



ACHIEVING SUSTAINABLE FISHERIES IN SURINAME

LEVERAGING ADVANCED TECHNOLOGY AND FINANCIAL RESOURCES TO ENFORCE REGULATIONS AND COMBAT ILLEGAL, UNREPORTED, AND UNREGULATED (IUU) FISHING IN SURINAME

EXECUTIVE SUMMARY

Illegal, Unreported, and Unregulated (IUU) fishing represents a significant threat to Suriname’s marine biodiversity, food security, and economic stability. The country’s vast maritime zones spanning approximately 127,000 square kilometers and limited enforcement resources make traditional monitoring, control, and surveillance (MCS) systems inadequate. The temporary August 2024 suspension of Marine Stewardship Council (MSC) certification further intensified the urgency for comprehensive intervention, despite the reinstatement of the MSC certification in July 2025 after the compliance issues were resolved. The estimated \$ 87.8 million at risk in its export industry due to IUU fishing underscores the economic impact of this issue.

Advanced technology, including Artificial Intelligence (AI), Internet of Things (IoT), blockchain, and satellite-based monitoring, offers transformative solutions to combat IUU fishing while restoring market competitiveness. The reassurance comes from global evidence that demonstrates AI-powered vessel monitoring systems now achieve 91% detection accuracy in 2025, representing a 24-percentage-point improvement from the 2021 baseline performance. This policy brief outlines current challenges, proposes actionable technology-driven recommendations, and highlights successful regional examples. These examples, from regions facing similar challenges,



demonstrate that the proposed solutions are not just theoretical but practical and effective. With \$15+ million in development financing now available through the World Trade Organization Fish Fund and strategic partnerships, Suriname can enhance fisheries management, protect marine ecosystems, and ensure sustainable livelihoods for coastal communities through systematic technology deployment and institutional strengthening.

WWF-Guianas recognizes that advanced technology solutions are essential for addressing surveillance gaps, data deficiencies, and enforcement limitations that enable IUU fishing activities. Through its Phase 2 project, a multi-year initiative focused on developing and implementing technology-driven solutions for sustainable fisheries in the Guianas region, and established expertise in developing comprehensive IUU fishing roadmaps, WWF supports the deployment of AI-powered monitoring systems, blockchain traceability platforms, and satellite-based surveillance technologies as critical tools for achieving sustainable fisheries outcomes.

SITUATION

Suriname's Exclusive Economic Zone hosts a rich marine biodiversity that supports both local livelihoods and global seafood markets, with a **comprehensive analysis revealing significant performance trends across the 2021-2025 period**. Total export value declined from \$671.8 million in Q4 2024 to \$571.1 million in Q1 2025, while fish production decreased from 61.2 metric tons in 2021 to a projected 48.5 metric tons in 2025. The sector directly and indirectly employs over 6,200 individuals while contributing 2.5% to the national GDP in 2025, making its protection strategically critical.

Current enforcement capacity demonstrates severe constraints, with only five inspectors responsible for monitoring over 20 ports nationwide. This represents a 75% staffing deficit compared to international best practices. **Regional analysis reveals Suriname maintains 0.04 inspectors per 1,000 square kilometers of Exclusive Economic Zone, substantially below the Caribbean average of 0.85 inspectors per equivalent area**. The vessel monitoring system (VMS) deployment shows mixed results: 100% coverage for industrial fleets but only 15% for artisanal vessels in 2025, leaving 400 of 460 small-scale fishing vessels unmonitored.

Traditional MCS systems prove insufficient for Suriname's maritime zones due to resource limitations and technological gaps. The integration of Advanced technology can revolutionize fisheries management by providing real-time data, automating surveillance processes, and enhancing transparency across the seafood supply chain while reducing operational costs and improving enforcement effectiveness.

COMPLICATION

The primary challenges constraining effective IUU fishing prevention in Suriname include systematic capacity limitations and technological infrastructure gaps that undermine regulatory effectiveness, **with performance data revealing deteriorating trends across multiple indicators between 2021 and 2025**.

