictions allowed the purchase of only three sewing machines.
- Addressing the age gaps among the beneficiaries and designing schedules to ensure widespread beneficiary participation.

Gaps

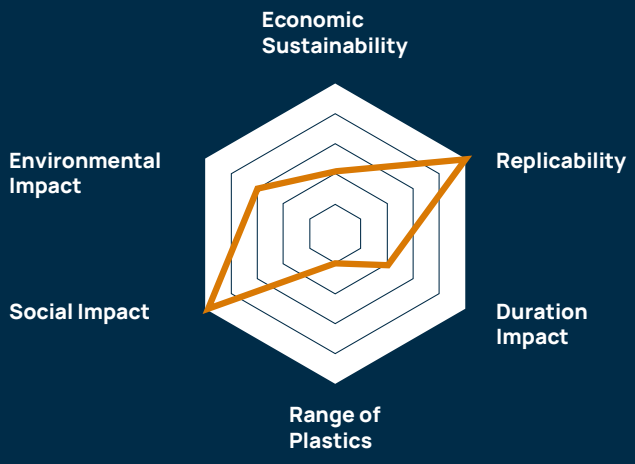
- Resource constraints which inhibit scalability. Exploring other sources of funding would assist in addressing resource constraints.
- Dedicated childcare support to further support the beneficiaries.

Economics

Funding from USEPA, COBSEA, and WWF in collaboration with Rappo.
Revenue is generated from the sale of bags priced between $7 USD to $32 USD and workshops.
Between 30 to 40% of revenue generated is allocated to wages and impactful initiatives. The remainder is used for the establishment of an impact center and training opportunities.

Outcomes

By 2023, 26 women participated in the project and 79,230 pieces of single use plastic bags were collected to create reusable bags.



*Caution: Scoring for assessment is conducted using the most reliable information available.

5.2.3 Reuse

When plastic or any waste material cannot be avoided or reduced, reuse is the next best option. Reuse refers to the purposeful use of a product or material with a similar function or repurposing for other functions. In this instance, this refers to the product being reused during consumption at source, prior to becoming a waste product. Reuse can minimize the ecological footprint of a product or material by increasing its functional life as it continues to be used.

Reuse interventions require a greater emphasis on, above all, an enabling regulatory environment for businesses and consumers, supported by education and awareness to drive behavior change and a reduction in plastic use and waste. Reuse can significantly be encouraged through changes in product design for more sustainable use. This can be driven by incentives and regulatory requirements. However, one limitation in redesigning products is the cost implication for island communities with a low-income base.

The key challenge with the case studies presented below are the need for a significant number of early adopters to ensure sustainability of the project or program; i.e., economies of scale. Therefore, in terms of replicability, case studies successful in areas of high population densities will need to be carefully assessed for replicability in the SICs.

Siklus

Jakarta, Indonesia

Category: 2

Summary

Siklus, a small Jakarta-based company offers mobile container swap services delivering refilled containers filled with household and personal products to households in Jakarta. Customers can conveniently receive refills at their doorsteps through the company's app or via WhatsApp. This initiative contributes to a reduction in single-use plastic consumption and promotes a more environmentally conscious approach to daily products.

Challenges

- Funding restrictions allowed the purchase of only three sewing machines.
- Addressing the age gaps among the beneficiaries and designing schedules to ensure widespread beneficiary participation.

Gaps

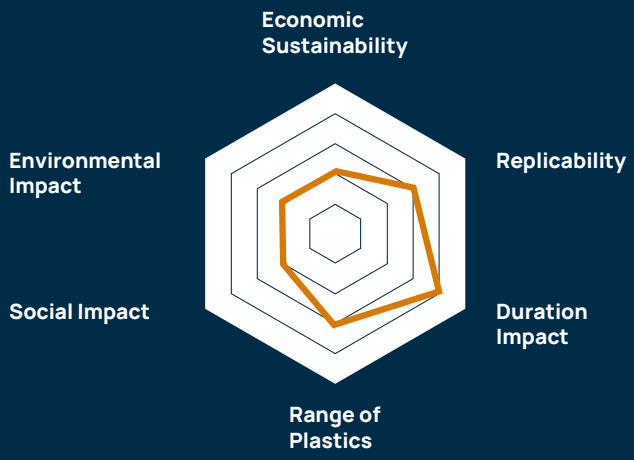
- Partnerships with local organizations and government to explore circular economy solutions.
- Product innovation and diversity for environmentally friendly products.

Economics

Two rounds of grant funding – USD $98,724 to start up and USD $497,000 to scale up.
Siklus has approximately 20,000 users and has generated about $743,000 USD within its first 2.5 years of operations.
Refilling model enables an average 20% discount for customers.

Outcomes

1.2 million pouches/sachets have been prevented from being used.
Project has expanded to Labuan Bajo, a small fishing community that has become a tourism destination.



*Caution: Scoring for assessment is conducted using the most reliable information available.

Mamma's Laef

Vanuatu

Category: 1a

Summary

Mamma's Laef is a social enterprise dedicated to enhancing menstrual health and hygiene for women and girls in Vanuatu's province. Its multifaceted approach includes designing, manufacturing, and distributing reusable sanitary pad packs while also providing crucial menstrual health education and awareness programs in rural communities. Additionally, Mamma's Laef has expanded their operations to encompass reusable hygienic adult diapers and baby diapers. They also utilize the remaining scrap cloth material to craft reusable breast pads and face masks.

Challenges

- Taboo regarding menstrual health.
- Access to water and adequate washing facilities.
- High importation costs and access to sewing materials

Gaps

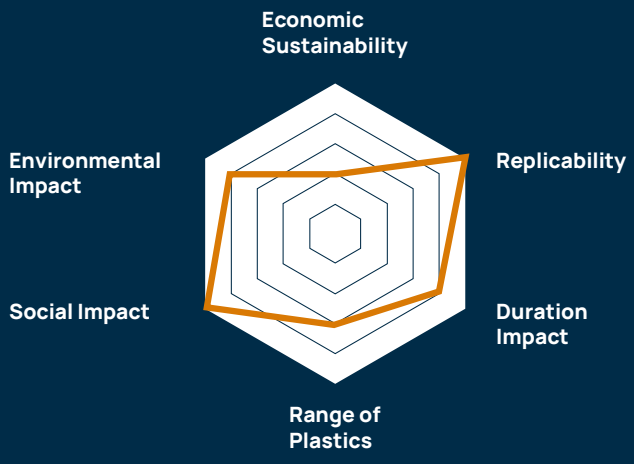
- Thorough assessment of the lifecycle impact of their products.
- Established strategy for the scalability of operations.
- Supporting legislation to encourage the use of reusable hygiene products.

Economics

Economic sustainability is maintained through grants and contributions.
Revenue is also generated from the sale of its reusable products.

Outcomes

in Q1 2024, Mamma's Laef distributed about 1000 reusable menstrual pads, 500 breast pads, 2000 face masks, and 500 incontinence pads. They also conduct ongoing educational awareness sessions for schools and community members since its establishment.



*Caution: Scoring for assessment is conducted using the most reliable information available.

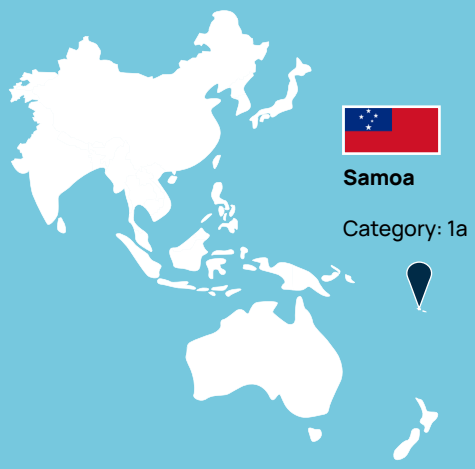
5.2.4 Mechanical Recycling

In most cases, recycling should involve collecting, sorting, and processing materials that would otherwise become waste, thereby converting them into new and functional products. In the small island community context, recycling means consolidation, sorting, and mostly exporting to overseas recycling markets. The absence of on-island recycling facilities leaves most small island communities with few options apart from the export of recyclable materials. With high freight costs in the absence of sophisticated retro-logistic models and transboundary movement compliance issues, recycling has proven challenging for SICs.

For this white paper, mechanical recycling is defined as the processing of plastic waste into recyclates (secondary raw materials) achieved without significantly changing the chemical structure of the material. Significant effort is underway to support and establish projects within SICs that allow for the successful collection, sorting, and creation of recyclates that can either be value-added within the country/communities or sold to overseas markets.

Legislation, collection, education, and sustainable financing solutions emerge as the key enablers, without which mechanical recycling is not successful at this small scale. The case studies presented below demonstrate initial successes within the mechanical recycling space in SICs and are ongoing projects.

Samoa Recycling and Waste Management Association



Summary

The Samoa Recycling and Waste Management Association (SRWMA) is the first waste management association established in the Pacific. SRWMA established a recycling operation equipped to sort and process PET bottles into bales, flakes and pellets for export sale. Additionally, the association has implemented a system for recycling air conditioner indoor units into flakes, and pellets. It is currently in the prototype phase for manufacturing plastic bricks from extruded air conditioner materials.

Challenges

- Market access.
- Financial constraints in ensuring continued employment and operations.

Gaps

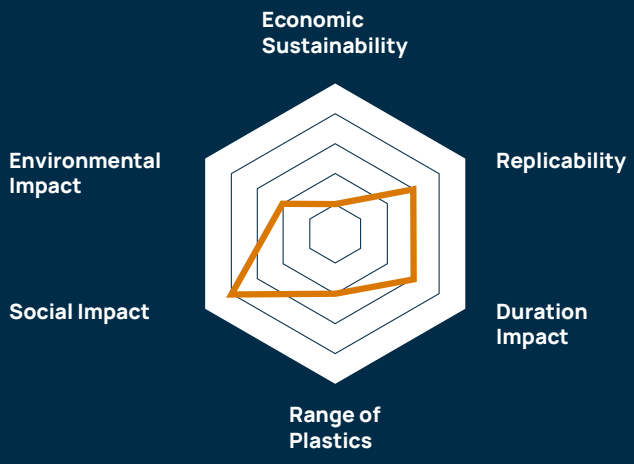
- Need for national segregation system for household waste and a collection system for commercial waste.
- Municipal authorities' limited capacity.
- Lack of financial sustainability.

Economics

Facility: constructed by Embassy of Japan (USD $175,620).
Machinery provided by J-PRISM, (crushing machine USD $9,542 and extruder USD $21,779).
SRWMA has been able to ship waste materials via the Moana Taka Initiative and depends on funding and technical support from UNDP, British High

Outcomes

In November 2020, SRWMA installed 52 small collection cages.
Estimated PET bottle collection of 2.4-3.6 ton/year and air conditioner collection of 45.5 ton/year.



*Caution: Scoring for assessment is conducted using the most reliable information available.

Renew St Lucia

Saint Lucia

Category: 1a

Summary

In collaboration with the International Union for Conservation of Nature (IUCN), Renew St. Lucia has established a local waste transformation project aimed at down-cycling single use plastic bottles to create furniture products. The initiative involves the collection of high-density polyethylene (HDPE) and polypropylene (PP) bottles from local hotels and households, which are then processed on-site using a grinder, press, and CNC machine to craft functional furniture.

Challenges

- Lack of recycling behavior within the communities.
- Need for a municipal/national source separation system.
- Lack of equipment and financing to purchase equipment in initial phase.
- High transportation costs.

Gaps

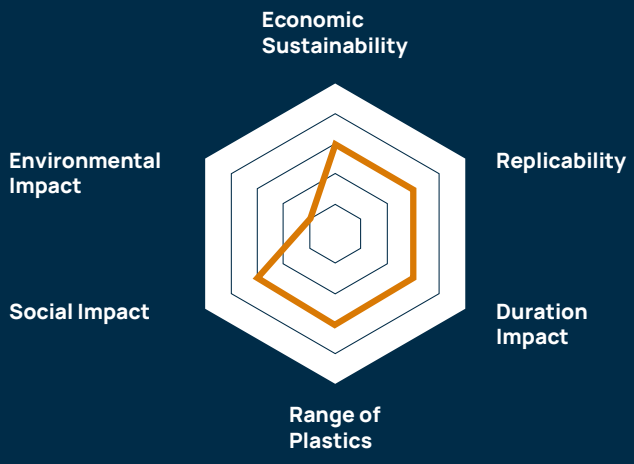
- Research to understand environmental impact of value added products.
- Implementation of a structured source separation system.
- Exploring upcycling or recycling solutions for other waste streams.

Economics

Funding and support were provided by IUCN and Norad. Starting capital required approximately USD$45,803, with an estimated revenue generation of $20,540 USD per month and a return on investment of 26 months.

Outcomes

Estimated 19 kg of plastic is required to make a 1000x1000x20 mm board for construction of value-added products. An approximate 80 tons of plastic per year would be processed through the project.



*Caution: Scoring for assessment is conducted using the most reliable information available.

5.2.5 Recycling – Chemical

The need for recycling is defined similarly for both mechanical and chemical recycling and, therefore, will also need similar enablers. Chemical recycling, for the purpose of this white paper, is defined as conversion of plastic waste to monomer or other raw materials for plastic production, achieved by changing the chemical structure of plastic waste through thermal cracking, gasification, depolymerization, or biological processes. Contrary to physical and mechanical recycling, chemical recycling breaks down the polymer structure into smaller molecules that can be used in the production of new polymers. Despite considerable efforts, this was the only level of the hierarchy of actions, within which the authors were unable to find a suitable existing case study.

There are various reasons for this. The implementation of chemical recycling projects in the SICs is in its infancy, and data and information are not readily available. It is also possible that the fundamental need for chemical recycling is source separated waste streams in consistent volumes. The volumes for financial sustainability of these projects simply don't exist in the SICs. Furthermore, the lack of volume is exacerbated by ever-increasing rates of SICs adopting actions like bans and levies, leading to a further reduction in the quantities of materials that chemical recycling projects depend on. The successful implementation of a chemical recycling project also requires strict adherence to environmental protection standards, which are often missing in the SICs, usually due to the lack of technical skills.

5.2.6 Recover Energy

Energy recovery from non-commercially recyclable plastic waste can potentially offer SICs an opportunity to address plastic pollution challenges while simultaneously promoting renewable energy generation and enhancing energy security. Energy recovery refers to the process of extracting usable energy from waste materials through various technologies and methods. For the purpose of this white paper, energy recovery includes waste to energy (incineration and energy recovery), co-processing, and waste to fuel. Case studies within this level of the hierarchy of actions were highly challenging to find; hence, only one spromising case study is presented below. There is a considerable effort underway with many technology companies developing capabilities for waste-to-fuel, e.g., agricultural diesel or heating oil. However, these solutions are not currently implemented at the scale of SICs and health and safety concerns due to emissions released as well as the possibility of chemical exposure from residue and waste-water streams need to be carefully considered.

Koror Center Plastics to Oil Facility

Palau

Category: 1a

Summary

The Koror State Recycling Center is a crucial component of Koror's waste management infrastructure, responsible for efficiently processing and recycling around 50% of the municipality's waste. Inaugurated in 2014, the energy recovery facility, housed within the recycling center, employs innovative waste-to-oil techniques to generate cracked oil utilized for small scale electricity generation. This facility has the capability to process a variety of materials including HDPE, LDPE, PP, PS plastics, and even used motor oil.

Challenges

- Determining suitable pyrolysis technology.
- Limited availability of skilled technicians and access to spare parts can impede maintenance and repair, leading to downtime and reduced operational efficiency.
- Collection of feedstock plastics.

Gaps

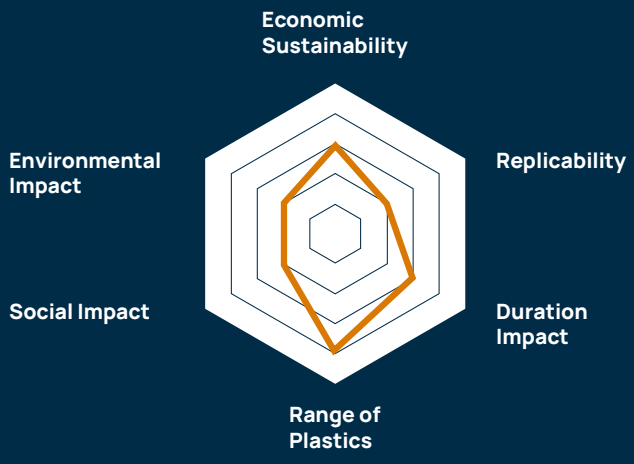
- Comprehensive maintenance strategy for waste-to-oil equipment.
- Implementing a feedstock management system.
- Supporting regulatory framework to support the collection of plastics required.

Economics

Foundational success of the facility can be attributed to generous donations and support from the Japan Government.
Fuel produced is used to power the Koror Recycling Center, the Capital Building Head Office, and the Public Works Shop.

Outcomes

500 kg of plastic per 24 hours can be processed.
The waste-to-oil facility has a maximum capacity for producing 1 liter of oil per 1 kg of waste produced.



*Caution: Scoring for assessment is conducted using the most reliable information available.

5.2.7 Responsible Disposal

SICs, by definition, have limited land resources due to their small geographic size. This makes siting and managing landfills challenging, as suitable land for waste disposal is scarce. Waste is often disposed of in open dumps or improperly managed landfills, posing environmental and public health risks. SICs' vulnerability to environmental hazards like extreme weather events further exacerbates this risk.

SICs often have limited financial resources and face competing priorities for investment in infrastructure, healthcare, education, and economic development.

Well-constructed and appropriately managed disposal sites remain a challenge for SICs despite long-term efforts to build and maintain appropriate disposal sites. Responsible disposal requires strong enablers like collection and sustainable financing, as with most other projects highlighted in this study. However, strong action on the higher levels of the hierarchy of actions supports responsible disposal as it allows for a longer life span for well-managed sites.

Community-Based Waste Management

Mersing Islands, Malaysia

Category: 1b

Summary

Due to the islands' remote location and small population, domestic and resort waste often finds its way into the ocean. The Mersing Islands project aimed to improve waste management by implementing a differentiated disposal system and establishing a transfer station. Through educational outreach, segregated bins were introduced for general waste, PET, HDPE, and PP plastic bottles. Households transport their waste to segregation bins placed within the community. Waste and recyclables are collected until a sufficient quantity is reached, then transported to the mainland to be sold to a recycler or sent to the landfill.

Challenges

- Attaining permits and time constraints.
- Disrupted international supply chains due to COVID-19.
- High transportation costs to move materials to the mainland.

Gaps

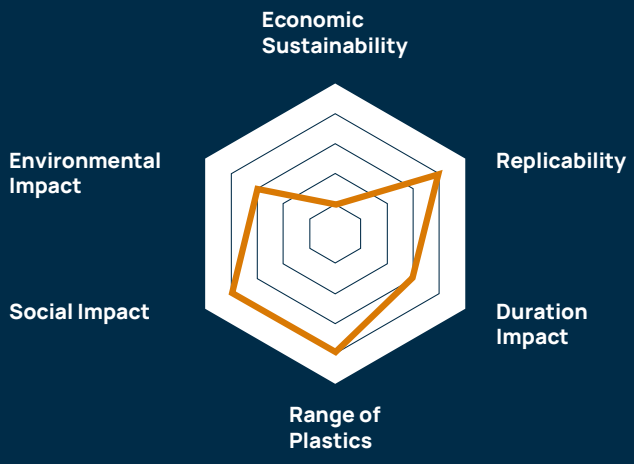
- Need for a funding model that ensures financial sustainability.
- Incorporation of climate resilience planning and implementation.

Economics

USEPA, COBSEA, MISC Berhad, and RCM worked in collaboration to provide support and funding for the project. Discussions are being held with government and private sector stakeholders to secure long term funding.

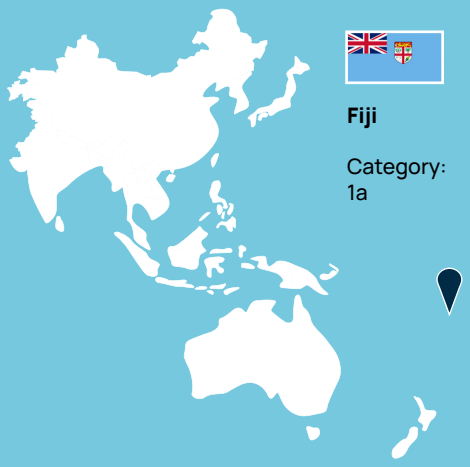
Outcomes

In 2023. a total of 720 kg of waste was collected through the bin collection system, along with 325 kg of waste from community cleanups. Of this, 491 kg was recycled.



