Plastic Pollution Case-study: Barbados

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Summary:

- Plastic pollution constitutes a major threat to the sustainable use of the resources on which Barbados relies heavily for tourism and fishing.
- Political, economic, and social stability have given Barbados a relatively high standard of living, contributing to a heavy concentration of marine litter.
- The island's attempts to regulate plastic waste are part of its strategy to be a regional and global leader in ocean protection.
- Barbados' policies which influence the management of ocean plastics are anchored primarily in waste management.
- One critical legislative intervention to date is the *Control of Disposal Plastics Act,* 2019.
- The Act was passed as a mechanism to curb single use plastics by banning imports and their distribution, sale, and use. However it contains a relatively large number of exemptions including many types of plastic packaging.
- The various regulatory frameworks will need to be complemented with an education and awareness policy aimed at catalysing attitudinal and behavioural change to be truly effective.

Introduction

Plastics are an inextricable part of modern life. However, many of the same properties which make plastics indispensable to humans, also make them serous environmental threats (Smith and Vignieri, 2021). The advent of pollution from macroplastics through nanoplastics has metastasised into an environmental issue of international proportions. Pollution from marine plastics, which results from both direct and land-based pollution, has been found in a variety of receptors including ecosystems (Lusher *et*. *al*., 2015; Bergmann *et*. *al*., 2019), the atmosphere (Zhang *et*. *al*., 2020; Vianello *et*. *al*., 2019), the sea (Bergmann *et*. *al*., 2017), beaches (Coe *et*. *al*., 1997), marine trophic pathways (Lusher *et*. *al*. 2017) and other food chains (Shruti *et*. *al*., 2020; Hernandez *et*. *al*., 2019; Cox *et*. *al*., 2019). As a result, ocean plastic pollution impacts coastal marine environments, their inhabitants and ultimately, the food and nutrition security of *Homo sapiens*. Recent studies also suggest that ocean plastics have created a unique 'plastisphere' where a unique home for specialised organisms, from animals that travel on it to bacteria that 'eat' it (Thomas, 2021).

Context & Marine Pollution Policy in The Caribbean Region

Small Island Developing States (SIDS) such as those which predominate the Caribbean Region, are often exposed to concentrations of plastic litter that are disproportionate to their own consumption and population (Lachmann *et*. *al*. 2017). Studies suggest that of the top thirty plastic polluters *per capita*, ten are from the Latin American and Caribbean region (Ita-Nagy, Vázquez-Rowe and Kahhat, 2021; Clayton *et*. *al*., 2020, Ewing-Chow, 2019). As a result, the SIDS Accelerated Modalities of Action (S.A.M.O.A) Pathway identified the need for addressing marine pollution by developing effective partnerships (including through the development and implementation of relevant arrangements, measures, instruments, and through the sharing and implementation of best practices) to manage waste, and promote sustainable development of the ocean-based economies of SIDS for fisheries and aquaculture, coastal tourism, seabed resources, and renewable energy (Article 58, 2014 S.A.M.O.A. Pathway). The Region is characterised by open economies, with relatively few industrial, manufacturing or agro-processing sectors. Caribbean states however are net importers of products, including substantial amounts of plastics in the form of packaging (Plastic Packaging Facts, 2013). Along with abandoned, lost, or otherwise discarded fishing gear (ALDFG) (Matthews, 2009), ocean plastics are increasingly contributing to a Caribbean marine litter hotspot (Law *et*. *al*., 2010).

Based on the data on the average proportion of waste composition generated in selected states in the [Wider] Caribbean Region (WCR), plastics contribute to 12 % of the Region's marine waste (Diez *et*. *al*., 2019). The root problem of the Caribbean's ocean plastics pollution is inadequate waste disposal, since plastics are discarded as wastes directly into waterways, or on land, where they subsequently find themselves into waterways (World Bank, n.d.; BBC, 2017; Law *et al*. 2010; do Sul and Costa, 2007). The emergence of plastics into the freshwater and marine environment is of grave concern, as ninety-two percent of marine litter in the Caribbean originates from land-based sources, as compared with a global average in 2014 of eighty-two percent (UNEP, 2019). Therefore, even though the Caribbean produces a negligible proportion of the plastics globally, it is a net generator plastic waste significantly above the global levels. In addition to land-based plastics, ALDFG is the largest sole contributor of plastic pollution directly to the marine environment and has been identified as a threat to non-target organisms through ghost-fishing (UNDP Barbados and the Eastern Caribbean, 2020; Lusher *et al*. 2017;