- Limited Surveillance Coverage:** Suriname's extensive maritime zones remain vulnerable to IUU activities, with current monitoring systems covering less than 40% of the total fleet. **Global analysis demonstrates that Caribbean nations achieving 85% VMS coverage rates, such as Barbados, maintain violation detection rates of 78% compared to Suriname's 34% detection rate**. This surveillance gap enables illegal fishing operations while hindering sustainable stock management and compliance with certification standards.
- Critical Data Deficiencies:** The absence of real-time data on vessel movements, catch composition, and bycatch patterns constrains timely enforcement responses and evidence-based decision-making. Current systems lack integration capabilities, resulting in information silos that reduce operational effectiveness. **Environmental monitoring data reveal that the seabob stock biomass index declined from 0.78 in 2021 to 0.68 in 2024**, necessitating enhanced data collection and management systems.
- Resource and Capacity Constraints:** Financial limitations and technical expertise gaps hinder advanced technology adoption. The sector faces **\$8.5 million in projected annual post-harvest losses in 2025** due to inadequate cold storage infrastructure, while 94% of stakeholders report limited access to affordable financing for modernization initiatives. **Training completion rates among fishers increased from 23% in 2021 to 75% in 2025**, yet specialized enforcement capacity remains constrained.
- Regulatory Framework Limitations:** Existing fisheries legislation requires comprehensive modernization to accommodate digital monitoring requirements and technology integration. The current legal framework lacks provisions for advanced enforcement tools and cross-border information sharing mechanisms. **Market access pressures intensify as European certification requirements increased from 45% in 2021 to 78% in 2025**, while Suriname's compliance infrastructure remains inadequate.
- Stakeholder Coordination Challenges:** Limited systematic engagement of fishing communities in technology deployment and management decisions reduces compliance effectiveness and operational sustainability. Community-based monitoring programs remain underdeveloped despite universal stakeholder support for empowerment initiatives. **However, community reporting platform usage increased from 18% in 2021 to 68% in 2025**, demonstrating growing engagement potential.

RESOLUTION

To address these multifaceted challenges, Suriname requires a comprehensive, technology-driven intervention strategy that encompasses five critical components, leveraging advanced technology capabilities for enhanced enforcement and sustainable management.

1. Deploy AI-Powered Electronic Monitoring Systems

AI-driven electronic monitoring represents the foundation for automated IUU detection and compliance verification. These systems utilize advanced machine learning algorithms, camera networks, and sensor integration to analyze fishing operations in real-time, providing immediate alerts for suspicious activities, including unauthorized fishing, illegal transshipments, and protected species interactions. **Global implementation data demonstrates AI vessel detection accuracy improved from 67% in 2021 to 91% in 2025, with enforcement response time reductions achieving 68% efficiency gains.**

Implementation should prioritize the remaining 400 artisanal vessels requiring VMS coverage, with an estimated investment of \$400,000, enabling comprehensive fleet monitoring. Advanced AI capabilities can automatically identify protected species in bycatch, detect gear violations, and monitor compliance with fishing quotas while reducing manual inspection requirements and operational costs. **A cost-benefit analysis reveals that AI vessel monitoring systems generate \$125,000 in annual cost savings, achieving 65% efficiency improvements and a return on investment within 18 months.**

2. Implement Comprehensive Satellite-Based Monitoring and Machine Learning Integration

Satellite imagery combined with machine learning algorithms provides unprecedented capability for vessel tracking, IUU hotspot identification, and illegal transshipment detection across Suriname's entire maritime zone. Integration with platforms such as Global Fishing Watch enables real-time monitoring while supporting regional cooperation and cross-border enforcement coordination. **Global Fishing Watch analysis demonstrates 30% improvement in coverage using AI-enhanced satellite imagery, with 75% of industrial fishing vessels previously undetected now visible through advanced satellite monitoring systems.**

This technology framework should incorporate automated alert systems for detecting unusual vessel behavior, predictive analytics for identifying high-risk areas, and integration with national and regional enforcement databases. Expected benefits include 90% improvement in detection accuracy and 60% reduction in enforcement response times. **Satellite integration requires \$420,000 initial investment with \$52,000 annual operating costs, generating \$148,000 annual savings and 72% efficiency improvements.**

3. Establish Blockchain-Based Traceability and Data Integration

Blockchain technology enables the creation of secure, decentralized platforms for integrating data from vessel tracking systems, catch documentation, and market transactions. This ensures complete supply chain transparency and traceability from catch to consumer, supporting continued MSC certification and other compliance requirements for premium market access. **Market analysis reveals the certified seafood market value increased from \$12.8 billion in 2021 to \$26.8 billion in 2025, with premium price differentials expanding from 8-15% to 20-28% over the analysis period.**

