



**Advancing Sustainable
Consumption and Production
Policy in the Tourism Sector for
Responsible Plastics Management
in the Maldives**

Acknowledgement

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European Commission, SWITCH-Asia Programme

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Executive Summary

The Republic of Maldives is an archipelagic country relying on tourism and fisheries as its economic mainstay. Tourism contributed more than 23% to its GDP (Gross Domestic Product) in 2018. Annual visitors to the country in 2019 totaled 1.7 million, having doubled over the past decade. Traditionally, tourism in the Maldives had been run under the 'one island – one resort' concept whereby individual uninhabited islands were leased for tourism. Since 2010, however, with the introduction of guesthouse tourism, guesthouses have been developed in the inhabited islands. The local inhabited islands have thus emerged as a separate tourism stream. The developmental trajectory of the Maldives, which includes changes to the tourism industry, and the continuing challenges in waste management in general and single-use plastics (SUP) in particular, results in the need for assessment and interventions to manage SUP and other plastic waste in the country.

To advance Sustainable Consumption and Production (SCP) policy in the tourism sector for responsible plastics management in the Maldives, the European Commission and the Government of Maldives agreed on an assignment to be implemented from March 2021 to March 2022. The objective of this assignment was to develop sustainable waste management policies and tools for minimizing and preventing SUP, and improving circularity of plastics in the tourism sector to be in line with SCP and circular economy policies in the Maldivian context.

The assessment conducted in this regard identified significant discrepancies in the data and statistics related to plastic waste generation. This affects the design, implementation and tracking of interventions related to plastics management. That said, existing data shows a generally increasing trend of plastic use in the country, with SUP bottles constituting a significant proportion of the total plastic waste. This is exacerbated by the reliance on bottled water as a potable water source despite the existence and availability of desalinated and piped water networks. Additionally, a significant volume of other plastics including plastic bags, food packaging, wrappers, pipes, and products used in beauty and hygiene is also imported.

The issue of plastics management in the Maldives is inextricably linked to the broader waste management systems. In this regard, plastics management faces a number of challenges including the lack of regulatory frameworks on separate collection, sorting of plastics, insufficient waste management infrastructure and resources, lack of enabling economic instruments and lack of user awareness on waste management. The availability of data is another issue that compounds the waste and plastics management in the country. Additionally, unclear and sometimes overlapping roles and responsibilities of the stakeholders also affects the efforts towards waste and plastics management.

Based on the challenge and opportunity analysis, and the key findings, this report provides details on potential actions that can be taken to improve the waste and plastics management in the Maldives. These recommendations aim at establishing data collection systems, policy instruments, improving capacity and waste management infrastructure, and implementing an Extended Producer Responsibility (EPR) scheme for plastic packaging in the country.

Abbreviations

ADB	Asian Development Bank
BATNEEC	Best Available Technology Not Entailing Excessive Cost
CSOs	Civil Society Organizations
CE	Circular Economy
DRS	Deposit Refund System
EPR	Extended Producer Responsibility
GDP	Gross Domestic Product
HDPE	High Density Polyethylene
HS code	Harmonized Commodity Description and Coding System, also known as the Harmonized System
IRENA	International Renewable Energy Agency
MARPOL	International Convention for the Prevention of Pollution from Ships
MCEP	Maldives Clean Environment Project
MPR	Mandatory Packaging Reporting
MSMEs	Micro, Small and Medium Enterprises
MWCS	Malé Water and Sewerage Company
MVR	Maldivian Rufiyaa
NGOs	Non-Governmental Organisations
OPEC	Organization of Petroleum Exporting Countries
PET	Polyethylene terephthalate
PRO	Producer Responsibility Organization
RWMF	Regional Waste Management Facility
SCP	Sustainable Consumption and Production
SEEA	System of Environmental Economic Accounting
SMEs	Small and Medium Enterprises
SUP	Single-Use Plastic
UNEA	United Nations Environment Assembly
URA	Utility Regulatory Authority
WAMCO	Waste Management Corporation

1. Introduction

1.1. Context

The Maldives is located in the Indian Ocean, with a total area of 90,000 km² of which approximately 298 km² is land. The country is made up of 1,192 islands spread across 26 natural coral atolls, and is divided into 21 administrative regions. Tourism and fisheries constitute the mainstay of the Maldivian economy. This unique setting influences the Maldives' economy across all sectors and affects its environmental governance.

Table 1. The Maldives: Key information

Number of inhabited islands	182
Number of resort islands	159
Resident population (Census 2014)	402,071 ¹
Waste generation (estimated, per year)	170,000 tonnes ² (4.2% of national GHG emissions)

Tourism is one of the Maldives' most important economic sectors, contributing more than 23% to GDP in 2018. Annual visitors in 2019 totaled 1.7 million, having doubled over the past decade. Although traditionally tourism in Maldives had been run under the "one island – one resort" concept whereby individual uninhabited islands were leased for tourism, with the introduction of guesthouse tourism in 2010, local inhabited islands have also emerged as a separate tourism stream. Prior to 2010, tourist guesthouses were not allowed on inhabited islands. By the end of 2020, 103 inhabited islands had registered guesthouses open for tourists.³

While the country is a world-renowned tourism destination, its lack of effective waste management systems creates serious environmental and social challenges. Additionally, given that fisheries is the second most important economic sector, the ineffective handling of plastics waste directly affects marine life, and by extension, human health. Ineffective waste management also threatens the environment on which the Maldivian tourism is built. Although waste generation has more than doubled in the last decade, waste management capacities have not been built up accordingly.

Waste generated by local residents and tourists is compounded by the waste generated from cruise ships in the Maldivian waters and waste from other countries carried by the Indian Ocean currents. This results in Maldivian coastlines being among those with the highest concentrations of microplastics globally. A study conducted in the Lh. Naifaru island, found "*one of the highest densities of microplastics found anywhere on the planet*".⁴

Single-use plastics (SUPs) constitute a significant proportion of the solid waste generated in the country. For example, in 2018, 104 million non-biodegradable plastic bags were imported for domestic consumption.⁵ A large volume of these plastic bags end up in the ocean through littering, and leakage due to inadequate waste management infrastructure and systems.

1 National Bureau of Statistics. 2015. Maldives Population and Housing Census 2014. <http://statisticsmaldives.gov.mv/nbs/wp-content/uploads/2015/10/Census-Summary-Tables1.pdf>

2 Ministry of Environment, 2019, Maldives First Biennial Update Report to the United Nations Framework Convention on Climate Change. <http://www.environment.gov.mv/v2/wp-content/files/publications/20200206-pub-maldives-first-biennial-update-report.pdf>

3 Ministry of Tourism. 2021. Maldives Tourism Bulletin, Issue 11. <https://www.tourism.gov.mv/dms/document/a9d9e5e6280e84ca1bac-05d8e9126029.pdf>

4 Patti T.B., et al. 2020. Spatial distribution of microplastics around an inhabited coral island in the Maldives, Indian Ocean, Science of The Total Environment, Vol. 748. <https://doi.org/10.1016/j.scitotenv.2020.141263>

5 UNICEF Maldives. 2019. Ending Plastic Pollution: The FenFulhi launch events in Addu City and Fuvahmulah Island. <https://www.unicef.org/maldives/stories/ending-plastic-pollution-fenfulhi-launch-events-addu-city-and-fuvahmulah-island>

The main waste treatment and disposal site in the Maldives is the Thilafushi Island landfill, a reclaimed lagoon located near a marine protected area. Operations on this site include open burning to reduce the of waste. While centrally located in the Maldives, it is more than 500 km from the southern atolls, meaning high transportation costs.

To tackle the waste issue, the Parliament of the Maldives passed a resolution which aims to phase out single-use plastics by 2023. This was followed up with a Single Use Plastics Phase-out Plan 2020-2023⁶, through which the government has set a target to progressively phase out SUP, and improve the governance and enabling environment related to this.

Currently, there are several ongoing projects targeted for addressing SUP in the Maldives, such as SACEP's [Plastic free Rivers and Seas for South Asia Project](#)⁷, [USAID's Clean Cities, Blue Ocean \(CCBO\)](#)⁸, and the new SWITCH-Asia grant project Prevention of Marine Litter in the Lakshadweep Sea or [PROMISE](#).⁹ To leverage synergy amongst existing initiatives on plastics management, to identify possible tools for minimizing and preventing SUP, and for improving circularity of plastics in the tourism sector, the current assignment was agreed upon by the European Commission (EC) and the Government of Maldives to be implemented from 1 March 2021 to 31 March 2022.

1.2. Objective

The assignment aims at advancing Sustainable Consumption and Production (SCP) policy in the tourism sector for responsible plastics management in the Maldives. Thus, its objective is to recommend sustainable waste management policies and tools for minimizing and preventing SUP and improving circularity of plastics in the tourism sector in line with SCP and circular economy (CE) policies in the Maldivian context.

1.3. Methodology

This report adopted a methodology consisting of several approaches chosen to take into account the scope of the assignment, and the existing situation of SUP and other plastic waste management in the Maldives. The approaches include:

- *Literature review*: Available publications, such as reports, articles, reviews, and news were accessed and reviewed for data related to waste, SUP waste, plastic importation, and other relevant information.
- *Stakeholder mapping*: An analysis and mapping of stakeholders were conducted to identify their roles, mandate, and any other relevant data and information.
- *Consultation and targeted interviews*: Stakeholders and other key informants were contacted to glean pertinent issues related to the SUP landscape in the Maldives. In this regard, six key informant interviews were followed by a broader stakeholder consultation workshop. The interviews and workshop were conducted online due to the prevailing COVID-19 situation in the country.
- *Technical meetings*: Four technical meetings targeting selected groups of stakeholders were held to deepen the understanding of the issues relevant to each cluster. These were carried out during the implementation of the assignment and included Government, Tourism, NGOs/civil society organizations (CSOs), and International donors.
- *Data analysis*: The data and information obtained from the stakeholder interviews and other implementation events (technical meetings, consultation and literature review) were analyzed. The findings were used to identify suitable good practices, and to make recommendations for SUP and other plastic waste prevention and minimization based.

6 [https://www.environment.gov.mv/v2/en/news/15184#:~:text=Phasing%2Dout%20single%2Duse%20plastic,Assembly%20\(UNGA\)%20in%202019.](https://www.environment.gov.mv/v2/en/news/15184#:~:text=Phasing%2Dout%20single%2Duse%20plastic,Assembly%20(UNGA)%20in%202019.)

7 <http://www.sacep.org/programmemes/plastic-free-rivers-and-seas-for-south-asia>

8 <https://www.usaid.gov/maldives/documents/fact-sheet-clean-cities-blue-ocean>

9 <https://projectpromise.eu/>

1.4 Organization of the report

This report is organized into five sections. **Section 1** provides an introduction to the assignment and to the methodology used to compile the report.

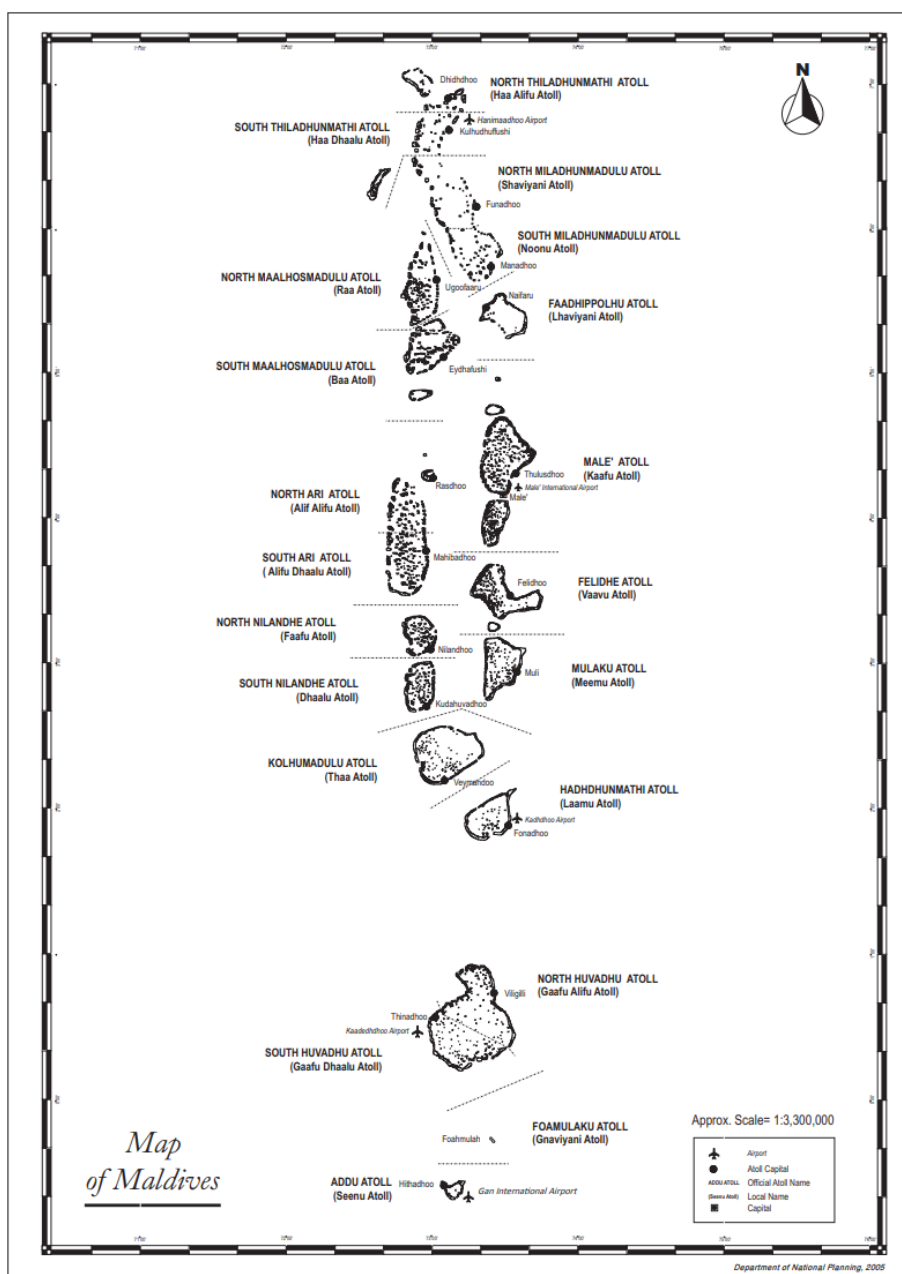
Section 2 provides the status of single use plastics in the Maldives. It presents the available information on the plastic waste generated, the country's legal and regulatory framework as well as a discussion on the challenges regarding data availability on waste and plastics in the country. The section also discusses the use of SUP bottles.

Section 3 provides an overview of the best practices, best available techniques and best environmental practices in relation to plastics management.

Section 4 provides policy recommendations based on the current status of plastics in the Maldives. This section also provides a preliminary outline of an Extended Producer Responsibility (EPR) scheme that can be introduced in the country.