*Caution: Scoring for assessment is conducted using the most reliable information available.

Naboro Landfill



Fiji

Category: 1a

Summary

The Naboro landfill is a sanitary engineered landfill comprising of a compacted clay protective liner, along with a leachate collection and treatment system. It is managed and overseen by the Ministry of Environment and Climate Change and is contracted to HG Leach Fiji to manage its daily operations. Equipped with geotextile fiber roads designed for high-level compaction, the landfill meets international best practice standards for disposal of waste. It serves as the disposal site for household, commercial, and industrial waste generated in Nasinu, Nausori, Navua, and Korovou.

Challenges

- Distant location contributing to cost inefficiency for waste transport.
- Limited expertise in landfill management.

Gaps

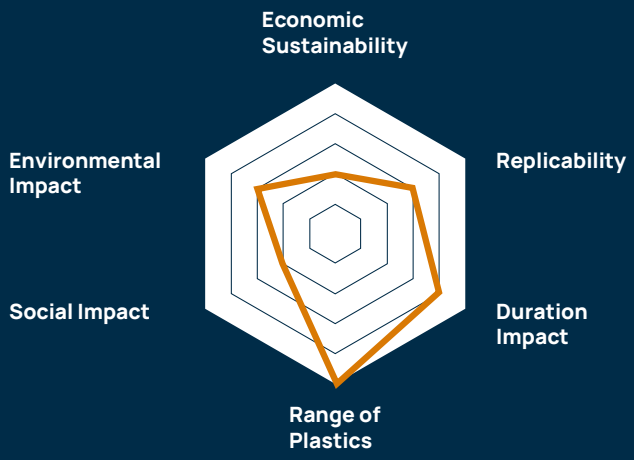
- Lack of established national guidelines for dumpsites and landfills in Fiji.
- No systematic approach for characterization of waste.
- No gas recovery and utilization.

Economics

The Naboro Landfill was constructed at a cost of about USD $6 million, funded jointly by the Fijian Government and the European Union.
A tipping fee ranges from USD $18 to USD $30 depending on type of waste generated. The Fiji government subsidizes about USD $440,000 annually to support operations.

Outcomes

Landfill life span: 70 years.
In 2022, the landfill received a total waste volume of 130,039 tons.



*Caution: Scoring for assessment is conducted using the most reliable information available.

5.3 Case Studies for Enablers/Enabling Environment

5.3.1 Collection

Waste mismanagement in small island communities stems from inadequate collection services to capture waste generated from various sources. The lack of capacity to provide waste collection services in terms of infrastructure, transport, and other operational costs limits collection coverage and frequency. Uncollected waste typically contributes to littering within the surrounding environment.

Plastic waste collection can be supported through financing and incentivizing mechanisms, including:

- economic policy instruments, such as container deposit schemes (CDS), tourist taxes, and plastic credits
- market-based instruments, such as the sale of recyclables, and local EPR, demonstrating the interdependency of the enabling environment to support actions along the hierarchy of actions that address the whole life cycle of plastics, including legacy plastics.

The start-up of these systems can present challenges due to the lack of guidance in developing legislation and the need for seed-funding to address legacy waste issues. Building sufficient capacity, both human and infrastructure, is also essential to enable efficient operation of the system and ensure the long-term sustainability of the collection programs.

Waste Collection Infrastructure

Jamaica

Category: 1a

Summary

With a loan from the World Bank and implementation support from the Jamaica Social Investment Fund, the Government of Jamaica launched an initiative aimed at enhancing waste collection and promoting community cleanliness in vulnerable communities spanning seven parishes. Essential equipment and infrastructure were acquired, establishing an efficient collection system. Additionally, a results-based incentive scheme, along with educational and outreach programs, as well as training and employment of environmental stewards, contributed to the success of the project.

Challenges

- Lack of awareness regarding significance of solid waste management.
- Lack of enforcement and regulatory environment to support enforcement of solid waste management.

Gaps

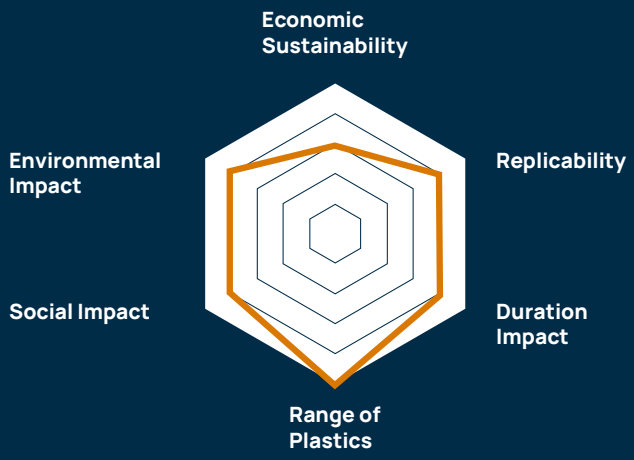
- Numerous small dumpsites but there is no sanitary landfill.
- Insufficient monitoring of waste disposal.
- Implementation of national programs to divert recyclable waste.

Economics

Funding for solid waste management operations is generated from property taxes, government grants, tipping, and hauling fees.
Environmental wardens gained a 10% salary bonus and community-based organizations received a performance-based bonus, ranging from USD $1,200 to USD $2,400.

Outcomes

Establishment of 5000 residual waste bins, 55 dumpsters, 30 recycling enclosures, 60 dumpster enclosures, 660 bin enclosures, 30 composting bins, and 3 waste collection trucks.
Workforce of 165 environmental wardens and 89,000 urban residents received regular waste collection.



*Caution: Scoring for assessment is conducted using the most reliable information available.

Prepaid Garbage System

Vanuatu

Category: 1b

Summary

In Vanuatu, the Port Vila City Corporation (PVCC) and the Luganville Municipal Council (LMC) introduced a prepaid garbage bag collection system, whereby residents are charged for plastic garbage bags according to the amount of waste generated, which is then collected and transported to the landfill. An improved system was implemented in 2015 and is in use by about 90 per cent of residents, according to a social survey conducted in 2017.

Challenges

- Logistical challenges due to incorrect bag prices and insufficient stock in the beginning.
- Accessibility in rural areas.
- Ensuring price stability, accountability, and financial transparency.

Gaps

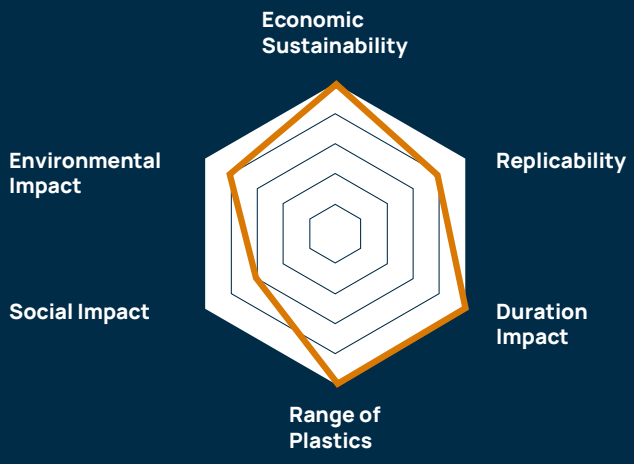
- Circular economy solutions and a source separation system for recovery of recyclables.
- Promote use of smaller bags to reduce waste volume.

Economics

Revenue is generated from the sale of bags. Prices take into consideration the cost of manufacturing, distributing and collecting the bags.
In PVCC, bags cost, in USD, $0.83 (retail), $0.66 wholesale, and $0.33 commission fee for 70 L bags. And $0.58 (retail), $0.49 wholesale, and $0.25 commission fee for 45 L bags.
In LMC, 70 L bags cost, in USD $0.66 (retail), with a $0.16 commission fee.

Outcomes

In 2021, 2022 and 2023, respectively USD $223,845, $270,479.36 and $334,445.61 were generated indicating an increase in use of the prepaid garbage bag collection system.



*Caution: Scoring for assessment is conducted using the most reliable information available.

5.3.2 Sustainable Finance

Sustainable finance for reducing plastic use and waste management refers to the provision of financial resources, investment, and funding mechanisms that support environmentally sound, socially responsible, and economically viable approaches to reduction of use and for managing waste. It encompasses various financial instruments, strategies, and initiatives aimed at promoting sustainable practices throughout the reduction and waste management lifecycle.

Sustainable finance can take the form of investment in infrastructure, financial incentives, and schemes like subsidies, EPR programs, grants, tax incentives, low-interest loans and green bonds, and pre-paid bag systems. It can also include legislative instruments that allow for the ongoing collection of funds that can be disbursed for management of waste.

Sustainable finance was one of the sections where the most case studies were available. We present here two examples of established, long-term systems that have proven successful after facing more than a decade of turbulent waste and recycling markets.

Container Deposit Scheme

Summary

Enacted in April 2011, the Beverage Container Recycling Regulations initially enforced a six-month deposit collection period without redemption to tackle legacy waste. Subsequently, deposits were offered for PET containers. The Container Deposit Scheme has been successful in facilitating the collection of PET bottles, along with other materials like glass, aluminum, steel cans, and tetra packs. Additionally, the scheme extends to companies producing bottled beverages, mandating them to pay deposits on their empty PET containers and preforms upon importation.

Palau

Category: 1a

Challenges

- Capacity limitations contributed to a pause in operations in the initial phase.
- Poor information sharing among operating ministries.
- Determining a deposit value and location of redemption centers to prevent competition with inferior collection sites.

Gaps

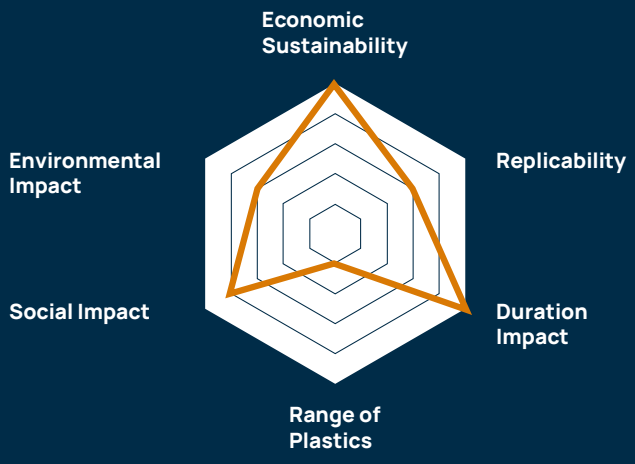
- Lack of feasibility study and an operations manual to guide the implementation of the scheme.

Economics

Palau's Recycling Fund manages deposits from a USD $0.10 import fee per item and preform, collected at the point of entry. Upon return, consumers receive USD $0.05.

Outcomes

In 2020, a total of 8,863,965 aluminum cans, 4,183,080 PET bottles, 404,633 glass bottles, 217,881 steel cans, and 527,700 tetra packs were collected at the redemption center.
87% of redeemable containers were collected.



*Caution: Scoring for assessment is conducted using the most reliable information available.

Waste Collection Fee System

Summary

The Kingdom of Tonga implemented various strategies to enhance Solid Waste Management (SWM) payments. The Waste Authority Ltd (WAL) linked waste fees with residents' electricity bills. In addition, it launched an extensive public awareness campaign, offered a trial period for waste collection at no cost, and enforced payment regulations. As of 2022, WAL is financially sustainable through a user pays system whereby waste fees are collected as part of the electricity billing system.

Challenges

- Reluctance of households to adhere to paying the SWM fee.
- Linking the fee system to a utility billing system that was extensive enough to encompass urban and rural households. with inferior collection sites.

Gaps

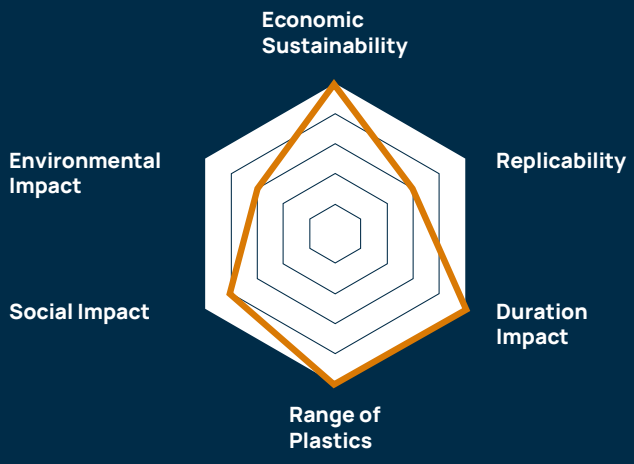
- Technology integration and innovation.
- Long term strategies outlining infrastructure development and resilience plans for waste management.

Economics

In 2019, the collection fees for households was about USD $6.60 per month, and for commercial entities varied from about USD $22- $352 per month. Tonga Power Ltd received 3.5 percent of the total waste fee collected as a commission from WAL.

Outcomes

Bill collection rate rose from 40% to 85% over seven years.
The Waste Authority Ltd's services cover 96% of the population, across the five main islands.



*Caution: Scoring for assessment
is conducted using the most reliable information available.

5.3.3 Regulatory Bans

Regulatory bans on specific single use and avoidable plastics can play a crucial role in driving progress toward better plastic waste management by reducing consumption, promoting alternatives, preventing pollution, encouraging recycling, raising awareness, fostering innovation, and facilitating international cooperation. By implementing comprehensive regulatory measures, policymakers can create the necessary incentives and frameworks to transition toward a more sustainable and circular economy for plastics.

As awareness of the issue of plastics, especially SUPs, gains traction, one of the most common actions implemented globally has been the ban on SUPs like carrier bags. As of April 2023, more than 100 countries have implemented a full or partial ban on single-use plastic bags. Between 2010 and 2019, the number of public policies intended to phase out plastic bags tripled (Elton, 2023). Therefore, case studies within this section have been selected based on the duration of the ban and the range of items included in the ban.

External Trade Order no.83 of 2017 and no.44 of 2018

Antigua and Barbuda

Category: 1a

Summary

Antigua and Barbuda implemented External Trade Order No. 83 of 2017 to address plastic pollution by restricting the importation, production, and trading of plastic shopping bags. Initially, the ban targeted all polyethylene shopping bags, primarily focusing on major supermarkets due to their significant contribution (90%) to environmental plastic litter, and then encompassing smaller stores later on. This effort was later expanded through External Trade Order No. 44, which introduced a phased-out ban on polystyrene food containers such as clamshells, trays, cartons, and cups.

Challenges

- Effective enforcement due to resource constraints.
- Altering perceptions and dependency on the banned items.

Gaps

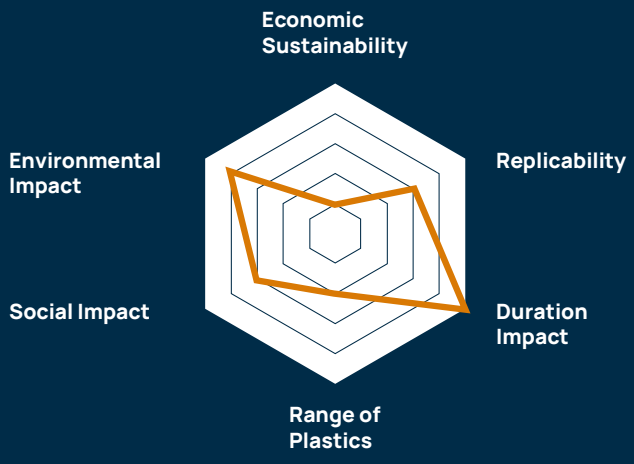
- Implementation of incentive measures directed at producers to take responsibility for waste generated.

Economics

No direct costs involved in enacting the ban.
A revenue recovery charge was implemented. Duties and sales tax were waived and tax incentives were provided.

Outcomes

15.1 % decline in the amount of plastics going to the landfill in the first year after the ban was introduced.



*Caution: Scoring for assessment is conducted using the most reliable information available.

Enabler: Regulatory Ban

Waste Management Regulations order no.15 of 2018

Summary

Vanuatu implemented the Waste Management Regulations Order No.15 of 2018 on single-use items, targeting non-biodegradable plastics, including bags and polystyrene containers. This includes shopping bags composed of polyethylene less than 35 microns thick, polystyrene takeaway boxes shorter than 30 centimeters, and plastic straws. Exceptions to the ban included plastic bags used for wrapping fish or meat at the point of sale and plastic straws integral to a product's packaging. Subsequently, in December 2019, the ban was expanded to encompass an additional eight items, such as plastic mesh, bags, and plastic cutlery.

Vanuatu

Category: 1a

Challenges

- Ineffective enforcement due to resource constraints.
- Altering perceptions and dependency.

Gaps

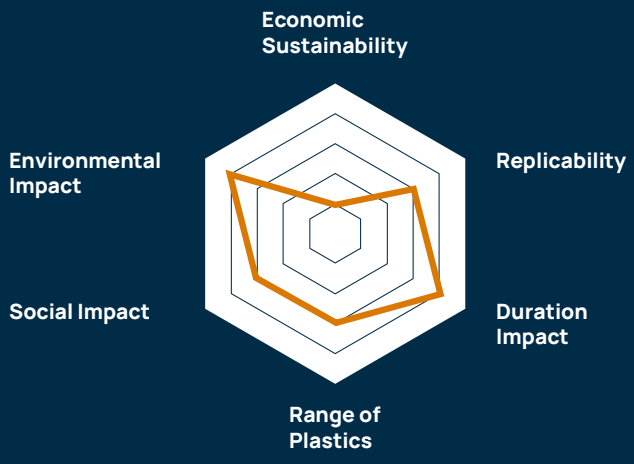
- Lack of legislation and associated best practices for recycling and source separation.
- Lack of a nationally coordinated collection system for recyclables.

Economics

No direct costs involved in enacting the ban.
The burden of procuring alternatives was passed on to businesses and importers.

Outcomes

90% reduction in lightweight single use plastics from 2018 to 2020.
The ban spurred the popularity of locally made palm leaf crafts and bags, as well as inspired other Pacific nations to join the effort.



*Caution: Scoring for assessment is conducted using the most reliable information available.

5.3.4 Awareness Raising

Awareness and education play crucial roles in reducing plastic use and pollution by fostering understanding, promoting behavioral change, and empowering individuals, communities, and businesses to adopt more sustainable practices. Increased awareness can enable consumers to make more sustainable purchasing decisions and support businesses that prioritize the hierarchy of actions. Awareness and education campaigns can also mobilize public support for policy changes and regulations aimed at reducing plastic use and pollution. By informing policymakers, stakeholders, and the general public about the need for stronger environmental protection and waste management policies, advocacy efforts can help shape and garner support for legislation, regulations, and initiatives to address plastic use and pollution and promote alternatives at local, national, and international levels. By promoting awareness of emerging trends, best practices, and technological advancements in alternatives to plastic and pollution prevention and mitigation, education initiatives inspire individuals and organizations to pursue innovative solutions to the plastic waste crisis.

Ultimately, awareness and education contribute to building a culture of sustainability where environmental stewardship, waste reduction, and conservation are valued and prioritized. By instilling a sense of responsibility and commitment to protecting the planet for future generations, education empowers individuals and communities to take collective action to address plastic pollution and promote a healthier, more sustainable world.

Education and awareness are the cornerstones of most successful projects showcased in this white paper.

Tide Freshwater Cup

Belize

Category: 1b

Summary

To empower communities as environmental stewards, the Toledo Institute for Development and Environment (TIDE) organizes an annual "Freshwater Cup Football League," integrating sports and environmental stewardship for eligible primary schools. In 2019, TIDE partnered with JICA and Oceana, sensitizing schools on plastic pollution's environmental impact. Schools were then required to design and execute projects addressing plastic pollution. Participants actively contributed to cleaning rivers, the coastline, and illegal dumpsites, as well as presenting their efforts within their school premises.

Challenges

- Coordinating games and environmental projects with the schools' schedule.
- Seeking funding support for participants.
- Participants' limited technical capacity to plan and implement environmental projects.