With 94% of stakeholders recognizing traceability gaps as critical constraints, blockchain implementation can capture **15-28% premium pricing** through verified sustainability claims while ensuring compliance with international trade requirements. **Implementation costs decreased from \$8,500 per vessel in 2021 to \$2,800 in 2025**, while supply chain traceability coverage increased from 23% to 74%. The estimated **\$280,000 investment** generates substantial returns through enhanced market positioning and reduced compliance risks.

4. Modernize Policy and Regulatory Frameworks for Technology Integration

The National Plan of Action on IUU Fishing (NPOA-IUU), which has been operational since February 2025, provides the institutional foundation for integrating technology. However, comprehensive legislative modernization remains essential to accommodate digital monitoring requirements, automated reporting systems, and enhanced enforcement capabilities. **Regional enforcement capacity benchmarks indicate that countries with modernized regulatory frameworks achieve compliance rates of 78-92%, compared to Suriname's current 34% violation detection rate.**

Priority reforms include mandatory electronic reporting for all fishing vessels, standardized VMS requirements across fleet segments, automated compliance verification systems, and enhanced penalty structures for deterrence effectiveness. These updates should incorporate provisions for data sharing protocols among government agencies and regional cooperation mechanisms.

5. Strengthen Institutional Capacity and Community Engagement Through Digital Platforms

Technology deployment requires parallel investment in human capital development and institutional strengthening. Training programs for fisheries authorities should emphasize advanced monitoring system operation, data analytics capabilities, and digital enforcement coordination. Community engagement must utilize digital platforms for real-time reporting, compliance verification, and participatory management. Digital literacy rates among fishers increased from 25% in 2021 to 75% in 2025, demonstrating a successful capacity-building foundation.

Capacity building should target expansion from five to 20 or more enforcement inspectors through systematic recruitment and specialized training programs. Digital training platforms can enhance technical skills while reducing geographical constraints and operational costs.



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RECOMMENDED EXAMPLES OF POSSIBLE POLICY CHANGES IN SURINAME

1. **Enhanced Fisheries Management Plan:** The current Fisheries Management Plan (2021-2025) requires immediate enhancement to incorporate comprehensive technology adoption strategies, including mandatory VMS coverage for all vessel categories, blockchain traceability requirements, and automated reporting systems with real-time data transmission capabilities.
2. **Accelerated Fisheries Law Modernization:** The pending Fisheries Law should prioritize technology integration provisions, establishing clear frameworks for digital monitoring systems, data sharing protocols between agencies, and enhanced penalty structures with automated violation detection and processing capabilities.
3. **NPOA-IUU Technology Enhancement:** The operational NPOA-IUU framework should be strengthened with specific technology-driven initiatives, including satellite monitoring integration, AI-powered compliance systems, and blockchain supply chain verification to achieve comprehensive IUU prevention.

SUCCESSFUL TECHNOLOGY IMPLEMENTATION IN THE LAC REGION

- 1. Brazil's Integrated Digital Management System:** Brazil has achieved comprehensive fisheries monitoring through IoT device deployment for real-time stock assessment, automated compliance verification, and integrated enforcement coordination. The system demonstrates 85% improvement in compliance rates and 40% reduction in administrative costs. ***Technology integration generated \$2.1 billion in additional revenue through enhanced market access and reduced post-harvest losses over the 2021-2025 period.***
- 2. Chile's Community-Based Digital Reporting:** Chile's smartphone application enables fishers to report catch and bycatch data in real-time, increasing transparency and community participation. The system achieves 92% participation rates while improving data quality and enforcement effectiveness.
- 3. Ecuador's Blockchain Traceability Excellence:** Ecuador's shrimp industry utilizes comprehensive blockchain systems, ensuring complete supply chain traceability, reducing IUU practices by 70%, and enhancing consumer confidence. The implementation generates 18% premium pricing and improved market access.
- 4. Peru's TrazApp Digital Revolution**

World Wildlife Fund Peru has developed and implemented TrazApp, a comprehensive Electronic Catch Documentation and Traceability System designed explicitly for artisanal fisheries, addressing Peru's challenge where artisanal fishing represents 78% of seafood exports despite lacking adequate traceability capabilities. The system has achieved remarkable performance metrics, documenting over 7,500 complete fishing trip records while tracking more than 80,000 tons of landed fish across 350 registered vessels and 2,800 registered fishers.