Section 5 provides conclusions of the report.

Figure 1. Map of the Maldives¹⁰



2. Current status of SUP and solid waste in the Maldives

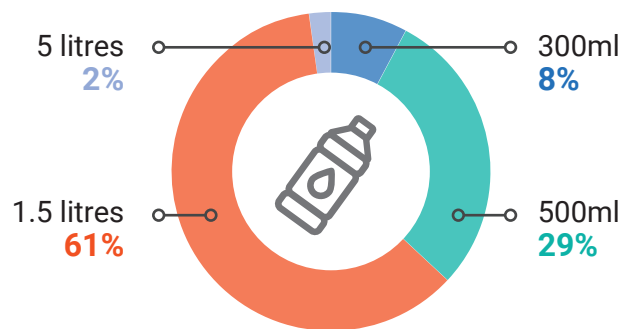
2.1. Status of SUPs and their waste

2.1.1. Status of SUPs

Single-use plastics were assessed by their main sources of consumption and of corresponding waste generation. The sources were identified as three distinct groups: (1) households, (2) commercial users (restaurants, cafes, offices), and (3) tourist resorts.

Plastic bottles have been of special interest particularly due to the increase in the number of bottles produced and used, the visual impact they have had in the country, and for their potential in recycling and circular alternatives. SUP containers and PET (Polyethylene Terephthalate) bottles of different sizes are primarily used for water and soft drinks. For example, drinking water is packed mainly in four bottle sizes and in 18- to 20-litre refillable containers. The proportion of the different water bottle sizes used in the country is shown in Figure 2.

Figure 2. Proportion of the four mineral-water-bottle sizes used in the Maldives



Most households in Malé (more than 78% residents) and in the islands in the outer atolls use bottled water and drinks on a daily basis, which they purchase primarily from local shops.¹¹ In the past, the islands relied on groundwater and rainwater for drinking. However, because of growing populations and the resulting pressure on groundwater, this is quickly becoming unfeasible. Degradation of the quality of groundwater has also resulted in a preference for bottled water as a source of potable drinking water. However, PET bottles can potentially be a source of a number of harmful chemicals including some that are endocrine disruptors. A recent study noted that in 193 examined food contact chemicals migrating from PET bottles, 150 were detected at least once.¹² Recycled PET was found to carry such chemicals in a higher concentration. The degradation that happens across the life cycle of PET bottles may also increase the likelihood of chemicals leaching into drinking water. In the context of the Maldives, the storage of PET bottles in hot and humid environments may particularly aggravate the degradation across the bottle life cycle. In Malé, only 14% of the population uses filtered tap water. This low usage of piped water is driven by a widespread negative public perception towards the quality of tap water.

Box 1. Key facts about SUP production and import

- 143 million PET bottles (≈ 3,300 tonnes) produced locally
- 17% growth in plastic imports between 2014 and 2018
- 4% total imports are plastics and rubber in 2018
- Other imported plastics (other than PET and plastic bottles): Plastic bags, food packaging, wrappers, pipes, and plastics used in beauty and hygiene products

11 MOPA and NIG Capital, 2021. Socio-economic impact assessment of the use of PET in the Maldives. https://mopa.mv/wp-content/uploads/2021/02/PET_use_SocioEconomic_impact_Maldives.pdf

12 Gerassimidou et al. 2022 Unpacking the complexity of the PET drink bottles value chain. <https://doi.org/10.1016/j.jhazmat.2022.128410>

As per the NIG Capital Household Survey, 57.5 million bottles are consumed per year by households, corresponding to 45% of the total production. Of this, 52% went to the atolls whereas 48% is consumed in Malé.¹³ The bottled water consumption in the Maldives is 226 litres per capita per year, compared to about 134 litres per capita in European countries such as Germany. On an average, households in the Maldives spent over MVR 600 (approximately US\$ 39) per month on bottled water. Together with the spending on bills for the piped water supply, households spend about 4 – 5% of their incomes on total water consumption per month.

Commercial outlets of bottled water and drinks are local cafes, restaurants as well as offices in Malé and the inhabited islands.

The tourism sector also consumes a large number of plastic bottles. The total number of PET bottles used in resorts is about 27.2 million per year. The bottles generally come in three sizes; 330ml, 500ml, and 1.5 litre, which account for 15%, 41% and 44% share of the total respectively. The 330ml soft drinks bottles are usually sold at the minibars in the guestrooms and provided free of charge in most speedboat transfers between the resorts and Hulhule airport. Resorts also serve 500ml bottles whilst the 1.5-litre mineral water bottles are provided on a complementary basis in the guestrooms as well as served at the resort restaurants. Of the 158 operational resorts¹⁴, most five-star and four-star resorts operate their own water bottling plants, and use refillable glass bottles to serve drinking water. However, 30% of the resorts, mostly three-star properties, purchase and serve locally produced PET bottles in their minibars, restaurants, guestrooms and transfer speedboats.

Box 2. Key numbers for plastic bottle consumption

- 57% households in the Maldives use plastic water bottles on a daily basis
- 57.5 million bottles (≈ 45 % of total production) are consumed per year by households
- MVR 600 (approx. US\$39) of household income, on an average, spent on bottled mineral water per month
- 225 liters of bottled water consumption per capita per year
- 27.2 million (19%) domestically produced PET bottles consumed in the tourist facilities per year.

The local production of PET bottles (Table 2), including those used for water and soft drinks, is estimated at 143 million bottles, which is equal to 3,300 tonnes of PET per year. It is estimated that the bottling industry contributes 2% of the GDP in the Maldives and has become one of the few significant local industries¹⁵ apart from the fishing industry (the latter contributed 15 % of the country's GDP and employed about 30% of the workforce in 2010).

Table 2. Overview of bottling plants in the Maldives

No.	Company name and brands
1	MWSC (TaZa)
2	MAWC (Bonaqua and Coca Cola soft drinks)
3	Happy Market (Life)
4	Island Beverage Maldives
5	Stelco
6	One Degree South
7	Handy Holdings Pvt. Ltd.
8	STELCO

13 MOPA and NIG Capital. 2021. Socio-economic impact assessment of the use of PET in the Maldives. https://mopa.mv/wp-content/uploads/2021/02/PET_use_SocioEconomic_impact_Maldives.pdf

14 Ministry of Tourism. 2021. Tourism Yearbook 2021. <https://www.tourism.gov.mv/dms/document/2f11c02edec48b0fa37014122e7c39e6.pdf>

15 Ibid 7.

In addition to the 143 million bottles produced locally, a large number of PET bottles are imported every year. However, the precise number of imported bottles is not available. It is estimated that around 100 tonnes of PET bottles are imported per year in the form of bottled beverages.¹⁶

In addition to PET or plastic bottles, the country also imports a significant volume of other plastics including plastic bags, food packaging, wrappers, pipes, and products used in beauty and hygiene items. Around 150 million biodegradable and 16 million nonbiodegradable plastic bags were imported in 2019.

2.1.2. SUP and other plastic waste

The State of the Environment Report 2016 notes that the primary waste stream in the Maldives is comprised of biodegradable waste. The report further¹⁷ notes that the per capita waste generation per day is 1.7 kg in Malé, 0.8 kg in the outer islands, and 3.5 kg in the tourist resorts.¹⁸ In this regard, it is estimated that urban areas generate 51% of the total waste, whereas the island communities and resorts generate 28% and 21% of the total waste respectively.¹⁹ However, it is important to note that these figures may be outdated, and as such, may underestimate the current rate of waste generation.

To compare, the global average for waste generation in 2016 was 0.74 kg/capita/person. In Europe and Central Asia, the regional average was 1.18 kg/capita/person, whereas in East Asia and the Pacific, the regional average was 0.56 kg/capita/person. Developed countries such as Germany averaged 1.72, France 1.13, whereas other small island developing states such as Fiji averaged 1.21, and Samoa 0.41 kg/capita/person.²⁰

The plastic footprint in the total waste generated in the Maldives per year is about 12% or an estimated 43,000 tonnes. The use of plastics and the generation of plastic waste has been a growing as an urgent concern in the Maldives. The main types of plastic waste generated include, among others, food packaging, plastic bags and plastic bottles. Given that 66% of the waste is estimated to be mismanaged²¹, preventing leakage of plastics into the oceans poses a significant challenge. The high level of mismanaged plastic waste is attributed to a lack of segregation of different types of waste, combined with a lack of systematic collection and treatment. However, it is important to note that given the geographical insularity of the Maldives and its dispersed population, establishing an integrated waste management system entails significant infrastructure and transport costs. These factors also affect the feasibility of large-scale recycling facilities. As such, strategies targeted at waste prevention, reduction and its management at the community level may be better suited for the local context.

Currently, a large volume of PET bottles and other plastics are leaking into the marine environment, which threatens the entire ecosystem and its biodiversity. The country incurs a loss of revenue of about MVR 10.8 million (approximately US\$ 700,000) per year, as more than 3,000 tonnes of PET bottles per year are either burnt or thrown away instead of being recycled. Another estimation shows that the PET bottles used in the beverage industry account for about 1% of the total waste generated.²²

The lack of infrastructure and processes for waste management present significant challenges to address single-use plastics waste in the Maldives. The lack of segregation at source results in waste being mixed and then dumped in landfill/waste management sites. Currently only a few islands household segregation but the lack of backend facilities prevent further treatment of the plastic waste.

Box 3. Key facts about plastic waste in the Maldives

- 43,000 tonnes: estimated total plastic waste per year
- 66% of mismanaged waste is plastic waste
- MVR 10.8 million (approximately \$700,000): estimated lost revenue per year due to poor waste management

16 Ibid 7.

17 Ministry of Environment and Energy, 2016, State of the Environment 2016, Available online : www.environment.gov.mv/v2/wp-content/files/publications/20170202-pub-soe-2016.pdf

18 There are discrepancies in various publications on waste generation rates, with rates per person per day ranging from 0.71 kg to 2.97 kg in Malé region, and 0.7 kg to 1.3 kg in the outer atolls. Additionally, various reports cite waste generation rates in resorts as per bed per night or per person per day, making comparison unfeasible.

19 Ibid 12

20 Kaza S., et al. 2018. What a Waste 2.0 : A global snapshot of solid waste management to 2050. Urban Development. <https://openknowledge.worldbank.org/handle/10986/30317>

21 Ibid 7.

22 Ibid 7.

Mechanisms for household waste segregation as well as facilities for sorting and recycling are envisaged under the current government policies and existing projects on waste management. At present there are no dedicated facilities for mechanical recycling of the plastic waste. However, one NGO (Parley Maldives) has partnered with various actors in collecting plastic waste and transferring it abroad for recycling.

Several ongoing projects are currently working to establish regional waste management infrastructure funded by donors such as OPEC Fund for International Development, Asian Development Bank (ADB), World Bank and International Renewable Energy Agency (IRENA) in R. Vandhoo, K. Thilafushi and S. Hithadhoo.²³ The regional waste management facilities (RWMFs) are modelled on an approach whereby atolls and islands are clustered together, with integrated waste management services established for each cluster, including a regional waste management facility where waste that cannot be processed on the island is transferred. These RWMFs are envisaged to also establish incineration capacities (currently being tested in R. Vandhoo and S. Hithadhoo), with waste-to-energy options being explored as well. Incineration as a method of waste management may not necessarily provide the right signal and mix of incentives in efforts targeting waste prevention and reduction in general. This, coupled with challenges in maintaining a consistent waste feed, bring into question the alignment and sustainability of various public policies towards waste management, in particular plastics waste management. As such, a more holistic assessment of existing policies and their alignment is required, with a goal to harmonize them.

More details on waste management in Malé, other atolls and in resorts and facilities are presented in the next sections.

Data availability

Reliable and systematic data on waste generation and plastics is currently unavailable in the Maldives. Different publications cite various figures, most of them being built on assumptions and estimations from outdated data. The Maldives Bureau of Classifications has conducted an exercise to compile National Waste Accounts under the System of Environmental Economic Accounting (SEEA) framework.²⁴ Details of the national waste accounts in relation to plastics are provided below. The types of plastics defined for the waste account framework include Polyethylene terephthalate (PET), High density polyethylene (HDPE), Polyvinyl chloride (PVC), Low density polyethylene (LDPE), Polypropylene (PP), Polystyrene (PS), and other plastics.

Table 3. Plastic waste generation and management

Total plastic waste generated by tourism, households and by imports [tonnes]				
Year	Tourism	Households	Imports	Total
2018	1,537	19,665		21,202
2019	1,738	20,486	443	22,667
Intermediate stage				
Year	Reused, recycled, recovered	Supplied to waste collection		Total
2018	131	21,202		21,333
2019	117	22,224		22,342
Final Stage				
Year	Total waste exported		Total waste collected	
2018	189		177 (-12*)	
2019	991		145 (-846*)	

* A negative sign indicates that export is greater than total collected, which shows that collection is underestimated

23 The letters R,K and S are atoll identifiers. Each atoll is allotted a letter, which is prefixed to the atoll name.

24 United Nations ESCAP and the National Bureau of Statistics, Maldives. 2021. Maldives National Waste Accounts 2018 & 2019 : Final report. https://www.unescap.org/sites/default/d8files/2021-04/Maldives_National_Waste_Account_Report_2018-19.pdf

For the waste accounts, data availability by sectors for plastics was only found for accommodation and food services, households, and exports for recycling. Data for other sectors such as food and agriculture is not available. In terms of plastic waste, data was only available for exports, but not for other modalities such as disposal in sea, open burning, incineration, landfill and storage.

Some of the challenges identified in the construction of the national waste accounts relevant to plastics management are:

- Lack of data on waste generated by different sectors
- Lack of waste segregation results in over 80% of the waste collected being classified as mixed and other waste
- The Waste Management Corporation (WAMCO), the largest waste management service provider, currently does not record data according to waste categories
- Waste transferred to Thilafushi is recorded only in terms of the carrying capacity of the vehicle regardless of the actual quantity loaded
- Lack of collection data for atolls
- Waste composition studies have been limited to households, resorts and healthcare facilities. None on waste generated by other industries.
- Lack of harmonization in waste categories results in the data not being comparable across studies and locations
- Although resorts are required to maintain a log of waste transported out of the resort, this data is not available with the Ministry of Tourism.

Given these issues, the estimation of total solid and plastic waste generated in the Maldives is found to be unreliable. This poses significant challenges in terms of formulating evidence-based policy, as well as monitoring of policy interventions related to plastics and plastic waste.

Waste management in Malé Region

Prior to 2016, household waste collection and its transfer to the waste collection points were carried out by individual households. A majority of households relied on waste collectors, primarily expatriate workers. The fee for such services was a flat rate ranging between MVR 100 and 150 per month (approximately US\$ 6 to 10). Initially, several waste collection points were spread across Malé. Later, two vessel points were designated for waste collection, one for compostable and household waste, and the other for non-compostable waste. From there the waste was transferred to the landfill site at Thilafushi.