Gaps

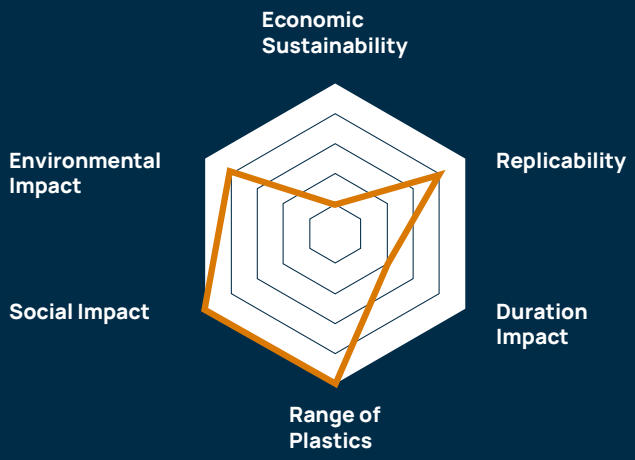
- Revenue generation can be facilitated through entrance fees.
- The football event can also be used as a platform by restricting the use of single use plastics at the event.
- Waste audits can help to raise awareness regarding the types of plastics being generated.

Economics

TIDE's Freshwater Cup is funded by donors and grants. The event itself does not generate any revenue.

Outcomes

19 schools participated, each with male and female teams and approximately 475 students.



*Caution: Scoring for assessment is conducted using the most reliable information available.

Sungai Watch

Bali & East Java, Indonesia

Category: 1b

Summary

Established in 2020, Sungai Watch raises awareness about plastic pollution through river clean-ups and comprehensive data collection from river waste and illegal dumpsites across Bali. Using social media, Sungai Watch shares clean-up schedules and invites online participation. Regular community engagement includes barrier installation and visits three times a year: pre-installation, post-installation for talks and cleanups, and report presentations. Collected waste is sorted by type and brand for a waste audit, generating an annual report to raise awareness.

Challenges

- Altering community practices and perceptions that contribute to illegal dumping and littering.

Gaps

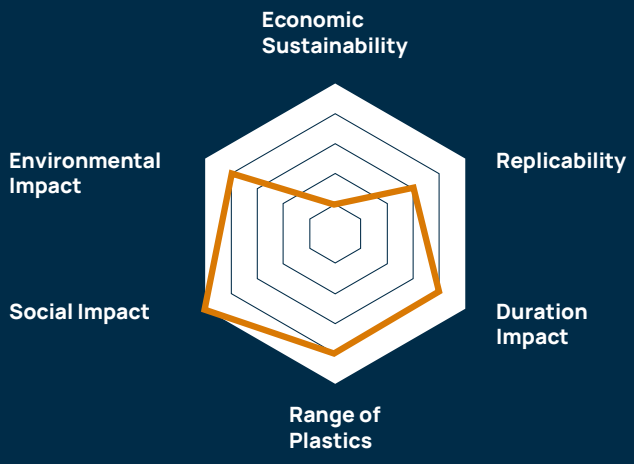
- Lacks enabling legislation.
- Lacks an established system that ensures financial self sustainability.

Economics

Sungai Watch was initiated through financial support from grants and donation.
Annual sponsorships continue to provide financing for barrier installation, river cleanups and outreach initiatives.

Outcomes

In 2023, Sungai Watch collected 844,936 kg and audited 537,189 plastics.
In the Tabanan Regency, the organization conducted 107 cleanups with over 1000 community members.
In Banyuwangi Regency, Sungai Watch conducted a cleanup with schools, and local groups that contributed to the collection of 36 tons of waste.



*Caution: Scoring for assessment is conducted using the most reliable information available.

5.4 Emerging Projects

With the global momentum on plastic waste gaining traction in recent years, numerous projects have commenced, showing promising preliminary outputs. This white paper would like to acknowledge these efforts and create an evolving repository of knowledge. These projects can serve as practical applications for island and remote communities to refer to when seeking proven outcomes in the future:

Searious Business/IUCN/NORAD: Plastic Waste-Free Tourism Tool Kits in SIDS
A Dutch consultancy developed tool kits with "tips and tricks" for eliminating plastic in hotels, cruise lines, and other tourism activities.

Searious Plastic in Saint Lucia (IUCN PWFI)
The above consultancy partnered with a local restaurant in Saint Lucia to promote the use of reusable take away containers.

Solo Soli Store by Pure Oceans (Tingloy Island, off the coast of Batangas, Philippines)
A small initiative by Pure Oceans whereby locals can trade in cleaned and segregated plastics found on the beaches, in exchange for goods such as laundry powder, dishwashing liquid, and others.

SEArcular by Greencore
SEArcular collects ocean bound PET, PP, and PC plastic and processes them into flakes for recycled use.

Nextwave plastics
An open-source collaboration among technology companies such as Dell Technologies and HP Inc. to develop a global network plastic supply chain using ocean bound plastic.

Plastic Bank
Plastic Bank establishes recycling systems in countries such as Haiti, Brazil, Indonesia, and the Philippines. Local residents can collect plastic from the environment and exchange it at designated collection points for goods and services.

Plastic Collective
An Australian-based company that "helps establish community operated plastic recycling micro-enterprises" in remote areas such as Gizo in the Solomon Islands, Siem Reap in Cambodia, as well as numerous projects across Indonesia, Malaysia and other countries.

Precious Plastic – Shredder
An Australian based open hardware plastic recycling that provides open-sourced blueprints for building machines designed to create plastic flakes from collected HDPE, PP, and PS plastic.

Triple Benefit
A Dutch firm that provides one-stop-shop support for development and implementation of plastics recycling solutions.

AfriCraft
Under the motto "Upcycling-products from Africa – Trade not aid," AfriCraft collects a wide range of recyclable waste including plastics from hotels and other businesses in Tanzania and turns them into attractive handicraft products that are sold on local and international markets.

5.5 Existing Collaborative Partnerships – Community of Practice

A number of organizations and partners have recognized that collaborative action is key in promoting continuous change and leveraging efforts in this space. This collaboration has gained traction in recent years, and the following examples illustrate successful existing and emerging partnerships and platforms aimed at building the capacities of small island communities.

PREVENT Waste Alliance Sub-Working Group on Small Islands and Remote Coastal Areas

Within the PREVENT sub-working group, more than 20 member organizations from the public, private, and governmental sector, academia, civil society, and public institutions (including IUCN, WWF, GIZ and AEPW) share experiences and exchange information on challenges, solutions, and best practices for combating plastic pollution in small islands and remote coastal areas. The group meets via regular webinars to share best solutions, foster connections among members, and to work on collaborative actions, such as this white paper.

Ubuntoo Environmental Solutions Platform

Through the IUCN Plastic Waste-Free Islands (PWFI) Project, the Ubuntoo "Greenhouse," that sits within an environmental solutions platform, was developed. It encompasses 82 product solutions, 66 knowledge product resources, and a newsfeed focused on plastic leakage and pollution specific to SIDS. The platform is intended to build capacity for small island communities on plastic pollution solutions and can be accessed **here**.

Technology Options for Plastic Waste in Island Contexts (TOPIC) Toolbox through World Bank

The TOPIC toolbox is designed to inform small island communities about available solutions and technologies to assist in addressing plastic waste issues. It is a decision-making tool based on specific local conditions in an area. The system works by inputting island data and market access into the toolbox to be able to generate a matrix of technologies and solutions fit for a particular island condition. The process also merges recommendation clusters into a conclusion sheet to guide the determination of appropriate solutions. It has been successfully applied in the islands of Malaysia. The toolbox can be accessed **here**.

Regional Strategic Action

While a regional legislation in the Pacific is not possible, a regional strategy endorsed by the member countries can provide a regional blueprint for addressing common issues. South Pacific Regional Environmental Program (SPREP), through the Pacific Regional Waste and Pollution Management Strategy, or Cleaner 2025, established regional strategic actions to guide its member countries in achieving target goals on waste prevention, resource recovery, residual waste management, and environmental monitoring. Specifically for marine litter, the Pacific Regional Action Plan: Marine Litter was developed with endorsement from the Pacific Forum Leaders (SPREP, 2018).

The Moana Taka Partnership

Once collected, the cost of shipping of recyclable materials (including container, packing, paperwork, etc.) continues to be one of the biggest challenges for Pacific Island Countries and Territories (PICTs) to achieve higher recycling rates. Considering the challenges faced by PICTs, The China Navigation Company Ltd/Swire Shipping Agencies, and SPREP signed a Memorandum of Understanding (MOU) on March 20, 2018, as part of the Global Recycling Day, to address critical waste management issues in PICTs under the Moana Taka Partnership (MTP) project. The Moana Taka Partnership enables Swire Shipping vessels to utilize empty shipping containers to transport non-commercial recyclable waste from islands. This waste is transported to countries with appropriate waste disposal facilities, ensuring that everything from oil to plastics to aerosols are properly recycled.

Regional Action on Recyclables

Pacific island countries have long recognized the need for an improved and effective solid waste management system. Prompted by the needs of its Pacific member countries, SPREP, and development partners working in this area, sought the assistance of the Pacific Region Infrastructure Facility (PRIF) to explore the establishment of a regional recycling network. A pre-feasibility was conducted, focusing on upgrading the facilities and networks in Fiji and Papua New Guinea (PNG), with value-adding processing for metals (excluding scrap steel), plastic, and paper/cardboard waste streams. Simultaneously, the option considered the upgrade required in other PICTs through financial and technical investment to achieve best practice compaction and shipping. The anticipated outcome is a deliberate improvement in the percentage of the target waste streams collected, processed, and exported to international markets (excluding glass).

COBSEA (Coordinating Body on the Seas of East Asia)

To address these regional and global threats and guide action in line with the Sustainable Development Goals (SDGs), COBSEA participating countries adopted the Strategic Directions 2018-2022 and a revised Regional Action Plan on Marine Litter (RAP MALI) in 2019. This plan aims to address marine pollution, focusing on nutrients, sediments and wastewater, marine litter, and microplastics. The COBSEA RAP MALI consolidates, coordinates, and facilitates cooperation, guiding the implementation of necessary environmental policies, strategies, and measures for sustainable, integrated management of marine litter in the East Asian Seas region. The COBSEA Secretariat closely coordinates with other Regional Seas programs, the Global Partnership on Marine Litter (GPML), and the Global Program of Action for the Protection of the Marine Environment from Land-based Activities (GPA). This collaboration supports effective action in the East Asian Seas region to achieve SDG target 14.1: to prevent and significantly reduce marine pollution of all kinds, particularly from land-based activities.

PRISM

PRISM aggregates more than 800 data sources to help users understand local, regional, or global waste management contexts—such as consumption patterns, available waste infrastructure, as well as demographic and socioeconomic data points. It aims to help decision-makers analyze opportunities, impact, and potential economic returns to improve waste management programs. PRISM is being piloted within the Alliance community and is expected to be available for public access in 2024. More information can be accessed here.

UNWTO – Global Tourism Plastics Initiative (GTPI)

The Global Tourism Plastics Initiative unites the tourism sector behind a common vision to address the root causes of plastic pollution. It enables businesses, governments, and other tourism stakeholders to lead by example in the shift toward a circular economy of plastics. Read more here.

6 Conclusion: Call to Action – Be Part of the Change

The analysis undertaken for this paper demonstrates that even with public awareness of sustainable practice regarding plastic waste, change cannot take place in a system that does not provide for long term economic, social, and environmental sustainability for plastic waste management in SICs. There is an ultimate responsibility for producers and distributors of goods to prevent the possibility of further environmental degradation because of the inability of SICs to appropriately manage plastic waste. This can be done through eliminating the mindset of "disposability" and the idea that any part of a product can be "thrown away," focusing instead on the concepts of refuse, reduce, and reuse. Promising interventions may include upgrading and support of local and traditional food and water supply systems as well as packaging materials and technologies, reducing reliance on imported materials. All of these provide job opportunities and increase the attractiveness of destinations in the growing ecotourism markets that many SICs depend on. Case studies like Ecofiltro and Chumbe Islands are examples of such interventions.

Taking a solutions-based approach, this white paper marks an important step in addressing the plastics issue through a systematic presentation of opportunities for consideration and potential investment. Attempts to collect case studies for all levels of the hierarchy of actions and enabling environment suggest that while efforts are ongoing across all levels, the most successful action for the SICs has been within the enabling environment (legislation, collection systems etc.). However, long term consistent support is required to ensure the projects are successful, with technical assistance and political will being the critical factors in the success of these interventions.

Solutions targeting the top of the hierarchy of actions are needed to "close the tap" and ensure that plastic pollution doesn't continue to be a problem of the future as it is today. Refuse, reduce, and reuse projects form the backbone of action at the top of the hierarchy. Our analysis suggests that for island and remote coastal areas with very limited capacity to redesign and process non-recyclable plastic materials, a staged and well-communicated phasing-out of non-essential plastics seems to be the ideal solution. The availability of appropriate alternatives/substitutes remains an issue that needs to be addressed. Financing to support trials remains the key enabler, and the key challenge is the need for a significant number of early adopters to ensure sustainability of the project or program. Consistent education and awareness are a must for the success of any project or program.

In the context of SICs, recycling means consolidation, sorting, value adding, and, often, exporting to overseas recycling markets. Legislation, collection, education, and sustainable financing solutions emerge as the key enablers, without which mechanical recycling is not successful at this small scale. Mechanical recycling is beneficial in that it has the potential to address the legacy plastics issue if applied appropriately.

The implementation of on-site chemical recycling and energy recovery projects in the SICs is in its infancy, and data and information are not readily available. Research suggests that volumes required for the economies of scale needed for financial sustainability of these projects simply don't exist in the SICs. Furthermore, the lack of volume is exacerbated by the increasing number of SICs adopting actions like bans and levies, leading to a further reduction in the quantities of materials that chemical recycling projects depend on.

Well-managed and environmentally sound disposal sites will always be necessary to handle waste material that has no other disposal option available through actions on the higher levels of the hierarchy. The unavailability of land, technical skills for ongoing management, lack of appropriate compliance and enforcement regimes, and the tyranny of disasters and climate change have led to the acute lack of appropriate disposal sites in SICs. This makes it even more urgent to take action on the higher levels of the waste hierarchy, thereby extending the lifespan of existing facilities.

There is no one-size-fits-all solution to the plastic pollution issue in SICs. However, there are numerous opportunities for cooperation at various levels, including global, regional, national, and local, to enable small island communities to address plastic waste within their realm, despite the economic, technological, environmental, and regulatory challenges they face. Section 5.5 references some collaborative actions that have started to take place. The interdependency of actions and enablers shows that a nuanced approach is needed to adequately address the issue of plastic pollution currently and into the future. Further strengthening of environmental safeguards,

compliance, and enforcement activities will need to be supported as well.

SICs are impacted by plastic pollution accumulation events on their shorelines and beaches, as well as being at high risk from disaster waste. These events can add to the legacy waste issue as well as increase mismanaged waste flows and further reduce resilience by damaging recycling facilities and landfills. It is imperative to integrate disaster risk and resilience considerations into strategies to address plastic pollution issues on SICs.

The negotiations for a global treaty to end plastic pollution present a once-in-a-generation opportunity to create a global solution to the escalating crisis of plastic pollution. Without an ambitious and fair treaty with legally binding global rules, plastic pollution is likely to triple by 2040, posing significant risks to our food and water and exacerbating damage to fragile ecosystems (WWF, n.d.). It is in this worldwide context that SICs have taken and can continue to take a bold stance, as noted by Ms. Asha Challenger (Antigua and Barbuda) in the foreword.

Despite consuming nearly three times less plastic per capita than high income countries, the true cost of plastic in low-income small island countries is 10 times that of high-income countries (WWF, 2023). The urgency to address this issue has never been clearer. By leveraging feasible strategies at scale, identifying areas needing further development, and aligning with global initiatives, the proposed framework sets the stage for transformative change in plastic waste management in small island communities. The time is ripe for a collaborative movement to gain momentum and enact change. Small island communities, with their unique strengths and vulnerabilities, can be the torchbearers of this collaboration and pave the path toward a planet free of plastic waste.

Appendix A: Definitions of Island Communities

Criteria	Category 1	Category 2
Size (population and land area)	• With an area equal to or less than 10,000 km2 and with a population of less than 200,000 (Adisoemarto, 2004) • Limited land availability for waste management infrastructure, e.g., landfills • Owing to smaller population, plastic volumes are not enough for activities at scale	• Usually (but not always) bigger in size and population than Category 1 • Land size is not a limiting factor for waste management infrastructure • Large and dense population is likely to contribute to greater plastic volume
Distance to trading areas	• Long distance to the other states/ countries or mainland, which poses logistical challenges • Frequency and availability of transport too low to make shipping of post-consumer plastic economical • Access to major shipping routes is lacking • Less tourism activity due to the long distance from departure points	• Close enough to other countries/ mainland to mitigate transport and logistics issues • There is access to major shipping routes • Proximity to other states and mainland allows more tourism activity
Governance	• Small island states and outer islands of bigger countries • National governance of large ocean, small-island developing states (1a), and local governance of outer islands within bigger countries (1b) • Inadequate resources to build up technical and institutional capacity • Weak legislative and policy structure to deal with pollution issues	• Bigger island nations and developed • National and local governance of main islands and population centers in large island states • With existing technical skills which can be tapped for plastic prevention and management • More mature legislative and policy structure, which may not necessarily target plastic wastes specifically but can be amended to promote plastic waste circularity. There is some degree of enforcement to the regulations as well. • Ability to access and coordinate donor funding and projects
Economic activity	• Non-industrialized developing economy • Volatile economy • Lack of resources to provide proper collection service and recycling facilities • Inadequate financial capacity to operate and maintain expensive infrastructure, if established • Do not/minimally trade (import/export) post-consumer plastics • High reliance on tourism and subsistence fishing for GDP, and therefore highly impacted by marine pollution	• Industrialized developing economy • Adequate resources to provide collection service and recycling facilities • Adequate financial capacity to operate and maintain expensive infrastructure • Ability to trade post-consumer plastics • With diverse sources of income and, therefore, subjected to both land and marine pollution

Appendix B: Summary of Key Challenges in Providing Sustainable Management Systems

Type	Issue	Challenges and Barriers
Infrastructure	Lack of space and technical skills	Small islands often lack adequate waste management infrastructure such as recycling facilities, landfill sites, and collection systems. This leads to improper disposal of plastic waste, including burning, dumping in waterways, or accumulating in open areas.
Economic	Resources for collection, sorting, and processing	Collection systems in Category 1 islands are not available for a substantial portion of the population due to a low revenue base and no or limited incentives for collection of recyclables. Sorting is usually performed at the disposal sites by waste pickers and sometimes directly from households by waste pickers. Ongoing finances are not available for sorting and processing infrastructure. The transportation costs associated with exporting or managing plastic waste on small islands can be exorbitant due to their remote locations. This makes recycling or exporting plastic waste economically unviable for many small island communities.
	Competing economic priorities	Waste management is not prioritized because investment is required in other sectors.
	Dependence on imported goods	Changing consumer preferences and limited manufacturing activities increase importation levels with plastic packaging.
Technology	Sorting and processing technology	Lack of available infrastructure for sorting and processing Sub-standard equipment, which may not be suitable for existing conditions such as available voltage, temperature, humidity, etc., is used for processing. These may pose safety concerns for workers and lack adequate environmental controls. Lack of technical skills to operate and maintain infrastructure where available.
Environmental	Environmental standards	Weak environmental standards may lead to flow of plastics to destinations that also have low environmental standards.
	Compliance with existing standards	Lack of human resources for enforcement and compliance of environmental standards leading to uncontrolled dumping and burning of waste

Type	Issue	Challenges and Barriers
Regulatory	Lack of regulation for prevention, collection, sorting, and disposal	Lack of targets and strategies for prevention, collection, sorting, and recycling or the management of end-of-life disposal of post-consumer plastics, especially from sectors such as fisheries and tourism Non-signatory to multilateral environmental agreements (Basel Convention and other relevant regional agreements, e.g., Waigani Convention) that allow for the appropriate transport of waste through overseas trade. Challenge is exacerbated for remote islands within larger economies.
Vulnerability: pollution, climate, and disaster	Vulnerable ecosystems	Small islands are highly vulnerable to ocean pollution as they are surrounded by water. Plastic waste not only accumulates on beaches but also affects marine life, coral reefs, and coastal ecosystems, posing a threat to biodiversity and tourism, which is often a significant source of income for these islands. Many small islands depend heavily on tourism, which can exacerbate the plastic waste problem due to increased consumption and disposal by tourists. Managing the influx of plastic waste generated by tourism while maintaining environmental integrity is a significant challenge for these islands. Small islands are particularly vulnerable to the impacts of climate change, including sea-level rise, extreme weather events, and coastal erosion. Plastic pollution exacerbates these vulnerabilities by contaminating fragile ecosystems and compromising the resilience of island communities.