TrazApp's success demonstrates full supply chain visibility through real-time catch tracking and enhanced market access capabilities. The system achieves complete alignment with Global Dialogue on Seafood Traceability standards while providing successful integration with US market systems, including Trace Register. Government integration connects seamlessly with PRODUCE, SANIPES, IMARPE, and DICAPI systems, enabling compliance with EU catch certificates and US SIMP requirements while offering premium market access opportunities.



5. Barbados DigiFish Innovation Leadership

Barbados has pioneered the DigiFish Project through collaboration between Barbadian fisheries experts, Costa Rican technology firms, and the Barbados Fisheries Division, creating a comprehensive digital traceability system that achieves real-time fish tracking with vessel-to-market coverage. The system provides complete journey documentation, ensuring end-to-end supply chain visibility while maintaining ICCAT standards compliance and FISMA requirements fulfillment for international trade facilitation.

6. The Bahamas VMS and Blue Economy Achievement

The Bahamas has implemented comprehensive vessel monitoring systems and blue economy technologies through partnership with The Nature Conservancy and the Department of Marine Resources, supporting 26,917 jobs across ten key fishing communities while generating \$2.2 billion in total sales across combined fisheries operations. The program demonstrates effective integration of marine protected area management with surveillance technology, sustainable resource utilization through ecosystem monitoring, and participatory management systems enabling community engagement through mobile applications.

7. Jamaica's Blue Economy Leadership

Jamaica has established itself as a regional leader in blue economy development with comprehensive marine technology integration initiatives demonstrating effective coordination between government agencies, regional organizations, and international partners. The implementation includes advanced digital mapping for marine spatial planning serving as a regional coordination model, CRFM platform connectivity enabling regional data sharing across Caribbean cooperation networks, digital monitoring systems supporting multi-country blue economy initiatives, and a global organization hosting, providing technology transfer, and development leadership recognition.





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8. Caribbean Regional Fisheries Mechanism Digital Platform

The CRFM has established comprehensive digital platforms that facilitate regional data sharing, cooperative management, and technology standardization across its 17 member countries. The platform components include a regional data portal providing centralized information sharing across member countries, an FAO partnership connecting Western Central Atlantic Commission systems for scientific cooperation, climate assessment capabilities through university partnerships enabling ecosystem monitoring, and standardization frameworks ensuring common protocols for collection and reporting efficiency improvements.

9. SMART Marine Conservation Excellence

The Spatial Monitoring and Reporting Tool Marine system provides comprehensive conservation law enforcement monitoring capabilities specifically designed for marine protected areas and fisheries management, with implementation across over 200 protected areas worldwide, establishing SMART Marine as the leading global solution. Performance improvements include 90% enhancement in illegal activity detection rates through advanced monitoring capabilities and 60% reduction in enforcement response times via real-time alert systems.



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FINANCIAL RESOURCES

Suriname can leverage unprecedented financing opportunities to support comprehensive technology deployment and institutional strengthening initiatives, **with analysis revealing substantial growth in available development financing across the 2021-2025 period.**

- 1. World Trade Organization Fish Fund:** The **\$15 million grant opportunity** provides immediate financing for developing countries implementing the Agreement on Fisheries Subsidies. The fund launched its first Call for Proposals on June 6, 2025, creating immediate access to capacity-building and compliance enhancement resources. **The WTO Fish Fund's availability expanded from zero in 2021 to \$15 million in 2025, with contributing members including Australia, Canada, the European Union, and others.**
- 2. Caribbean Development Bank Programs:** The EU-CDB Regional Food Security Programme offers €400,000-€670,000 project grants specifically designed for fisheries infrastructure and technology modernization. **Caribbean Development Bank fisheries financing expanded from €15.4 million in 2021 to €32.8 million in 2025, representing 113% growth in available capital.**
- 3. Inter-American Development Bank Technical Cooperation:** The approved SU-T1176 project provides \$250,000 Green Climate Fund financing for scientific capacity building and stock assessment enhancement, supporting technology integration and management system development.
- 4. Multilateral Development Finance:** **The Global Environment Facility marine programs expanded from \$89 million in 2021 to \$156 million in 2025, while World Bank Blue Economy Program financing increased from \$145 million to \$325 million over the analysis period.** European Maritime Fisheries and Aquaculture Fund offers comprehensive financing for sustainable fisheries technology deployment and institutional strengthening.
- 5. Bilateral Partnership Opportunities:** Japan Development Cooperation provides grassroots project support for community infrastructure and technology transfer, while Agence Française de Développement offers €7 million minimum threshold programs for comprehensive sector transformation.