Since 2016, waste collection has been carried out by the state-owned enterprise, WAMCO. WAMCO charges a flat fee of MVR 150 per household per month for daily collection, with additional service rates for waste from commercial centres and for waste not categorized as daily household waste. Households that do not opt to register for WAMCO collection have the option to transfer the waste to the WAMCO collection point free of charge. Currently, given that there is no segregation at source, the collected waste is generally categorized as mixed waste.

Since its inception, WAMCO has been struggling to a) register households for collection, and b) collect fees from the registered households. With regard to the former, over 30,000 households (equivalent to around 75% of the total households in the Greater Malé Region) remain unregistered with the company. Additionally, as the waste is collected regardless of fee payment status, incentivizing users to pay the monthly fee has been a challenge. This has been expounded by the change in collection methods during the pandemic, with households required to put out the waste on the street at a designated time, with the result that distinguishing waste from registered households was impossible to track. As such, waste management in the Greater Malé region still struggles with institutionalizing a working user principle as well as segregation of waste at the source.

Under a recent amendment introduced on 1 January 2022 to the waste management regulations in the Maldives, segregation at source of household waste has been made mandatory in all the islands (but not in Malé City), and its implementation officially started on 1 June 2022. A majority of the islands, however, have

not started implementation due to a variety of challenges such as a dearth of equipment, manpower and waste-collection vehicles.

Waste management in other atolls

Waste collection and transfer in other islands is still primarily carried out by individual households. That said, a few islands have established waste collection services, supported by a user fee system. The collected waste is generally transferred to a designated site. However, because of the overall mismanagement of waste (including the lack of capacity and enforcement), disposal at other areas, including around the shoreline, is not uncommon. This creates a high risk of leakage into the marine environment. Ten per cent of the plastic waste entering the oceans is estimated to originate from these residential islands.

The collected organic waste in the islands is occasionally transferred to Thilafushi with government support. In some islands, partnerships with surrounding resorts also exist where the resorts assist in the transfer of the accumulated waste on the island to Thilafushi. Given the geographic insularity, such transfers tend to be expensive and financially unfeasible in the long term. However, neither the transfer by government nor by the resorts is the norm in most islands, being dependent on political exigencies in the case of the former, and the relationship local councils of the inhabited islands have with resorts in the latter. As such, neither of these forms of transfer can be considered systematic or sustainable.

Under the Decentralisation Act, local governments are mandated to provide waste management and other municipal services. Additionally, under the Waste Management Policy 2015, island councils are required to develop an island waste management plan, which is then submitted to the EPA for approval. Waste management is, however, one amongst many responsibilities with which the local councils are charged. Many councils are hampered in this effort due to a lack of resources and the need to prioritize various demands under their mandate.

National-level efforts supporting waste management in the islands are primarily in the form of establishing island waste management infrastructure, integrated into regional facilities. Such an approach is designed to reduce the financial burden of transferring waste to Thilafushi as well as to overcome the lack of economies of scale in processing and managing waste in small communities. This has entailed the provision of waste management equipment and technical support.²⁵

Waste management from tourist resorts and facilities

Waste management in resorts is covered under tourism-related regulations. Under the Regulation on the Protection and Conservation of Environment in the Tourism Industry, all resorts are required to have adequate waste treatment equipment such as bottle crushers, compactors and incinerators. Kitchen and green waste were allowed to be disposed of into the sea until 2021 when the Ministry of Tourism banned this practice following public and media attention over an incident that showed such waste being accumulated on the reefs.

Non-recyclable items on the resorts are collected and transported to Thilafushi. Usually this is done through a third-party contract. There are anecdotal reports that some of this waste is dumped into the ocean during transport as well as of inadvertent leakage due to uncovered transport of waste in open boats. Given that there is no tracking or enforcement from departure from resorts to entry to Thilafushi, it is difficult to confirm these reports. Although, Maldives is also Party to MARPOL Annex V, which regulates the prevention of pollution by garbage from ships, currently there are no mechanisms in place to monitor or enforce this. The lack of such mechanism for transporting waste and regulating ocean dumping were concerns raised by several stakeholders during the consultations for this report.

Recycling on resorts is generally not cost effective given the limited waste stream and the cost of logistics and transportation. However, during the stakeholder consultations, it was noted that Parley Maldives currently has partnerships with 48 resorts to collect and recycle single-use PET bottles.

It is important to highlight that there has been a major shift in recent years in terms of plastic- bottle

25 <https://www.wcdn.imo.org/localresources/en/OurWork/Environment/Documents/Simplified%20overview%20of%20the%20discharge%20provisions%20of%20the%20revised%20MARPOL%20Annex%20V.pdf>

consumption in the resorts, with many resorts adopting glass refillable options in order to reduce their plastic footprint. This shift is primarily driven by two factors, a) industry changes due to expectations of tourists as well as concerns on environmental sustainability, and b) economic savings due to reduced reliance on purchasing plastic water bottles.

The increased penetration of tourism on inhabited islands adds to the overall waste generated in the islands, particularly plastics in the form of plastic bottles. Although some guesthouses have also adopted water filters and refillable options, this currently is not the norm. Guesthouses currently rely on the inadequate waste management system present on the islands, with the result that this waste is largely mismanaged.

Beyond the stream of plastics in the form of plastic bottles, stakeholders consulted for this report also noted that plastic food packaging is also an issue that needs to be considered. Stakeholders in the tourism sector noted that addressing this issue requires changes to the supply chain as well as practicable government regulations.

2.1.3. Existing legislative framework

Currently, plastic pollution is addressed through general legal instruments on environmental protection and associated regulations related to waste management. A summary of the existing legal and regulatory framework in this regard is provided in Table 4.

Table 4. Waste management regulatory framework

Instrument/Policy	Summary
Environmental Protection and Preservation Act (EPPA, Act No: 4/93)	Overarching framework related to environmental protection and preservation, and primary legal instrument utilized to enact associated regulations Articles 2, 7 and 8 specifically relate to waste management
Decentralisation Act (07/2010)	Provides a mandate to local councils to deliver waste management services
National Waste Management Policy (2015)	Provides the framework for waste management plans, waste management facilities, education and awareness, and management of statistics The policy integrates various principles of waste management, which can be used as an entry point for introducing segregation and separation of plastics The policy comprises 10 strategies. Of these, the most relevant strategies that endorse international principles for waste management include the utilization of the 3R concept (reduce, reuse, recycle) in the overall development of waste management policies and management.
Waste Management Regulations (2013/R-58)	Establish the regulatory framework for waste management, including requirements to record and maintain data of waste generated and treated

Instrument/Policy	Summary
Regulation on the Protection and Conservation of the Environment in the Tourism Industry (enacted under the Maldives Tourism Act 2/99)	<p>Section 5 of the Regulation details provisions for the management of solid waste in the tourism sector</p> <p>It requires waste disposal to be carried out in a manner that will have ‘least impact’. However, this phrase is not defined.</p> <p>All resorts are obliged under their operational license to have waste treatment equipment such as a bottle crusher, metal compactor and incinerator in place</p> <p>Section 5.3.5 requires information relating to particulars of vessels, including the capacity and proper logs on trips made for waste disposal in an island or part of it leased for tourism, to be submitted to the Ministry of Tourism</p> <p>Ministry of Tourism conducts regular inspections of the resorts during which they assess the condition of the waste management area and waste management practices</p>

The National Waste Management Policy (2015) provides an overarching framework on which sustainable SUP management policies and associated regulations can be based. In fact, the key objective of the Policy is to ensure that all waste-related policies, regulations, standards plans and masterplans are prepared with a common basis. Additionally, it includes roles and responsibilities for waste management at the individual, household, atoll, regional and national levels. The policy outlines 10 strategies to address the issue of waste management in the Maldives. These include island councils’ responsibilities to prepare waste management plans and manage the waste at the island level; collection of fees from households to manage waste; encouraging the utility companies to carry out the tasks of managing waste in the islands; establishment of regional waste management centers; encouraging and providing means to generate income using waste products; and conducting training on waste management at the national level.

The legal and regulatory framework currently lacks clear demarcation of roles and responsibilities with regard to waste management. For instance, it does not specify the role of producers and retailers in the end-of-life management of products. Additionally, stakeholder consultations revealed challenges in the application and implementation of waste-related provisions in the tourism sector. For example, there is confusion as to whether the Waste Management Regulations (2013/R-58) or the Regulation on the Protection and Conservation of the Environment in the Tourism Industry prevail with regard to regulating aspects of waste management in tourist resorts. This is partly related to the existence of two separate entities dealing with the enforcement of each regulation. Although the regulations are not mutually exclusive, the absence of coordination amongst the enforcement entities results in a lack of clarity on the scope of application and enforcement. Similar issues can also be found with the Decentralisation Act, and the subsequent allocation and demarcation of roles and responsibilities.

The Ministry of Environment, Climate Change and Technology published the plastic phase-out plan in August 2020. The plan sets out target dates for the ban of selected plastic products imported and produced in the country as well as the imposition of taxes and Extended Producer Responsibility policies on selected single-use plastic products. Table 5 provides an overview of the key long-term targets of the phase-out plan.

Table 5. Long-term targets in the SUP Phase-out Plan 2020

Target	Deadline
To provide a variety of affordable and accessible non-single-use plastic alternatives to consumers	2030
To establish regulations to promote a circular economy for different sectors in the country	2030
To establish at least one recycling facility in the Maldives that has pre-sorting, sorting and recycling technologies	2030

In addition to these long-term targets, the plan also considers several immediate and short-term measures were considered. According to the plan, together with other selected plastic items, all imported and locally produced beverages in 330 ml and below PET packaging were initially proposed to be banned from January 2021. As per the President’s Decree issued on 30 December 2020, this target was amended banning all imported beverages in PET bottles below 500 ml from 1 June 2021. In a further step, it has been proposed that all imported as well as locally packaged water in PET containers or bottles below 1 litre will be banned from December 2023.

On 25 April 2021, the strategic implementation plan for Single-Use Plastic Phase-out in the Maldives by 2023 was launched. The details of the Plan and its associated policies, and the key actions as it applies to the tourism sector are shown in Figure 3, and Tables 6 and 7.

Key facts about the SUP Phase-out Plan 2020-2023

➔ *The Plan is built on **six key policies** designed to progressively phase out single-use plastics, address the legislative and data gaps, and build the institutional capacity of relevant stakeholders.*

- **Policy 1:**
Ban the import, production and sale of specific SUP products
- **Policy 2:**
Introduce market-based instruments
- **Policy 3:**
Strengthen the nation-wide database and setting reduction targets for plastic packaging
- **Policy 4:**
Extended Producer Responsibility
- **Policy 5:**
Provision of sustainable alternatives
- **Policy 6:**
Education and awareness

Figure 3. An overview of the SUP Phase-out Plan 2020-2023



Table 6. Targets of SUP Phase-out Plan 2020 – 2023

Targets	
Short term	<ul style="list-style-type: none"> • Enact the national SUP phase-out regulation in 2021 • Initiate a national data collection mechanism to identify product packaging of imported products • Achieve 85% collection of SUP waste in the Maldives to prevent leakage into the environment by 2023 • Set national reduction targets for SUPs by 2023
Long term	<ul style="list-style-type: none"> ▪ Provide a variety of affordable, accessible and reusable non-plastic alternatives to consumers in the Maldives by 2030 ▪ Formulate a legal framework to regulate and promote circular economy for different sectors in the Maldives by 2030 ▪ Establish an adequate plastic recycling facility that has pre-sorting, sorting, and recycling technologies by 2030

The SUP Phase-out Plan envisaged the enactment of an EPR regulation by December 2021. Although the regulation has not yet been enacted, work has been ongoing to draft the regulation. The EPR regulation would also require close engagement with relevant stakeholders in order to gain their buy-in for such a scheme. The underlying policies of the SUP phase-out plan 2020-2023 are summarized in Table 7.

Table 7. Underlying policies of SUP Phase-out Plan 2020 – 2023

Policy	Details	Key activities and potential relevance to the tourism sector
Policy 1: Ban the import, production and sale of specific SUP products	<p>Under this Policy, 9 categories of SUP products will be banned in the Maldives from 1 June 2021. These products include plastic straws, single-use plates and cutlery, Styrofoam lunch boxes, plastic shopping bags below 30 x 30 cm, PET bottles below 500 ml, single-use cups below 250 ml, cotton buds with plastic stems, shampoo and soap bottles below 50 ml, and imported areca nuts in plastic wrapping.</p> <p>A further three categories of SUP products are scheduled to be banned from 1 December 2022. These include shopping bags below 50 microns thickness, shampoo and soap bottles below 250 ml., and water in PET packaging below 1 litre.</p>	<p>The key activities under this Policy include incorporation of the banned products into the Prohibited and Restricted Items list for import, registration and declaration of existing stocks, stock clearance, and implementation of the full ban on selling and distribution by December 2020.</p> <p>The primary effect of this Policy on the tourism sector would be the ban on plastic straws, water bottles, and restrictions on allowed sizes for shampoo and soap bottles.</p>

Policy	Details	Key activities and potential relevance to the tourism sector
<p>Policy 2: Market-based instruments</p>	<p>The key tools and activities under this Policy include</p> <p>Tariffs: Introduction of a 400% tariff in June 2021 for shopping bags of more than 30 x 30 cm, raw materials for PET bottles, empty PET bottles, and mineral water in PET bottles, as well as a 400% tariff on balloons, plastic balloon sticks and SUP party decorations. This was to be followed by the introduction of a 400% tariff on shopping bags above 50 microns in thickness starting from 2022.</p> <p>Duty exemption: Exemptions covering a variety of alternative, plastic-free products introduced from June 2021.</p> <p>Levies: Introduction of an MVR 2 levy at the point of sale for shopping bags over 30 x 30 cm, balloons, plastic balloon sticks, SUP party decorations, and plastic sachets and condiment tubs from restaurants and food delivery stations. This has been followed by the introduction of an MVR 2 levy on shopping bags over 50 microns starting from 2022.</p> <p>Incentives and facilitation: This will be carried out in two phases. In the first phase, key businesses and importers engaged in the provision of plastic-free alternatives will be identified and registered. This will be followed up by the development of a facilitation and expansion programme targeting these entities.</p>	<p>The key activities under this Policy include amending the Import-Export Law, implementing the tariff and levy mechanisms, product verification, standard setting, registration of importers and businesses engaged in plastic-free alternatives, and the development and implementation of a facilitation and incentive programme for them.</p>
<p>Policy 3: Strengthening the nation-wide database and setting reduction targets for plastic packaging</p>	<p>This Policy focuses on two main strategies: strengthening national import data, and determining national reduction and collection targets by 2023.</p> <p>Under the strategy for strengthening import data, the primary focus is to enhance customs data classifications by December 2021, to better capture the flow of plastic products. As of September 2022, includes 97 HS codes of products packed in plastic packaging.</p> <p>National reduction and collection targets are aimed to be set by 2023.</p>	<p>The key activities under this Policy are to develop new Harmonized System (HS)²⁶ codes for products, and improve data management and use.</p>

26 Full form is Harmonized Commodity Description and Coding System.

Policy	Details	Key activities and potential relevance to the tourism sector
<p>Policy 4: Extended Producer Responsibility</p>	<p>This Policy involves enacting a Producer Responsibility on Packaging by December 2021, and introducing a Deposit Refund Scheme (DRS) by December 2021 as for of EPR. As of September 2022, the inclusion of EPR in the Waste Act is under Parliamentarian discussion.</p>	<p>The key activities under this Policy include the development of an EPR scheme with complementary administrative schemes such as DRS, a separate collection and transfer infrastructure for plastics, Best Available Technology Not Entailing Excessive Cost (BATNECC) for Regional Waste Management Facilities, and establishment of one recycling facility taking into account the Maldivian context.</p>
<p>Policy 5: Provision of sustainable alternatives</p>	<p>This Policy involves using regulatory, informative and economic policy instruments to address SUP in the Maldives. Most of the activities under this policy are geared towards the water sector.</p>	<p>In addition to activities targeted at the provision of safe, potable water using plastic-free alternatives, this Policy also covers activities that will see the mandatory provision of certain products in the tourism, transport and retail sectors, such as</p> <ul style="list-style-type: none"> Mandatory provision of soap and shampoo bottles above 200 ml Provision of plastic-free or reusable packaging for water, and personal hygiene and beauty products Mandatory provision of non-plastic sea sickness bags on all public and private sea transport.
<p>Policy 6: Education and Awareness</p>	<p>This Policy aims at continued education and awareness generation through targeted public campaigns and information dissemination.</p>	<p>The key activities include the development of communication and awareness plans, and conducting campaigns to contribute to the policy goals of the SUP phase-out plan.</p>

2.1.4. Other ongoing initiatives

a. International level

The Maldives participated in and is party to two international instruments related to waste and pollution control (Table 8).

