The sargassum bloom in Latin America and the Caribbean: challenges and sustainable solutions

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Expert group meeting to review the document "Responding to sargassum influxes through integrative and adaptive natural resources management approaches in the Caribbean SIDS region – an exploratory framework"

Main causes of the massive increase of sargassum

Marine Nutrient Pollution (Nitrogen and Phosphorous)

- Discharges of untreated wastewater into the Atlantic and Caribbean (N/P ratio has significantly increased
- Runoff from agriculture: fertilizers, livestock waste and sedimentation
- Comparing 1990 and 2021, fertilizer use quadrupled in LAC

Climate change impacts

Globally, between 2023 and 2024, ocean temperatures increased for 13 consecutive months, reaching their highest levels in the last 65 years. Sea water in the **Mesoamerica and Caribbean subregion is warmer**.

Ocean currents and winds

- North Equatorial Current and the Guyana Current → from West Africa and Brazil to the Caribbean and the Gulf of Mexico
- Ocean currents concentrate external waste in the Caribbean, where plastic pollution is three times the global average

Sargassum biomass is at historically unprecedented levels, with the May 2025 peak being the highest ever recorded (37.5 million mt)

sargassum is a barometer of global change

Managing the problem

Sargassum excess in shores is a complex, transboundary challenge that requires local and national strategies and actions

- Intercepting sargassum at sea before landfall with floating barriers
- Gather sargassum afloat using boats and robotic systems
- Beach collection: remove stranded biomass minimizing damage

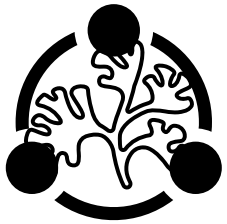
  - **Manual collection**: Labor-intensive but less harmful to beach ecosystems like turtle nesting sites.
  - **Mechanical rakes/loaders**: Faster but risk removing sand and damaging dunes if not properly managed.
  - **Timing**: Best during early morning, before it starts decomposing and emitting hydrogen sulfide gas (H_2S).

- Develop new products using sargassum collected in beaches

Cross-Cutting challenges in developing new value chains and products from sargassum

- There are technical and economic challenges in transforming sargassum into valuable products across different industries
- Shared Barriers Across All Products
    - Costs of sargassum removal, storage, and disposal (often requiring specialized equipment and disposal sites)
    - Limited economies of scale, particularly in SIDS
    - Irregular sargassum supply
    - Limited private sector investment
    - Fragmented regulations and support
    - Insufficient circular economy strategies in countries

Product-Specific Challenges



Bioenergy

- Low energy density in sargassum
- High water and salt content
- Lack of processing infrastructure
- Regulatory and land-use issues

Biofertilizers

- Nutrient variability
- Potential toxicity (heavy metals)
- Need for safe treatment and certification
- Regulatory gaps

Bricks for construction

- Drying and stabilization needs
- Salinity affects structural properties
- Requires scaling up
- High transport/logistics costs

Pharmaceuticals / Nutraceuticals

- Inconsistent chemical composition
- Contamination risks require purification
- Advanced R&D and long approval processes
- Regulatory barriers

Bioplastics

- Biochemical composition (high salt, ash and moisture): less efficient than with other biomass.
- Technical and processing limitations, including decomposition risks
- Economic feasibility: higher cost than other bioplastics e.g. from starch.
- Absence of bioplastic standards for marine biomass
- Residual waste, energy use

A lot of work is needed to develop adequate regulatory frameworks and integrated strategies

Sargassum is a transboundary challenge. It requires national strategies and actions combined with regional cooperation