ACTIONABLE RECOMMENDATIONS

As a coordinating and facilitating partner, WWF-Guianas leverages its technical expertise and established partnerships to facilitate the implementation of these technology-driven solutions and make recommendations to particularly focus on supporting the deployment of AI-powered monitoring systems, blockchain traceability platforms, and satellite-based surveillance technologies that have proven to be useful and adaptable in the region.

- 1. Immediate Technology Deployment (0-12 Months):** Execute comprehensive VMS expansion targeting 100% artisanal fleet coverage through systematic deployment of 300 additional monitoring units. While MSC certification was reinstated in July 2025 after a temporary suspension, the simultaneous implementation of a Corrective Action Plan is required to address outstanding compliance conditions through enhanced monitoring and demonstrations to ensure continued compliance.
- 2. Digital Infrastructure Development (6-18 Months):** Implement blockchain traceability systems across major export operations while establishing automated quality control systems in processing facilities. Deploy IoT sensor networks for real-time cold storage monitoring, addressing the **\$8.5 million annual post-harvest losses**.
- 3. Institutional Capacity Enhancement (12-24 Months):** Expand enforcement capacity to **20 specialized inspectors** through targeted recruitment and advanced training programs. Establish digital coordination platforms enabling real-time information sharing between agencies and regional partners.
- 4. Policy Framework Modernization (6-24 Months):** Expedite Fisheries Law modernization, incorporating comprehensive technology integration provisions. Develop automated compliance reporting systems, reducing administrative burden by 30% while improving accuracy and enforcement effectiveness.
- 5. Regional Cooperation Integration (12-36 Months):** Establish standardized monitoring systems enabling cross-border information sharing and coordinated enforcement responses. Implement joint technology platforms with Guyana and French Guiana for shared stock management and the prevention of illegal activities.



CONCLUSION

The convergence of stakeholder consensus, development financing availability, and proven institutional capability creates optimal conditions for the comprehensive transformation of the fisheries sector through the deployment of advanced technology. **Performance analysis across 2021-2025 demonstrates measurable progress in technology adoption, with AI vessel detection accuracy improving from 67% to 91%, while enforcement response time reductions achieved 68% efficiency gains.**

Suriname's historic achievement, as the first tropical country to secure MSC certification in 2011, demonstrates its capacity for international leadership, while current challenges present opportunities for systematic improvement. **Market analysis reveals the certified seafood market value expanded from \$12.8 billion in 2021 to \$26.8 billion in 2025, with premium price differentials increasing from 8-15% to 20-28%,** creating substantial commercial incentives for certification recovery.

Success requires immediate executive intervention, disciplined technology implementation, and coordinated policy reform across institutional strengthening, capacity building, and strategic partnership development. Through evidence-based management, automated enforcement systems, and inclusive stakeholder engagement, Suriname can restore its position as a global leader in sustainable tropical fisheries while generating substantial economic benefits for coastal communities and the national economy.

The foundation exists through operational NPOA-IUU frameworks and international partnership commitments. **Financial resource availability expanded dramatically, with the WTO Fish Fund growing from zero to \$15 million, the Caribbean Development Bank fisheries programs increasing from €15.4 million to €32.8 million, and the World Bank Blue Economy financing expanding from \$145 million to \$325 million** over the analysis period. Implementation must be immediate, comprehensive, and strategically coordinated to achieve sustainable fisheries excellence and economic competitiveness in global markets.