Table 8. Multilateral waste-related instruments to which the Maldives is party

Instrument
Basel Convention on the Transboundary Movement of Hazardous Waste, and their Disposal
Ban Amendment
MARPOL Convention Annex V

Maldives is party to the MARPOL Convention (International Convention for the Prevention of Pollution from Ships) Annex V, and has subsequently banned the disposal of waste from vessels on the sea. The challenge remains in realizing these provisions in domestic law, and establishing appropriate monitoring and enforcement mechanisms. The disposal of waste into the ocean was consistently identified as a serious concern by various stakeholders consulted for this report. In particular, there were concerns that waste being transferred to Thilafushi is dumped enroute, and that there is a lack of capacity as well as mechanisms to monitor and track the waste being transported by sea.

In addition to the two instruments mentioned above, efforts are underway to garner support for a global plastics treaty. Such a treaty is envisioned to get commitments from governments towards a coordinated set of actions and policies, catalyze a comprehensive global effort to address the problem at scale, and help put the world on a path towards a circular economy for plastics. The objective of such a treaty would be to eliminate plastic leakage into the ocean by a specific date. Critical elements of the treaty could include:

- Harmonized regulatory standards and common definitions across markets
- Clear national targets and action plans that aggregate to deliver on the treaty’s overarching objective
- Common reporting metrics and methodologies across the plastics value chain
- Coordinated investment approaches to support infrastructure development in key markets and innovation.

b. Regional level

[PROMISE Project](#)



Prevention of Marine Litter In the Lakshadweep Sea (PROMISE) is a regional project covering India, Sri Lanka and the Maldives, funded by the EU-SWITCH-Asia Facility.²⁷ The project, seeks to promote source-to-sea solutions to reduce marine littering in tourism clusters along the Lakshadweep shorelines of the Maldives, Sri Lanka and India. It focuses explicitly on Micro, Small and Medium Enterprises (MSMEs) in contributing to the tourism sector to support it in waste minimization, thereby enhancing the attractiveness of tourism, avoiding further deterioration of marine ecosystems and improving people’s living conditions.

27 SWITCH-Asia. PROMISE. <https://www.switch-asia.eu/project/promise/>

[Plastic free Rivers and Seas for South Asia Project](#)

This is a USD 50 million project implemented by SACEP and funded by the World Bank.²⁸ The project is a regional project focused on the South Asia region. The project has three components: 1) supporting competitive block grant investments to reduce plastic waste; 2) leveraging public and private sector engagement solutions; and 3) strengthening regional integration solutions.

[Clean Cities, Blue Ocean \(CCBO\)](#)

This is a USAID project²⁹, which has provided grants to two local NGO, Small Ideas Geographic Society (SIGS) and Namoonaa Baa. The objectives of CCBO are to: 1) develop, test and implement new models that promote reducing, reusing and recycling (3R) practices and enhance solid waste management; 2) facilitate partnerships and investment around key needs, such as infrastructure; and 3) strengthen local systems to build the Maldives' resilience and self-reliance.

c. National level

This section covers the list of ongoing donor-funded projects related to sustainable waste management and single-use plastics in the Maldives. Table 9 provides the details of the project funding to establish waste management infrastructure across the country.

Table 9. Waste management infrastructure projects

Regional Waste Management Center	Targeted region	Geographical coverage	Donor agency
R. Vandhoo	Zone 1 and 2	Upper North and North Region	OPEC Fund for International Development (OFID) and the World Bank
K. Thilafushi	Zone 3	Greater Malé Region	Asian Development Bank (ADB)
To be defined	Zone 4 and 5	Upper South Region	World Bank
S. Hithadhoo	Zone 6 and 7	Southern Region	International Renewable Energy Agency (IRENA) – small scale waste to energy component

In line with the existing framework for phasing out plastics, Government of the Maldives has already initiated or taken certain steps, for example:

- Amended Import-Export law to take into account the SUP Phase-out Plan
- Introduced duty exemptions for environmentally friendly alternatives to SUPs
- Introduced tariff and levy systems on certain SUP products
- Enacted National SUP Phase-out Regulation
- Formulated a legal framework to regulate and promote circular economy for different sectors in the Maldives by 2030
- Legislation on Producer Responsibility on Packaging under discussion as part of the Waste Act (status August 2022).

28 SACEP Plastic free Rivers and Seas for South Asia Project. <http://www.sacep.org/programmemes/plastic-free-rivers-and-seas-for-south-asia>

29 USAID. Clean Cities, Blue Ocean: Maldives https://www.usaid.gov/sites/default/files/documents/USAID_Maldives_EV_08-2021_-_Clean_Cities_Blue_Ocean.pdf

2.2. Mapping of the stakeholders

2.2.1. The mapping

There are a number of key stakeholders in the waste management space. The stakeholders, together with their mandate and key roles are summarized in Table 10.

Table 10. Key stakeholders, their mandate and key role SUP and other plastic waste in management

Entity/Agency	Mandate and key roles
Policy and regulatory functions	
Ministry of Environment, Climate Change, and Technology	Formulate and enact policies, develop and implement the legislative and regulatory framework, undertake projects and measures in the sectors of environment protection, waste management and pollution control, climate change , energy, water and sanitation, meteorology, and science and technology
Maldives Customs Service	Administer/enforce the laws and regulations related to customs and the movement of goods through Maldivian borders
Environmental Protection Agency	EPA is the regulatory entity for environmental protection, conservation, and environmental impact assessment. EPA also has regulatory functions related to the waste management sector, in particular through setting standards and guidelines.
Utility Regulatory Authority	URA is the entity responsible for regulating and monitoring utilities provided to the public, including water, sewerage, electricity and waste management.
Maldives Food and Drug Authority	MFDA issues licenses to and conducts audits of the food industry as well as regulates the production and packaging of food and beverages in the Maldives.
Collection and service delivery	
Waste Management Corporation	WMC is a state-owned enterprise established to provide sustainable waste management services. Currently, its activities are focused in the Greater Malé Region, and include the collection of household waste and management of the <i>Thilafushi</i> landfill site.
Island Councils	Under the Decentralisation Act and the Waste Management Regulation, island councils are provided the mandate for oversight of municipal services, including waste management.
Producers / importers	
Producers	Production of plastic water bottles
Importers/wholesalers/retailers	Import of fast-moving consumer goods, and goods with plastic packaging
Enabling businesses	
Businesses providing alternatives	Suppliers of SUP alternatives such as water purification systems and alternative packaging Local entrepreneurs providing local and innovative solutions to SUP alternatives

Business Centre Corporation	BCC is a state-owned entity involved in providing support to small and medium enterprises (SMEs), conducting programmes to promote innovation, and providing services and facilitating financial support to SMEs.
SME Development Finance Corporation	SDFC is a state-owned specialized financial institution providing financial products and ancillary services to MSMEs and entrepreneurial start-ups with the primary purpose of easing access to finance for MSMEs.
Information dissemination, awareness and community mobilization	
Non-governmental organizations and community-based organizations	These organizations engage in advocacy and awareness raising in the community and implement community-based projects. They also carry out monitoring and reporting of environmental issues across the country.
Media organisations	Support dissemination of key messages and information to the public and play a key role in awareness raising.

2.2.2. Stakeholder collaboration

Stakeholder collaboration with regard to plastics management remains largely ad hoc. This results in fragmentation and a lack of coordination in efforts amongst all relevant stakeholders. Although a Plastics Committee was constituted to draft the SUP Phase-out Plan 2020-2025, the Committee has not continued to function regularly following the finalization of the Plan.



EU SWITCH-Asia's PROMISE Project

3. Good practices for waste prevention and minimization

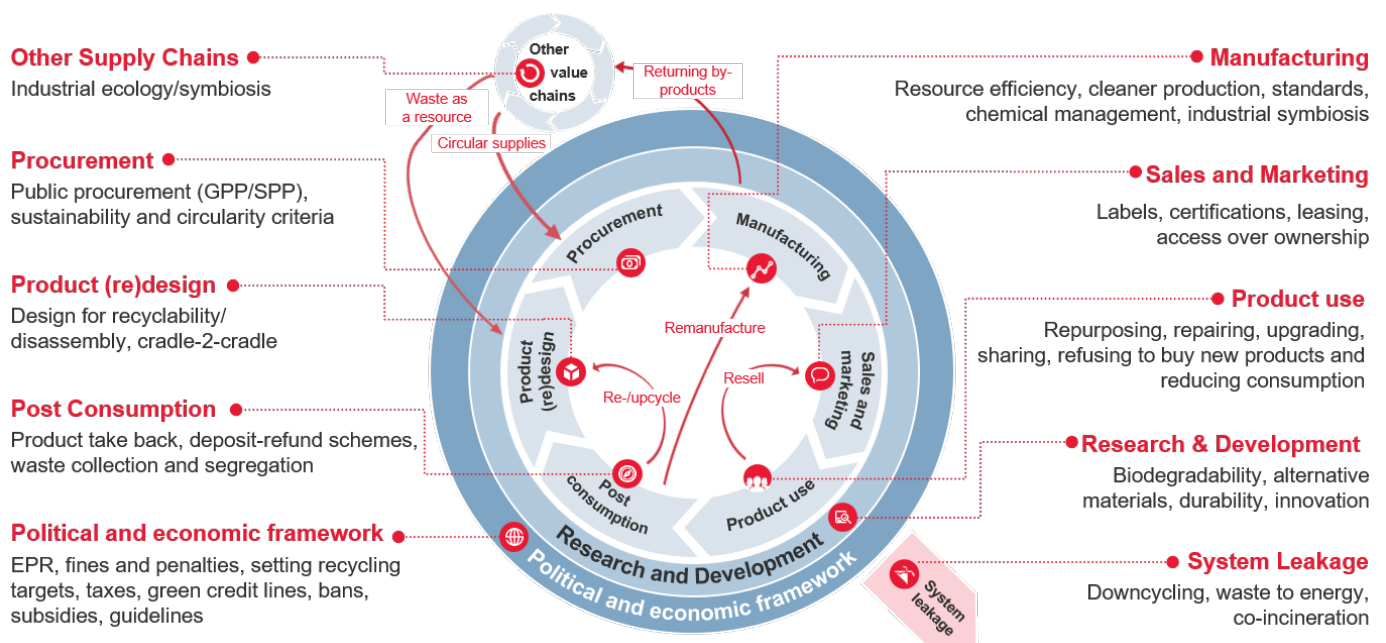
3.1. Circularity opportunities and solutions

Good practices for waste prevention and minimization linked to circularity opportunities can be identified from an analysis of the Circular Economy (CE) framework for plastics (Figure 4). In the Maldives, SUP pass through all stages, from design, procurement of materials, manufacturing, sale, use, post-consumption, to disposal (including leakage from their life cycle). The framework also covers political and economic instruments, the technology, and research and development.

Higher levels of circularity opportunities are present in processes of product design (redesign), resale, remanufacture, recycle/upcycle, reuse aimed at shifting to circular supplies, recovery after disposal, increasing resource efficiency, extending plastic lifetime and providing product-as-service business models. Lower levels of circularity can be seen on the downstream processes of value chains and good waste management practices. It should be noted that downcycling by waste-to-energy schemes, incineration and dumping or landfilling are not circularity solutions because valuable materials are lost from the system.

The CE strategies, thus, can be categorized into several groups: (1) increasing resource efficiency (through reducing plastic packaging); (2) recovering after disposal (if plastic packaging waste cannot be prevented); (3) extending the lifetime of plastic packaging (e.g., the user refilling a bottle repeatedly over an extended period); (4) providing plastics packaging as a service (ownership shift, bottle in service of the customer but owned and refilled by company); (5) shifting to circular supplies (use of alternative materials); and (6) facilitating demand for a circular plastics economy. Each strategy consists of possible technical solutions, and employs economic, regulatory, voluntary and informational instruments.

Figure 4. The Circular Economy framework for plastics



(Source: adelphi research GmbH)³⁰

30 <https://www.adelphi.de/en>

3.2. Enabling policy practices and instruments

There are different instruments that correspond to the CE strategies (Figure 5). These are grouped into regulatory, economic, voluntary and informational. The roles of consumers, even though not explicitly indicated, are embedded in most instruments (e.g., taking part in plastic sorting, collection, take-back-system, observation) given that without their involvement those instruments cannot be implemented successfully. For example, to facilitate demand for circular plastic economy, the acceptance by consumers of recycled products or products with recycled parts is crucial. It can be achieved through awareness raising about recycling, recycled products, and circular economy.

