



SUMMARY OF THE REPORT: THE ECONOMIC IMPACT OF PLASTIC POLLUTION IN SAINT LUCIA

Impacts on the fisheries and tourism sectors, and the benefits of reducing mismanaged waste

[Full publication](#)

July 2023

INTRODUCTION

In 2019, IUCN launched the Plastic Waste-Free Islands (PWFI) project, aiming to reduce plastic waste generation and leakage into the ocean in island nations in the Pacific and Caribbean regions.

An economic assessment was conducted as part of the project in Saint Lucia. The study examined the impacts of marine plastics on the fisheries and tourism sectors and the costs and benefits of implementing a national recycling system from a national and from a regional cooperation perspective.

Plastic waste is a global problem!

Plastic pollution leads to contamination of the marine environment

9% of plastics are recycled

22% is mismanaged

80% of marine plastics can be attributed to land-based sources

20% of marine plastic pollution originates from the fishery sector



Harms biodiversity and ecosystems

Reduces the provision of ecosystem services

Has negative impacts on the economy, such as for:

- fisheries
- tourism sectors

To address the issue, efficient policy responses and legal instruments are required at various levels. These can include waste reduction at the source, extended producer responsibility, consumer behavior changes through bans and taxes, educational campaigns, and improvements in waste management infrastructure.

The Caribbean Region heavily relies on a healthy marine ecosystem for its economy, specifically tourism and fisheries, which faces significant challenges due to plastic pollution, driven by poor waste management systems and limited recycling. Governments in the region have started implementing measures such as bans on single-use plastics, but more analysis of policy responses is needed.

IMPACT OF MARINE PLASTICS IN ANTIGUA & BARBUDA (2019)

The impact of marine plastics in Saint Lucia in 2019 was assessed through data collection and analysis. Two different plastic accumulation scenarios were considered to estimate the stock and flow of marine plastics in the region, specifically on the shoreline and the Exclusive Economic Zone of Saint Lucia. The study focused on the impact of marine plastics on the fisheries and tourism sectors.

For the fisheries sector, the impact on revenue caused by marine plastics was estimated. Factors such as repair costs, lost productive time, and reduced catches were considered. The estimated impact on fisheries revenue in 2019 was 3.7% of the total revenue, equivalent to 834,527 East Caribbean Dollars (XCD) or 308,781 US Dollars (USD).

The study also calculated the costs of completely cleaning up all plastics ending up on the coastline to prevent further accumulation of plastics and potentially impacting the tourism sector through a reduction in visitors in the future. The estimated costs for coastal clean-ups in 2019 ranged from XCD 1,167,029 (USD 431,913) to XCD 3,415,098 (USD 1,263,914) depending on the plastic accumulation scenario.

CASE STUDY INTRODUCTION

Saint Lucia is a small island developing state in the Eastern Caribbean, see Map 1 below.

Map 1



In this country > 77,666 tonnes of plastic waste were disposed, mainly single-use plastics.

Around 18.6% of all plastics disposed end up leaking into the marine environment annually.

To combat the problem of plastic litter, Saint Lucia has enacted several multilateral environmental agreements, as well as various national laws. The policy initiatives include the 1993 Anti-litter legislation aimed at reducing public area nuisances, the 1996 Saint Lucia Solid Waste Management Authority Act for a national waste management strategy, the Marine Pollution Management Act of 2004 to manage ship waste and protect territorial waters, and the Medical Waste and other Bio-hazardous Wastes Management Plan of 2006 to regulate biohazardous waste handling and disposal.

The government of Saint Lucia has implemented measures to manage plastic waste, including funding for the Solid Waste Management Authority, a ban on single-use polystyrene products, and an initiative to collect PET bottles. They also impose environmental levies and fees on visitors and ships. The 2008 Returnable Containers Act encourages the return of plastic containers for cash refunds.

Overall, the impact of marine plastics in Saint Lucia in 2019 amounted to XCD 2,001,556 (USD 740,768) to XCD 4,249,625 (USD 1,572,770) in direct costs (impact on fisheries and total estimated costs of coastal clean-up).

These findings highlight the significant economic implications of marine plastics on Saint Lucia's key economic sectors, emphasising the need for effective measures to mitigate plastic pollution and protect the environment and the economy of the region.