Appendix C: Full Breakdown of Scoring Criteria

Criteria	Score = 1	Score = 2	Score = 3	Score = 4	Score = 5
Economic sustainability	Not enough cash flow to support ongoing Capex and OpEx	Not enough cash flow to support ongoing Capex but is generating just enough cash flow to cover recurring OpEx, resulting in inability to breakeven	Enough cash flow to cover recurring Capex and OpEx, though just enough to breakeven but at risk in case of recession/high volatility	Enough cash flow to cover Capex and OpEx, enabling breakeven/ expansion of operations	Enough cash flow to cover Capex and OpEx, generating a reasonable margin to mitigate risks of recession/volatility
Replicability/ Ease of implementation	Not easily replicable as the project requires major modification/establishments in access to markets, physical infrastructure, technical capacity, institutional structures, and social acceptance	Limited replicability as the project requires modification/ establishments in four of the mentioned areas: access to markets, physical infrastructure, technical capacity, institutional structures, and social acceptance	Replicable. The project requires modification/ establishments in three of the mentioned areas: access to markets, physical infrastructure, technical capacity, institutional structures, and social acceptance.	Well-suited. The project requires modification/ establishments in two of the mentioned areas: access to markets, physical infrastructure, technical capacity, institutional structures, and social acceptance.	Easily adaptable. The project requires minimal modification/establishments in one of the mentioned areas: access to markets, physical infrastructure, technical capacity, institutional structures, and social acceptance.
Duration impact	Project solely consists of operations providing temporary relief to plastic issues. For example: clean-ups or events	Projects go beyond a one-off operation and combine multiple ways to relieve plastic issues. E.g., cleanups combined with art and awareness raising	Project involves medium to long term operations but faces logistical challenges. For example, infrastructure development without enabling environment	Project involves establishment of medium to long term operations supported by enabling environment but might lack financial sustainability or a supporting education campaign	Project involves long-term operations, is supported by appropriate logistical support, enabling environment, education, and awareness
Range and type of plastics	Solves the plastic waste issue of one high value plastic waste stream only, removing/ avoiding 10-20% of the plastic waste stream	Solves the plastic waste issue of several high value plastics waste streams, removing/avoiding 20-30% of the plastic waste stream	Solves the plastic waste issue of high value and/or one low value waste stream, removing/avoiding 30-50% of the plastic waste stream	Solves the plastic waste issue of high value and/or more than one low value waste streams, removing/avoiding 50-80% of the plastic waste stream	Solves the plastic issue of all plastics, removing/avoiding 80%-100% of the plastic waste stream

Criteria	Score = 1	Score = 2	Score = 3	Score = 4	Score = 5
Social impact	Minimal or no impact on GEDSI community members. There is no consideration, and project outcomes do not contribute to GEDSI community.	Basic awareness and consideration shown, with limited efforts to address GEDSI concerns, and minimal involvement from the GEDSI community	Inclusion of GEDSI perspectives in project planning and decision-making, with some activities targeting GEDSI	Substantial positive impact on GEDSI. Proactive measures are taken to ensure equal representation and collaboration with GEDSI stakeholders to maximize impact.	Comprehensive strategies across all project phases. There is clear evidence that there is increased gender equality, diverse representation, and enhanced social inclusion.
6. Environmental impact	Long-term negative environmental impacts such as leaching of microplastics, loss of biodiversity, and significant climate change contributions	Medium-term local negative impacts like habitat fragmentation and medium-term water/soil contamination	Short-term local negative impacts including odor, localized littering, noise pollution, and erosion.	No significant negative environmental impacts identified	Proven benefits to the entire island or country with no known potential environmental impacts

Appendix D: Hierarchy of Actions

The case studies presented in this section follow the hierarchy of actions, each of which has been assessed against the criteria in the assessment framework (Table 1). The interpretation of the hierarchy of actions as used in this white paper is provided below:

Refuse	Saying no to unnecessary items and hazardous/toxic materials. Includes elimination of non-renewable/recyclable materials without a market value Bans, although a perfect example of refuse, are considered an enabler within this white paper and presented in the corresponding section. This level of the hierarchy promotes "turning off the tap" and removes the need for end-of-life management of plastics. This may include re-designing and rethinking of material used, supported by education campaigns.
Reduce	Minimizing the quantity of material used promotes the use of renewable materials and incorporation of recycled content in new products. Actions under reduce also work toward removing the need for management of end-of-life plastics; therefore, effectively preventing the problem from the start.
Reuse	Clean, reuse, refurbish, and repair. Promotes the creation and adoption of products with longer lifespans, keeping them in the economy for as long as possible Promotes the use of refillable and reusable containers for beverages, food, and personal care products. It supports initiatives that encourage repairing and refurbishing plastic products to extend their lifespan
Mechanical Recycling	Processing of plastic waste into recyclates (secondary raw materials) achieved without significantly changing the chemical structure of the material. Can solve the challenge of ongoing management of plastic waste and can tackle some legacy plastics. However, requires enablers in the form of legislation, education, collection systems, and financing to implement. Economies of scale and logistics of transport remain the biggest challenge for recycling on SICs.
Chemical Recycling	Conversion of plastic waste to monomer or other raw materials for plastic production, achieved by changing the chemical structure of plastics waste through thermal cracking, gasification, depolymerization, or biological processes Can solve the challenge of ongoing management of plastic waste and can tackle some legacy plastics. However, requires enablers in the form of legislation, education, collection systems, and financing to implement. Economies of scale and logistics of transport remain the biggest challenge for recycling on SICs.
Recover Energy	Waste to Energy, co-processing, waste to fuel Can solve the challenge of ongoing management of plastic waste, low value plastics, and legacy plastic issues. However, economic sustainability of energy recovery solutions on SICs remains unproven.
Responsible Disposal	Disposal of waste that cannot be processed through disposal at managed landfills Availability of managed landfills serve to solve the ongoing issue of management of low quality and non-recyclable materials. However, managed sanitary landfills require land, financial investment, and technical skills, all of which remain a challenge for SICs.

Appendix E: Detailed Case Studies

Refuse

Refuse: A measurable reduction in the use of SUP drink bottles and plastic bags	When Samoa was announced as the host of the 2019 Pacific Games, the government and organizers recognized the opportunity to change the behavior and mindset of sports lovers toward single-use plastics. In place of the usual single use plastic bottles, all 5,000 athletes at the games were given reusable water bottles, with 350 refill stations installed around the venue. Food providers were also directed to use either biodegradable or reusable takeaway containers and utensils. In addition, athletes and officials were supplied with reusable bags, and spectators were encouraged to bring their own reusable water bottles and food containers.
Caution	One-off event requiring donor support for funding.

Multi Criteria	Notes	Score	Data Availability Score
Economic Sustainability	UN Environmental Program and the Australian, French, New Zealand, and UK governments contributed USD $153,000 to support the games going 'green' (UNEP, 2019). Waste audit showed that waste generation during the games was only half of the usual per capita generation in Samoa. This indicated less waste generated during the games, which resulted in cost saving for collection and disposal. The event was co-chaired by the Ministry of Natural Resources and Environment, Secretariat of the Pacific Regional Environment Program (SPREP), and included the Pacific Games Office (PGO); Samoa Tourism Authority; Ministry of Women, Community, and Social Development; Ministry of Education, Sports and Culture; UN Environment; and Samoa Recycling and Waste Management Association (SRWMA) (SPREP, 2020). The refillable containers, reusable containers, and bags were bought through contributions from donors and sponsors, which were distributed among players. All costs for the projects were borne through donations from donors.	1	Data moderately available
Replicability	Project easily replicable. It provided campaigns to drive social acceptance and required the purchasing of reusable containers and bags. A sustainability report was produced, which can guide future Pacific Games hosts to facilitate a similar plastic-free event. The roadmap created in Samoa can be replicated elsewhere.	4	Sufficient data available
Duration Impact	It was a one-time event with high replicability, targeted at reducing use of single-use plastics and encouraging the use of reusable and compostable items.	2	Sufficient data available
Range of Plastics	PET bottles (10.596%) + LDPE bags (18.874%) = approximately 29% of average global plastic waste stream. Based on the type of plastics targeted, percentages were assumed based on values from Geyer et al. (2017) to obtain estimated percentages per plastic type in the overall plastic waste stream. A waste audit conducted showed that the Pacific Games was successful in significantly reducing plastic waste by about 3.65%, which equated to about 1.5 tons of	2	Data moderately available

	plastic based on the total amount of waste generated, which would have otherwise occupied space at the landfill or contributed to littering. 9,000 reusable bags were distributed to athletes and officials, and 8,000 1-liter, reusable water bottles were distributed to all athletes, officials, and volunteers (SPREP, 2020).		
Social Impact	Project involved a wide range of stakeholders, including government, private sector, and the surrounding community, which contributed to social inclusion. Both women and men were involved in the benefits provided by the project. After the event, 150 water refill stations were given to local schools for continued use (SPREP, 2020).	3	Data moderately available
Environmental Impact	The banning of single-use plastics and promotion of reusable bottles saved one million single use plastic bottles from being discarded. The event contributed to less waste being generated and ultimately the reuse of certain items. There is possibility of production of emissions related to the transportation of reusable containers and bags from the supplier. Given that it was just a one-time event, the release of emissions related to transportation is not prolonged over an extended period of time. Some plastic waste was also still generated as a result of the Pacific Games, but it was collected and a waste audit was conducted.	4	Data moderately available
Additional Information	**https://library.sprep.org/sites/default/files/2022-03/greening-games-report-sustainability_2.pdf**		
Challenges	The event organizer was reluctant to discourage the use of single-use plastic bottles due to health and safety concerns for the athletes. The organizing committee, with advice from the Samoa-based environmental organizations and other plastic reduction advocates, offered the use of water refilling stations with well-cleaned 10L refillable bottles and assurance of a reliable cleaning process that was demonstrated to the sport organizers. Maintaining an adequate supply of water at the refilling stations was also a challenge that could have impacted athletes' performance, so close monitoring was required. Getting the spectators highly involved in the plastic-free event goal was very challenging. A massive campaign was launched prior to the event, using highly visible advertisements such as posters, billboards, printed leaflets, and media coverage. The venue was strictly monitored and waste audits were conducted to measure the impact of the campaign, with daily reporting of results showcased in a booth at the venue.		
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Refuse: A reduction in the use of single-use consumables	Chumbe Island Coral Park Ltd (CHICOP), located in Zanzibar, Tanzania, is a pioneering not-for-profit social enterprise founded in 1992. It is the first privately managed Marine Protected Area (MPA) in the world and encompasses a protected coral reef sanctuary and forest reserve. Park management and comprehensive conservation education programs for local schools and communities are fully funded by a small ecolodge on Chumbe island. Welcoming tourists since 1998, CHICOP has remained steadfast in its dedication to ecologically sustainable architecture and operations, ensuring minimal impact on the island's delicate terrestrial and marine ecology. Utilizing a uniquely innovative design, each building functions as a self-sufficient unit that generates its own renewable water and energy, with rainwater catchment and filtration, solar water heating, and photovoltaic electricity, while sewage is avoided at source with composting toilets and artificial wetlands (Nordlund, et al. 2013). The park operates an eco-lodge based on a minimal impact ecotourism model, aiming to preserve the delicate marine and terrestrial ecosystems of the island. One of CHICOP's notable initiatives includes the implementation of a zero single-use plastics policy, reflecting its commitment to reducing waste generation at its source.
Caution	Project is dependent on tourism revenue and is impacted by fluctuations in tourism numbers.

Multi Criteria	Notes	Score	Data Availability Score
Economic Sustainability	From 1992 to 1998, CHICOP attracted investment totaling USD $1.2 million from a combination of private and donor financing to develop its facilities and operations (Riedmiller, n.d.). CHICOP generates revenue primarily through ecotourism activities, offering visitors a range of nature experiences such as guided snorkeling, walks, and environmental education programs. Day trips cost approximately USD $110 per person, while overnight stays at the eco-lodge cost about USD $300 per person per night. The revenue generated, which provides an average USD $570,000/year, supports both marine protected area management and eco-tourism operations (UNEP, n.d.). CHICOP operates within a not-for-profit framework, reinvesting all generated funds into conservation management and environmental education programs for local schools and communities. This model has enabled CHICOP to maintain financial sustainability for more than two decades (Mitchell et al., 2018). CHICOP faces financial constraints for capacity building and the development of eco-innovations. The temporary closure of the island due to the Covid-19 pandemic in May 2020, following the suspension of international flights, led to significant loss of income, posing challenges in funding operations. No ongoing investment needed beyond seed funding.	4	Sufficient data available
Replicability	The initiative can be replicated but will require investment and a supportive enabling (governance) environment.	3	Sufficient data available
Duration **Impact**	It is a long-term initiative that has been ongoing since 1992. The zero-waste policy being implemented on the island contributes to avoiding the use of single-use plastics and promotes use of local handicrafts made from natural materials for tableware and kitchen utensils, etc.	5	Sufficient data available

Range of Plastics	No data available for plastic as little to no plastic is used on Chumbe, which has a zero single-use plastics policy; therefore, there are no plastic bags, SUP food storage containers, disposable cups, plates and bowls.	5	Sufficient data available
Social Impact	In the early 1990s, CHICOP benefitted from an investment policy that allowed for a private initiative to establish and manage a self-funding MPA, which was CHICOP's business model from the outset. The employment of former fishers and their training as park rangers, along with collaboration with several sectoral governmental agencies, neighboring village communities, and academia in an advisory committee established in 1995, has helped to avoid any user conflicts. This is also supported by the environmental education programs that have, by the end of 2023, covered over 13,000 students, teachers, and community members (Riedmiller, n.d.). Where possible, goods are sourced locally and transported in locally made biodegradable baskets, which generates income for locals. Additionally, locals are hired to work on the island and within the protected area. CHICOP actively engages with nearby communities. Educational visits are offered to schools and community members. Additionally, CHICOP conducted a series of workshops in 2021 and published a Sustainable Seafood Guide to support the transitioning of Zanzibar to a safe "Green Destination" post Covid-19 through awareness raising on the threat of unsustainable tourism practices.	4	Sufficient data available
Environmental Impact	CHICOP's architectural design and tourism operations are based on various sustainable technologies and practices to minimize its environmental footprint. These include controlling and restricting visitor numbers and implementing a zero single-use plastic policy that requires 90% of goods supplied for the kitchen operation to be sourced in local farmers' markets so they are fresh and unprocessed, and transported in locally made traditional biodegradable baskets. Additionally, drinking water and sodas are provided in recycled glass bottles. Guests are provided with biodegradable shampoo and soap, while all laundry is washed off the island. White linen is avoided for the toxic effects of bleaching and detergents on water bodies and ocean biodiversity, in particular, sensitive coral reefs. Partnerships are established with private waste operators for collection and processing of recyclable materials. All organic waste, including non-cooked fruit and vegetable waste, is successfully composted on the island. Waste collected from daily beach clean-ups are taken off the island. Plastic bottles and other hard plastic waste are separated and handed to local informal plastic bottle pickers for sale to local agents who sell it to plastic recyclers in Zanzibar City. Other light plastics and non-organic documenting the beach plastic waste in transit.	4	Sufficient data available

Additional Information	**https://chumbeisland.com/wp-content/uploads/2023/05/Chumbe_Management_Plan_2017-2027-1.pdf** **https://chumbeisland.com/wp-content/uploads/2023/09/Cons-EE-status-report-2023.pdf** **https://chumbeisland.com/wp-content/uploads/2017/12/Architectural_design.pdf** **https://www.oecd.org/stories/ocean/chumbe-island-coral-park-zanzibar-d0ddfc01/** **https://greeningtheislands.org/chumbe-island-in-zanzibar-25-years-a-pioneer-of-zero-impact-eco-architecture-and-operations/**
Challenges	To have a level playing field for conservation businesses and SME ecolodges, there is a need for the government to adopt, implement, and enforce policies, legislations, regulations, and incentives that support private sector investment in effective nature conservation and sustainable business practices. While Tanzania, including Zanzibar, is among the 34 African countries that have so far banned the production and use of single-use plastic carrier bags, existing legal provisions for Extended Producer Responsibility (EPR) for bottlers are not yet enforced. This has encouraged the ongoing replacement of traditional returnable glass bottles with single-use PET bottles for soda drinks, which will make it difficult for ecolodges like Chumbe to enforce its zero SUP policy. Zanzibar lacks a comprehensive, well-established solid waste management system for waste taken off the island, most of which is washed up plastics from the beach.

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Reduce

Reduce: Reduces dependency on single-use bottles as the filters provide a dual function: as a filter and a refillable dispenser	Founded in the 1990s, Ecofiltro began as a Guatemalan non-profit organization, donating around 2000 environmentally friendly water filtration units annually to families in need in Guatemala. Crafted from natural materials like clay, sawdust, and colloidal silver, these units effectively filter water for safe consumption. The clay and silver remove solids, bacteria, and parasites, while the sawdust neutralizes odors, flavors, and turbidity. In 2009, Ecofiltro transitioned from a non-profit to a social enterprise model. This strategic shift allowed the company to implement a pricing model whereby luxury models sold to urban consumers could subsidize the sale and donation of more basic, affordable units to households and schools in rural Guatemalan communities, as well as 17 other countries including SIDS such as Belize and Haiti.
Caution	Needs community education to move away from SUP bottles to the use of reusable water jugs and filtered water.

Multi Criteria	Notes	Score	Data Availability Score
Economic Sustainability	Ecofiltro operates as a social enterprise that generates income from the sale of filters, carbon credits, and philanthropy. Business has expanded through the years and is considered to be economically self-sustaining. Water filters are considered a necessity good/service, which creates dependency on the product. With the cheapest unit starting at a capacity of 22 liters, a single unit can purify enough water for a family of seven per day, with 1 to 2 liters of water being purified per hour. The purifier costs approximately US$28.40 and lasts for two years. The unit housing for the filter costs USD $42.60. This business is successful and self-sustaining. The Family Foundation provided funding for the first 20 years of Ecofiltro's operations. Primary funding is now generated from profit made from filter sales, carbon credits, and philanthropy from other organizations (Gray, 2020).	5	Data moderately available

Replicaility	The initiative involves creating infrastructure and requires technical capacity to produce and design filters, as well as developing the market for sale of filters. Federal law – Acuerdo Gubernativo No. 189-2019 – prohibits the use and distribution of single-use plastic bags, plastic straws, disposable plastic plates, glasses, stirrers, disposable plastics, and expanded polystyrene food containers. This enabler led to the implementation of the initiative. Due to Ecofiltro's success in small and remote coastal communities, the initiative is highly replicable for remote and regional communities.	4	Sufficient data available
Duration Impact	It is an ongoing initiative that promotes reuse and the reduction of the use of single-use plastic bottles.	5	Sufficient data available
Range of Plastics	The use of Ecofiltro prevents the usage of more than 8,000 1-litre bottles for a seven-person family annually These units could also be used in the tourism sector with the introduction of a system offering reusable bottles to tourists and access to Ecofiltro in accommodations and restaurants. This can significantly reduce the reliance on single-use plastic bottles. Based on the most common water bottle used by tourists (0.33-liter bottles), each week, Ecofiltro could prevent the use of an average of 63 bottles per tourist visiting small island countries. In 2023, Ecofiltro produced approximately 300,000 units and sold 270,000 units (H. Cardona, personal communication, January 31, 2024).	2	Insufficient data available
Social Impact	Ecofiltro operated initially as a non-profit and then converted to a social enterprise. Its main target is to make filters accessible to low-income families (Gray, 2020). Its social enterprise model allows the purchase of filters that are sold at higher costs in urban areas to subsidize the purchase and production of low-cost filters in rural areas.	4	Data moderately available
Environmental Impact	There is some short-term impact from the operation of facilities manufacturing the filters. Note: filters are handmade and use natural materials such as clay. There are filters that are created from plastic buckets, which are not as environmentally friendly as it relates to production. HDPE buckets, however, can be recycled.	3	Insufficient data available
Additional Information	**https://www.climateimpact.com/case-studies/ecofiltro/**		
Challenges	Production poses a challenge due to its manual nature. Clay Ecofiltros are handmade and air dried, contributing to a limit on the production speed for the units and filters. Finding a way to offer the filter at a low cost to lower income rural families is another challenge. Ecofiltro experienced challenges with rural households failing to complete all their payments for filters. Due to this, the company established a filter program. Cultural beliefs and perceptions also served as a challenge in the beginning as some community members were reluctant to drink from the filters (Figueredo & Chowdhury, 2019). The implementation of a recycling program for the plastic housing to be able to manage the disposal of such housing at the end of their life cycle is lacking, as well as the implementation of educational programs on water hygiene, sanitation, and the impact of single-use plastics.		

