

SUMMARY

Sint Maarten Solid Waste Management Sector Assessment (2020)



Overview

This Country Solid Waste Management Sector Assessment (CSWMSA) for Sint Maarten presents a comprehensive, system-wide baseline of the island’s municipal solid waste (MSW) sector as of 2020. Commissioned to inform the design of an Integrated Solid Waste Management System (ISWMS), the assessment covers the full value chain—generation and composition, collection and transfer, treatment and disposal, recycling and recovery—as well as the enabling environment: institutions and governance, legal and regulatory frameworks, financing and cost recovery, and data and monitoring. The analysis is framed by Sint Maarten’s economic profile as a high-income Small Island Developing State (SIDS) with extreme dependence on tourism and high exposure to natural hazards.

The assessment situates sector performance in the dual-shock period following Hurricane Irma (2017) and the onset of COVID-19 (2020). Irma generated massive debris, destroyed essential infrastructure, and exacerbated chronic weaknesses in waste operations and environmental controls. The pandemic further strained municipal finances and disrupted recycling markets, while shifting waste generation from commercial to residential streams.

Problem Statement

The central diagnosis is that Sint Maarten’s solid waste system is environmentally unsound, operationally fragile, and financially unsustainable. The primary disposal site on Pond Island—approaching five decades of use—operates without fundamental environmental safeguards (liner, leachate and gas management), lacks

accurate weighing since 2015, and faces recurring fires and slope instability. Responsibilities are fragmented within government; there is no independent, empowered waste authority; and the regulatory framework is outdated and incomplete. Economically, the model relies on general revenues and tourism-linked fees rather than direct user charges or tipping fees, offering no path to full cost recovery or incentives for waste reduction. High per capita waste generation (estimated at 3.53 kg/capita/day, excluding construction and demolition waste) and limited diversion (around 11% recycling) leave 85–88% of the waste stream landfilled. In short, the island remains locked in a collect-and-dump paradigm that is vulnerable to shocks and mounting environmental liabilities.

Objectives

The assessment's primary purpose is to establish an authoritative baseline and gap analysis to guide Sint Maarten's transition from a fragmented, reactive waste model to an integrated, resilient, and financially viable ISWMS. Specifically, it seeks to:

- Characterize current waste flows, infrastructure, practices, performance, and costs across the MSW chain, including Irma-related debris management.
- Diagnose institutional, legal, and regulatory shortcomings that limit effective planning, oversight, and enforcement.
- Assess the financial architecture of service provision (revenues, subsidies, cost drivers, and leakage points) and options for cost recovery.
- Identify feasible, sequenced reforms and investments to modernize disposal, expand recovery and recycling, and embed circular economy principles.
- Propose a governance and financing pathway—centered on an independent authority and modern legislation—to deliver reliable services, protect the environment, and improve resilience to disasters and market disruptions.

The primary target audience for the assessment is the Government of Sint Maarten: Ministry of Public Housing, Spatial Planning, Environment and Infrastructure (VROMI); Ministry of Finance; Office of the Prime Minister; and the National Recovery Program Bureau—policy makers, regulators, and implementers of the SWM reform agenda. Other audiences are the World Bank Trust Fund administrators and technical teams supporting the design and financing of sector reforms and investments; from the private sector, waste collection contractors, recyclers, logistics firms, and prospective investors in recovery and treatment infrastructure; and from civil society and the public, NGOs, community groups, and residents whose participation in source separation, cleanliness, and accountability is essential for sustained sector performance.

Findings

A. Waste generation, composition, and flows

- Very high per capita generation: At an estimated 3.53 kg/capita/day (excluding construction and demolition, C&D), Sint Maarten's MSW intensity is among the highest in the Caribbean—reflecting a tourism-driven, consumption-heavy economy and a large daily “population equivalent” from visitors.
- Composition dominated by inorganics and organics: Earlier studies indicate, within the MSW (non-C&D) stream, significant shares of organics (20%), paper/cardboard (12%), and glass (~12%), with metals and textiles in smaller proportions. C&D has historically represented about 41% of the total waste stream—critical for facility planning given its volume and density characteristics.