PROPOSED SOLUTIONS

The recommendations for improving waste management in Saint Lucia include, among others, strengthening the recycling system by improving waste collection and separation.

Through the PWF project, establishing a Regional Recycling Hub in the Caribbean has been proposed as a potential solution for Saint Lucia and other Caribbean islands to improve waste management.

Recycling efforts in Saint Lucia are currently minimal due to a lack of source separation of recyclable materials and limited volume of available material, which restricts economies of scale. Nevertheless, some recyclers are already active in the country, collecting, processing, and exporting plastics for recycling.

This study considered the costs and benefits of a recycling system when Saint Lucia implements it alone, as well as from a regional cooperation perspective with all countries bordering the Caribbean Sea, also reducing plastic leakage into the sea.

OVERALL DIRECT COST MISMANAGED PLASTICS (2023-2040)

After estimating the impact of marine plastics in 2019, the study estimated the future impact of plastics continuing to leak into the marine environment, without measures to reduce this leakage.

The future and present values for the period 2023-2040 of the overall impact, direct cost to the fisheries sector, and clean-up costs are displayed in Table 1 and they depend on which plastic scenario is chosen; thus, four different values are presented.

Table 1		
Future and present values of the overall direct costs to fisheries and coastal clean-ups (2023-2040) (discount rate: 6.35%)		
	Plastic Accumulation Scenarios	
	Scenario 1	Scenario 2
Future Value	48,465,196	98,224,015
Present Value	26,676,605	54,151,056

COST OF IMPLEMENTING THE RECYCLING SCHEME

To understand the costs and benefits of reducing mismanaged waste and plastic leakage into the Caribbean Sea, the study estimated the costs of improving the recycling system in Saint Lucia, considering improved collection and sorting, and transport to existing large-scale recycling infrastructure.

Currently, the operating cost of the general waste management system is estimated to amount to XCD 196.9 (USD 72.5) per tonne of waste. The estimated cost per tonne of recycling plastics is presented in Table 2.

Table 2			
Estimated costs of recycling per tonne of plastics (2019) ²			
Types of cost		XCD per tonne	USD per tonne
Collecting cost	Labour cost	332.8	123.2
	Investment cost	41.2	15.3
	Fixed cost	37.5	13.9
Sorting cost		296.0	109.5
Shipping cost		66.3	24.6
Total		773.8	286.5

The following figure compares the Waste Management Budget (WMB) under the BaU scenario with the WMB under the recycling scenario, which is combined with the cost of recycling. The difference between the two waste management scenarios is equal to the additional cost of the proposed solution, i.e. the recycling system as shown in Figure 1.

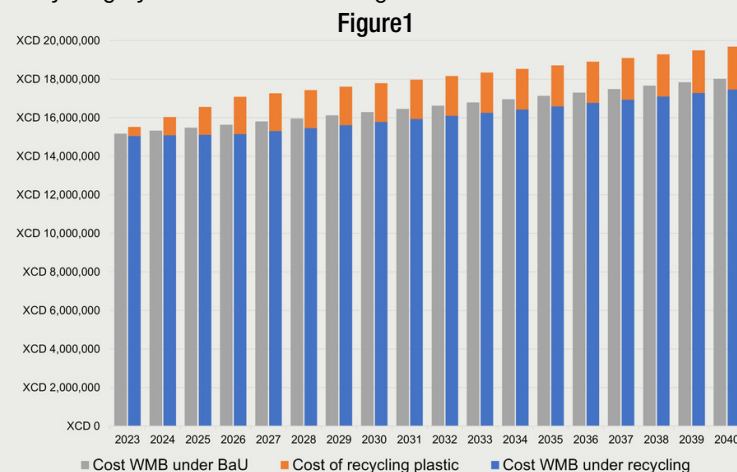


Figure 1 – Estimated costs of recycling, and the waste management budget under BaU scenario and the national recycling scenario (XCD/year)

The future value of the overall cost is estimated to be XCD 25,473,259 (USD 9,427,556). Applying the discount rate of 6.35% results in an estimated present value of XCD 13,495,094 (USD 4,994,483).

The impact in terms of the amount of plastics accumulating in Saint Lucia's waters and coastline under the two recycling scenarios (national recycling and regional cooperation) is displayed in Figure 2 below.