Case study reviewed by Hector Cardona.
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Reduce: Reduces the number of plastic bags used and disposed of	A pilot project was implemented in coastal areas near Untia, Makassar with the social enterprise 'Rappo.' The project equipped 26 women with valuable sewing skills, enabling them to craft reusable bags from cotton materials and hard-to-recycle plastic bags. By incorporating single-use plastic bags into the sewn bags, the project encourages sustainability by diverting from landfills and illegal dumpsites plastic waste collected from waste banks, schools, universities, laundry businesses, and other business establishments. Rappo formed partnerships with various stores to sell the sewn bags both online and physically at stores within and outside the city limits. Revenue generated from the sale of the bags provides a source of income for the women involved. Rappo has organized product exhibitions and talk shows to showcase the work of the women and promote the use of their reusable bags.
Caution	The Rappo project was not conducted in small island communities. They were conducted in two impact centers: Makassar, South Sulawesi and Depok, West Java; however, this project is highly replicable in small island communities. Also, the project depends on soft plastics for feedstock. A ban on soft plastics would affect potential feedstock.

Multi Criteria	Notes	Score	Data Availability Score
Economic Sustainability	Funding was provided by the Coordinating Body on the Seas of East Asia (COBSEA) by the United Nations Environment Program (UNEP) through the Plastic Smart Cities by WWF Indonesia Program. Rappo covered project management and the purchasing of sewing machines and carried out the training (UNEP, 2023). Rappo offers 15 varieties of upcycled products and bags. Prices vary depending on the model, ranging from approximately $7 USD to $32 USD. Approximately 30 to 40 percent of revenue generated is allocated to providing fair wages for the women involved, as well as supporting impactful initiatives such as training and development programs. Additionally, part of the revenue generated is allocated toward the establishment of an impact center for activities and further training opportunities (A. Nurul Ulum, personal communication, February 14, 2024). Production costs are not very significant for this project; however, it is likely that revenue generated is sufficient to cover CapEx, given that this is a very small project. Revenue is also generated from workshops.	2	Data moderately available
Replicability	The project provided infrastructure (sewing machines) and training. Considering the scale of the project being small (26 women and 3 sewing machines), and the project requiring only basic modification for infrastructure and capacity building, it is easily replicable. It also has the potential to expand to other reusable items such as rags, nappies, face masks, nipple covers, and so on.	5	Sufficient data available
Duration Impact	The project is ongoing and has grown from 16 women to 26 women (A. Nurul Ulum, personal communication, February 14, 2024). The production of reusable bags promotes reducing the use of single-use plastic bags. The project is highly dependent on single-use plastics for feedstock.	2	Sufficient data available
Range of Plastics	LDPE = approximately 19% of average global plastic waste stream. Based on the type of plastics targeted, percentages were assumed based on values from Geyer et al. (2017) to obtain estimated percentages per plastic type in the overall plastic waste stream. By the end of 2023, 79,230 pieces of plastic waste were collected to create bags.	1	Data moderately available

Social Impact	The project aimed to empower women within the community throughout the project planning and implementation phases. It provided accessibility to mothers by allowing them to bring their children to the training sessions. The sessions were adapted to their schedules as caretakers. Social media presence and a marketing campaign involving product exhibitions and talk shows were carried out. The project gained local government support, and the local community was excited and engaged throughout the pilot project.	5	Sufficient data available
Environmental Impact	The bags are handmade and use cotton cloth. Ongoing production, transportation, and acquisition of the cotton material contributes to short-term emission. Even though the project contributes to the use of reusable bags and diverts SUP plastic bags from the landfill or illegal dumpsites, it is likely that the plastic bag component of the reusable bag would break down after some time of use.	3	Insufficient data available
Additional Information	**https://wedocs.unep.org/handle/20.500.11822/43189**		
Challenges	Challenges arose due to resource constraints, as the pilot funding permitted the acquisition of only three sewing machines, each restricted to use by a single person at a time. In response, a strategic scheduling system was introduced (UNEP, 2023). To bridge the age gap between the beneficiaries and the Rappo team, individualized support and guidance were provided to foster emotional connections with each participant (UNEP, 2023). Rappo firmly believes in respecting the roles of participants as mothers and wives. Priority was placed on arranging schedules that accommodated the participants' responsibilities. For instance, during lunch time, participants were permitted to return to their homes to prepare lunch for the families. Additionally, to accommodate beneficiaries who had young children, the children were allowed to attend the sessions with their mothers. This ensured that participants could actively participate in initiatives without compromising their essential roles within their families.		

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Reuse

Reuse: Reduces reliance on some of the hardest recyclable materials (sachets) by offering refills	Indonesia, a major contributor to global ocean plastic pollution, produces approximately 7.8 million tons of plastic waste each year. Commonly found littering its beaches are disposable plastic sachets and pouches, popular for their affordability. In a significant move toward combating this issue, the P4G initiative invested in Siklus, a small Jakarta-based company that now operates mobile refill stations, offering a sustainable solution, Customers can conveniently receive refills at their doorstep. Siklus offers a container swap model, allowing customers to exchange empty containers for refilled containers with household products, thus reducing single-use plastic consumption and promoting a more environmentally conscious approach to daily products. The empty containers returned by customers are either cleaned and refilled at Siklus' facilities or returned to the product supplier for reuse or recycling.
Caution	This initiative is implemented in high density population, and replication in a sparsely populated island community could be challenging.

Multi Criteria	Notes	Score	Data Availability Score
Economic Sustainability	The project has received funding from multiple sources. P4G provided two rounds of grant funding – USD $98,724 in 2018 for start-up funding and USD $497,700 in funding to scale up (P4G, n.d.). Customers pay for refilling and container swap services, which generated approximately $743,000 USD within the first 2.5 years of operations. There are approximately 20,000 users utilizing Siklus (J. Situmeang, personal communication, March 21, 2024). Teja, Aptar, and Eden Impact are some of Siklus' major investors. Additionally, Siklus has established partnerships with Unilever, P&G, Reckitt, Mars, Wipro, Unza Vitalis, Nestle, Sinarmas Land, and Ralali. Siklus offers about 100 different household and personal care products to its customers.	2	Data moderately available
Replicability	Replicable but would require a population large enough to sustain demand for the refilling services to make operations sufficiently feasible. Additionally, the initiative requires access to a supplier and infrastructure to be able to run operations, as well as access to equipment to provide mobile refillable services.	3	Sufficient data available
Duration Impact	Siklus has invested in medium to long term equipment for washing and refilling containers, as well as for offering mobile services. The enterprise contributes continuously to reuse and reduce initiatives, which reduces the disposal of LDPE, HDPE, and PET detergent bottles and sachet packaging.	4	Data moderately available
Range of Plastics	LDPE (18.874%) + HDPE (13.245%) + PET (10.596%) = approximately 43% of average global waste stream. Based on the type of plastics targeted, percentages were assumed based on values from Geyer et al. (2017) to obtain estimated percentages per plastic type in the overall plastic waste stream.	3	Insufficient data available
Economic Sustainability	The project provides a slightly more economical option as the refills offer customers a 20% discount (Solution Search, 2024). Also, the refills can be delivered directly to households, which offers convenience; however, the primary objective is to reduce the use of single-use plastics. Benefits to members of the GEDSI community are achieved as a result of the service being offered at a discounted rate.	2	Data moderately available
Environmental Impact	Use of the household detergents being refilled could contribute to chemical contamination after use. 1.2 million pouches/sachets have been saved from being used due to Siklus's initiative (J. Situmeang, personal communication, 2024).	2	Insufficient data available
Additional Information	**https://www.siklus.com/**		

Challenges	Maintaining sufficient stock and management of stock to ensure that products are not damaged or expired poses a challenge. Siklus' business model is dependent on consumers being willing to reuse and replace packaged products. Establishing a pricing model that is competitive with other household and personal care products also poses a challenge for Siklus. In 2022, Siklus had to pause sales due to the Indonesian Food and Drug Agency being concerned about the lack of appropriate regulations for refill solutions(P4G, n.d.). This lack of refill regulations had posed a challenge, which impacted the operations of Siklus, resulting in Siklus changing its refill model to a container swap model.

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Reuse: Reduces reliance on single-use menstrual pads through the distribution of locally hand sewn menstrual pads	Mamma's Laef is a social enterprise dedicated to enhancing menstrual health and hygiene for women and girls in Vanuatu's provinces. Its multifaceted approach includes designing, manufacturing, and distributing reusable sanitary pad packs while also providing crucial menstrual health education and awareness programs in rural, remote, urban, and peri-urban communities. Additionally, Mamma's Laef has expanded its operations to encompass reusable hygienic adult diapers and baby diapers. The enterprise also utilizes the remaining scrap cloth material to craft reusable breast pads.
Caution	This initiative requires education and awareness to promote social acceptance of reusable personal hygiene items, specifically in communities where personal hygiene and menstrual health are taboo topics.

Multi Criteria	Notes	Score	Data Availability Score
Economic Sustainability	Economic sustainability is maintained through grants from sources such as the Canada Fund for Local Initiatives, supplemented by support from NGOs like World Vision and CARE International, along with contributions from international donors and expatriates (up until 2021 only). Additionally, Mamma's Laef sells the reusable products that it makes to generate revenue.	2	Insufficient data available
Replicability	Its operations emphasize replicability, requiring only basic equipment for production and a small trained staff.	5	Data moderately available
Duration Impact	Ongoing – the project is constantly producing reusable products. With ongoing efforts, Mamma's Laef ensures a lasting impact, reducing the consumption of single-use sanitary products and encouraging reuse through the continuous production of reusable items.	4	Sufficient data available
Range of Plastics	27-29% of the waste stream by weight in Vanuatu was nappies (2020). However, the percentage of nappies replaced by the reusable product is unknown.	3	Insufficient data available
Social Impact	Mamma's Laef aims to distribute approximately 6000 menstrual pads in the first half of 2024. It has distributed to 16 islands within Vanuatu. It has employed a staff of 8 men and women total. Additionally, as of 2018, Mamma's Laef had conducted educational awareness sessions reaching 2,910 women, boys, girls, and men. 3,500 menstrual kits have been provided to women and girls (Mama's Laef, 2024).	5	Data moderately available

Environmental Impact	Reusable pads can last between 2 to 5 years. Fabric to create pads is imported from China, Australia and New Zealand. The organization addresses a range of plastics, particularly polypropylene (PP) and polyethylene (PE), through manufacturing and distributing re-usable hygiene adult diapers, baby diapers, breast pads, and face masks.	4	Insufficient data available
Additional Information	**https://www.mammaslaef.com/what-we-do/**		
Challenges	Taboo regarding menstrual health inhibits awareness. Access to water and washing facilities restricts the ability to keep reusable menstrual pads and other products from Mamma's Leaf sanitary. Given the location of Mamma's Laef Vanuatu's operations, high costs of importing key materials such as cloth poses a challenge. Maintaining economic viability as a social enterprise is also a continuous challenge.		

Case study reviewed by Belinda Roselli.
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Mechanical Recycling

Machinery and facilities to create pellets, flakes, and blocks from plastic materials	Established in 2017 with support from the Japanese Technical Cooperation Project for the Promotion of Regional Initiatives on Solid Waste Management Phase II (JPRISM II), the Samoa Recycling and Waste Management Association (SRWMA) is the first association established in the Pacific. SRWMA has established a recycling operation equipped to sort and process PET bottles into bales, flakes, and pellets. Additionally, the association has implemented a system for recycling air conditioner indoor units into flakes and pellets. It is currently in the prototype phase for manufacturing plastic bricks from the extruded air conditioner material.
Caution	The initiative is highly dependent on external support for procurement of machines and technical expertise to train staff to use machines. Additionally, the initiative depends on Moana Taka Partnership to minimize shipping costs of waste materials to other countries.

Multi Criteria	Notes	Score	Data Availability Score
Economic Sustainability	Most of SRWMA's activities have been supported by workers of the companies that are run by the executives of SRWMA (SPREP, 2023). SRWMA lacks self-financial sustainability to generate sufficient revenue to sustain operations and maintenance and also employ workers. Facility: constructed by GGP, Embassy of Japan (WST $477,097). Machine: provided by J-PRISM II (crushing machine – WST $25,922, extruder – WST $59,166). Equipment and tools for the facility: provided by J-PRISM II. The association cannot employ workers without financial support from donors.	1	Data moderately available
Replicability	The project is dependent on access to equipment, as well as technical expertise to operate the equipment that processes materials. The project created institutional structure through the creation of an association and facilitated research for markets. The project is highly dependent on support from UNDP, British High Commission, US Embassy, Coca-Cola Foundation, J-PRISM, and other donors for financial and technical support. SRWMA has been able to ship waste materials through the Moana Taka Initiative, which provides free container hire and shipment of eligible waste between Swire Shipping serviced ports.	3	Sufficient data available

Duration Impact	With support from J-PRISM II, SRWMA was able to attain equipment and establish its recycling facility; however, SRWMA faces logistical challenges in securing financial sustainability and in the sale of recyclable materials to external markets.	3	Sufficient data available
Range of Plastics	With support from J-PRISM II, SRWMA was able to attain equipment and establish its recycling facility; however, SRWMA faces logistical challenges in securing financial sustainability and in the sale of recyclable materials to external markets. Mechanical Recycling: HDPE and PET bottles, as well as PS air conditioner components are processed to produce flakes and pellets. PET bottles are baled for export. PET (10.596%) + PS (5.629%) + HDPE (13.245%) = approximately 29% of average global plastic waste stream. Based on the type of plastics targeted, percentages were assumed based on values from Geyer et al. (2017) to obtain estimated percentages per plastic type in the overall plastic waste stream. Since November 2020, SRWMA has installed about 52 small collection cages for plastic bottles in the town area. The current annual collection amount of PET bottles through the recycling station project is estimated to be 2.4-3.6 ton/year. SRWMA has been collecting beverage containers through a school recycling competition, whereby primary schools compete to collect the largest number of PET bottles, HDPE bottles, and HDPE bottle caps. The competition resulted in the collection of approximately 3 tons of bottles. It is estimated that SRWMA's annual bottle collection is 1.27-1.56% of the overall volume of waste PET bottles in Samoa (SPREP, 2023).	2	Data moderately available
Social Impact	SRWMA actively participates in educational programs that benefit the surrounding communities and educational institutions. The President of SRWMA is a female and uses the platform to advocate for women within the waste management sector. The collection of waste materials provides some revenue for waste pickers. The project has also contributed to collaboration between schools and private businesses to establish voluntary collection infrastructure.	4	Sufficient data available
Environmental Impact	SRWMA's annual air conditioner collection amount through its member recycling companies is 45.5 ton/year (SPREP, 2023). Copper, iron, and aluminum parts are prepared for export, and the plastic components (polystyrene and acrylonitrile butadiene styrene) are shredded and pelletized. SRWMA has also experimented with creating bricks with these plastics. This has diverted waste from illegal dumpsites and the landfill. Improper storage of materials can lead to contamination as storage equipment in Samoa is currently unregulated. The equipment to carry out mechanical recycling requires energy consumption, and the transportation of recyclable material to markets contributes to carbon emissions, which is fairly small due to the size of SRWMA's operations.	2	Data moderately available

[1]Approximate prices for the plastics collected and processed into flakes and pellets vs baling include Plastic Type. Product and Form Purchase Price (WST/ton), HDPE: Bottle cap (flake) 800-1000 tala, HDPE: White bottle (flake) 800 tala, HDPE: Blue bottle (flake) 1,300 tala, PS: Air conditioner indoor unit (flake) 1,700 tala, ABS: Air conditioner indoor unit (pellet) 1,800 tala, PET: PET bottle cap (cap) 1,000 – 1,200 tala, PET: PET bottle (flake) N/A

Additional Information	**https://www.facebook.com/profile.php?id=100064791273791**
Challenges	Market access for recyclers, given that previously, recyclers only had access to machines that could compress PET bottles. Ensuring continued employment for workers and developing the technical capacity of workers are challenges for SRWMA due to financial constraints. At present, households, commercial businesses, tourism operators, and fishers are not required to segregate waste. Also, commercial waste is the responsibility of businesses and agencies. Municipal authorities have limited capacity to undertake community education and compliance activities (IUCN, 2021). Self-financial sustainability to generate sufficient revenue to sustain operations and maintenance, and also employ workers is a gap that restricts SRWMA's activities due to its dependence on donor financing.

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Mechanical recycling: HDPE and PP plastics are ground and pressed, and a CNC machine is used to craft furniture	The small island of Saint Lucia grapples with a common issue—the logistical challenges of recycling in the absence of major recycling centers and the burden of high transport costs, making exporting plastic waste financially difficult. In collaboration with the International Union for Conservation of Nature (IUCN), Renew St. Lucia has established a local waste transformation project aimed at down-cycling single-use plastic bottles to create furniture products. The initiative involves the collection of high-density polyethylene (HDPE) and polypropylene (PP) bottles from local hotels and households, which are then processed on-site using a grinder, press, and CNC machine to craft functional furniture.
Caution	The initiative is highly dependent on external support for procurement of machines and technical expertise to train staff to use machines. Additionally, the initiative depends on Moana Taka Partnership to minimize shipping costs of waste materials to other countries.

Multi Criteria	Notes	Score	Data Availability Score
Economic Sustainability	Funding and support were provided by IUCN and Norad. Starting capital requires USD$45,803, with an estimated revenue generation of $20,540 USD per month. It is estimated that Renew St. Lucia will have an ROI of 26 months and should be able to cover its operational costs through the sale of the furniture produced (Searious Business, 2021). The project is fairly new and will require time to determine if it is able to break even.	3	Sufficient data available
Replicability	Replicable; however, requires access to equipment such as a shredder and a CNC machine. Also, requires technical expertise to operate and maintain the equipment. IUCN donated a shredder, heating and cooling presses, and a 3D printer through Norad. Triple Benefit designed and implemented the plastics recycling facility. The Government of Saint Lucia, IUCN, Norad, and RENEW St. Lucia were involved in developing the business plan.	3	Sufficient data available
Duration Impact	The project is ongoing. Equipment and facility for recycling has been established; however, there are logistical constraints, given that Saint Lucia does not have an established source separation system.	3	Sufficient data available
Range of Plastics	HDPE (13.245%) + PP (18.212%) = approximately 31% of average global plastic waste stream. Based on the type of plastics targeted, percentages were assumed based on values from Geyer et al. (2017) to obtain estimated percentages per plastic type in the overall plastic waste stream.	3	Data moderately available

	It is estimated 19 kg of plastic is required to make a 1000x1000x20 mm board for construction of value-added products. An approximate 80 tons of plastic per year would be processed through the project (Searious Business, 2021).		
Social Impact	The facility involves the participation of other recyclers and waste pickers as the collection and resale of recyclable material to the facility provides feedstock for their operations. The project trained Renew St. Lucia staff to better understand the issue and impacts of plastic waste and to properly operate the machines donated. A promotional campaign was held with hotels and resorts that partnered with the initiative, which consisted of a mini exhibition that ran for a period of 2 weeks. Partners, for now, are hotels and resorts (D. Finnegan, personal communication, February 6, 2024). Renew St. Lucia has been looking into expanding collection to communities.	3	Sufficient data available
Environmental Impact	Given that some of the furniture produced will be outdoor furniture for accommodations, research is required to understand the risk of microplastic release from wear and tear, physical damage, and degradation over time. Furniture can be remelted and used to re-reproduce new furniture.	1	Insufficient data available
Additional Information	**https://www.iucn.org/sites/default/files/2022-10/business-plan-plastic-waste-to-product-saint-lucia.pdf**		
Challenges	Sorting and recycling behavior is not developed among the public. A municipal/national source separation system is not in place. Some recyclers have organized their own collection system, whereby they would offer regular and sustained collection services (Tsai, 2013). Previously, there was a lack of equipment for processing of materials, but donor organizations have contributed to attain equipment. High transportation costs. Additional research is required to understand the environmental impact of value-added products created. Hotels have agreed to source separate; however, implementing a sorting system from the household level and exploring how other waste streams can be recycled/upcycled on-site could be explored. An advanced recovery fee scheme to incentivize collection and recycling activities could be explored.		

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Energy Recovery

Energy recovery: Cracked oil for electricity generation is created from HDPE, LDPE & PP plastics	The Koror State Recycling Center is a crucial component of Koror's waste management infrastructure, responsible for efficiently processing and recycling around 50% of the municipality's waste (Starkey, 2017). Inaugurated in 2014, the energy recovery facility, housed within the recycling center, employs innovative waste to oil techniques to generate cracked oil utilized for small scale electricity generation. This facility has the capability to process a variety of materials including HDPE, LDPE, PP, PS plastics and even used motor oil.
Caution	The pyrolysis operations are dependent on sufficient plastic feedstock to generate cracked oil.