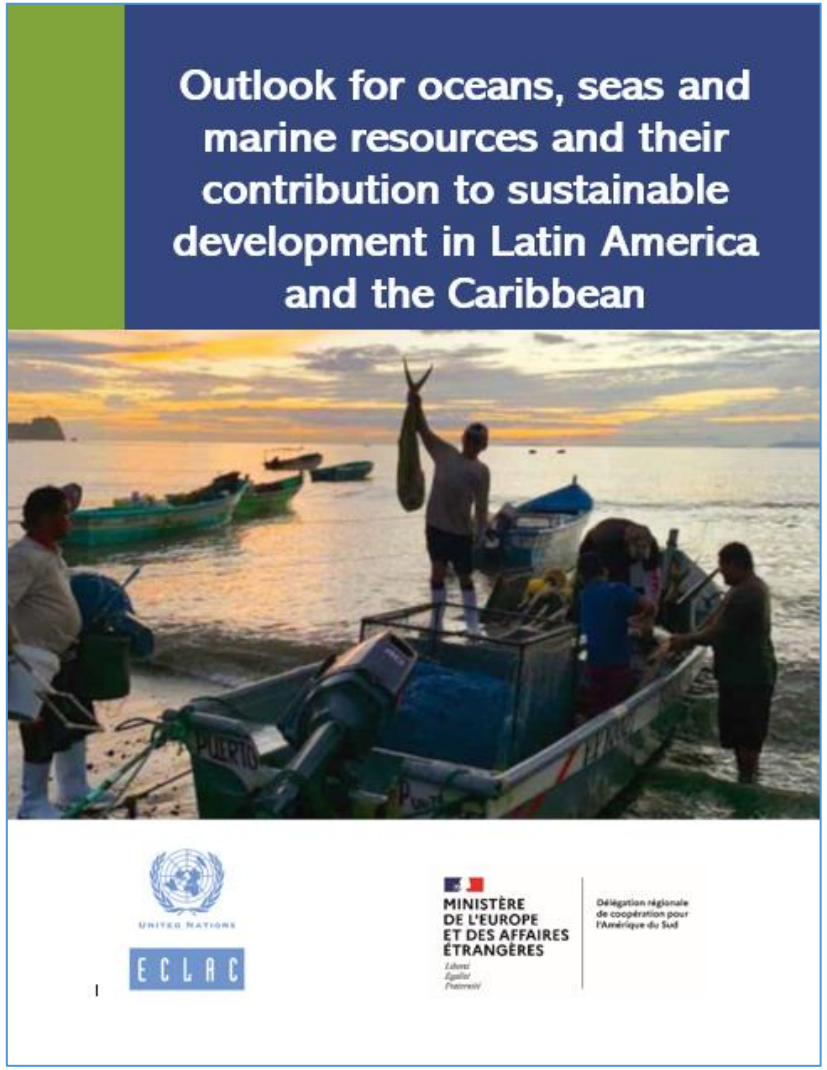
- Reduce land-based sources of fertilizers (N,P) to prevent eutrophication and excessive sargassum blooms.
- Apply circular economy approaches to transform sargassum into new products.
- Political commitment is required to achieve harmonized regulatory frameworks, tax incentives, blue finances and scalable projects
- Promote and strengthen regional scientific, monitoring and policy initiatives and networks
- Partnerships of government with universities, technology centers, and coastal communities.
- Inclusive governance: Ensure participation of local actors and the private sector (fishing cooperatives, hotel associations) municipalities, and coastal communities
- ECLAC can help with capacity building and to implement South-South cooperation between the continental and insular areas of the Greater Caribbean, promoting the exchange of technologies, best practices, scientific data, and community experiences.

Thanks!

Our publications:

https://www.cepal.org/es/temas/biodiversidad-desarrollo-sostenible

2025 publications



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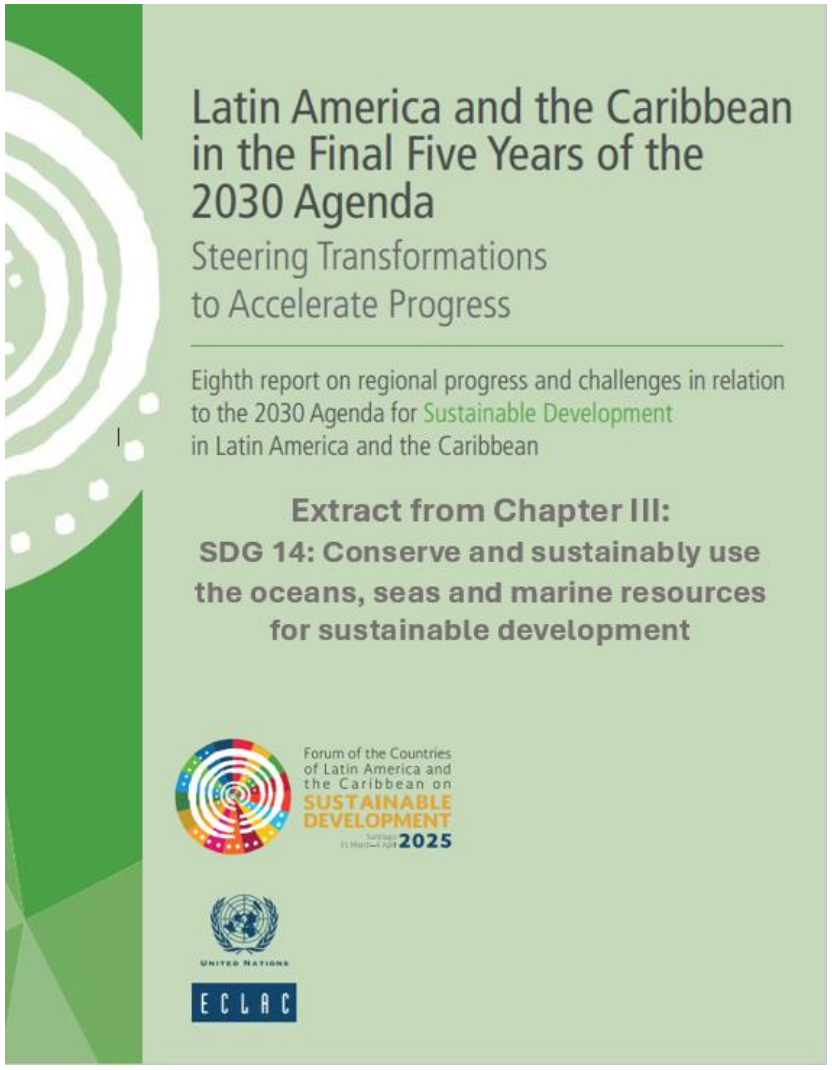

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