NOAA 2015). These are significant concerns, as the Caribbean Sea is recognised as a special area (Article 141, 2001 Revised Treaty of Chaguaramas; Articles 1, 2 & 3, 1983 Cartagena Convention), and is a primary trans-shipment route and a major gateway to transporting cargo (Caribbean Development Bank, 2018). The Caribbean's marine environment and its biodiversity – primarily within the context of the sustainable blue economy – are the linchpin of the region's socio-economic future (Lancaster, 2019; UNCTAD, 2018; World Bank, 2017). This also includes significant benefits for both those who work at sea, and those whose livelihoods depend on it. In 2016, the World Bank estimated that the ocean economy in the Caribbean could generate gross revenues of US$407 billion, equivalent to 14% to 27% of the estimated value of the global ocean economy. This is a significant figure given the fact that the Caribbean Sea accounts for less than 1% of the total global area of oceans (Roberts and Patil, 2016).

Pollution of the Caribbean's marine and coastal environment by plastics, constitute major threats to the sustainable use of these resources on which the region relies heavily for tourism and fishing (Courtene-Jones, 2021; Debrot, 2013), as marine ecosystems provide food, livelihoods, and income to over a hundred million people through fisheries, tourism, coastal protection, and transportation (Diez *et*. *al*., 2019). Consequently, plastic pollution threatens trade, jobs, ancillary service, food and nutrition security (Ewing-Chow, 2019), shipping and damage to coastal and underwater sites (UNEP, n.d.). There is also the increased recognition that ocean plastic pollution threatens the ability of Caribbean states to achieve the sustainable development goals (e.g., SDGs 1, 2, 3, 6,8, 9, 11,12, 13, 14, 15). Further, there is an urgent need to combine international, regional, and national policy frameworks that address marine pollution as a comprehensive strategy to target its major sources. Caribbean states have therefore progressively embraced strategies to address the sources and impacts of marine litter, by implementing national (Clayton *et*. *al*., 2020) and regional responses (Wienrich, Weland and Unger, 2021) aimed at reusing, repurposing, or reducing plastics and plastic pollution.

A notable mechanism has been within the framework of the Regional Seas Programme for the Wider Caribbean Region – the 1983 Cartagena Convention and its 1997 Protocol on Land-based Sources of Pollution – and projects, programmes, and policies under the auspices of the RSP, e.g., the Project on Prevention of Marine Litter in the Caribbean Sea (PROMAR) (PANOS Caribbean, 2019; UNEP, n.d.). However, while there have been a number of innovative approaches, Barbados, along with Trinidad & Tobago, Guyana, Antigua & Barbuda, St. Lucia, St. Christopher (St. Kitts) & Nevis, The Bahamas, Grenada, Anguilla, and Aruba continue to generate more plastic debris than the weight of 20,000 space shuttles (Ewing-Chow, 2019; UNEP, 2015; UNEP, n.d). Without improved management of ocean plastic pollution (and other sources of marine pollution), the Caribbean's natural marine capital will be depleted, the region stands to lose the economic backbone to its sustainable blue economy: a vibrant, healthy ocean that contains a significant proportion of the hotspots biodiversity (CEPF, 2019; Linardich et. al., 2017; Miloslavich et. al, 2010; Meyers et. al., 2000), and which provides food and income to its population (Diez *et*. *al*., 2019).

Ocean Plastics Pollution in Barbados

Barbados, is the easternmost island state of the Lesser Antilles, located in the Atlantic Ocean east of the Caribbean archipelago (**Figure 1**). While the island is relatively small in size – 432 km^2 (167 square miles) (CIA, 2022) – it has an exclusive economic zone which measures 388 times this size (Heileman, 2004).