- Weak data and weighbridge gaps: The non-functioning weighbridge since 2015 undermines mass balance estimates, cost analysis, and performance monitoring. Reliance on periodic studies and operator logs hampers precision in planning and accountability.

B. Collection and transfer

- Mixed model with fragmented oversight: VROMI contracts private operators for household collection and area cleaning; however, commercial waste collection operates on an unregulated open-subscription basis. Private haulers invoice businesses directly while disposing at the landfill without tipping fees—creating perverse incentives and revenue leakage.
- Limited service standardization: Route planning, segregation at source, and reporting requirements vary by contract and operator. There is no systematic separation program for organics or recyclables, and no obligation for haulers to report tonnages or composition.

C. Treatment, disposal, and environmental performance

- Critical landfill deficiencies: The Pond Island MSW landfill operates without a liner system or leachate and gas management, suffers recurrent subsurface fires, and presents stability risks to adjacent communities and ecosystems. Low achieved waste density (reported around 800–850 kg/m³) signals insufficient compaction and poor space utilization. Daily cover and stormwater controls are inadequate, raising vector, odor, and runoff risks.
- Disaster debris site: The separate Irma Debris Disposal Site (IDDS) partially addressed post-Irma volumes, but long-term strategies for residual debris (e.g., metals, concrete crushing for reuse, wood management) remain underdeveloped.
- High disposal dependence: With limited recycling capacity and no energy recovery, up to 85–88% of collected waste is landfilled. There is no operational material recovery facility (MRF), nor is there an established composting program for organic fractions.

D. Recycling, recovery, and markets

- Informal, under-regulated ecosystem: A small number of private recyclers focus on high-value streams (e.g., ferrous/non-ferrous metals, vehicle batteries, select plastics) for export. The estimated recycling rate (~11%) is below regional peers and highly sensitive to commodity prices, shipping costs, and quality of feedstock (contamination).
- Lack of enabling infrastructure and policy: There are no EPR schemes for priority waste (tires, batteries, e-waste), no island-wide segregation program, and no incentives for recovery (e.g., deposit-refund on beverages). Absence of standards and registration for recyclers reduces traceability and quality control.

E. Institutions, policy, and regulation

- Fragmented mandates and conflict of roles: VROMI's concurrent operational and regulatory roles limit oversight independence and risk management. The National Recovery Program Bureau (NRPB) manages post-Irma investments but is not a permanent sector steward. Staffing and budget for SWM within VROMI (approx. 11 staff) are inadequate for systemwide planning and enforcement.
- Outdated legal framework: The lack of a comprehensive solid waste law leaves major gaps—no waste flow control, no defined service standards or permit regimes for haulers and recyclers, no mandatory data reporting, and no enforceable penalties for non-compliance. A draft law (2019) exists but has not yet delivered a modern, integrated framework.

F. Financing and cost recovery

- Unsustainable fiscal model: The total SWM budget (approx. US\$10.2 million) is funded mainly by government subsidies (31%). Households do not pay direct user fees; landfill tipping fees are not levied. The absence of gate fees eliminates both revenue and a fundamental tool for flow control and behavior change.
- Weak cost and performance data: Without weighbridge data and standardized reporting, unit costs (e.g., O&M per ton, collection per household) are uncertain. Indications of high per-ton O&M cost (approx. US\$78/ton) likely reflect inefficiencies, underinvestment in compaction and cover, and diseconomies of scale—as well as data gaps rather than high service levels.
- Shock exposure: Tying funding indirectly to tourism taxes exposes the system to demand shocks (e.g., COVID-19) without countercyclical buffers or dedicated revenue streams to ensure service continuity.