Multi Criteria	Notes	Score	Data Availability Score
Economic Sustainability	Palau's economic landscape leans significantly on COFA with the United States, with an annual injection from the COFA Trust Fund bolstering various sectors, including waste management initiatives. Palau is committed to charting a course toward self-sufficiency, particularly in light of the impending expiration of the COFA agreement in 2024. There is an import tax in place, and the recycling program is financed through a dedicated recycling fund that is now sustainable due to the country's beverage container recycling program. The oil produced by the facility is being used for electricity generation. It is estimated that if the oil generated can fully replace the electricity supply for the Capitol Building and the Public Works Shop's generators. Savings ranging from $100,000 USD to $150,000 USD can be achieved (JICA, 2017).	3	Data moderately available
Replicability	The foundational success of the recycling facility and the effective implementation of waste to oil techniques can be attributed significantly to the generous support provided by Japan, which initially funded both the facility's construction and its infrastructure.	2	Data moderately available
Duration Impact	Ongoing operations since 2014 and the center expanded its operations.	3	Data moderately available
Range of Plastics	The equipment has the capability to process HDPE (13.245%), LDPE (18.874%) PP (18.212%) and PS (5.629%) = approximately 56% of average global plastic waste stream. Based on the type of plastics targeted, percentages were assumed based on values from Geyer et al. (2017) to obtain estimated percentages per plastic type in the overall plastic waste stream.	4	Insufficient data available
Social Impact	Most of the plastics required for the facility are beverage containers that do not provide financial compensation for consumers to redeem such containers. The center is working with a small number of households, businesses, and government agencies for the collection of plastics required for the plastic to oil facility. Plastics are segregated at the source and then either brought in voluntarily or collected by the recycling center's staff. Free compost produced at the recycling center is given to participants who aid in the collection and provision of such plastics. Currently, the management of the recycling center and congress members are working to incorporate the plastics processed by the waste to oil facility into Palau's container deposit scheme. The plastic to oil facility is used for experimental activities, educational programs, and demonstration.	2	Data moderately available

Environmental Impact	The REP-500 plastic to oil equipment can extract 500 kg of plastic per 24 hours. Oil produced with the machine can be used for boilers, diesel fuel extenders, and so on. The motor of the machine is powered by electrical supply. 1 kg of plastic produces 1 L of oil (S. Etibek, personal communication, March 12, 2024).The operation of plastic to oil conversion reduces the quantity of non-recyclable plastics that end up at the landfill; however, it contributes to the production of a fossil fuel. Additionally, given that the fuel produced is used to sustain generators, it contributes to short term noise pollution. While plastic to oil machines are beneficial for reducing waste sent to landfills or dumpsites, they pose health and safety concerns due to emissions released and the possibility of chemical exposure.	2	Insufficient data available

Additional Information	**https://kororstategov.com/swmo/energy.html**
Challenges	Evaluating pyrolysis technologies suitable for Palau's unique environmental context due to its remote nature and small population is a challenge. Consideration must include accessibility to various plastic types and broader environmental factors to ensure effective implementation. Limited availability of skilled technicians and access to spare parts can impede the maintenance and repair of pyrolysis equipment, leading to downtime and reduced operational efficiency.

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Responsible Disposal

The project implemented a waste segregation collection system and provision of appropriate end of life disposal.	The pilot project aimed to enhance waste management within the Mersing Islands by introducing a differentiated waste disposal system and establishing a transfer station. The initiative involved extensive educational outreach programs, encompassing visits to households and schools to introduce the new waste disposal system (COBSEA, 2022). Segregated bins strategically placed in communities prompted residents to responsibly sort and dispose of general waste and plastic bottles (PET, HDPE and PP), using the system. Each community had designated individuals responsible for overseeing the waste segregation process. Regular collection services facilitated the transportation of waste from these bins to the transfer station. At the transfer station, recyclables are extracted and stored until a sufficient quantity is accumulated, after which they are transported to the mainland and sold to a recycling enterprise.
Caution	The project relies heavily on external financial support to sustain its operations.

Multi Criteria	**Notes**	**Score**	**Data Availability Score**
Economic Sustainability	The US Environmental Protection Agency (USEPA), the Coordinating Body on the Seas of East Africa, (COBSEA), MISC Berhad, and Reef Check Malaysia (RCM) worked in collaboration to provide support in funding the project. Due to high fuel costs, the cost of transportation of recyclables is too high to be covered by the sale of recyclables(UNEP, 2023). In the foreseeable future, the anticipation is that either tourism operators or the municipal government will play a role in shouldering the expenses associated with transporting recyclables to the mainland.	1	Data moderately available

Replicability	Project provided infrastructure and carried out outreach programs to promote social acceptance and participation. A market already existed, given that the project works with a recycling enterprise that's established on the mainland. The project also had political support in attaining permits.	4	Sufficient data available
Duration Impact	The project involved the establishment of infrastructure for the collection of waste along with establishing a system to be able to transport waste and manage recyclable materials. Logistical challenges regarding the transportation of materials to the mainland needs to be sorted out.	3	Sufficient data available
Range of Plastics	PET (10.596%) + HDPE (13.245%) + PP (18.212%) = approximately 42 % of average global plastic waste stream (recycled). Based on the type of plastics targeted, percentages were assumed based on values from Geyer et al. (2017) to obtain estimated percentages per plastic type in the overall plastic waste stream. In 2023, a total of 720 kg of waste was collected through a bin collection system, along with 325 kg of waste from community cleanups. Of this, 491 kg was recycled and 554 kg was sent to the landfill.	4	Sufficient data available
Social Impact	The project team consulted community members from the inception of the project and has conducted various educational programs and supplemental workshops with community members. For instance, they conducted a workshop with local women to make soap from used cooking oil (COBSEA, 2022).	4	Data moderately available
Environmental Impact	Inadequate infrastructure and improper storage of materials could potentially lead to contamination, especially since aall waste is collected. The transportation of recyclable material to the mainland has a small carbon footprint due to the small scale of the project's operations. End of life material is still landfilled and the quality of the landfill unknown.	3	Insufficient data available
Additional Information	**https://wedocs.unep.org/handle/20.500.11822/43186**		
Challenges	The project had to be implemented within a short time frame, and permits were required for establishing the waste segregation system and the transfer station, which required some time to be processed. Supply chain disruptions, which occurred as a result of Covid-19, contributed to delays in the delivery of equipment (COBSEA, 2022). Due to considerable expenses related to the transportation of recyclables, effective planning and funding were required to ensure that transportation costs did not surpass revenue generated (COBSEA, 2022). A funding model that generates sufficient capital or cash flow from operations is required to attain financial sustainability to ensure the continuity of the project's operations and the maintenance of infrastructure. Climate resilience planning could be incorporated into the project to take into consideration the vulnerability of bins, other established infrastructure, and the project's operations.		
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The design and construction of the landfill helps to contain the environmental impacts of waste collectively disposed of.	The Naboro landfill situated in Suva, the capital city of Fiji Islands, is a sanitary engineered landfill comprising of a compacted clay protective liner as well as a leachate collection and treatment system. The landfill is managed and overseen by the Ministry of Environment and Climate Change and is contracted to H.G Leach Fiji (Pte) Ltd to run its day-to-day operations. Additionally, it features access roads made with geotextile fiber for high level compaction. The landfill has been designed and constructed to adhere to international best practice standards for landfilling general waste. The landfill accommodates household, commercial, and industrial waste from areas around Suva, Nasinu, Nausori, Navua, and Korovou.
Caution	While this landfill is likely the best disposal engineered landfill operating in the PICs, the technical complexity and high cost make it difficult to be replicated in other areas. However, the model of subcontracting the operations of the landfill to international companies, while building internal expertise, could be considered by all SICs.

Multi Criteria	Notes	Score	Data Availability Score
Economic Sustainability	The Naboro Landfill was constructed at a cost of USD $6 million, funded jointly by the Fijian Government and the European Union (Asian Development Bank, 2024). Extension works are implemented from time to time; however, no information regarding costs is available. The landfill commenced operations in 2005, and since then, its management has been outsourced to a private company. The Naboro landfill site imposes a tipping fee of approximately USD $18 per ton for green and general waste, and USD $30 for special waste. The annual payment made by the city of Suva to the Naboro Landfill amounts to approximately USD $269,503 (SPREP, 2022). Commercial and industrial customers typically pay for waste disposal through gate fees charged at the landfill, but waste disposal fees are not fully recovered through gate fees at the Naboro Landfill, or from council charges. As a result, the government subsidizes about USD $440,000 annually to support the council's and landfill's operations.	2	Sufficient data available
Range of Plastics	Project involved the implementation of infrastructure for the landfill and required technical expertise for the management of the landfill. It also involved establishing an institutional structure for the management of the landfill. It is anticipated that the landfill will have a lifespan of about 70 years (Asian Development Bank, 2014). The New Zealand Government supported the environmental impact assessment and engineering study to ensure that the proposed location for the Naboro landfill was environmentally sound (Zariff, n.d.). The landfill is likely the best disposal engineered facility in the Pacific Island Countries region that is still operating in accordance with established standards.	2	Sufficient data available
Duration Impact	Operations of the landfill is ongoing. The landfill does not provide a solution to the underlying issue of plastic waste. It is only a measure that contributes to the controlled disposal of waste.	2	Sufficient data available
Range of Plastics	The landfill accepts all forms of waste, including plastics. In 2022, the landfill received a total waste volume of 130,039 tons (Krishna, 2022).	5	Data moderately available
Social Impact	The landfill contributes to the overall wellbeing of inhabitants due to the controlled management of waste, which reduces negative spillover effects as it relates to garbage. The collection and landfill system has space for growth,	2	Insufficient data available

	in consideration of recyclers and waste pickers, as well as creating programs to support GEDSI.		
Environmental Impact	Methane generated is being released to the atmosphere. Considering that there are measures in place to collect and process leachate, there is a controlled system to try to mitigate negative environmental impacts. Measures are in place to prevent leachate spillage, and also there is leachate treatment on site.	3	Insufficient data available
Additional Information	**https://www.leachltd.co.nz/hg-leach-fiji-ltd-naboro-landfill/**		
Challenges	The site is considered far from the areas it serves. Because of this, the location is cost inefficient for distant councils, given the high fuel cost to travel great distances to dispose of their waste. Also, the limited capacity of collection vehicles requires multiple trips, which results in high disposal costs. Thus, there have been complaints and difficulties to pay tipping fees. Naboro is the only type of engineered waste landfill facility in the country and requires special technical expertise, which is limited in the country. With limited to no competition that has the expertise required to manage such a landfill, the daily operation of the facility has been contracted to the same company for years at a high cost. This contributes to high tipping fee rates put in place by the government. While the Naboro Landfill has established operational and management procedures for a full range of services for the public to dispose of waste, through HG Leach, the rest of the dumpsites and landfills throughout Fiji do not have such guidelines. There is no systematic approach for the categorization and segregation of wastes upon entry into the facility; thus all the wastes, whether problematic or not, are landfilled as mixed waste, without regard for potential toxicity. There is no gas recovery at the landfill, thus methane is emitted into the atmosphere.		

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Collection

The project contributed to the acquisition of waste collection infrastructure.	With a loan from the World Bank and implementation support from the Jamaica Social Investment Fund, the Government of Jamaica launched an initiative aimed at enhancing waste collection and promoting community cleanliness in vulnerable communities, spanning seven parishes. Essential equipment and infrastructure were acquired, establishing an efficient collection system. Additionally, a results-based incentive scheme, along with educational and outreach programs, as well as training and employment of environmental stewards, contributed to the success of the project.		
Caution	While the collection system has been launched successfully, the lack of sanitary landfills remains a critical gap.		
Multi Criteria	**Notes**	**Score**	**Data Availability Score**
Economic Sustainability	The project, funded and executed by the World Bank and Jamaica Social Investment Fund, assisted with the issue of limited collection vehicles by funding three solid waste collection trucks. Sustainable funding for solid waste management operations is currently limited to property taxes and government grants. Property taxes form a portion of the Parochial Fund administered by the Ministry of Local Government and Community Development. Tipping fees and other sources of revenue also help to offset the provision of solid waste management services. Commercial waste haulers are required to pay a haulage fee (PAHO, 2003). Sustainable funding for solid waste management operations is limited to property taxes and government grants, which is not sufficient to cover CapEx and OpEx. The project itself does not directly generate revenue.	3	Sufficient data available

Replicability	The project provided necessary waste collection infrastructure and contributed to the establishment of institutional structure by instituting environmental wardens and a financial incentives program. Factors that facilitated the successful implementation of the project included ongoing engagement with the communities involved to raise awareness and, consequently, garner support from them. Additionally, the incentive-based scheme stimulated the participation of community members as environmental wardens, encouraged community-based organizations to assist with implementation at the community level, and provided motivation for the Solid Waste Management Authority to extend its support for project implementation.	4	Data moderately available
Duration Impact	The project is ongoing and involved the establishment of infrastructure and enablers such as the financial incentives systems that have encouraged compliance. Another cycle of the project is currently being implemented and is directly funded by the World Bank.	4	Sufficient data available
Range of Plastics	Approximately 5,000 residual waste bins, 55 dumpsters, 30 recycling enclosures, and 30 composting bins were strategically placed to promote improved waste management practices. A workforce of 165 environmental wardens were recruited and trained to enhance community cleanliness, collaborating closely with CBOs (World Bank, 2023). By 2021, regular collection for all waste reached 89,000 urban residents, fostering a heightened sense of entitlement to consistent services. Residents proactively contacted the NSWMA to report missed pickups or damaged bins. In late 2022, an additional 50 waste collection trucks were acquired by the National Solid Waste Management Authority, enabling a transition to weekly pickups and increasing efficiency in 90% of communities.	5	Insufficient data available
Social Impact	Bins were placed in several communities, helping to provide regular waste collection for 89,000 urban residents. Environmental wardens were hired, which created job opportunity for low-income community members who benefitted from a results-based incentive scheme. The scheme rewarded waste management and cleanliness achievements by providing payment conditional on the accomplishment of certain targets. Waste collection service providers and local communities were the primary beneficiaries of the incentive scheme; however, the scheme was also applied to school-based environmental clubs, composting, and recycling initiatives. Environmental wardens received quarterly bonuses, while community-based organizations received biannual bonuses. Wardens got a 10% salary bonus for meeting minimum criteria, and CBOs received a performance-based bonus ranging from USD $1,200 to $2,400 (Wei et al., 2021). The environmental wardens' intervention specifically targeted the unemployed. More than 70% of the environmental wardens were women. The warden program also facilitated the involvement of participants with disabilities.	4	Data moderately available

Environmental Impact	The project contributed to positive environmental outcomes. The project played a major role in the control of mosquito-borne disease outbreak in the project communities through the elimination of mosquito breeding sites. According to the Southern Regional Health Authority, the Aedes Index in the project communities was less than the other communities.	4	Data moderately available
Additional Information	**https://documents.worldbank.org/en/publication/documents-reports/documentdetail/897101482711862882/jamaica-jamaica-integrated-community-development-project-p146460-implementation-status-results-report-sequence-05**		
Challenges	Equipment limitations due to accessibility to waste collection trucks previously. Financing has been limited due to low property tax returns that finance public waste management initiatives in Jamaica. Lack of standard containerization and maintenance, coupled with a lack of private sector investment in recycling activities, has contributed to informal dumpsites and an increase in volume of waste generated in areas of Jamaica. Numerous small dumpsites are scattered across Jamaica, yet the absence of a sanitary landfill remains a critical gap. While plans are underway to address this issue, there is an immediate need for enhanced management. Insufficient monitoring of the current waste disposal hinders accurate estimates crucial for forward planning. This includes establishing new waste disposal facilities and assessing the risks associated with acquiring new lands for solid waste disposal (Auditor General of Jamaica, 2022). Lack of awareness regarding the significance of solid waste management, as well as a lack of regulatory environment necessary for enforcement posed a challenge during the implementation of the project.		

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The project contributed to the establishment of a prepaid garbage collection system.	In Vanuatu, the Port Vila City Corporation (PVCC) and the Luganville Municipal Council (LMC) introduced a prepaid garbage bag collection system whereby residents are charged in accordance with the amount of waste generated. Households are required to purchase bags particularly supplied for the disposal and collection of their waste. In PVCC, the prepaid garbage bag collection system, known as the Yellow Bag, was introduced in 2010 but failed as a result of procurement and logistical issues. The system was reintroduced in 2015 and is in use by about 90 per cent of residents, according to a social survey conducted in 2017.		
Multi Criteria	**Notes**	**Score**	**Data Availability Score**
Economic Sustainability	PVCC offers two bag sizes: a large 70-liter bag for USD $0.83 and a small 45-liter bag for USD $0.58 at retail prices. The procurement of yellow bags is outsourced by PVCC, and wholesalers have the option to buy them directly from the supplier. Wholesale prices for the 70-liter bags are USD $0.66, which includes a USD $0.33 commission fee to PVCC. Wholesalers can make a profit of USD $0.17 per bag. Meanwhile, at LMC, an 80-liter bag is available for USD $0.66 each. LMC receives a USD $0.17 commission for every bag sold (Anai & Kodani, 2022). Stable financial source for waste management with Yellow Bag sales became the 4th largest income for Port Vila in 2017. Revenue is generated from the sale of bags. The financial mechanism takes into consideration the cost to manufacture and supply the bag, government taxes, cost of collecting the waste, cost of disposing the waste, and margins for suppliers and retailers. In 2021, 2022 and 2023, respectively, USD $223,845, $270,479.36 and $334,445,61 were generated.	5	Sufficient data available

Replicability	From the period 2016 to 2018, total bag sales in Port Vila showed an increasing trend of 369,000 (2016), 505,000 (2017) and 568,000 (2018). The participation rate also showed an increasing trend from 70 per cent in 2016 to 100 per cent in 2018, demonstrating the effectiveness of awareness campaigns via newspaper, radio and, TV, supported by community meetings throughout the year. In Luganville, sales also increased from 2015 to 2018, from 30,000 in 2015, to 56,000 in 2016, to 59,000 in 2017 to 64,000 in 2018. The participation rate increased from 20 per cent in 2015 to 40 per cent consistently over the next three years (Anai & Kodani, 2022). Based on the above-mentioned statistics, the sustainability and replicability of the prepaid bag system in Vanuatu is promising. The lessons learned can be used to customize the system for other small island countries, taking into consideration the cultural context, governance, and institutional arrangements of the country.	4	Sufficient data available
Duration Impact	The initiative has been operating since 2016 and is ongoing. The system has been financially sustainable and includes outreach to stakeholders to encourage participation.	5	Data moderately available
Range of Plastics	All plastics are placed in the bags and disposed of at the landfill.	5	Insufficient data available
Social Impact	While the removal and containment of waste contributes to social and health wellbeing for the community, having to pay for the use of bags results in a barrier for low-income families to access the service. The prepaid garbage collection system is used by residents in both rural and urban areas.	3	Insufficient data available
Environmental Impact	The bags are biodegradable, which allows the bags to decompose. The system has led to the implementation of the first ever collection system for Vanuatu, leading to the reductio	4	Data moderately available
Additional Information	**Vanuatu Prepaid Collection System**		
Challenges	Logistical challenges: incorrect prices were printed on the bags and depletion of stock also posed a challenge in 2010 (Anai & Kodani, 2022). Identification of a reliable exclusive supplier in the beginning of the implementation of this initiative. Accessibility in rural areas. Securing accountability and financial transparency. Price stability: the rate of VAT increased; however, the price of bags has not increased. Suppliers absorbed the price increase in VAT considering that the price of the bags had to remain stable to encourage acceptance within the community.		
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Finance

Implementation of an effective system for the collection of fees for collection services	The Kingdom of Tonga implemented various strategies to enhance solid waste management (SWM) payments. These included integrating SWM fees into water bills, deploying specialized collection teams, and introducing prepaid waste bags. Despite these efforts falling short of expectations, the Waste Authority Ltd (WAL) took further action by linking waste fees with residents' electricity bills. In addition, it launched an extensive public awareness campaign, offered a trial period for waste collection at no cost, and enforced payment regulations. As of 2022, WAL is financially sustainable through a user-pays system whereby waste fees are collected as part of the electricity billing system.
Caution	Project is highly dependent on the prior establishment of a collection system for utilities that has an extensive network.