¹ The study considered transport to Miami as a proxy for costs, while an exact location for the Regional Hub is not yet decided.

² Source: Searious Business, 2021; PEW, 2020.

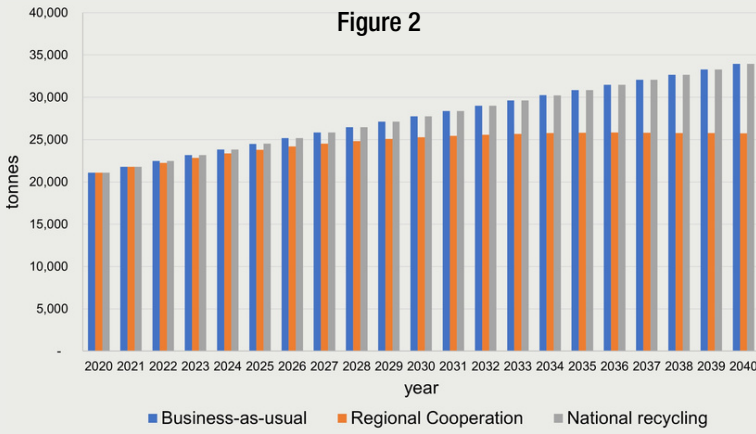


Figure 2 – Estimated tonnes of plastics in Saint Lucia's waters under the three future plastic management scenarios

OVERALL RESULTS NATIONAL AND REGIONAL RECYCLING SCENARIOS

The next figures show the annual benefits of both recycling scenarios (national and regional cooperation) as well as the annual costs of implementing the proposed national recycling system. Figure 3 shows the results under the first plastic accumulation scenario, while Figure 4 shows the results under a second plastic accumulation scenario. Results are displayed both in discounted and non-discounted values. Table 3 shows the net future and present values of the regional cooperation and national recycling scenario.

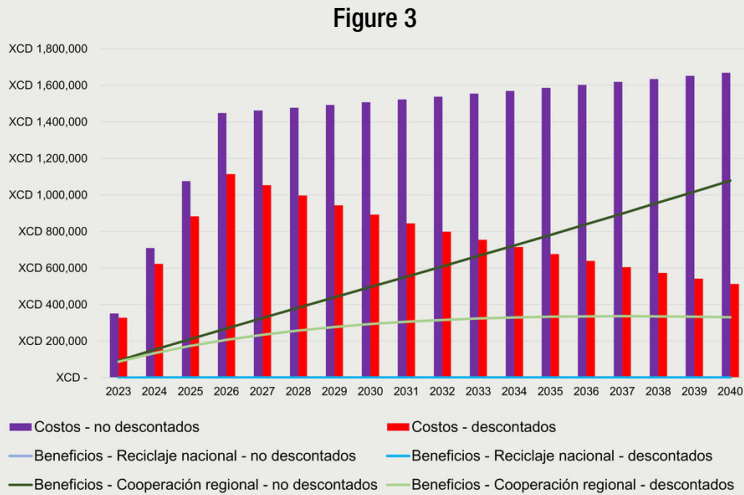


Figure 3 – Cost of recycling plastics for Saint Lucia; benefits of the national recycling and regional cooperation scenario under plastic accumulation scenario 1 (future and present values, discount rate: 6.35%)

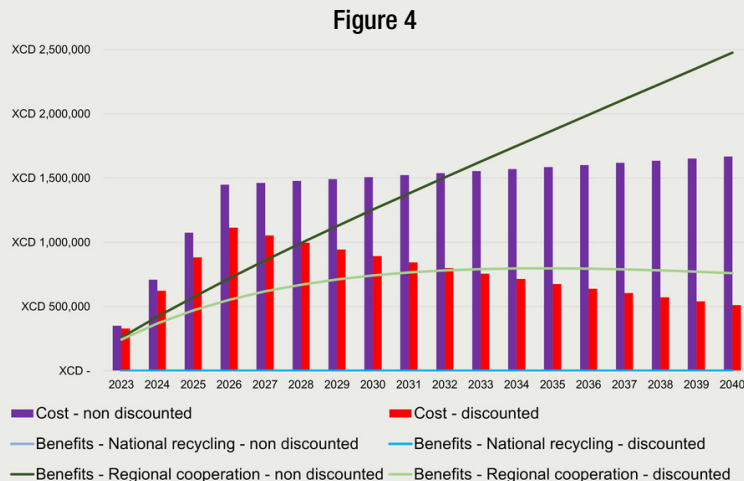


Figure 4 – Cost of recycling plastics for Saint Lucia; benefits of the national recycling and regional cooperation scenario under plastic accumulation scenario 2 (future and present values, discount rate: 6.35%)