Table 11. CE strategies and their corresponding instruments

CE strategies	Regulatory / planning instruments	Economic / fiscal instruments	Voluntary instruments	Informational instruments
Reduce Plastics input	<ul style="list-style-type: none"> Waste management plans Best Available Technology (BAT) regulation Eco-design regulation 	<ul style="list-style-type: none"> Tax relief for reduced industrial plastics waste Resource Efficiency Credit Facilities Landfill tax 		<ul style="list-style-type: none"> Cleaner Production Centre's Capacity Building Programmes on packaging eco-design
Recover after disposal	<ul style="list-style-type: none"> Implementation of national EPR schemes for plastics in packaging Single use plastics bans Implementation of national norms for recycled plastic (e.g. use of local materials for construction) Formalisation of plastic packaging waste picker and collector communities 	<ul style="list-style-type: none"> Sustainable public procurement (e.g. recycled plastic in urban furniture) Tax on single use plastic bags Tax incentives for recyclers Circular Credits for informal waste pickers 	<ul style="list-style-type: none"> Public private partnerships for recycling technologies Voluntary EPR schemes Voluntary deposit systems Voluntary private schemes 'alternatives to single use plastics' Municipal waste separation and collection partnership with informal waste picker cooperatives 	<ul style="list-style-type: none"> Guidelines for municipal domestic waste separation Guidelines for alternatives to single use plastics Information centres or help desk for collectors, pickers, separators, recyclers Eco-labelling schemes for separation Awareness raising campaigns
Extend the life-time of plastics (packaging)	<ul style="list-style-type: none"> Implementation of national EPR schemes for plastics in packaging 	<ul style="list-style-type: none"> Sustainable public procurement Deposit systems 		
Provide plastics (packaging) as a service		<ul style="list-style-type: none"> Open Innovation Challenges Municipal grant schemes Crowdfunding schemes 	<ul style="list-style-type: none"> Eco-entrepreneur business development programmes in partnership with business support organizations 	
Shift to Circular Supplies		<ul style="list-style-type: none"> Sustainable public procurement Subsidies for alternatives to plastic packaging material 	<ul style="list-style-type: none"> Partnership for alternatives to water sachets (drinkable water fountains) 	<ul style="list-style-type: none"> Guidelines for alternatives to plastics packaging

CE strategies	Regulatory / planning instruments	Economic / fiscal instruments	Voluntary instruments	Informational instruments
Facilitate demand for circular plastics economy	<ul style="list-style-type: none"> Standardized recyclate quality Public procurement procedures in favor of recycled products 	<ul style="list-style-type: none"> Economic incentives to promote the use of recyclates Funding for research and development of new technologies 	<ul style="list-style-type: none"> Voluntary basis/ agreement on providing data and information. 	<ul style="list-style-type: none"> Certificates and labels for products made of recycled plastics

(Source: adelphi research GmbH)

Based on CE framework strategies and their corresponding instruments, the following section provides an analysis of the CE opportunities within the context of the Maldives.

3.3. Analysis of circularity opportunities in the Maldives

3.3.1. Challenges towards circularity options

The major factors and challenges identified in the reduction of single-use plastics can be clustered around legislative framework and incentives, capacity and institutional mechanisms, capacity building, availability of substitutes to plastics, and implementation. Table 11 summarizes the relevant factors associated with the identified challenges and the corresponding opportunities for SUP and waste management in the Maldives.

Legislative framework and incentives: Currently, the framework related to waste management contains inconsistencies in terms of the objectives being pursued. In this regard, the promotion of incineration options does not align with efforts towards reduction of waste generation. One reason might be the lack of monitoring and evaluation mechanisms in the policies and plans. As such, there is a possible tension between the goals pursued and the subsequent signals sent to the market and the public. Revisiting and reconsidering the outcomes being pursued through various policies may help to integrate and concentrate the efforts towards waste management.

Additionally, various market and non-market-based instruments need to be activated in order to address the plastics issue in the Maldives. However, getting the right mix of incentives and disincentives is key to putting in place policies that work. Consultations with producers suggested a limited appetite for additional taxes on plastic products, and therefore, further taxation may be difficult to impose. A route being utilized through the SUP Phase-out Plan is introducing targeted bans on certain products. Although bans are relatively new, limiting the availability of single-use plastics can be an effective way to reduce plastic consumption. Furthermore, the lack of integration of monitoring and evaluation mechanisms into policies and plans also makes it difficult to track the progress, review, and address implementation challenges.

Capacity and institutional mechanisms: A lack of demarcated roles and of clarity on the role of local councils, responsibilities and regular coordination mechanisms affect the implementation and enforcement of various policies and regulations related to plastic waste management. In particular, the role of local councils needs to be further clarified and the councils empowered.

Stakeholders consulted pointed out that the most challenging issue is the lack of comprehensive data and basic guiding documents on waste management. For example, data on the amount of plastic and biodegradable bags, and transported waste is requested from and collected by the resorts, but only on an irregular basis as a result of ad hoc requests. This data is mostly collected manually and not recorded in a centralized system. Since all institutions consulted for this report expressed similar experiences regarding the data management system, it is evident that the establishment of a centralized system could benefit the different government bodies and state agencies simultaneously. In order to have uniform and reliable data collection in the future, a tracking system is to be established by the government in the next two years, into which other stakeholders such as WAMCO and tourist resorts will feed their data. However, even if a system for data collection is established, the authorities lack the capacity to analyze the data and give appropriate policy advice based on the results.

When dealing with plastic and other waste, it is obvious that there is a lack of adequate infrastructure and insufficient funding for waste management. The Maldives' context clearly shows there is no "one-size-fits-all" solution. Promoting waste segregation at source, improving waste management capacity and infrastructure are sorely needed.

Capacity building: The stakeholders consulted for this report noted that in addition to technology, infrastructure and human resources, awareness building too was urgently needed. They recommended that instruments like green taxes must be applied for the right purposes, incentives can be set and priorities changed by taxing environmentally friendly products more favourably, and shifting to local products to overcome the high dependence on imports. Awareness raising to change the unfavourable perception towards using piped water is also required. In addition, capacity development for legislation enforcement is required to overcome the weakness in that area.

Availability of substitutes for plastics: The tourism sector has the leverage to disrupt prevailing supply chains, thereby helping curb the import of single-use plastics; for example, by purchasing unpackaged products, especially in the hygiene sector. To influence the existing supply chains, however, needs a lot of motivation from the tourism sector. The availability of alternatives was noted as a significant barrier. Whilst the market has catered for some products such as straws and bottles, concerns remain regarding safety, pricing and availability of substitutes for other products such as those used in food and beverage packaging. The pandemic led to an increase in food deliveries and take out, which led to an increase in the use of plastics in the food and beverage industry. Industry stakeholders such as restaurant and cafe owners, and local food producers and vendors highlighted that the price of alternatives was the primary hinderance to adopting alternate options. The plastics used in the industry are currently treated in the same manner as general waste, with the industry externalizing the management of its waste to the wider community. Internalizing the costs and responsibilities by the industry would help to reduce its reliance on plastics. Nevertheless, given the financial impact of the pandemic on the industry, at present it has little interest to adopt measures that would add extra costs. Measures that provide incentives and other forms of support to offset or mitigate the cost of adopting alternatives are therefore required. The issue also ties into awareness, and demand from the public for alternatives.

Given the heavy reliance in the Maldives on bottled water for drinking, a switch to piped water would have a significant and quick impact on reducing plastic consumption. The market already has alternatives such as water filters that improve the taste of piped water and can help assuage misconceptions about its quality. This issue also demonstrates that sometimes the problem is not the availability of substitutes but a lack of awareness, which needs to be addressed through targeted campaigns. Coupling this with incentives to adopt such alternatives could also help to increase the uptake.

Implementation: Challenges with regard to plastics management in the Maldives are an outcome of the aggregation of various cross-cutting issues such as the data landscape, lack of clarity on roles and responsibilities, and the lack of coordination, human resources and financial capacity. All this hampers the implementation of various policy initiatives. Mechanisms to monitor and evaluate policies are currently not in place, partly because of a lack of focus on goals and the ultimate outcomes being pursued.

Although the SUP Phase-out Plan was drafted by a committee, its representativeness has been questioned by some stakeholders. It would therefore be useful to initiate a Multistakeholder Coordination Platform for the implementation of the SUP Phase-out Plan and the systematic development of a sustainable waste management system. An intersectoral and interinstitutional Working Group comprising relevant stakeholders from the government, private sector and trade would facilitate discussion and exchange on details of implementation of the Plan.

3.3.2. Opportunities for a circular plastics economy

Moving decisively towards more sustainable plastics use, a circular economy could deliver considerable benefits. There is a need to promote investment in innovative solutions and turn today's challenges into opportunities. In this regard, a focus on smart and innovative solutions that take into account design and production features to facilitate reuse, repair and recycling can lead to a more circular economy and, by extension, reduce greenhouse gas emissions. The opportunities can be foreseen in the short, medium and long term, and aligned with different CE strategies and business models (Figure 4) and CE instruments (Figure 5). Deciding whether an opportunity belongs to the short, medium or long term depends on the

readiness of relevant aspects linked to each opportunity and its relative implementing period. The assigning tasks would need to be evaluated by the expert team. Possible opportunities are summarized in Table 11.

a. Opportunities in the short term

A number of opportunities linked to regulatory and fiscal instruments can be used in the short term, for example, revisiting and reconsidering the outcomes being pursued, reviewing the existing policy instrument, initiating incentives for alternatives to plastics, or a combination of several suitable incentives. Clarification about the stakeholders involved and their responsibilities should be done as soon as possible. SUP ban can be issued in a relatively short time when applied to certain types of SUPs, such as straws and plastic bags.

Moreover, government plans to establish piped drinking water in all the inhabited islands presents another opportunity to reduce the reliance on SUP bottles. However, the primary obstacle in this regard is the existing public concern about the quality and taste of piped water. Targeted interventions designed to increase the use of piped water can be a low hanging fruit which can quickly and significantly reduce the SUPs in the Maldives. Addressing this would, however, require action targeted at awareness raising, and at setting the standards for household pipes and plumbing.

b. Opportunities in the medium term

The largest number of opportunities belong to this group. Taking into account the policy and fiscal instruments, some interventions could be: making recycling mandatory, banning landfills on some islands, issuing policy/strategy linked to design for recyclability of plastics, providing incentives to adopt alternatives to plastics or to mitigate the costs of adopting the alternatives.

Shifting to circular supplies with alternative solutions for SUPs and providing guidelines for the SUPs aim to avoid, reduce and to find substitutes for those in daily use. Taking plastic bottlers as an example, given that 21% of locally produced plastic bottles are consumed in the tourist facilities and 34% in restaurants and cafes, closer engagement with the industry can help to reduce SUP-bottle footprint. Already several tourist resorts, liveaboards and guesthouses have embraced the use of glass bottles for water and reverse osmosis water treatment to reduce the environmental impact, and to benefit from the cost savings associated with the shift. As such, the economic and the environmental benefits can be leveraged to bring in more partners to undertake such initiatives. Although glass bottles can be used multiple times, it is important to note that the shift towards these bottles may create another, though much smaller, waste stream.

Plastic packaging is a priority area when it comes to design for recyclability. Product design is key to improve recycling levels. The design for recycling comprises less complexity of materials used, less material variations and compounds, environmentally sound printing colours, removable adhesives, and transparent (not coloured) packaging. A weak demand for recycled plastics is a major obstacle to transforming the plastics value chain. Plastics are often recycled by small and predominately regional facilities. More scale and standardization would support smoother market operation. Manufacturers need a reliable supply of materials in sufficient volume, with constant quality specifications. Resistance to change among product manufacturers and a lack of knowledge of the additional benefits of closed-loop recycled plastics have also emerged as barriers to a higher uptake of recycled material.

Awareness raising to facilitate demand for a circular plastics economy through voluntary and informational instruments, and providing incentives through fiscal instruments are considered options in the medium term, but they have positive impacts only in the long term. Consumers, as key players, should be incentivized and made aware of the key benefits of avoiding SUP waste, and thus enabled to contribute actively to the transition. Better design, new business models and innovative products will promote more sustainable consumption patterns. With better knowledge of SUPs, citizens, the government and the private sector are likely to support more sustainable and safer consumption and production patterns for plastics. This will provide a fertile ground for social innovation and entrepreneurship.

With regard to waste management at the community level, the geographical dispersal of island communities presents challenges for transportation of waste. However, because of the small size of communities, reduction and prevention of plastic waste may not require huge investments. Targeted locally-led solutions, a proper combination of different solutions from implementation to policy instruments, such as banning of plastic convenience products and mandatory plastic sorting and collection, can provide a way for communities to manage their waste. The ban and substitution of plastic packaging of convenience products will reduce the generation of SUP waste.

Regarding implementation, it is crucial to seize the opportunity to establish a centralized system for data collection, monitoring and evaluation. Without reliable data, targets for SUP and other plastic waste management will not be possible to set and achieve.

c. Opportunities in the long term

In the long term, improvement of the waste management infrastructure at the regional and national levels, through regulatory instruments, would play an important role. Although the reliance on incineration, as observed from on-going projects (section 2.1.4), may run counter to the efforts towards reduction and reuse, opportunities exist to integrate SUP reduction and prevention into the project framework of regional waste management, and strengthen the collection, segregation and processing mechanisms. The creation of sorting and recycling capacity at the atoll and island level will help to address the SUP issue and lead to the creation of new jobs. Improving collection and sorting systems could significantly increase the economics of plastics recycling. It should be noted that in order to improve waste management, reliable data collection and update on a regular basis need to be integrated into the waste management plans.

With the help of improved separation and collection, and investment in innovation, skills and capacity upscaling, export of poorly sorted plastics waste can get phased out. Recycled plastics can become an increasingly valuable feedstock for new small-scale industries. The market for recycled and innovative plastics should be promoted so that more products incorporate some recycled content. National, regional and local authorities, in cooperation with waste management operators, have a key role to play in raising public awareness and ensuring high-quality separation and collection. Financial resources collected through the EPR schemes can do much to boost such efforts. Similarly, deposit-refund systems whereby consumers get a refund on returning recyclable items, can contribute to achieving very high levels of recycling.

Together with improved waste management infrastructure, innovative and appropriate instruments to enable circularity opportunities are crucial for SUP and other plastic waste minimization and prevention. Enabling factors come from different instruments: regulatory, economic, voluntary and informational. The best solutions are the ones that are able to integrate and harmonize those instruments into one scheme or policy. In this regard, EPR seems to fit well for the Maldives' context. EPR might offer opportunities and provide finance to invest in waste management infrastructure, and for improving SUP and other plastic waste management practices.