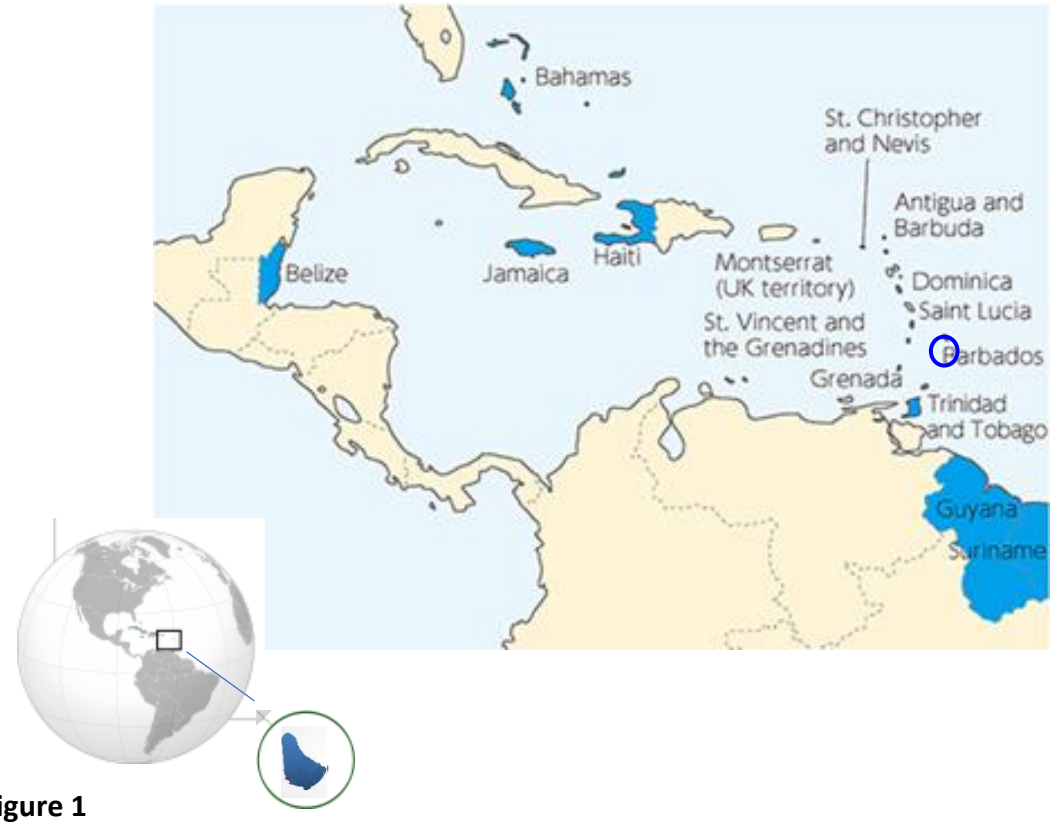

Figure 1

The Republic of Barbados

Consequently, Barbados is one of the SIDS which is considered a large ocean state (Lancaster, 2022; Chan, 2018), and its maritime space holds exciting untapped possibilities for the sustainable exploitation of the blue economy (Ministry of Environment, National Beautification, and the Blue and Green Economy, 2020). Barbados' has a population of about 302,674 (CIA, 2022) and is one of the more populous and prosperous Caribbean islands (BBC, 2021). Political, economic, and social stability have given it a relatively high standard of living, which directly contributes to a heavy concentration of marine litter, mainly from plastic packaging, plastic bottles, and other single use plastic items, and foam containers (diez et. al./World Bank, 2019; Oceanographic Magazine, n.d.). In a 2017 International Coastal Clean-up organised by the Ocean Conservancy along 44 kilometres of Barbados' coast, yielded a litter concentration of 1260 items/km (Ocean Conservancy, 2017). This provided a useful snapshot of the common litter items per kilometre found on Barbados' coastline and the state's contribution to the Caribbean marine litter hotspot (World Bank, 2019; Law *et. al.*, 2010).