Multi Criteria	Notes	Score	Data Availability Score
Economic Sustainability	In 2011, WAL introduced a joint billing system, incorporating solid waste management fees into water bills, aiming to improve cost recovery rates. Later in 2016, WAL upgraded the payment system by collaborating with Tonga Power Ltd , the local electricity distribution authority. This collaboration led to the integration of waste fees into the electricity billing system, ensuring coverage throughout the entire country, including the outer islands. In 2019, the collection fees for households were about USD $6.60 per month, and for commercial entities varied from about USD $22-$352 per month. Tonga Power Ltd received 3.5 percent of the total waste fee collected as a commission from WAL. Revenues collected through the user fee system supported daily SWM operations such as fuel, truck repairs, and communication campaigns. Bill collection rate rose from 40% to approximately 85% over seven years (World Bank, 2023). Until 2022, WAL has been partially funded through the plastic bag levy; however, as the bill collection rate has risen, the annual report for WAL 2022 indicates that it is now fully financially sustainable and does not need the plastic bag levy to carry out its functions.	5	Data moderately available
Replicability	In 2005, the new national government made changes to the solid waste management system in Tongatapu. It codified the new system through the Solid Waste Management Act, which established the Waste Authority Ltd to provide solid waste management services. Financial assistance was provided by donor agencies to finance landfill development and technical assistance to WAL on waste treatment site management.	3	Data moderately available
Duration Impact	The initiative has been ongoing from its inception in 2005 and consists of the implementation of a fee collection system for waste collection services, which is a temporary relief to waste issues. The initiative also offered extensive public engagement sessions to build awareness.	5	Sufficient data available

Range of Plastics	Collection encompasses the collection of all municipal solid waste.	5	Insufficient data available
Social Impact	The Waste Authority Ltd 's services cover 96% of the population across five main islands. To further engage the community, WAL launched the "Clean Green Tonga" communication campaign across various mediums and conducted educational workshops for students. Expansion efforts, starting with the outer island group of Vava'u, involved extensive public engagement, including radio campaigns, information booths at local events, and consultations with community leaders (World Bank, 2023).	4	Data moderately available
Environmental Impact	About 75% of households burned their waste as they felt it was the easiest option. WAL ran mass media campaigns on specific waste-related topics, including waste burning, illegal dumping and littering, unpaid waste service fees, and sanitation. This, along with the implementation of the collection system, contributed to a reduction in the burning of waste and illegal dumpsites.	3	Data moderately available
Additional Information	**https://www.thegpsc.org/knowledge-products/solid-waste-management/behavior-change-solid-waste-management-compendium-cases**		
Challenges	Inconsistent solid waste management services discouraged households from adhering to monthly solid waste management fees. Many residents did not prioritize waste management, influenced by ingrained societal norms that discouraged proper waste disposal practices. In an effort to improve fee collection rates, WAL partnered with local women's groups, offering a 10% commission for collecting monthly solid waste payments from residents. However, urban residents perceived these groups as lacking legitimacy, resulting in reluctance to pay. Compounding the issue, the primary government water supply, managed by the Tonga Water Board (TWB), only covered urban areas. Rural communities had their separate water supply, complicating waste fee collection efforts, particularly from households without water meters. Additionally, WAL faced challenges in obtaining and following up with non-paying residents' details (World Bank, 2023).		
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Project resulted in the implementation of a deposit return scheme	The Beverage Container Recycling Regulations took effect in 2009, with actual implementation commencing in April 2011. The National Government contracted the Koror State Government to operate a collection point, allowing the public to receive refunds for beverage containers from October 2011. The Container Deposit Scheme has operated successfully, undergoing minor changes such as adding another redemption center in 2016, lifting size limitations in 2019, and recently incorporating steel food containers, like those used for tinned tuna. Apart from steel food containers, the redemption centers have been accepting aluminum cans, PET bottles, glass bottles, and tetra packs.
Caution	This initiative is highly dependent on the implementation of supporting legislation and technical expertise to establish the recycling fund and enabling institutional structures.

Multi Criteria	Notes	Score	Data Availability Score
Economic Sustainability	The deposits are held in a revolving fund which is called "the Recycling Fund," maintained by the Ministry of Finance, separate and apart from other funds of the National Treasury. The scheme introduced a USD $0.10 import fee, which is USD $0.10 deposit per item and is collected by Customs from importers at the port of entry for not only beverages, but also empty beverage containers, and plastic preforms used for manufacturing bottles for local bottling of water. The refund of USD $0.05 plus the USD $0.025 handling fee per item is paid from the deposit fee of USD $0.10 by the National Treasury in response to the monthly claims from the redemption center operators. Under the act, a quarter of deposits – USD $0.025 per item – is retained in the recycling fund to be used for waste management activities. This money accumulates in the fund, as do unredeemed deposits or those deposits from items not bought back for refund. These funds set aside for waste management use have enabled activities such as improving the national landfill, purchasing vehicles and equipment for the landfill, and awareness activities on 3Rs (JICA, 2022).	5	Sufficient data available
Replicability	The project is highly replicable but has been supported through a range of legislative reforms and enabling environment (SPREP, 2022) in the form of: • Chapter 16: Recycling Program, the National Code Title 11: Business and Business Relation (RPPL No.7-24, RPPL No. 10-14, RPPL No. 10-31). In October 2006, the Republic of Palau established a recycling program through the passage of Public Law No. 7-24, enabling the operation of a beverage deposit scheme. • Beverage Container Recycling Regulations 2006 (with amendments in 2009 and 2019) MOU between Ministry of Public Infrastructure, Industries & Commerce (MPIIC), Ministry of Finance, and Koror State Government/ MOU with Belau Garbage & Scrap Company • Contract between MPIIC and Palau Waste Collection Company • Support from JICA for capacity building	3	Sufficient data available
Duration Impact	The project is ongoing since 2006 and involves the establishment of infrastructure and a recycling fund to facilitate the deposit return scheme.	5	Sufficient data available

Range of Plastics	The Beverage Container Recycling Program Annual Report, 2020 indicates that a total of 8,863,965 aluminum cans, 4,183,080 PET bottles, 404,633 glass bottles, 217,881 steel cans and 527,700 tetra packs were collected (SPREP, 2022). The redemption of legacy waste is reflected in the 132% redemption rate in 2012, and even after a few years until 2014, more than 90% redemption is achieved. Overall, Palau achieved a high redemption rate of 87% success rate since the program launched and managed to redeem about 137 million containers so far from 157 million imported into the country (SPREP, 2022). It is interesting to note that glass is being repurposed to crafts through glass blowing on the island. 4,183,080 PET bottles (10.596%) were collected = approximately 11% of global plastic waste stream. Based on the type of plastics targeted, percentages were assumed based on values from Geyer et al. (2017) to obtain estimated percentages per plastic type in the overall plastic waste stream.	1	Adequate data available
Social Impact	The scheme creates the opportunity for revenue generation for recyclers and waste pickers and reduces waste being diverted to the landfill/ illegal dumpsites, which creates social and health wellbeing for all.	4	Insufficient data available
Environmental Impact	A range of plastic, aluminum, and tetra packs are recovered; however, the scheme is directly related to the importation and exportation of materials. As such, this is tied to emission production due to shipping activities.	3	Insufficient data available
Additional Information	**https://palau-data.sprep.org/system/files/UNEP%20Palau%20Report%20FINAL%20APWC%5B1%5D%20copy.pdf**		
Challenges	Initially, a deposit of USD $0.15 was charged, but this was not found feasible so it was reduced to USD $0.10. It would have been better to have determined a set fee before implementing the CDS program. Locating redemption centers so as not to affect the operation of inferior locations can be challenging, but it also highlights that having more than one collection point can sustain redemption rates. Implementation was temporarily halted due to capacity limitations until personnel were adequately trained through a three-year JICA project concluding in 2008, after which the Beverage Container Recycling Regulation was put into effect. This resulted in a long lead time between the project launch and commencement. Monitoring of the program was negatively impacted by poor information sharing between the two ministries operating the system, and also, inaccurate calculations eroded estimated funds allocated for new waste generation (APWC, 2020). Source of funding for legacy wastes (not levied or charged any deposit upon entry into the country) is another challenge. The seed funding accumulated within the first six months of operation, as incoming goods were levied, but no deposit was offered on items. This helped address legacy waste redemption when the return scheme commenced.		

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Bans

Implementation of legislation prohibiting the importation and distribution of PS and LDPE single-use plastics	Antigua and Barbuda implemented External Trade Order No. 83 of 2017 to address plastic pollution by restricting the importation, production, and trading of plastic shopping bags. Initially, the ban targeted all polyethylene shopping bags, primarily focusing on major supermarkets due to their significant contribution (90%) to environmental plastic litter and then encompassing smaller stores later on. This effort was later expanded through External Trade Order No. 44, which introduced a phased-out ban on polystyrene food containers like clamshells, trays, cartons, and cups.
Caution	The implementation of the regulatory ban requires extensive education and outreach engagement, as well as access to SUP alternatives.

Multi Criteria	Notes	Score	Data Availability Score
Economic Sustainability	In July 2015, the cabinet of Antigua and Barbuda agreed to reduce the importation of plastic bags and invested USD $25,000 to ensure every citizen, resident, and household had reusable bags to replace plastic shopping bags prior to an aggressive educational campaign. The Government of Antigua and Barbuda had researched and recommended alternatives; however, the private sector had to incur the cost of procuring those alternatives. Antigua and Barbuda introduced tax incentives for the importation of reusable (non-plastic) bags to aid enforcement of the ban. The Cabinet waived duties and other taxes, inclusive of the Antigua and Barbuda sales tax and the revenue recovery charge on the importation of reusable shopping bags, making the bags affordable.	1	Sufficient data available
Replicability	The ban requires the implementation of legislation prohibiting the importation and distribution of single-use plastics and educational campaigns to encourage compliance.	3	Data moderately available
Duration Impact	Ongoing since implementation. The regulatory ban targets inhibiting the use of SUPs.	5	Sufficient data available
Range of Plastics	In the first quarter of 2017, all LDPE shopping bags were prohibited. On July 1st, 2017, distributors were given 6 months to deplete their stock of polystyrene food service container (clamshells, bowls, plates, and hot and cold beverage cups). The following stages involved banning SUP spoons, forks, knives, straws, food trays, egg cartons, and naked coolers (Global Plastics Policy Center, 2022). LDPE (18.874%) + PS (5.629%) = approximately 25% of average global plastic waste stream. Based on the type of plastics targeted, percentages were assumed based on values from Geyer et al. (2017) to obtain estimated percentages per plastic type in the overall plastic waste stream.	2	Insufficient data available
Social Impacts	Antigua and Barbuda adopted an eight-step process, which resulted in the ban being integrated into existing legislation (Mittempergher et al., 2022). The process included four rounds of stakeholder engagement to ensure participation and acceptance of policy. Substitution with paper bags was made available in supermarkets and	3	Insufficient data available

	shops, as well as reusable alternative bags. Government-approved alternatives were determined through research and consultation with importers and distributors, with government identifying and promoting Bagasse as the key priority for alternatives (Global Plastics Policy Center, 2022). Widespread public campaign increased the effectiveness of, and compliance with, bans on SUPs. Educational activities included workshops with the focus of "Educate, Engage, Alternatives" (Walker et al., 2021).Reusable bags were provided to all households before the full implementation of the ban. Additionally, tax incentives assisted in making the reusable bags being sold by the stores more affordable.		
Environmental Impact	There was a 15.1% decline in the number of plastics going to the landfill in the first year after the ban was introduced (Seuchran, 2019).	4	Insufficient data available
Additional Information	**https://health.gov.ag**		
Challenges	Enforcement of the ban is a challenge. Public discussions and the introduction of fines and penalties for breaching the ban were implemented two years after the introduction of the ban. Due to the convenience and dependency of consumers, changing perspectives requires time and significant outreach.		

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Implementation of legislation prohibiting the importation and distribution of PS and LDPE single-use plastics	Vanuatu implemented a ban on single-use plastic bags in 2018, targeting non-biodegradable plastics, including bags and polystyrene containers. These items included shopping bags composed of polyethylene less than 35 microns thick, polystyrene takeaway boxes shorter than 30 centimeters, and plastic straws. Notably, exceptions to this prohibition applied to plastic bags used for wrapping fish and meat at the point of sale and plastic straws integral to a product's packaging (Wander, et al., 2019). Subsequently, in December 2019, the ban was extended to include all single use plastic bags, excluding those used for the packaging of meat and fish. The revised ban also encompasses single use cutlery, stirrers, plates, cups, egg cartons, mesh nets, and artificial flowers, all made of plastic. Following thorough consultations, the initial proposal for a ban on single-use diapers was revised to incorporate a phased-out approach. The phased-out strategy allows for a comprehensive evaluation of the environmental impact and practical implications before determining the most suitable long-term solution.		
Caution	The implementation of the regulatory ban requires extensive education and outreach engagement, as well as access to SUP alternatives.		
Multi Criteria	**Notes**	**Score**	**Data Availability Score**
Economic Sustainability	The enactment of the ban itself did not require any investment. The burden of procuring alternatives is passed on to businesses, importers and distributors. Consumers are encouraged to bring their own reusable bags at the stores.	1	Insufficient data available
Replicability	Highly replicable, but the following enablers were essential to ensure a successful implementation: • Order 15, Waste Management Act No. 24 of 2014 (Vanuatu) • Clean Seas Campaign	3	Data moderately available

	• Implementation of penalties: To uphold these regulations, severe penalties are in place, imposing fines ranging from 500,000 VUV (about USD $4,134) to 1,000,000 VUV (about USD $8,268), or potential imprisonment for up to three months, targeting individuals or corporations involved in the manufacturing or sale of the proscribed items. • Strong public support and consistent communication about what was banned and when.		
Duration Impact	Ongoing since its implementation. The regulatory ban discourages the use of single use plastic bags, polystyrene takeaway boxes, and plastic straws. Behavior change is considered low as stronger plastic bags are still being used.	4	Sufficient data available
Range of Plastics	The law prohibits the manufacturing of disposable PS containers (closed containers less than a foot long, including hinged or lidded containers), LDPE single-use plastic bags with a thickness less than 35 microns, and single-use straws. LDPE (18.874%) + PS (5.629%) + PP (18.212%) + PET (10.59) = approximately 53% of average global plastic waste stream. Based on the type of plastics targeted, percentages were assumed based on values from Geyer et al. (2017) to obtain estimated percentages per plastic type in the overall plastic waste stream.	3	Data moderately available
Social Impact	Women are creating traditional handicrafts and bags that are alternatives for the SUPs banned. One of the popular alternatives are bags made from the leaves of a palm-like tree in Vanuatu (Focus Online, 2020). Strong political support for the ban that was taken up by NGOs and the local community organizations has led to a widespread acceptance of the ban.	3	Data moderately available
Environmental Impact	A 90 per cent reduction in lightweight single-use plastic bags from 2018 to 2020 was demonstrated, based on waste audits, with single-use bags going from 2 per cent to 0.1 per cent of household waste. Other encouraged alternatives include paper bags, cardboard boxes, reusable bags, and paw-paw, bamboo, and metal straws.	4	Data moderately available
Additional Information	**https://environment.gov.vu/index.php/environmental-protection/plastic-ban**		
Challenges	There were verbal comments from the residents opposing the idea of the ban, especially the shopping bags. It did not take long for the government, though, to make people aware of its contribution to having a cleaner environment. Progressively, people are now focused on using alternatives available on the island.		

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Awareness Raising

Environmental responsibility and community engagement among participating schools	The Toledo Institute for Development and Environment (TIDE) is a non-profit conservation organization in Southern Belize. To empower communities as environmental stewards, TIDE organizes an annual „Freshwater Cup Football League," integrating sports and environmental stewardship for eligible primary schools. To qualify, schools must plan and implement an environmental project. In 2019, TIDE partnered with JICA and Oceana, sensitizing 19 schools on plastic pollution's environmental impact. Schools were then required to design and execute projects addressing plastic pollution. Participants actively contributed to cleaning rivers, the coastline, and illegal dumpsites, as well as presenting their efforts within their school premises.
Caution	The initiative is highly dependent on external financial support.

Multi Criteria	Notes	Score	Data Availability Score
Economic Sustainability	TIDE's Freshwater Cup is dependent on donor and grant support, so it does not generate sufficient revenue for Capex or OpEx. It is funded by donor organizations. The 2019 TIDE Freshwater Cup program was funded by the International Community Foundation and the Protected Areas Conservation Trust. Approximately $50,000 BZD was donated to obtain prizes that were given to the winning teams, to award the best environmental projects, as well to purchase uniforms and footwear for the teams and provide transportation.	1	Data moderately available
Replicability	Institutional structure was provided by the schools, and organization for the league was facilitated through TIDE. Key enablers were buy-in/commitment from the school community and the Catholic ministry (ministry that oversees and predominantly manages a large proportion of the primary schools throughout Belize). Support and encouragement from parents and the surrounding communities also contributed significantly to the project.	4	Data moderately available
Duration Impact	Institutional structure was provided by the schools, and organization for the league was facilitated through TIDE. Key enablers were buy-in/commitment from the school community and the Catholic ministry (ministry that oversees and predominantly manages a large proportion of the primary schools throughout Belize). Support and encouragement from parents and the surrounding communities also contributed significantly to the project.	4	Data moderately available
Range of Plastics	All plastics were collected in the clean-ups.	5	Insufficient data available
Social Impact	Approximately 475 community members were actively involved in the initiative, which included primary and secondary school children, supporting teachers and parents, as well as community members. Each participating school had a female team and male team that participated in the football tournament, which ensured gender inclusivity.	5	Sufficient data available

Environmental Impact	The initiative contributes to the removal of plastics through clean-ups. A small generation of single-use resulted from the games due to spectators drinking from single-use cups and bottles, which may contribute to littering. Also, short term emissions from the transportation of students from the playing grounds to their communities.	4	Insufficient data available

Additional Information	**https://tidebelize.org/wp-content/uploads/2021/01/2019-TIDE-Annual-Report.pdf**
Challenges	Scheduling the games and environmental projects to accommodate schools' activities. Financial constraints posed a challenge in the initial phase as financial support was required to assist the teams with acquiring uniforms, adequate footwear, transport provision, and also booking a location to host the games. Some teachers from the schools lacked the technical capacity to write a strong project proposal and encountered challenges in implementing their projects successfully before the games.

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Community meetings, clean-ups, and waste audits. Appropriate disposal and artwork	Established in 2020, Sungai Watch raises awareness about plastic pollution through river clean-ups and comprehensive data collection from river waste and illegal dumpsites across Bali. Using social media, Sungai Watch shares its clean-up schedule and invites the online community to participate. The clean-ups involve a diverse group of stakeholders, including local government, businesses, youth groups, and social organizations. Sungai Watch also ensures regular engagement with the local community where barriers are installed. Community visits are conducted at least three times a year: pre-installation of barrier, post installation to facilitate talks and clean-ups, and to present a performance report (Sungai Watch, 2021). With the waste collected, Sungai Watch sorts by material type and brand to conduct a waste audit. With this information, a report is generated annually to help build awareness of the types of materials collected. Some of the plastics, such as plastic bags, are upcycled into compressed plastic sheets for art displays to build awareness.
Caution	The initiative is highly dependent on external financial support.