Table 12. Influencing factors associated with identified challenges and their corresponding opportunities for SUP and waste management in the Maldives

Factor	Challenges / Issues	Opportunities	Time period
Legislative framework and incentives	Inconsistencies in terms of the outcome objectives being pursued	Revisiting, and reconsidering the outcomes being pursued through various policies to integrate and concentrate efforts towards waste management	Short
	Missing legislative framework for plastics management and enabling CE for plastics.	Introduction of an EPR scheme	Long
		Review of existing policy instruments	Short
		Mandatory recycling	Medium
		Mandatory segregation laws/enforcement of mandatory segregation laws	Long
		Landfill ban	Medium
		Ban on certain products to reduce plastic consumption, for example, ban on single use plastics	Short
		Development of a policy/strategy and guidance documents on design for recyclability of plastics	Medium
		Harmonization of policy/legislative instruments	Medium
	Lack of monitoring and evaluation mechanisms integrated into policies and plans	Development and enforcement of monitoring and evaluation mechanisms existing in policies and plans	Medium
	Inactivated market and non-market-based instruments linked to plastics issue or lack of suitable fiscal incentives	A tax on environmental performance of plastic products	Medium
		Increasing the price of plastic products	Short
		Deposit-refund schemes for plastic bottles	Medium
		Establishing a user-fee model for waste disposal (volume-, frequency- or weight-based pricing)	Medium
		Volume-, frequency- or weight-based pricing of waste with possible subsidies for appropriate behaviour	Medium
		Incentives for shift to alternatives for plastics	Short
	Getting the right combination of incentives and disincentives, for example, tax on environmental performance of plastic products in combination with incentives for shift to alternatives for plastics or increasing the price of plastic products.	Short	

Factor	Challenges / Issues	Opportunities	Time period
Capacity and Institutional mechanisms	Lack of demarcated roles, responsibilities and regular coordination mechanisms	Clarification of the demarcated roles and responsibilities of institutions linked to waste and plastic waste management, and establishment of regular coordination mechanisms	Short
	Lack of clarity on the role of local councils	Clarification of the role of local councils, and empowering them	Short
	Lack of comprehensive data and of basic guiding documents on waste management	Establishment of a centralized system for data collection and monitoring, and creating guiding documents on waste management	Medium
		Establishment of a tracking system by the government	Medium
	Weak capacity of authorities to analyze data	Increasing the capacity of authorities to manage and analyze data	Medium
	Weak capacity for policy, incentives design and advice	Capacity development for policy design	Medium
		Capacity development for design of incentives	Medium
		Capacity development of local NGOs/CSOs	Medium
	Lack of adequate infrastructure and insufficient funding to manage waste	Promoting segregation of plastics at source	Medium
		Strengthening waste management infrastructure	Long
Strengthening the organizational and management capacity for waste management infrastructure		Long	
Capacity building	Lack of awareness-raising activities and of incentives such as green taxes, EPR, alternatives to plastics, willingness to shift to local products	Training programmes, modules and activities in fields of waste management offered by universities, training institutes, NGOs	Medium
		Encouraging uptake of alternatives to plastics and using piped water	Long
		Raising awareness among and demand from the public for alternatives using different media.	Medium
		Education and information campaigns targeting personal and pro-social norms	Medium
		Behavioural change campaigns targeting plastics reduction and recycling	Medium
		Introduction of an EPR scheme	Long
		Awareness campaigns and regional and international exchanges of best practices on waste management	Medium
		Weak legislation enforcement	Capacity development on legislation enforcement

Factor	Challenges / Issues	Opportunities	Time period
Availability of substitutes to plastics	Higher price of alternatives compared to plastic products	Providing incentives and other forms of support to offset or mitigate the costs of adopting alternatives	Medium
	Same treatment of plastics used in industry as general waste, and externalizing management of plastics used in industry to community	Internalizing the costs and responsibilities by the tourism industry to reduce the reliance on plastics	Medium
	COVID-19 led to increased plastic use in food and beverage packaging	Providing incentives and other forms of support to offset or mitigate the costs of adopting alternatives	Medium
		Raising awareness and demand from the public for alternatives to plastics	Medium
	Lack of information on available alternatives	Providing information on available alternatives	Short
	Heavy reliance on bottled water for drinking	Switching to piped drinking water for a significant and quick impact on reducing plastic consumption	Short
		Providing incentives to adopt alternatives to bottled drinking water	Medium
		Using targeted campaign to increase awareness and change perception of piped drinkable water versus bottled water	Medium

Factor	Challenges / Issues	Opportunities	Time period
Implementation	Issues from lack of data, lack of clarity on roles and responsibilities, lack of coordination, human resources and financial capacity	Establishment of a centralized system for data collection	Medium
		Clarification of the demarcated roles and responsibilities of institutions linked to waste and plastic waste management, and establishment of regular coordination mechanisms	Short
		Further clarification on role and empowering of local councils	Short
		Introduction of an EPR scheme	Long
	Lack of mechanisms to monitor and evaluate policies, and lack of focus on goals and ultimate outcomes being pursued	Establishment of a monitoring and evaluation system by the government	Medium
	Absence of instrument to facilitate discussion and exchange of details on implementation of SUP Phase-out Plan	Initiating a Multistakeholder Coordination Platform for the implementation of the SUP Phase-out Plan. and systematic development of a sustainable waste management system	Short
		Introduction of an EPR scheme	Long
	Poor waste management practices at atoll and regional levels	Improvement of waste management practices with improved sorting and recycling capacity at atoll/regional levels	Long

3.4. Good practices for SUP and other plastic waste prevention and minimization

Based on the analysis of circularity options for the Maldives, this section discusses some good practices that could be replicated in the country.

3.4.1. Shift to circular supplies with alternative solutions for SUP

Several good practices aim to reduce, substitute and avoid SUP. A significant proportion of single-use items such as cups, straws and utensils can be replaced with alternatives that are more sustainable. An established global market already exists for such alternative products (for example, Faircup, Recup, Cup for Cup). Alternatives for certain items, such as metal straws and refillable bottles, are easily available in the Maldives. A local NGO, Zero Waste Maldives, also offers products such as menstrual cups. Additionally, several other NGO-led initiatives such as *Plastic Noon Gotheh*³¹ provide reusable bags in order to reduce reliance on single-use plastics.

Although such alternatives do provide an avenue to reduce the overall plastic use, the environmental footprint of these products should nevertheless be evaluated. Generally, only after a minimum of 50 cycles do such products provide a positive energy balance, and are thus considered suitable only if they can continue to be used beyond that. Additionally, the available methods of re-collection and rinsing of such products are also important factors to consider in the evaluation for adopting the alternatives.³²

3.4.2. Recovery after disposal

All bottled water packaging is 100 percent recyclable with well-established services in place to support the recycling of these containers—from widespread collection and separation to processing and end use. Many types of plastic, such as PET (polyethylene terephthalate) and HDPE (high density polyethylene), can be recycled multiple times. Plastics reclaimers wash, grind and further process plastic resin for reuse in new products. Recycled PET (rPET) is often used to make new bottles, but can also be made into fiber for other products. For every pound of recycled PET flakes used, energy use and greenhouse gas emission are reduced by 84% and 71%, respectively.³³

Decentralized recycling concepts integrated with the micro and small enterprise models are suited for the islands of the Maldives, and can generate income and employment opportunities as well. Although such models cannot entirely solve the complex SUP waste issue in the Maldives, they do have the potential to contribute to the solution, and at the same time raise awareness within the community, and provide opportunities for active NGOs and micro and small enterprises.

A good example is the *Plasticpreneur*³⁴ concept, a well-developed, decentralized, small-scale plastic waste recycling technology, which is economically affordable for local startups. The Austrian start up, *Plasticpreneur*, offers a set of affordable recycling machines (shredder, extruder, injection moulder) that are long-lasting and can be easily assembled, repaired, exchanged, transported and shipped worldwide. *Plasticpreneur* also offer support for the installation and setting up of individual businesses for local community-based initiatives.

3.4.3. Extended Producer Responsibility as CE instruments

Commonly, producers are responsible for their production process and their products' safety when in use. Extended Producer Responsibility is defined as the additional shift of responsibility for the end-of-life management of products and materials to the producers. EPR obliges producers to establish efficient collection of waste products, and manage the safe environmental treatment and disposal, and recycling of products at the end-of-life stage.

31 <https://www.maccs.com.mv/png>

32 Umweltbundesamtes. 2019. Untersuchung Der Ökologischen Bedeutung von Einweggetränkebechern Im Außer-Haus-Verzehr Und Mögliche Maßnahmen Zur Verringerung Des Verbrauchs. https://www.umweltbundesamt.de/sites/default/files/medien/1410/publikationen/2019-02-20_texte_29-2019_einweggetraenkebechern_im_ausser-haus-verzehr_final.pdf.

33 PETnology. 2010. Using recycled PET saves energy and generates less greenhouse gas: New life cycle inventory study for recycled PET and HDPE. <https://www.petnology.com/online/news-detail/using-recycled-pet-saves-energy-and-generates-less-greenhouse-gas-new-life-cycle-inventory-study-for-recycled-pet-and-hdpe>

34 <https://plasticpreneur.com/>

There are two main intentions behind the establishment of such systems:³⁵

- To share the physical, organizational and/or financial responsibility for waste management between producers and the government, thus reducing the burden on municipalities. This creates more resourceful and effective schemes increasing the end-of-life collection, environmentally-sound treatment of collected products, and waste reuse and recycling;
- To provide incentives for manufacturers to design resource-efficient and low-impact products.

The introduction of EPR has been shown to increase collection and recycling rates, and through this, can reduce the need for virgin feedstocks and lower the cost for secondary raw materials. The design and implementation of such a scheme entail:

- Materials and products included in the scheme
- Producers being subject to EPR regulation
- Obligations companies must comply with
- Organization of the EPR scheme
- Setting of collection, reduction and recycling targets
- Establishment of a fee system and guidelines on product recyclability, and on proportion of recycled material in products.³⁶

EPR can be a useful solution to improve waste collection in the Maldives, supporting activities such as waste transport that are currently too expensive. In an ideal EPR scheme for PET bottle-to-bottle recycling to occur, producers would partially or fully finance and organize the following steps to achieve high recycling rates of products:

- Collection of PET bottles and process to PET bottle bales
- Process the PET bottle bales to PET flakes
- Process the PET flakes to PET granules
- Process the PET granules to PET bottles.

Authorities can determine the quantity of PET bottles on the market and oblige producers to collect a certain percentage of these bottles, and require a certain percentage of the PET bottles to be recycled.

By shifting some of the responsibility of collection and recycling of PET bottles through EPR, the government can encourage better practices by producers such as ensuring more eco-friendly designs for their products, which would make them easier to recycle and reuse. Even though EPR is the individual responsibility of each producer, producers often deal with it collectively, forming Producer Responsibility Organizations (PROs). PROs act on behalf of the producers to organize and finance the collection of plastics.

Additionally, Deposit Refund System (DRS) can be used as a complementary administrative tool alongside EPR. DRS can achieve high collection and recycling rates of PET bottles, often with 85-90% success rates. The Malé Water and Sewerage Company (MWSC) had operated a reverse vending initiative starting in June 2018. Although the public response had been promising, the company faced two issues, 1) public awareness about the scheme was low, and 2) technical difficulties in repairing the machines. As a result, this initiative is currently not in operation. This case demonstrates the importance of public engagement as well as the need for technical and human resource capacity for implementation.

EPR schemes may either be mandated through legislation or organized through voluntary associations of producers. They may also operate in the form of either a competitive (with multiple PROs) or a monopolistic (with a single PRO) system. The choice of modality in this regard is dependent on the specific country context.

35 WWF. 2019. Position Paper – WWF Network : Extended Producer Responsibility (EPR) for plastic packaging, World Wildlife Fund, Available online: https://wwfeu.awsassets.panda.org/downloads/wwf_epr_position_paper.pdf

36 Watkins et al. 2017. EPR in the EU Plastics Strategy and the Circular Economy: A focus on plastic packaging. <https://ieep.eu/uploads/articles/attachments/95369718-a733-473b-aa6b-153c1341f581/EPR%20and%20plastics%20report%20IEEP%209%20Nov%202017%20final.pdf>

4. Findings and Recommendations

4.1. Findings

The key findings of this assignment relevant to waste management, and in particular to SUP waste management, are as follows:

4.1.1. Legislative framework

A number of limitations in the legislative framework with regard to waste management in the country have been identified. These include the lack of regulations on segregation and separate collection of waste plastics; lack of demarcated roles and responsibilities for producers, individuals, and other stakeholders; limited capacity for monitoring, regulation and enforcement; lack of solid waste management regulations and enforcement structures at the local government level; and insufficient waste management fees and the lack of full cost recovery schemes leading to poor waste management practices and capacity.

Thus, the primary barriers to SUP phase out and plastics management are the legal and regulatory framework, insufficient waste management infrastructure, missing economic instruments, and the lack of user awareness. As the problems of plastic waste, especially SUP waste, are global concerns, discussions are ongoing on formulating an international legally-binding convention to address plastics. The United Nations Environment Assembly (UNEA), in the second part of its fifth session (UNEA-5.2) held in the first quarter 2022, discussed the issue of a global agreement. UNEA-5.2 endorsed a resolution that calls for the establishment of an Intergovernmental Negotiation Committee (INC) with the mandate to prepare an international legally-binding instrument to address plastic pollution. The outcome of this process can inform the policy directions and measures of countries in the future. The Maldives will not be an exception; the influence of global trends, collaborations and agreements will have a positive effect on its plastic and SUP waste management.

4.1.2. Data collection and quality

The data on waste generation as well as SUP waste generation are generally unavailable in the Maldives. Most data available from published reports, articles and other types of publications are not up-to-date, are based on assumptions and estimations and not on real measurements. Lack of reliable and updated data on waste generation and waste composition results in poor waste management and missing recovery options, and cannot support waste management planning and policy selection.

4.1.3. Stakeholders

The shift towards modern waste treatment incorporating resource efficiency and circular economy requires clearly defined and assigned roles for stakeholder, and close collaboration among them. However, at present the roles and responsibilities of producers, individuals and other stakeholders overlap and are unclear.

4.1.4. Capacity and infrastructure

Currently waste management practices in the Maldives are limited to collection, transportation and landfill/dumping as final disposal. Reutilization of resources, thus, is lacking. For plastics, there is no dedicated facility for pre-sorting, sorting and recycling, including mechanical recycling (downcycling). High transportation costs for transferring waste from one island to another, poor quality of the collected plastic waste resulting from the lack of sorting and separate collection, and the unavailability of infrastructure for recycling makes this process generally unfeasible in the country.

4.2. Recommendations

Based on the mapping of challenges and opportunities in Table 11, a number of recommendations for SUP and other plastic waste management can be proposed. These include the improvement of the legislative framework with suitable instruments; investing in infrastructure for SUP sorting, collection, and recycling; capacity building; public awareness; law enforcement; data collection and monitoring; and long-term waste management planning, among others. For the Maldives, the most relevant and important recommendations focus on (1) data collection, (2) waste management infrastructure development, (3) policy instruments, and (4) capacity development.

The selection and prioritization of the recommended four fields of activities were based on the following criteria:

- Measures with a direct impact on local SUP issues
- Timely implementable solutions that can achieve significant results
- Measures that can contribute to the implementation of national (and international) policy instruments, e.g., SUP phase-out plan and introduction of a national EPR system
- Interventions that can improve organizational and managerial structures to deal with SUP-related issues, and can influence future decisions and plans.