Like many states therefore, Barbados' population, environment, and economy suffer from discarded plastics, especially discarded single-use materials. While Barbados was in the past heavily dependent on the export of sugar as its main revenue earner, subsequent to the 1950s, this was supplanted by tourism (Downes/ECLAC, 2001). Fisheries is also a key economic activity and is closely linked to the restaurant and hospitality sector, as well as tourism activities such as the Oistins historic fishing and market town area (Moghal and O'Connell, 2018; Lancaster and Bovell, *forthcoming*). NGOs such as Barbados Blue and the Barbados Sea Turtle Project have documented the impacts of plastics on coral reefs and their marine inhabitants such as the marine turtles (Oceanographic Magazine, 2021). While there are no existing studies on the health or socioeconomic impacts of plastics in Barbados, there are documented impacts of plastics on the health, as plastics absorb pesticides and persistent organic pollutants such as polychlorinated biphenyls (PCBs) (Teuten *et*. *al*. 2009; Rochman and Browne 2013). Additionally, there is speculation that marine can ingest microplastics, which bioaccumulate and biomagnify in marine environments and organisms (Diez *et*. *al*./World Bank, 2019). As a result of these impacts of ocean plastics on its sustainable development, Barbados has become part of a global movement to ban or tax some of the main ocean plastic items.

Legal and Policy Framework for Plastics in Barbados

As illustrated in **Table 1**, the legal and policy framework for plastics is influenced by international and regional instruments, as well as a diverse range of laws. The framework to address ocean plastic pollution is therefore diffuse and disorganised. Nevertheless, the island's regulation of plastic waste is part of its strategy to be a regional and global leader in ocean protection. This pivoting has progressively occurred over the past four years by means of actions by the Government of Barbados (GoB). This includes in 2018, the establishment for the first time of a Ministry of Maritime Affairs and the Blue Economy (now Ministry of Environment, National Beautification, and the Blue and Green Economy), and the commitment to a roofs-to-reefs model to balance this new development trajectory (GIS Barbados, 2018). Additionally, the island state plans to safeguard 30 % of its EEZ as a means of harnessing support for a high seas agreement for the Caribbean region and beyond and stepping forward as Champion of the Commonwealth's Blue Charter, by co-leading an action group on marine protected areas with the Seychelles (Pew Trusts, 2021). The island has also launched the Barbados National Energy Policy 2019 – 2030, which includes transitioning to renewables by 2030, and renewable energy (RE) generation and storage. These goals provide an important basis to address both the environmental issues of ocean plastics and climate change through the circular economy. This circular economy approach can potentially reduce the volume of plastics entering oceans, while reducing greenhouse gas emissions associated with combustion of fossil fuels by creating green energy such as hydrogen, methane, and ethylene from plastic waste (Lancaster, *forthcoming*).

Barbados' policies which influence the management of ocean plastics are anchored primarily in waste management. In the early 1990's, the decision was taken by the GoB, under the Ministry of Health [and Wellness], to create a structured framework with respect to the management of solid waste which was fast becoming a critical issue for the island

(BSWMP, 2018). The entity charged with spearheading these waste management strategies was the Environmental Protection Department (EPD), which has traditionally conducted monitoring and regulation of the solid waste management and government operated solid waste disposal sites. The EPD was given two mandates, first to regulate and monitor solid waste disposal facilities, and secondly, to develop policies for the regulation of solid waste management. In regard of the first mandate, the EPD leads the collection and disposal of non-hazardous solid waste from homes island and government agencies around the island using the Sanitation Service Authority (SSA). The SSA also has a commercial arm, which offers services to the private sector. These services are complemented by those of the Solid Waste and Hazardous Substances Section (SWHSS), which was established in 2005 with the aim of fulfilling the EPD's second mandate of improving the regulation of solid waste management. The SWHSS is also responsible for the implementation of the Integrated Solid Waste Management Programme (ISWMP), an infrastructural project which commenced in 1993 with a feasibility study (Carter and Singh, 2010). The ISWMP was also a major component of the general policy of the Health Sector Development Plan 1993-2000, encompassing the whole island of Barbados, and providing for the preparation of a long-term vision of managing solid waste in Barbados over the next twenty years (EPD, n.d.).