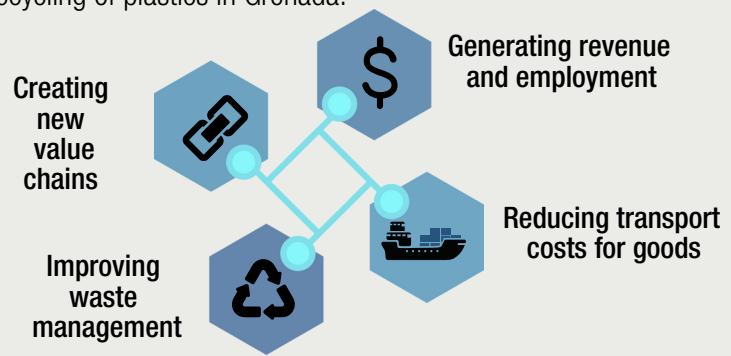
Table 3 shows that none of the scenarios are profitable based on the benefits, costs, and discount rate considered. However, under plastic accumulation scenario 2 and considering regional cooperation, the sum of the net benefits in future value (without the discount rate) is positive for Saint Lucia. In this case, the sum of the benefits becomes higher than the costs of recycling starting in 2033, which leads to a positive net future value after this period.

Recycling Scenario	Plastic Accumulation Scenarios	Net Future Value		Net Present Value	
		XCD	USD	XCD	USD
National recycling	1	-25,464,710	-9,424,393	-13,490,704	-4,992,859
	2	-25,453,354	-9,420,190	-13,484,675	-4,990,627
Regional Cooperation	1	-14,974,562	-5,542,029	-8,547,000	-3,163,212
	2	46,407	17,175	-1,279,293	-473,461

Net future and present values of the national and regional cooperation scenario under both plastic accumulation scenarios (discount rate used: 6.35%)

The study highlighted the potential benefits of selling recycled plastics. To breakeven in net present value over the 18-year period considered (considering the negative net values presented in the table above), Saint Lucia would need to resell the plastics at least at a constant price of XCD 577.23 (USD 213.63) per tonne under the least profitable scenario (national recycling under plastic accumulation scenario 1) and XCD 54.74 (USD 20.26) per tonne under the best case (regional cooperation under plastic accumulation scenario 2).

Additionally, there are other potential benefits of increased recycling of plastics in Grenada.



OTHER ASPECTS OF THE IMPACT OF MARINE PLASTIC POLLUTION AND INSTRUMENTS TO REDUCE IT

Plastic pollution on the coastline of Saint Lucia not only threatens tourism revenue but also potentially affects job opportunities within the sector, which currently provides 14,000 to 20,000 direct jobs, and 38,500 indirect jobs, accounting for around 78% of total employment. Moreover, the detrimental impact of marine plastic pollution on the fisheries sector could jeopardize the livelihoods of approximately 14,640 workers, constituting about 14.5% of the labour force, including those engaged in direct commercial capture and others dependent on fishery-related activities.

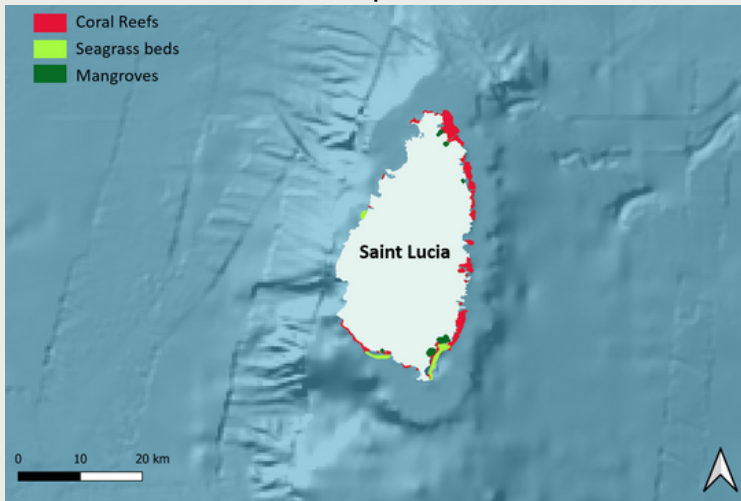
A 2012 census revealed that 30% of those employed in the fisheries sector earn 25 to 50% of their household income from fishing, underscoring the sector's critical role in maintaining livelihoods, particularly in rural coastal communities where underemployment and unemployment remain significant issues. Furthermore, the small-scale fishery sector contributes considerably to poverty reduction and food security, signifying the wider economic, socio-cultural, and environmental implications of plastic pollution.