4.2.1. Data and data collection

At the stakeholder interviews and technical meetings, the general lack of data in the Maldives was noted as a key challenge. This includes data on waste management (generated waste, landfilled waste, exported waste) and on import of products.

In this regard, information on the amount of generated waste is not precise or up-to-date. At the generation level the only available data relates to waste generation per person, with three different values for the city, atolls and resorts. However, these generation rates may also be outdated, and subsequently underestimate the actual waste generated in the Maldives currently.

The waste landfilled in Thilafushi is not weighed as it arrives by vessels and is directly dumped into the landfill. The data recorded is usually equal to the vessel capacity, whether the vessel is fully loaded or not. This could have created an overestimation of the dumped waste.

Additionally, since only a part of the consumed PET bottles are produced locally, the majority of SUP waste is generated from imported products. The Maldivian Customs Service has a comprehensive database with all the HS codes of products imported into the country. However, this record is not detailed in terms of product size, product content and the name of the importing company. The absence of these details makes the assessment of imported SUPs challenging.

Proposed solution

The Government, together with the Maldives Customs Service, is enhancing the classification system for imported products as one of the recommendations in the SUP Phase-out Plan. As of September 2022, the Maldives Custom Service has developed a list which contains 97 specific HS Codes for various products packaged in plastic material. These individual classification codes which allow the identification of the product by its packaging, and help determine national collection and recycling targets by 2023. This target could be strengthened via mandatory reporting, as in Singapore where it was introduced in 2019. Under a Mandatory Packaging Reporting (MPR) scheme, producers of packaged products, such as brand owners, manufacturers and importers, as well as retailers such as supermarkets, will be required to submit packaging data to an appointed authority. In the case of the Maldives the latter could be the Environmental Protection Agency.

Companies will have to provide information on the packaging placed on the Maldivian market, according to the type of packaging material (e.g., plastic, paper, metal, glass), packaging form (e.g., carrier bags, bottles) and the corresponding weights.

Mandatory packaging reporting aims to raise companies' awareness of the benefits of packaging reduction and to spur them to reduce the amount of packaging used. This will lay the foundation for an EPR scheme for plastic waste management that will be implemented in the coming years.

Proposed process

Under the MPR, a specific agency should be appointed to run the entire reporting process. This agency could be the Environmental Protection Agency, working in close coordination with the Ministry of Environment, Climate Change, and Technology. The appointed agency should identify the requirements to comply with the MPR. Suggested criteria are:

- Defining the type of packaging and SUP products that need to come under the MPR
- Identifying producers supplying goods in plastic packaging in the Maldives
- Identifying producers with a minimum turnover, which should be set by the specific authority (e.g., in Singapore the minimum turnover for this purpose is S\$ 10 million)
- Defining the reporting timeframe (i.e., quarterly, yearly)
- Identifying actions to be taken by producers to move towards circularity (i.e., reduced plastic content, higher recyclable items, etc.).

Resources needed

Resources that will be required to establish an MPR mechanism include support to develop the guidelines and reporting requirements. Additionally, familiarization of relevant stakeholders with MRP will be required prior to the scheme being made mandatory. The reporting agency would also require technical and human resource support to manage the data once it is received, and analyze it for further policy interventions.

Proposed time plan

Since the data and its management is a cross-cutting issue affecting other policy dimensions, this issue should be given a high priority. In the initial phase, developing the guidelines and technical capacity at the Environmental Protection Agency could be the focus. This could be followed up with support to roll out the MPR in the next phase.

Proposed support

The proposed support to implement this recommendation is through the provision of technical assistance to design an MRP scheme, and technical support to the Environmental Protection Agency to process and analyze the data.

4.2.2. Waste management infrastructure development

The Maldives lacks adequate infrastructure to manage various kinds of waste on the islands. Given the limited availability of land and the dispersion of islands over a large geographic area, waste management is currently inefficient. At present, there are only limited waste collection services, and waste treatment and disposal systems in the country.

Most of the available technology lacks innovation and is not small-island friendly. Additionally, the Maldives lacks the technical knowledge of operation and maintenance (O&M), which is critical for sustainably operating the waste management infrastructure.

The islands and atolls lack insufficient funding for waste management infrastructure, equipment and practices. Logistical and economic support to sustain the waste management infrastructure, too, is wanting. Furthermore, the waste management infrastructure also needs to be planned considering the growing population and increasing purchasing capacity which leads to more waste generation. Needs analysis is usually not conducted before an infrastructure project is implemented, resulting in low infrastructure capacity. In addition, those responsible for managing and operating the infrastructure lack the required know-how.

Proposed solution

To tackle the infrastructural issue with regard to plastic waste and SUP, three types of intervention should happen:

1. Promotion of segregation of plastics at source
2. Strengthening waste management infrastructure—many islands have waste collection centres too small to deal with all the collected waste. Interventions to increase the storage space can allow the local councils to store more material, ensuring continuous waste collection.
3. Strengthening the organizational and management capacity for waste management infrastructure.

Proposed process

Although household segregation was introduced in early 2022, in practice most households still do not segregate their waste. For this to happen, information dissemination to create awareness about segregation is urgently needed. In terms of infrastructure management, support to the Waste Management Corporation for operating the regional waste management infrastructure is required. This includes improving the technical capacity on O&M of the existing and planned infrastructure. Additionally, given that the Decentralisation Act provides the local councils a role in managing waste, improving the human resource capacity of local councils to plan, implement and oversee waste management aspects on the islands will be important.

Proposed actors and their responsibilities

The primary stakeholders in this process will be WAMCO, other waste management operators (if established in the future), the local councils (to provide the oversight function at the local level), the Utility Regulatory Authority (URA) (to undertake the regulatory functions), and the community and individual households.

Resources needed

The resources required for this action will largely entail technical and capacity-building support to improve the expertise on O&M of the waste management service providers, capacity building for local councils and URA to oversee the operators, and targeted social and behavioural change programmes for households to encourage segregation at home. In the long term, under a developed EPR scheme, the funds collected should be invested in the development of the key infrastructures.

Proposed time plan

Given the recent changes requiring households to segregate plastics, social and behavioural interventions are required immediately to sensitize citizens and encourage segregation. WAMCO, local councils and regulatory agencies will require a multi-year capacity development programme, given that the required capacity at these entities is generally lacking.

Proposed support

The proposed support under this action is provision of technical capacity building at targeted entities. This can include the development of guidelines and standard operating procedures, as well as human resource capacity development in the form of training and exchange programmes.

4.2.3. Policy instruments

Currently the SUP Phase-out Plan and related activities targeting plastics management are predominantly focused on single-use plastic bottles. This is largely due to the ubiquitous nature of plastics bottles and the visual impact of these bottles being dumped. Though focusing on plastics bottles can quickly reduce the amount of plastic waste, there is also the risk that this focus comes at the expense of other forms of plastics. Products such as Styrofoam, plastic packaging for consumer products and many others also require targeted actions. Additionally, focus on SUP also does not address the larger waste management issue, the inefficiencies within it that lead to mismanaged waste as well as the overall goal to reduce the generation of waste in the first place.

Considering the overall waste management system in the Maldives, establishing and implementing a user fee remains a challenging issue. For instance, in Malé households are charged a flat fee of MVR 150 per month for waste management. It has, however, been found that many households continue to not be registered for the service or pay the waste management fee.

Waste management fees can be used to generate revenue for running the system. Additionally, the fees can also be used as a targeted instrument to reduce the generation of waste.

Proposed solution

Currently, the Maldives operates a flat-fee pricing for its waste management service. A flat-fee scheme means that private households do not pay a variable price linked to the amount of waste they generate. This leads to a perception of zero marginal cost to the waste collection service, resulting in no incentives to reduce the waste they produce, or to reuse or recycle it. In contrast, a unit pricing for waste management can impose a cost on extra units of waste generated by the households. Commonly used unit pricing systems include:

- Volume-based pricing: The fee is determined based on the volume of waste collected (for instance, by number of bags)
- Frequency-based pricing: Fee is determined based on the frequency of waste collection on a specified bin or bag size
- Weight-based pricing: Fee is determined according of the weight of waste, with bins being fitted with a microchip identifying the user, and then being weighed upon collection.

A shift away from flat pricing to unit pricing will help address the inefficiencies of waste collection fees, given that the marginal price of waste disposal for the household is zero in the case of flat pricing, whereas the actual marginal cost of collection and disposal is positive. Piloting a unit pricing system can be used to inform and refine the user fee system in the Maldives. A frequency-based pricing is likely to be better suited in the context of the Maldives, and is likely to generate a higher incentive to reduce waste.

Proposed process

A change in the modality of user fee collection will be challenging. It is recommended that a pilot scheme be introduced in a selected island or locality before rolling it out. This could be integrated into the island-level waste management plans through broad-based stakeholder consultations. Stakeholder sensitization will also need to be conducted to familiarize the participating households with the goals and process of the fee modality.

Proposed actors

Depending on the locality chosen for the pilot study, this may include island or city councils. The Utility Regulatory Authority will also be a key stakeholder given that fees are approved by it.

Resources needed

Piloting of such a scheme requires substantial groundwork to sensitize the community. This entails continuous engagement with households to help them understand the goals and process of the scheme. A robust monitoring and tracking framework will also be required to measure the behavioral changes, and how the scheme affects the actual generation of waste over time.

Proposed time plan

A multi-year pilot is recommended to analyze the impact on subsequent waste generation rates. Adequate time also needs to be built into the backend of such a scheme to sensitize households and generate stakeholder buy-in, and also to develop a baseline to measure the change across time.

Proposed support

The proposed support to develop and pilot unit pricing modalities for the user fee will primarily comprise technical support to identify a suitable modality, and to track and measure the performance changes across the pilot period. In addition, communication support will be needed to sensitize stakeholders and garner their buy-in.

4.2.4. Capacity development

The Government Training Requirements 2021-2023³⁷ compiled by the Ministry of Higher Education anticipate that 247 personnel need to be trained in environmental science and environmental protection technologies at various levels. Although this analysis is not based on disaggregated data or specifics on the areas related to waste management, the requirement is counted within the environmental sector. The analysis does represent a skill gap at the government institutions and agencies.

Consultations for the current assignment identified the following areas as those requiring capacity development:

- Environmental management
- Statistics and data management
- Recycling technologies
- Management of waste facilities
- Business analysis
- Environmental toxicology and pollution
- Engineering, specializing in waste management.

The above is a preliminary analysis of where skill gaps can be found in the waste management context. A further detailed study needs to be conducted to get a clearer picture of the exact skills gaps, and the level of training required for each area.

Proposed solution

Although no training programmes specific to waste management are currently available at Maldivian training institutions, several existing programmes can provide transferable skills that can be employed in the waste management sector. These include the Bachelor of Environmental Management programme at the Maldives National University. The Ministry of Higher Education's the *Maldives: Enhancing Employability and Resilience of Youth (MEERY)*³⁸ project is currently working with the Maldives Clean Environment Project (MCEP)³⁹ implemented by the Ministry of Environment, Climate Change, and Technology, to compile training modules for waste management under the 'Waste to Wealth' theme. Once finalized, the modules may be offered through various polytechnic training institutes in the Maldives.

Proposed process

Though the training opportunities in the Maldives are limited, some stakeholders have had good experiences in collaborating with training institutions abroad to conduct online training programmes. Such modalities can also be considered for the waste management field. The modules under preparation should be used for specific training in the field of sustainable waste management, blended with practical application and internships within the concerned agencies and infrastructure projects.

37 Ministry of Higher Education. 2021. Government training requirement 2021-2023. <https://mohe.gov.mv>

38 Ministry of Higher Education. MEERY Project. <https://meeryproject.mohe.gov.mv/>

39 World Bank. Maldives – Clean Energy Project. <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/192061504721796911/maldives-clean-environment-project>

Proposed actors and their required interactions / responsibilities

The specialized courses should be integrated into the curricula and offered by the Maldives National University, Maldives Institute of Technology and Maldives Polytechnic. Under the Ministry of Higher Education, the MEERY Project with its Waste to Wealth programme and the MCEP, a collaboration for a capacity development initiative in the field of sustainable waste management can be set up to develop and continuously update the curricula.

Resources needed

Besides the technical expertise to adapt existing courses and curricula to specific training needs, a limited number of experienced trainers and experts have to be mobilized or developed. For the first batches of training programmes and a Training of Trainers (ToT), cooperation with an international training institution would be useful. Such a cooperation could achieve substantial results within two years (up to 10-person months of an experienced international lecturer in the field of sustainable waste management, four visits overseas by the selected participants to accompany the development, adaptation and implementation of the training content).

The introduction of the curricula, the recruitment of appropriate lecturers and the operational costs of the training courses could be supported in the first instance by the donor community, which should then be transitioned in a way that it remains sustainable.

Proposed time plan

Given the lack of technical and organizational expertise, the capacity development programme for sustainable waste management must be started as soon as possible. The estimated training demand for 250 personnel from the waste management agencies and operational units will increase with time when additional waste management facilities become operational. As such, at least 10 courses to train 25 participants each are required.

When conducting on-the-job training, the need to maintain staff numbers at a level that does not affect the routine operations of the agency would be critical. Training those already working in the targeted agencies will, therefore, take from few to multiple years depending on the funding available for these activities. Refresher programmes should also be integrated into this process.

Proposed support

The Ministry of Higher Education and the Ministry of Environment, Climate Change, and Technology should be supported for a detailed training needs assessment, and the development of the respective curricula. A specific training of trainers will enable the faculties of the participating institutions and external lecturers to address the subjects of sustainable waste management in the Maldivian context.

Based on these findings, a detailed plan would have to be prepared for training and resource mobilization through national implementing universities and international technical assistance agencies.

4.3. Implementation of an EPR scheme in the Maldives

The increase in SUP use, particularly in the form of water bottles, highlights the need to introduce policy and economic mechanisms that integrate the polluter pays principle to manage this waste stream. Currently, under the SUP Phase-out Plan, the government is in the process of drafting legislation on producer responsibility. This section provides a preliminary framework to guide the development of an Extended Producer Responsibility framework in the Maldives.

EPR can be described as an environmental policy which seeks to decrease the total impact of a product by making the producer responsible for its entire life cycle, including take-back, recycling and final disposal. At a conceptual level, EPR distinguishes between three types of responsibilities: physical, financial and informative. Whereas physical responsibilities are concerned with material handling, logistics and collection of waste, financial responsibilities are about the provision of funds for covering technical and administrative expenses of the system. The informative responsibilities include aspects such as awareness raising, information sharing, and monitoring and enforcement.

EPR generally involves an environmental fee that producers and importers pay to have their products, once they become waste, managed through a Producer Responsibility Organization (PRO). The PRO is as a specialized service provider for compliance management which is fulfilling legal responsibilities (physical, financial and informative) on behalf of producers. In order to fulfil these functions, it acts as a supply chain coordinator. A typical EPR scheme requires producers and importers to collectively (or as mandated by law) set up a PRO, with individual fee contribution to the PRO generally being determined by the market share of the producer/importer. This fee is used to pay to process and recycle the materials, or in instances where it cannot be recycled, to dispose of it in an environmentally sound manner.