Barbados' Legal & Policy Framework For Regulating Ocean Plastics		
International	Regional	National
• 1982 UNCLOS • 1973/78 MARPOL • 1972 London Convention and its 1996 Protocol • S.A.M.O.A Pathway • Global Programme of Action	• 1973/78 MARPOL • S.A.M.O.A Pathway • Global Programme of Action • 1983 Cartagena Convention, the 1997 LBS Protocol and the 1991 SPAW Protocol • 2001 Revised Treaty of Chaguramas • 2014 Caribbean Community Common Fisheries Policy • CARICOM's Draft Environment and Natural Resources Policy Framework • Caribbean Sea Commission • 2014 Regional Action Plan for Marine Litter (RAPMaLi) for the Wider Caribbean Region • Caribbean Large Marine Ecosystem and Adjacent Regions (CLME+) • GEF Project Integrating Water, Land, and Ecosystems Management	• Control of Disposal Plastics Act, 2019 • Returnable Containers Act, 1987 • Health Services (Collection and Disposal of Refuse) Regulations, 1975 • Coastal Zone Management Act, 1998 • Marine Pollution Control Act, 1998 • Town and Country Planning, 1968 and Town and Country Planning (Amendment) Act, 2007 • Fisheries Act 1993 (amended 2000), 1998 and Fisheries (Management) Regulations, 1998 including Draft Fisheries (Management) Regulations 2021 • Environmental Levy Act, 1996 • Environmental Levy (Validation and Repeal) Act, 2011 • Municipal Solid Waste Tax Act, 2014 • Emergency Management Act, 2006 • National Conservation Commission Act, 2000

	in Caribbean Small Island Developing States	• Marine Areas (Preservation and Enhancement) Act, 1976

Table 1

In 2021, the EPD was appointed Barbados' focal point to a regional Project which may be potentially important in the island's management of the ocean plastics problem. The Global Environment Facility (GEF) Islands Child Project 10279, which is Funded by UNEP, FAO and executed by Basel Convention Regional Centre for Training and Technology Transfer for the Caribbean (BCRC Caribbean), is a 5-year project launched in 2021 in nine countries including Barbados. It is designed to prevent the build-up of material and chemicals in the environment that contain POPs and mercury and other harmful chemicals and to manage and dispose of existing harmful chemicals and materials (Lancaster, *pers. com*.).

Legislatively, the *Returnable Containers Act* 1987 was the earliest attempt to curb the quantity of plastics entering the Barbadian environment. The *Act* provided for a return on deposit on all beverage containers – both plastic and non-plastic – and the fees generated under this scheme have encouraged high rates of collection and return (EPD, n.d.). Based on the success of achieved under this scheme, the GoB has expanded the principle to other recyclable items. Until recently, however, recycling was a private sector led activity, but in 2021 the GoB instituted an island-wide dissemination of receptacles which mandates the segregation of recyclables such as glass and plastics by homeowners (Barbados Advocate, 2021). This government intervention is spearheaded the Sanitation Service Authority (SSA) Residential Waste Collection Improvement Project, which is aims to promote the 5 Rs of waste management, which simultaneous addresses congestions in the landfills. Additionally, the strategy aims to raise education and awareness, as well as provide better environmental health and labour conditions for sanitation workers (Prosource Ltd., 2022; Barbados Today, 2021).

Another of Barbados' critical legislative intervention to date is the *Control of Disposal Plastics Act,* 2019 which was passed as a mechanism to curb single use plastics. The law's overarching aim is banning imports of petroleum-based, single use plastics, and their distribution, sale, and use (Sections 4 and 5). However, s. 6 provides for exemptions listed in the First Schedule, which include plastic disposal bags, plastics for medical and pharmaceutical purposes, plastics used for storage of agriculture products, for perishable or preservation of foods, plastic straws attached to tetra pak boxes, polystyrene for packaging fresh meat and plastics manufactured for export. These provisions in the 2019 *Act* are supported by the *Customs Act*, 1998 which provides for environmental levies on the cost, insurance, and freight (CIF) value of all goods imported in containers that are not made of plastics, glass, metal, or paperboards. Excise tax at rates ranging from 5 to 60 percent is chargable on petroleum products. This will be bolstered by the *Customs Tariff (Amendment) Order*, 2019, which will provide for further taxation on plastic products.