Multi Criteria	**Notes**	**Score**	**Data Availability Score**
Economic Sustainability	Sungai Watch was initiated through financial support from grants and donations. Annual sponsorships continue to provide financing for barrier installation, river clean-ups, and outreach initiatives. Sungai Watch has 119 employees. Trash booms are constructed using affordable, locally-sourced materials such as stainless steel and galvanized steel wire mesh hung from PVC pipes. Sungai Watch has partnered with Plastic Fischer to test floating booms (Whiting, 2020). One year's barrier sponsorship is USD $6,000 to enable barrier construction, installation, daily collection and sorting of waste, brand audit, and reporting (K. Bencheghib, personal communication, March 11, 2024).	1	Data moderately available
Replicability	Project involves technical expertise to conduct audits, as well as for infrastructure that allows garbage collection to occur. Volunteers and the impact of the education and outreach activities require social acceptance, for which effort is made through periodic meetings with communities and involving high priests and community leaders in building awareness.	3	Sufficient data available

Duration Impact	Sungai Watch has invested in medium to long term facilities for shredding and processing waste materials collected, as well as to conduct waste audits. It has been actively involved in numerous communities throughout Indonesia to carry out a collaborative approach to address river and coastal waste.	4	Sufficient data available
Range of Plastics	They collect and audit all waste that the barriers collect. Education and awareness efforts discourage waste generation and encourage upcycling activities.	4	Insufficient data available
Social Impact	Sungai Watch consults communities before placing barriers and also updates them throughout the process. It empowers communities through its education and awareness activities. Also, its operations employ community members from various economic backgrounds, which creates opportunity for revenue generation. Examples of art pieces Sungai Watch has contributed to include: • Through collaboration with Futura and one of the sustainable hotels (Potato Head), a 3-meter-high 3D sculpture, representative of a river warrior, was created with 14,000 plastic bags. The sculpture will be touring around the world to raise awareness (Kotian, 2023 • Also, they worked in collaboration with Karmagawa to create a globe from 3,000 pieces of hard plastics for Earth Day.	5	Data moderately available
Environmental Impact	In 2023, Sungai Watch collected 844,936 kg of non-organic waste from clean-ups and audited about 537,189 pieces (Sungai Watch, 2023). Initiatives focused on facilitating transformative projects in the Tabanan Regency through community engagements, including converting an illegal landfill on a riverbank into a sunflower garden, as well as weekly volunteer clean-ups. In the Tabanan Regency, 41 villages were cleaned, 107 clean-ups were organized, and over 1000 community members were involved. In Gianyar, Sungai Watch's efforts were concentrated on strengthening relationships with businesses and local governments to reduce the amount of illegal dumping. 78 clean-ups were conducted, and over 700 community members were involved. In the Banyuwangi Regency, a collaborative clean-up with the mayor, schools, and local groups was conducted at Pantai Teratas, where they removed 36 tons of plastics from the coastline (Sungai Watch, 2023).	4	Sufficient data available
Additional Information	**https://www.canva.com/design/DAF6GTqlzhs/RwjfzonUGjswQ2dlU5RV2g/view?utm_content=DAF6GTqlzhs&utm_campaign=designshare&utm_medium=link&utm_source=editor**		
Challenges	Not all collected waste can be reused or recycled due to a lack of existing machines that are able to upcycle certain items; instead, it is directed to landfills as residual waste, especially if it has been exposed to open environments for extended periods. Approximately 31% of what is collected is sent to the landfill. Despite launching extensive education and socialization campaigns, altering behaviors and perceptions remains a considerable challenge.		

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7 References

ADB. (2013). Solid Waste Management in the Pacific: Fiji Country Snapshot. https://www.adb.org/sites/default/files/publication/42672/solid-waste-management-fiji.pdf

ADB. (2013). Solid waste management in the Pacific: Fiji country snapshot. https://www.adb.org/sites/default/files/publication/42672/solid-waste-management-fiji.pdf

Adisoemarto, S. (2004). Small islands: Protect or neglect? An Indonesian case. International Journal of Island Affairs, 13(1/2), 89–94. https://www.cbd.int/doc/ref/island/insula-indonesia-en.pdf

Adeoti, T., Fantini, C., Morgan, G., Thacker, S., Ceppi, P., Bhikhoo, N., Kumar, S., Crosskey, S., & O'Regan, N. (2020). Infrastructure for Small Island Developing States. https://content.unops.org/publications/Infrastructure_SIDS_EN.pdf

Anai, J. & Kodani, Rikae. (2022, January). Development of user pay system (prepaid garbage bags) for waste management service in Vanuatu. J-PRISM. https://www.sprep.org/sites/default/files/documents/publications/%E3%80%90FIN%E3%80%91_JPRISM_Good_Practice_Vanuatu_B_web.pdf

APWC. (2020). Palau – Waste audit report: Analysis of waste generation, recycling and disposal data collected in November 2019. https://palau-data.sprep.org/system/files/UNEP%20Palau%20Report%20FINAL%20APWC%5B1%5D%20copy.pdf

Asian Development Bank, Pacific Department. (2014) Solid waste management in the Pacific: Fiji country snapshot. https://www.adb.org/sites/default/files/publication/42672/solid-waste-management-fiji.pdf.

Auditor General of Jamaica. (2022, July). Management of solid waste: National Solid Waste Management Authority performance audit report. https://auditorgeneral.gov.jm/wp-content/uploads/2022/07/Performance-Audit-Report-NSWMA-July-25-2022-FINAL.pdf

Brown, C., Milke, M., & Seville, E. (2011). Disaster Waste Management: A review article. Waste Management, 31(6), 1085–1098. https://doi.org/10.1016/j.wasman.2011.01.027

Busch, P.O. (2022). (rep.). Small Island Developing States and Plastic Pollution Challenges and Opportunities of a Global Agreement on Plastic Pollution for SIDS. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). Retrieved from https://www.giz.de/de/downloads/giz2022-en-sids-plastic-pollution.pdf.

Clayton, C., Walker, T., Bezerra, J., & Adam, I. (2021). Policy responses to reduce single-use plastic marine pollution in the Caribbean. Marine Pollution Bulletin, 162. https://doi.org/10.1016/j.

COBSEA. (2022). Integrated waste management. Mersing Islands, Malaysia. United Nations Environment Program. https://static1.squarespace.com/static/5c9c815e348cd94acf3b352e/t/63871e164f4fdd08009fb146/1669799474001/Case+Study+Report+Integrated+Waste+Management+Mersing+Islands%2C+Malaysia.pdfhttps://wedocs.unep.org/handle/20.500.11822/43186

Elton, C. (2023, April 5). "Really encouraging": Plastic bag bans work, say campaigners. Where is Europe lagging behind? Euronews. https://www.euronews.com/green/2023/04/05/really-encouraging-plastic-bag-bans-work-say-campaigners-where-is-europe-lagging-behind

Fair Planet. (2019). The top 10 items that are polluting our oceans. https://www.fairplanet.org/story/the-top-10-items-that-are-polluting-our-oceans/

Figueredo, A., & Chowdhury, R. (2019). Conceptualization of community-based entrepreneurship: A case study of Eco filtro in Guatemala. European Association of Work and Organizational Psychology in Practice, 2(11), 77-101. https://eprints.soton.ac.uk/430806/1/inpractice_2019_special_issue_11_4_figueredo.pdf

Focus Online. (2020, February 16). The island state of Vanuatu shows us: This is what happens when a country bans plastic. https://www.focus.de/perspektiven/nachhaltigkeit/nachhaltigkeit-der-inselstaat-vanuatu-macht-vor-das-passiert-wenn-ein-land-plastik-verbietet_id_10367183.html

Geyer , R., Jambeck, J. R., & Lavender Law, K. R. (2017). Production, use and fate of all plastics ever made. Science Advances, 3(7). https://doi.org/10.1126/sciadv.1700782

Global Plastics Policy Center. (2022). Global Plastics policy review: Antigua and Barbuda external trade (shopping plastic bags prohibition) order, No.83. Revolution Plastics Institute, University of Portsmouth.

Gray, M. (2020). An analysis of climate change mitigation programs: Identifying factors for success in Guatemala. [Master's thesis, University of Graz]. Uni-graz. https://unipub.uni-graz.at/obvugrhs/download/pdf/4901662?originalFilename=true

IUCN. (2021, July). Pacific regional report (Fiji, Samoa, Vanuatu) for the Plastic Waste Free Islands project. https://www.iucn.org/resources/grey-literature/pacific-regional-report-fiji-samoa-vanuatu-plastic-waste-free-islands

IUCN. (2023). Plastic waste free islands blueprint – a journey to zero plastic waste. https://www.iucn.org/sites/default/files/2023-03/iucn_blue-print-report_final.pdf

IUCN. (2023, January 31). Three briefs on the economic impacts of plastic pollution on Caribbean Islands (Antigua and Barbuda, Grenada, and Saint Lucia). IUCN.org. https://www.iucn.org/resources/grey-literature/three-briefs-economic-impacts-plastic-pollution-caribbean-islands-antigua

JICA. (2016). Summary report: The Republic of Palau verification survey with the private sector for disseminating Jap anese technologies for promoting collection, segregation and reduction of solid waste by recycling plastic waste to oil. https://openjicareport.jica.go.jp/pdf/1000029501.pdf

JICA. (2022, March). Container deposit schemes in the Pacific Islands: A guide for Policy makers. https://www.sprep.org/sites/default/files/documents/publications/%E5%88%A5%E6%B7%BB%EF%BC%91%E3%80%80Final%20Copy%20CDS%20Guide.pdf

Kloiber, U. (2013). Chumbe Island Coral Park conservation and education, status report 2013. https://www.reefresilience.org/wp-content/uploads/Chumbe-Island-Coral-Park-Conservation-and-Education-Status-Report-2013.pdf

Kotian, V. (2023, April 20). One river at a time with Gary Bencheghib. Design Hotels. https://www.designhotels.com/culture/conscious-future/think-holistically/

Krishna, B. (2023). (rep.). Fiji's Experimental Environmental Account for Solid Waste 2022. Fiji Bureau of Standards. Re trieved from https://www.statsfiji.gov.fj/images/documents/Economics_Statistics/Annual_Reports/Satellite-Accounts/2022_Fijis-Experimental-Environmental-Account-for-Solid-Waste.pdf.

Lachmann, F., Almroth, B. C., Baumann, H., Broström, G., Corvellec, H., Gipperth, L., Hassellov, M., Karlsson, T., & Nilsson, P. (2017). Marine plastic litter on Small Island Developing States (SIDS): Impacts and measures. Swedish Institute for the Marine Environment, University of Gothenburg.

Mama's Laef. (2024). What We Do. https://www.mammaslaef.com/what-we-do/

Mitchell, B., Stolton, S., Bezaury-Creel, J., Bingham, H., Cumming, T. L., Dudley, N., Fitzsimons, J. A., Malleret-King, D., Redford, K. H., & Solano, P. H. (2018, December 20). Guidelines for privately protected areas. IUCN. https://portals.iucn.org/library/sites/library/files/documents/PAG-029-En.pdf

Mittempergher, D., Raes, L., & Jain, A. (2022). The economic impact of plastic pollution: Impacts on the fisheries and tourism sectors, and the benefits of reducing mismanaged waste. IUCN. https://www.iucn.org/sites/default/files/2023-01/report-economic-assessment-antigua-and-barbuda.pdf

Mycoo, M., Wairiu, M., Campbell, D., Duvat, V., Golbuu, Y., Maharaj, S., Nalau, J., Nunn, P., Pinnegar, J., & Warrick, O. (2022). Small Islands. In H.-O. Pörtner, D. C. Roberts, M. Tignor, E. S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, & B. Rama (Eds.), Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (pp. 2043–2121). Cambridge University Press. https://doi.org/10.1017/9781009325844.017

Nordlund, L. M., Kloiber, U., Carter, E., & Riedmiller, S. (2013). Chumbe Island Coral Park—governance analysis. Marine Policy, 41, 110-117. https://doi.org/http://dx.doi.org/10.1016/j.marpol.2012.12.018

PAHO. (2003, August). Regional evaluation: Municipal solid waste management services – Country analytical report, Jamaica, evaluation 2002. https://iris.paho.org/bitstream/handle/10665.2/55767/jamaica_solid_waste_eng.pdf?se-

PG4. (n.d.). Siklus. https://p4gpartnerships.org/pioneering-green-partnerships/all-p4g-partnerships/siklus

Phelan, A. A., Ross, H., Setianto, N. A., Fielding, K., & Pradipta, L. (2020). Ocean plastic crisis: Mental models of plastic pollution from remote Indonesian coastal communities. PloS one, 15(7), e0236149. https://doi.org/10.1371/journal.pone.0236149.

Precious Plastic. (2023, January 12). What they do with river plastic is insane: Sungai Watch. [Video]. YouTube. https://www.youtube.com/watch?v=R4XBz7LJ_dk

Riedmiller, S. (n.d.). Chumbe Island Coral Park – A private marine park in Zanzibar (Tanzania). ICREI. https://www.icrei.fr/en/wp-content/uploads/sites/2/2016/01/riedmiller.pdf

Searious Business. (2021). Report to IUCN plastic waste free islands, waste-to-product business pan, Saint Lucia, Gland, Switzerland. IUCN. https://www.iucn.org/sites/default/files/2022-10/business-plan-plastic-waste-to-product-saint-lucia.pdf

Seucharan, C. (2019). Fines, jail time and education: How other nations deal with plastic waste. The Star. https://www.thestar.com/vancouver/2019/06/10/fines-jail-time- and-education-how-other-nations-deal-with-plastic-waste.html

Solution Search. (2024). Water Pollution and Behavior Change: Siklus. https://solutionsearch.org/contests/entry/1090

SPREP. (2018). Pacific regional action plan: Marine litter 2018-2025. https://www.sprep.org/sites/default/files/documents/publications/MAP-Digital-small.pdf

SPREP. (2020). Sustainability report: Greening of the games. https://library.sprep.org/sites/default/files/2022-03/greening-games-report-sustainability_2.pdf

SPREP. (2022). Solid waste management country profile: Palau. http://www.jstor.org/stable/resrep46451

SPREP. (2022, August). Solid waste management bountry profile: Fiji. https://www.sprep.org/sites/default/files/documents/publications/JPRISM%20II%20Solid%20Waste%20Management%20Country%20Profile_Fiji.pdf

SPREP. (2023, March 9). SRWMA/J-PRISM II Pilot Project – completion report. https://library.sprep.org/content/srwmaj-prism-ii-pilot-project-completion-report

Starkey, L. (2017). Challenges to plastic up-cycling in small island communities: A Palaun tale. https://escholarship.org/content/qt4jd2q9dc/qt4jd2q9dc_noSplash_117304a646f1dd4d5000b4f69bf41371.pdf

Sungai Watch. (2021). Sungai Watch impact report: October 2020 - December 2021. https://humance.io/storage/files/Rqxbf8UX9oephFC0thumholJLhJ6kDQjNELorvtH.pdf

Sungai Watch. (2023). Sungai Watch impact report 2023. https://www.canva.com/design/DAF6GTqlzhs/RwjfzonUGjswQ2dlU5RV2g/view?utm_content=DAF6GTqlzhs&utm_campaign=designshare&utm_medium=link&utm_source=editor#6

Thushari, G. G. N., & Senevirathna, J. D. M. (2020). Plastic pollution in the marine environment. Heliyon, 6(8), e04709. https://doi.org/10.1016/j.heliyon.2020.e04709

Tsai, T. (2013). A study of recycling in Saint Lucia. https://www.sluswma.org/wp-content/uploads/2020/03/a-study-of-recycling-in-saint-lucia-2013-11-Feb-2014.pdf

UNCRD. (2019). State of plastics waste in Asia and the Pacific – Issues, Challenges and Circular Economic Opportunities.

UNEP. (2019, August 1). Samoa makes history with the first green Pacific Games. https://www.unep.org/news-and-stories/story/samoa-makes-history-first-green-pacific-games

UNEP. (2019). Small Island Developing States. Waste Management Outlook.

UNEP. (2023, August). Integrated solid waste management good practices to prevent plastic marine litter in the East Asian Seas Region: Mersing Islands, Malaysia. https://wedocs.unep.org/handle/20.500.11822/43186

UNEP. (2023, August). Integrated solid waste management good practices to prevent plastic marine litter in the East Asian Seas Region: Untia, Makassar, Indonesia – Women Empowerment – COBSEA Case Study Series. UNEP. https://wedocs.unep.org/handle/20.500.11822/43189

UNEP. (n.d.). Chumbe Island Coral Park – The potential of privately managed MPAs. http://mpath.unep.org/chumbe-island-coral-park

Wander, A. Sagapolutele, F., & Prince, A. (2019). Vanuatu – Waste data report: Analysis of waste generation and disposal data collected in November 2018. https://www.cefas.co.uk/clip/resources/reports/south-pacific-clip-reports/waste-data-report-vanuatu-apwc/

Wei, F., Monteiro, E., & Kaza, S. (2021). Jamaica: Integrated community development project. World Bank Group. http://documents.worldbank.org/curated/en/310851636577362412/Jamaica-Integrated-Community-Development-Project

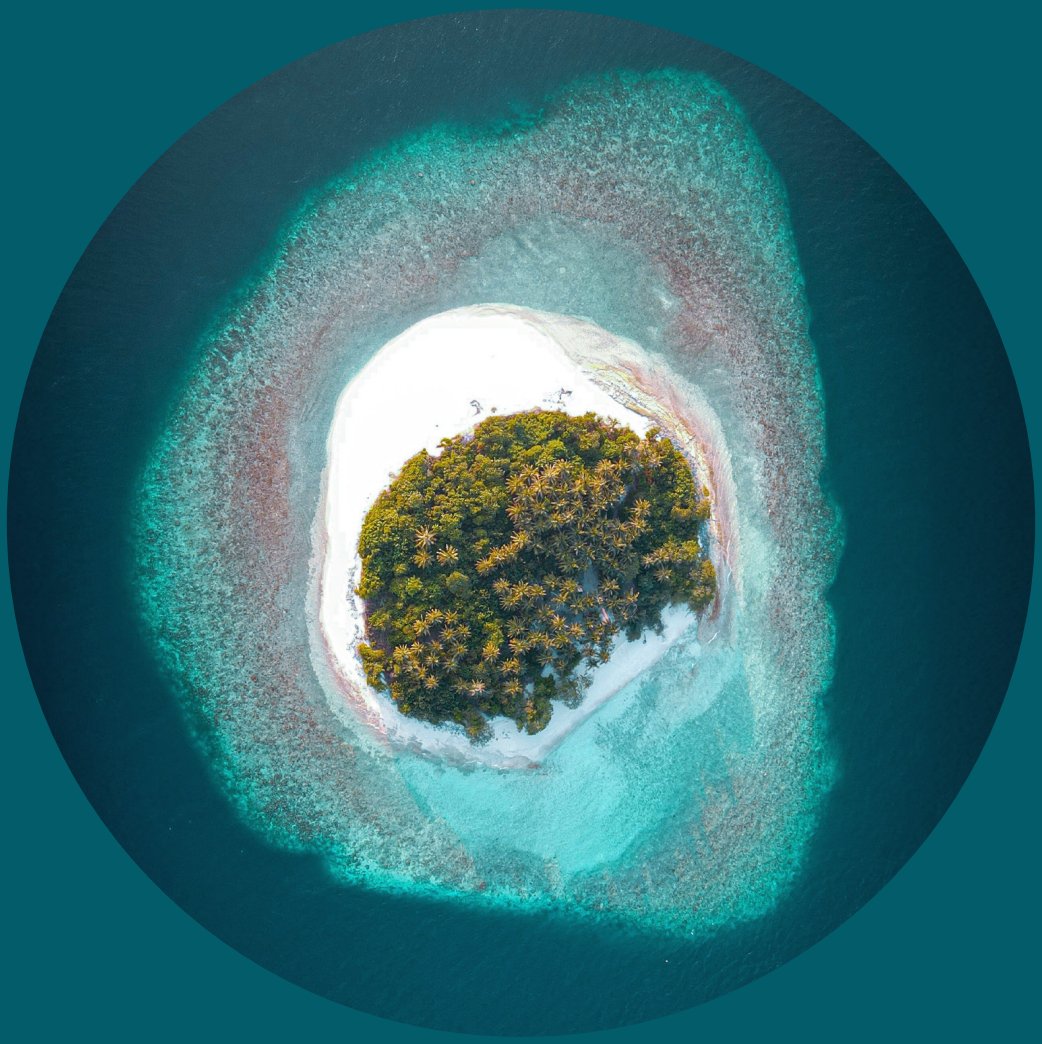
Whiting, K. (2020, January 13). This man came up with a genius solution to clean up Indonesia's polluted rivers. https://www.weforum.org/agenda/2020/01/this-man-is-installing-100-trash-barriers-in-balis-rivers-to-stop-plastic-pollution/

World Bank. (2023). Behavior change in solid waste management: A compendium of cases. https://documents1.worldbank.org/curated/en/099091423124016666/pdf/P17734413028110821 84c8156db86923f14.pdf

WWF. (n.d.). A global treaty to end plastic pollution. WWF. https://wwf.panda.org/act/plastic_pollution_treaty/a_global_treaty/

WWF. (2023). (rep.). Who Pays for Plastic Pollution? Enabling Global Equity in the Plastic Value Chain. Retrieved from https://wwfint.awsassets.panda.org/downloads/english--wwf_enabling_global_equity_webv.pdf.

Zariff, R. (n.d.). From solid waste dumps to sanitary landfills in the Pacific Islands: The Fijian scenario. https://docplayer.net/58499601-From-solid-waste-dumps-to-sanitary-landfills-in-the-pacific-islands-the-fijian-scenario-razia-zariff.html



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