4.3.1 Potential EPR models

The different EPR models possible are:

- **Mandatory vs. voluntary**

EPR systems can be either voluntary, with companies participating out of intrinsic motivation and interest, or mandatory, in which participation is obligatory by law for certain companies.

- **Individual producer responsibility vs. collective producer responsibility (Producer Responsibility Organization or PRO)**

Producers are usually given the option to fulfil their responsibility individually or collectively. Individual collection may imply, for instance, that producers set up their own take-back systems. On the other hand, producers may also choose to join a collective scheme, usually in the form of a Producer Responsibility Organization.

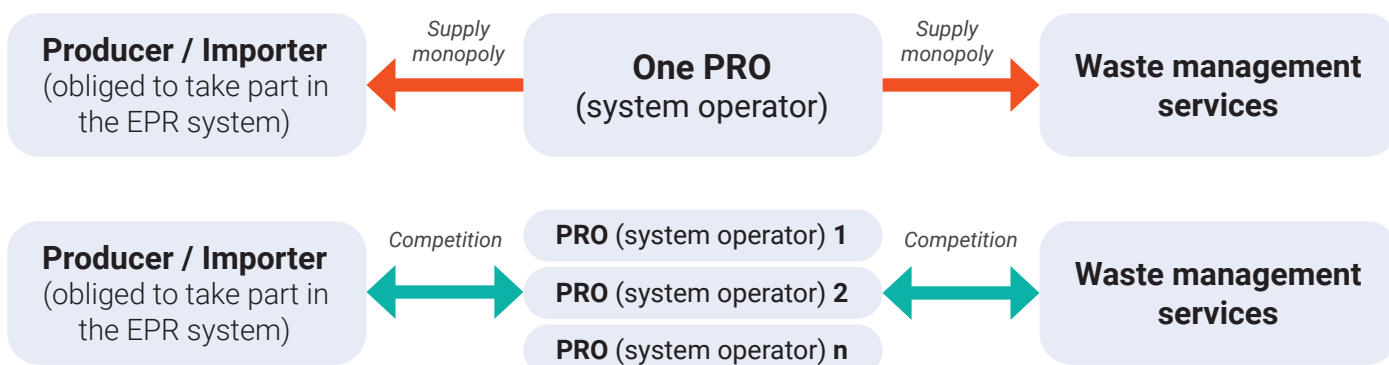
- **EPR for all packaging versus selected packaging**

In the EPR scheme for all packaging, all packaging materials are system-relevant. Thus, the PRO has to set up and operationalize a system for all materials like plastics, paper and cardboard, metals, glass, and all composites and beverage cartons. In contrast, in EPR for specific packaging only certain, selected packaging is system-relevant, such as only plastics (further distributed to specific types of plastic in the EPR Maldives case) meaning that the producers and importers only need to pay an EPR fee if their packaging is made up of this specified material. This can lead to undesirable substitution effects if producers and importers substitute their packaging material with materials for which they do not need to pay.

- **Single and multiple PROs (Monopolistic versus competitive schemes)**

Even when deciding on setting up a PRO, there are different scheme structures to be considered. Single (monopolistic) PRO means that one organization (PRO) coordinates collection and recycling in a centralized system. Multiple (competitive) PRO means that many organizations (PROs) compete for customers (i.e., producers) to coordinate collection and recycling in a decentralized system.

Figure 5. EPR scheme structure showing single and multiple PROs



Source: WWF, 2020

4.3.2 Stakeholders in the Maldives' EPR scheme

A key component of establishing an EPR scheme is to delineate responsibilities and distribute costs. In this regard, the Table 12 provides a summary of existing relevant stakeholders, and their anticipated roles in an EPR scheme in the Maldives.

Table 12. Stakeholders, their mandate and roles in EPR scheme in the Maldives

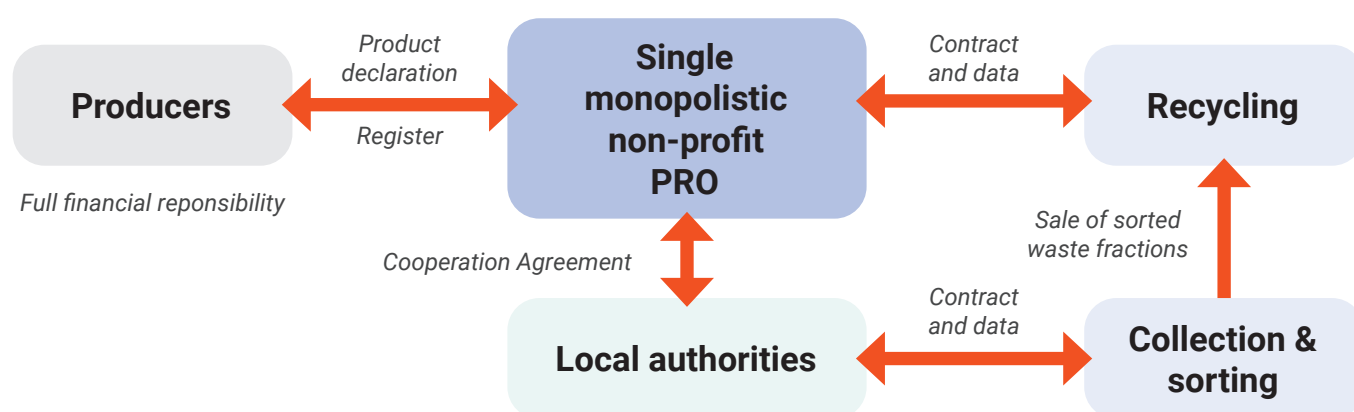
Entity/Agency	Mandate and key roles	Role in EPR
<i>Policy and regulatory functions</i>		
Ministry of Environment, Climate Change, and Technology	Formulate and enact policies, develop and implement the legislative and regulatory framework, undertake projects and measures in the sectors of environment protection, waste management and pollution control, climate change, energy, water and sanitation, meteorology, and science and technology	As the primary policy maker in the environment and waste management sector, the Ministry will develop the required legal and regulatory instruments, or set targets
Maldives Customs Service (MCS)	Administer/enforce the laws and regulations related to customs, and the movement of goods through Maldivian borders	MCS can also be leveraged to collect and collate data and information related to the movement of plastic products to further inform policy development
Environmental Protection Agency	EPA is the regulatory entity for environmental protection and conservation, and environmental impact assessment. EPA also has regulatory functions related to the waste management sector, in particular through setting standards and guidelines	As a regulatory body involved in establishing standards and guidelines, it can be leveraged as a reporting entity to track and monitor the performance of producers/importers The agency can also be leveraged to develop technical guidelines and standards
<i>Collection and service delivery</i>		
Waste Management Corporation (WAMCO)	State-owned enterprise established to provide sustainable waste management services. Currently, the activities of the company are focused in the Greater Malé Region, and include the collection of household waste and the management of the <i>Thilafushi</i> landfill site	As the service-delivery entity operating in the largest urban area in the country, the company handles a large share of the total waste generated in the country It is involved in the collection as well as the final disposal of waste

Island councils	Under the Decentralisation Act and the Waste Management Regulation, island councils are provided the mandate to oversee municipal services, including waste management	The councils are involved in the collection as well as final disposal of waste
<i>Producers / importers</i>		
Producers	Producers of plastic water bottles	Compliance with EPR targets, as well as form partnerships to achieve these targets
Importers/wholesalers/retailers	Importers of fast-moving consumer goods, and goods with plastic packaging	Compliance with EPR targets as well as forming of partnerships to achieve these targets

4.3.3 Potential modality of the EPR scheme in the Maldives

Discussions with stakeholders for the current assignment also looked into potential modalities of an EPR system that would be practical for the Maldives. The Figure 6 provides the potential mechanism to organize an EPR scheme in the country.

Figure 6. Suggested EPR scheme for the Maldives



The stakeholders consulted leaned towards monopolistic and collective approach, with a single assigned PRO coordinating the collection and recycling in a centralized fashion with a non-profit approach. Given the relatively small volumes of plastic waste generated across the communities, such a monopolistic approach may be better suited as it would allow the organization to keep its overheads low through coordination and integration. The producers could then work collectively to exert their responsibility and mandate the PRO coordination.

Additionally, a mandatory approach through dedicated legislation would be required to support the EPR scheme in the Maldives. Given the stakeholder landscape in the Maldives with a concentration of a small number of competitive producers and importers as well as the urgency applied to the plastics issue, mandating EPR would yield better success insofar as it gives predictability to competitors and helps mobilize the realization of the scheme quickly.

The implementation of an EPR scheme would require the introduction of a PRO into the waste management sector. The PRO would coordinate with island councils and WAMCO in the collection of waste, with designated industries paying fees to the PRO based on the amount of material footprint they have on the Maldivian market.

The implementation of the EPR scheme is also dependent on the capacity of waste management authorities, and the establishment of recycling and material recovery facilities. With these facilities in place, the PRO would be able to contract recyclers and material recovery facilities to handle the incoming waste. This would also involve additional financial flows in terms of transport costs to the material recovery facility or collection centre, and payment of the price gap to recyclers. As there are currently no recycling facilities in the Maldives, for now the contracts for recycling will involve recycling facilities abroad.

Table 13. Financial burdens and benefits of EPR for stakeholders

Stakeholder	Responsibility	Outputs	Costs	Benefits
Local authorities (including WAMCO)	Collection	Source segregated plastic	Collection costs Administration costs Pre-sorting	Financial compensation from PRO
PRO	Ensure recycling rates	N/A	Financial compensation to local authorities Service fee to sorters (Materials recovery facilities - MRFs) Disposal of residues Operating expenses	Environmental fee from companies Sale of plastic bales to recyclers
Collection and sorting (MRFs)	Sorting	Sorted bales	Capital expenses Operating expenses	Service fee from PRO
Recyclers	Sorting, shredding, compacting etc.	Flakes or granules	Capital expenses Operating expenses Purchase of bales from PRO Disposal of residues	Sale of flakes/ granules
Producers	Financial responsibility for the plastics	N/A	Environmental fee to the PRO	Compliance with recycling targets

Ultimately, the success of the EPR scheme would be dependent on engagement with the stakeholders, and getting their support and buy-in. Table 13 lists some of the financial costs and benefits of EPR for stakeholders. Generally, the private sector in the Maldives comprising importers and wholesalers have tended to be reluctant to engage in discussions related to waste management. In such a situation, outreach and communication would be the key to design and deploy a successful EPR scheme in the country.

4.3.4 Potential rollout and timeline for EPR

Given the several systemic challenges present regarding waste management in the Maldives, a gradual introduction of the EPR concept may be required.

A Mandatory Packaging Reporting (see section 4.2.1 for its rollout) could pave the way towards a structured data collection system, which is the basis of an established EPR. This process could take from two to three years for the industry to comply with the mandatory reporting, by which time they would develop a good understanding of the plastic market size.

With a robust Mandatory Packaging Reporting established, a comprehensive legislation on EPR could be introduced. As a first, a PRO could be mandated to collect higher market value plastics (i.e., PET and HDPE), while other reduction initiatives should be rolled out to address non-recyclables/difficult to recycle materials such as composite plastics packaging. This process would require another two to four years before the entire industry joins and supports the PRO activities. When that happens, all the other packaging materials can be included in the EPR scheme with the entire industry contributing to the plastic waste management in the Maldives.

4.3.5 Potential challenges to introducing EPR in the Maldives

High transportation costs: The cost of transporting collected waste to MRFs and recycling facilities are typically high. The geographical insularity of the Maldives and its dispersed population could add to the transportation costs.

Limited waste collection services: It may be difficult to develop waste collection services and the required infrastructure for waste management, especially in rural areas. Multiple factors cause rural areas to be overlooked by formal waste management. These are geographical boundaries, scattered housing, low inhabitant densities, low household incomes,, long distances from urban areas and high transportation cost. In the Maldives, most of the islands still do not have a structured collection service.

Limited number of facilities to accept certain types of plastic waste: Some plastics, especially multi-layer plastics, are challenging to recycle. Given that the Maldives does not have recycling facilities, linking up with facilities abroad that can accept various types of plastics will be important to enhance the success of a potential EPR scheme.

Free-riding: Depending on the EPR modality selected and how the producers/importers are identified, if there are categories of producers/importers exempt from the EPR scheme but they are responsible for a substantial share of the plastic products being used, it may affect the integrity and stakeholder buy-in to the scheme.

Although EPR schemes are envisaged to cover the entire life cycle of products, implementation of EPR schemes have largely focused on the end-of-life aspects of products. The upstream and design changes that lead to reduction of plastics are not easily realized through EPR schemes. As such, EPR schemes may sometimes lose their focus on prevention, reduction and reuse stages of the waste hierarchy.

This issue may be particularly pertinent to the Maldives given its high dependence on imports. An EPR scheme implemented locally may not necessarily lead to the desired changes in the upstream and design aspects of products that would avoid the creation of plastic waste in the first place. Additional measures may be required to complement the EPR scheme to incentivize either the desired upstream changes, or reduce plastic proliferation through promotion of alternatives and avoidance strategies.

5. Conclusions

Plastics and plastic waste remain a pressing issue for the Maldives. An increase in the use of plastics and the mismanagement of plastic waste threatens the natural environment of the country. This could have disastrous implications for the socio-economic well-being of the country given its reliance on the environment for tourism, fishing, food security and the way of life of its citizens.

To protect the ecosystems of the Lakshadweep Sea, marine plastics pollution in the Maldives needs to be halted urgently. The coral atolls of the Maldives have highly biodiverse ecosystems and unique natural features. In addition to their inherent value as natural capital, pristine nature is the main source of attraction for high-value tourists. Yet the atolls are now under threat from unsustainable consumption patterns and a lack of effective waste management. Current practices also threaten the livelihoods of local fishermen. Tourists and the tourism sector as well as the more affluent inhabitants of the urban centre, Malé, are among the strongest drivers of plastics use.

A move away from reliance on plastics, and preventing or reducing plastic waste requires addressing the issue at various levels. Discussions with the key stakeholder for this assignment identified the lack of data collection, poor waste management infrastructure, lack of policy instruments and the need for capacity development as the main challenges. For the successful implementation of the SUP Phase-out Plan, these issues need to be addressed with urgency.

The implementation of the above recommendations will be subject to the availability of resources as well as coordination and collaboration amongst the stakeholders. For example, the introduction of an Extended Producer Responsibility scheme can be a suitable mix of policy and economic tools thereby helping to address the systemic issues of plastic proliferation and waste management in the Maldives.

The commitment from the government of the Maldives to address SUPs and implement the SUP Phase-out Plan provides a good foundation for responsible plastics management, and demonstrates the political willingness to address the issue holistically.



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