G. Cross-cutting vulnerability and resilience

- Disaster and climate risk: Elevated hazard exposure (hurricanes, storm surge, intense rainfall) intersects with weak landfill engineering, insufficient debris management capacity, and inadequate emergency waste protocols. Lack of redundancy in transfer and disposal capacity magnifies the risk of service disruption.
- Land constraints: Limited available land for new facilities increases the premium on technical efficiency (e.g., compaction, cover, gas capture, leachate control) and on diversion strategies that reduce residuals bound for disposal.

Lessons Learned

Several approaches have delivered tangible results. Contracting private haulers for household waste collection has demonstrated the operational potential of structured public–private partnerships, provided that contracts include clear service standards, performance monitoring, and cost transparency. Grassroots initiatives led by NGOs and civil society—such as small-scale recycling and composting pilots and public awareness campaigns—have revealed strong local appetite and social capital for behavior change, which can be leveraged to scale source separation and strengthen community buy-in. In addition, post-disaster recovery financing, particularly through the Trust Fund and related programs, created a unique window to accelerate planning and capital investments, as long as institutional reforms advance in parallel.

At the same time, several shortcomings have constrained system performance. Operating without an integrated waste authority has resulted in fragmented governance, blurred roles between operator and regulator, and persistent gaps in oversight, data, and accountability, slowing strategic planning and investment sequencing. The absence of user fees, landfill gate fees, or penalties for non-compliance has weakened the polluter-pays principle, deprived the sector of sustainable revenues, and removed incentives for waste minimization and segregation. Deferred infrastructure upgrades, particularly the prolonged use of an unlined and poorly managed landfill, have compounded environmental liabilities such as fires, leachate, and emissions, while significantly increasing long-term remediation costs. Dependence on volatile revenue sources, including general budget subsidies and tourism-linked taxes, has further exposed the system to external shocks such as Hurricane Irma and the COVID-19 pandemic, limiting service continuity and system improvements.

A combination of enabling and constraining factors will shape future progress. Access to recovery financing, the existence of a draft legal framework that can be refined and finalized, demonstrated private sector capacity, transferable experience from other SIDS, and community willingness to engage in recycling and

cleanliness initiatives all provide a strong foundation for reform. However, persistent constraints—including land scarcity, the small market scale that limits in-island recycling economics, historically limited political appetite for introducing user fees, commodity price volatility affecting export-oriented recyclers, and institutional capacity limitations within VROMI—must be addressed deliberately to translate lessons learned into sustainable outcomes.

Conclusion and Recommendations

The assessment concludes that incremental fixes will not stabilize Sint Maarten’s waste system. A paradigm shift to an integrated, performance- and data-driven ISWMS is essential. The implications are fourfold:

Governance reform is foundational

- Establish an independent Integrated Solid Waste Management Authority (ISWMA) to plan, procure, regulate, and oversee services—separating operations from enforcement to eliminate conflicts of interest.
- Mandate data collection and reporting, including weighbridge functionality, operator reporting, and regular public disclosure of performance metrics.

Modernize infrastructure and operations

- Stabilize and upgrade the existing landfill immediately (interim cell management, cover, stormwater controls, fire mitigation), then plan for its controlled closure and remediation with proper environmental controls.
- Develop a modern disposal solution aligned with projected residuals after diversion (e.g., engineered sanitary landfill cell; assess feasibility of energy recovery only on the basis of rigorous waste characterization, scale, and financial viability).
- Invest in a MRF and transfer capacity suitable for the island’s volume, with targeted pre-sorting and quality control to support viable export markets for recyclables.
- Pilot and scale organic waste diversion (e.g., decentralized green waste mulching, targeted food waste composting for commercial generators) to reduce landfill methane potential and extend disposal life.

Implement a sustainable financial model

- Introduce landfill tipping fees with an initial ramp-up and social safeguards, combined with regulated tariffs for commercial generators and a fair, transparent household charge (e.g., embedded in utility bills or a dedicated waste fee).
- Adopt the polluter-pays principle and explore EPR schemes for priority waste streams (tires, batteries, e-waste, beverage containers) to finance collection and end-of-life management.
- Ring-fence revenues in a waste management fund to ensure O&M continuity, capital replacement, and emergency response.