Barbados' legislative framework for coastal and marine management will also support the regulation of ocean plastics. This ranges from legislation regulating planning, coastal zone and marine management, fisheries, and the management of hazardous wastes.

This includes an assessment of the gaps in the *Town and Country Planning Act*, 1968, the *Marine Pollution Act*, 1998 and the *Coastal Zone Management Act*, 1998 which collectively implement obligations under a range of international and regional instruments. These include MARPOL, UNCLOS, Basel, Rotterdam, Stockholm, the Cartagena Convention, the LBS Protocol, as well as the Revised Treaties of Chaguaramas and Basseterre. To various extents, these legislation also support biodiversity, ecosystem, and cultural heritage related conventions such as Convention on Biodiversity, CITES, Ramsar, the World Heritage Convention, the Convention on Underwater Cultural Heritage, the SPAW Protocol and the Inter-American Turtle Convention. However, these pieces of legislation were passed in an era when the management of ocean plastics was not a priority international environmental issue. Likewise, Barbados' fisheries legislation – which is currently going a consultation process aimed at modernising it – and the marine protected areas legislation, are other regulatory regimes which will need to be reviewed and streamlined. This will allow them to support the protection of ecosystems, biodiversity, and other coastal marine receptors.

Conclusion and Recommendations

Plastic pollution is emerging as a leading environmental issue in the Caribbean region, which exacerbated by its small island development status. Barbados, which as the largest EEZ to land ratio in the region, is also as one of the more developed and economically stable Caribbean states. As a result, the island has a high level of consumerism, which combine by its tourism industry (both cruise and air), and regionally, is one of the leading contributors to the ocean plastic pollution. Additionally, Barbados is positioning itself as a leader in the blue economy. Addressing ocean plastics is therefore more than an issue of ecological, economic, health, social and cultural importance; it is one of necessity.

However, the policy and regulatory framework which can effectively support the ocean plastic pollution is fragmented and is primarily focused on recycling and the banning of single use plastics. Consequently, the 2019 legislation does not comprehensively cover a broad spectrum of plastics, and arguably exempts plastics for packaging which comprise a large proportion of the ocean plastics problem. These exemptions arguably do not provide incentives to some sectors to explore alternatives to plastics. However, one can argue that this was a most practical starting point given the cost of alternatives, the characteristics of Barbados' recycling and [circular] economy, as well as the country's status as a SIDS. Recycling is done shipping plastic and non-plastic receptacles overseas periodically since there is not a critical enough mass locally to sustain a recycling plant. However, given the island's current policy focus under the Barbados National Energy Policy 2019 – 2030, the development of a circular economy model could be a viable approach to tackling both plastic pollution and climate change.

Barbados is also in the process of revamping its customs legislation, but a lacuna which needs to be addressed is the health impact of plastics to humans as well as marine species. This is critical, especially as there is a leading example of chemical pollution plaguing the marine coastal ecosystem of the French Antilles. Another area which could be enhanced to complement the environmental levies under the customs legislation, and fines imposed under environmental health legislation is operationalising both criminal and civil legislation aimed at corporate and larger potential producers and polluters of ocean plastics. This may be the most practical way of addressing these categories of

stakeholders, who regionally, are usually dealt with under environmental management legislation. Barbados however has delayed in passing environmental protection legislation for close to fifteen years. Two other important areas which will need to be bolstered are addressing the impact of marine pollution on ecosystems, biodiversity and fisheries, which will require active engagement with the tourism industry, especially cruise tourism, hoteliers and restaurants, as well as fishers. This is especially given that ALDFG – such as nets and traps which contain plastics – n is regionally identified as a leading source of marine pollution in the Caribbean. While this is a transboundary issue, it will also need to be addressed at a national level.

Finally, regulatory frameworks, which either provide incentives or sanctions, will need to be complemented with an education and awareness policy aimed at catalysing attitudinal and behavioural change. This is fundamental as a long-term sustainable strategy to addressing ocean plastics at the grassroots, country level.