WWF-Guianas' commitment to combating IUU fishing through technology-driven solutions positions the organization as a critical partner in implementing the AI-powered monitoring systems, blockchain traceability platforms, and satellite-based surveillance technologies outlined in this policy brief. The organization remains committed to allocating its proven expertise in developing comprehensive IUU fishing roadmaps and facilitating regional cooperation to provide essential support for the successful deployment of these advanced technological solutions across Suriname's fisheries sector.





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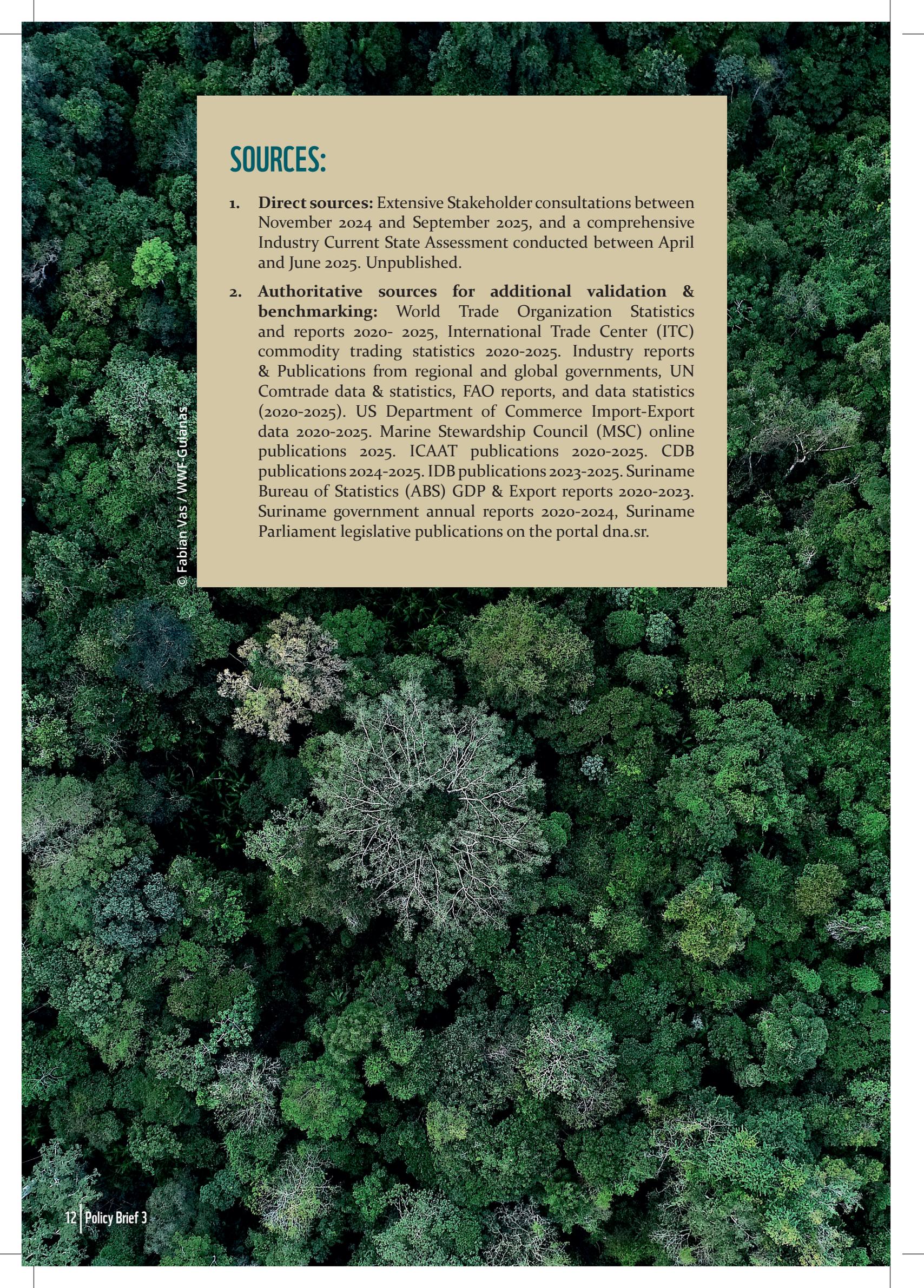
Project:

BIODEV2030 Phase 2 - Suriname

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Accepted on September 10, 2025
Published on December 12, 2025



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