Strengthen the legal and policy framework

- Enact a comprehensive solid waste law enabling flow control (directing all MSW to authorized facilities), defining service standards, permitting haulers and recyclers, requiring data reporting, and enabling enforcement and penalties.
- Institutionalize source separation mandates phased by generator type, beginning with commercial establishments and high-yield streams (e.g., cardboard, organics, metals).
- Integrate disaster debris management protocols into the ISWMS, including prearranged contracts, temporary staging sites, and procedures for rapid triage and recovery of materials.

Priority Actions and Sequencing

Short term (0–12 months)

- Reactivate and enforce weighbridge operations; implement interim landfill fire and slope stabilization measures; standardize operator reporting; establish a SWM program management unit pending authority formation.
- Prepare tariff and fee schedules with affordability and competitiveness analysis; initiate stakeholder consultations; design and adopt service standards and reporting templates for haulers and contractors.
- Draft and consult on the solid waste bill; develop landfill operations plan and immediate environmental control measures; launch targeted pilots for commercial cardboard and green waste diversion.

Medium term (12–36 months)

- Establish the ISWMA; roll out tipping fees and commercial tariffs with compliance monitoring and sanctions for non-payment; commence phased household fee implementation with social protection measures as needed.
- Procure and commission MRF and transfer enhancements; implement an island-wide source separation program in phases; enact EPR for tires and batteries; adopt deposit-refund for beverage containers.
- Move to engineered disposal with leachate and gas management; formalize recycler registration and quality standards; launch public education campaigns aligned with source separation and fee reforms.

Long term (36+ months)

- Plan and implement controlled closure of the legacy landfill; scale organics diversion; evaluate long-term residual treatment options based on updated mass balance and financial performance.
- Institutionalize sector benchmarking and periodic independent audits; update the ISWMS strategy at five-year intervals; maintain a capital replacement plan funded from ring-fenced revenues.

Risks and mitigation

- Affordability and social acceptance: Phase-in fees with clear service improvements, transparent accounting, and social safeguards. Communicate benefits (health, cleanliness, resilience) and reinvest visible gains (e.g., cleaner public spaces).
- Market volatility: Diversify recovered materials portfolio; prioritize quality control to access higher-value markets; pursue regional partnerships for consolidation and export.
- Institutional capacity: Pair authority establishment with capacity building, technical assistance, and performance-based contracts for operators that include training and knowledge transfer.

End-State Vision: A clean, resilient Sint Maarten supported by a financially self-sustaining ISWMS that diverts significant recyclables and organics, safely disposes residuals in engineered facilities, and is governed by an independent authority operating under a modern legal framework with transparent data and consistent service quality.

Methodology

- **Data and document review:** Collation and analysis of available administrative records (e.g., historical weighbridge data up to 2015), VROMI operational reports, consultant studies on landfill conditions, and national statistics on population and tourism to estimate waste generation and composition.
- **Field visits and observations:** Site inspections of the Pond Island MSW landfill and the Irma Debris Disposal Site; observation of collection routes and contractor practices; visits to private recycler facilities to understand capacities, materials handled, and export channels.
- **Stakeholder interviews:** Discussions with VROMI officials, private haulers, recyclers, port and airport representatives, and civil society groups engaged in recycling and awareness initiatives to triangulate data and identify practical constraints and opportunities.
- **Benchmarking and comparative analysis:** Reference to performance norms and practices in peer Caribbean SIDS and OECD contexts to contextualize generation rates, diversion benchmarks, and financial models suitable for small-island scales.
- **Gap and risk analysis:** Structured assessment of technical, institutional, legal, financial, and environmental gaps; identification of priority risks (fires, slope instability, leachate) and immediate mitigation measures; development of a sequenced reform and investment roadmap.

This summary was produced with the assistance of an AI language model based on the original report. The full report is available at sintmaartenrecovery.org/analytical-studies