Marine plastics negatively impact Saint Lucia's fisheries and tourism sectors, as well as the island's economy overall. The tourism industry is still struggling due to COVID-19 travel restrictions and is also at risk from climate change impacts like rising seas, storms, and erosion that harm beaches and deter visitors. The fisheries industry faces challenges from climate change and overfishing, with Caribbean fishery resources being among the most overexploited globally. This has led to a decline in regional production by over 40% in the last two decades, and half the species in the region are listed as globally 'threatened' or 'near threatened.'

IMPACT ON MARINE AND COASTAL ECOSYSTEMS

Marine ecosystems in Saint Lucia, including coral reefs, mangroves, and seagrass beds, are crucial for tourism, natural coastal defense, livelihoods in the fisheries sector, and various ecosystem services such as shoreline protection, breeding grounds, water purification, and carbon sequestration. The conservation and restoration of these ecosystems are essential due to their significant contribution to the island's economy, employment, and vulnerable conservation status of certain species. Map 2 below displays the locations of these ecosystems.

Map 2



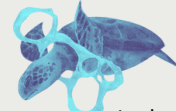
Marine plastics have detrimental effects on coral reefs, seagrass beds, and mangrove forests, interfering with their ecological functions and causing population declines and increased disease. These impacts are exacerbated by other stressors such as climate change, pollution, overfishing, and invasive species, leading to the degradation of marine and coastal ecosystems, affecting tourism, fish stocks, and marine biodiversity including seabirds and marine mammals.

IMPACT ON MARINE WILDLIFE

Saint Lucia's waters are home to 22 marine mammal species, one of which is currently listed as "vulnerable". There are also four turtle species found in the waters of Saint Lucia. Two are listed as "vulnerable", one as "endangered" and another one as "critically endangered". Of the 36 seabird species in Saint Lucia, three are listed as "vulnerable", and one as "endangered".

Marine plastics pose various dangers to marine fauna including:

- entanglement,
- ingestion,
- colonisation by invasive species and
- contact or coverage with plastics and exposure to harmful chemicals.



Seabirds, sea turtles, marine mammals, sharks, rays, and sponges are among the species affected with:

- ingestion of plastics leading to potential mortality,
- entanglement causing suffocation or drowning, and
- plastic debris serving as vectors for the spread of pathogens and pollutants.

Plastic pollution should be considered in conjunction with other stressors when assessing its impact on the marine environment, as it may contribute to the decline of individuals, populations, or ecosystems, but not necessarily cause critical population decreases on its own. In addition to macroplastics, the presence of microplastics is a concern as they can be ingested by small organisms, bioaccumulate contaminants, and elicit toxicological effects, posing risks to marine animals throughout the food chain.



FINAL REMARKS

This study primarily focused on estimating direct costs for the fisheries and tourism sectors in Saint Lucia, but it acknowledges that some costs and benefits were not included, such as the impact of ghost fishing, or the full costs of establishing a Regional Recycling Hub and the demand for recycled plastics under the current and future market.

The study emphasizes the need to consider the broader impacts of mismanaged plastics on blue natural capital assets, marine biodiversity, and the overall economy, recognizing the complexity of quantifying the impact on marine ecosystems. It suggests the implementation of a national recycling system and shows the positive impact of regional efforts to address the plastic waste problem, while highlighting the importance of reducing plastic use, improving waste management infrastructure, and integrating local recyclers into the system.

Further research is needed to gather data on mismanaged plastics, understand the actual costs including microplastics, and develop comprehensive accounting frameworks like Ocean Accounting to assess the economic impacts of marine plastics and multiple stressors.