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OFFICE OF EVALUATION AND INTERNAL OVERSIGHT

INDEPENDENT TERMINAL EVALUATION

"Development and Implementation of a Sustainable Management
Mechanism for POPs in the Caribbean"

UNIDO Project ID: 150049

GEF ID: 5558



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TABLE OF CONTENTS

Acknowledgements	v
Abbreviations and acronyms.....	vi
Glossary of evaluation-related terms	viii
Executive summary	xii
1. Introduction.....	1
1.1. Evaluation objectives and scope	1
1.2. Project Context	1
1.3 Project objectives	2
1.4 Project Implementation arrangements, stakeholders, and funding	5
1.5. Evaluation Methodology	7
1.6 Theory of Change	7
2. Project's contribution to development results - Effectiveness and impact	10
2.1. Eastern Caribbean - Project contributions to sound integrated chemicals management ..	10
2.2. Progress toward impact.....	10
3. Project's quality and performance	29
3.1. Design.....	29
3.2. Relevance	29
3.3. Coherence	30
3.4. Efficiency.....	31
3.5. Gender mainstreaming	31
4. Performance of Partners.....	33
4.1. UNIDO.....	33
4.2 BCRC- Caribbean	34
4.3. National counterparts	34
4.4. The GEF	34
5. Factors facilitating or limiting the achievement of results	35
5.1. Monitoring & evaluation	35
5.2 Results-based management and monitoring	35
5.3. Other factors	36
5.4. Overarching assessment.....	37
6. Conclusions, recommendations, and lessons learned	38
6.1. Conclusions	38
6.2. Recommendations.....	39
6.3. Lessons learned	40
ANNEXES:.....	42

Annex A: Project evaluation criteria	42
Annex B: Evaluation Terms of Reference:	43
Annex C: Project Results Framework	43
Annex D: List of Stakeholders Interviewed	45
Annex E: Methods used to calculate the reduction of POPs	48
Annex F: Reported co-financing	51
Annex G: GEF 5558-Project Outputs Verification Table.....	54
Annex H: Core Indicators	66

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Abbreviations and acronyms

Abbreviation	Definition
ANU	Antigua and Barbuda
AWP	Annual Work Plan
BAT	Best Available Technique
BCRC-CARIBBEAN	Basel Convention Regional Centre for Training and Technology Transfer for the Caribbean Region
BDOS	Barbados
BEP	Best Environmental Practice
BZE	Belize
CARPHA	Caribbean Public Health Agency
CWG	Country Working Group
DDT	Dichlorodiphenyltrichloroethane
DoE	Department of Environment
EC	European Commission
EMA	Environment Management Authority
EMS	Environmental Management System
ESM	Environmentally Sound Management
EST	Environmentally Sound Technologies
EU	European Union
FAO	Food and Agricultural Organization of the United Nations
GEF	Global Environment Facility
GDP	Gross Domestic Product
M&E	Monitoring and evaluation
MEA	Multilateral Environmental Agreement
MoH	Ministry of Health
MTR	Mid-term review
NEMS	National Environmental Management Strategy
NFP	National Focal Point
NGO	Non-Governmental Organization
NIPs	National Implementation Plan (on Persistent Organic Pollutants (POPs))
NPO	Non-for-profit Organization
PBBs	Polybrominated biphenyls
PCBs	Polychlorinated biphenyls

Abbreviation	Definition
PCTs	Polychlorinated Terphenyls
PIF	Project Identification Form (of the Global Environment Facility)
PMU	Project Management Unit
POPs	Persistent Organic Pollutants
PPG	Project Preparation Grant
PPP	Public Private Partnership
PSC	Project Steering Committee
PWC	Project Working Committee(s)
SAICM	Strategic Approach to International Chemicals Management
SC	Stockholm Convention
SCD	Stockholm Convention Division
SIDS	Small Island Developing States
SKN	Saint Kitts and Nevis
SL	Saint Lucia
SME(s)	Small and Medium Enterprise(s)
SUR	Suriname
SVG	Saint Vincent and the Grenadines
SWMCOL	Trinidad and Tobago Solid Waste Management Company
SWMA	Solid Waste Management Authority
Mt	Metric ton
T/a	Metric ton per year
TBC	To be confirmed
ToR	Terms of Reference
TT	Trinidad and Tobago
UNDP	United Nations Development Programme
UNE	United Nations Environment
UNIDO	United Nations Industrial Development Organization
UPOPs	Unintentionally produced Persistent Organic Pollutants
UWI	University of West Indies
WHO	World Health Organization
WIP	Work Implementation Plan

Glossary of evaluation-related terms

Term	Definition
Assumptions	Hypotheses about factors or risks could affect a development intervention's progress or success. Necessary conditions for the achievement of results at different levels. These are conditions that must exist if the project is to succeed but which are outside the direct control of the project management. This is called the external logic of the project because these conditions lie outside the project's accountability and can be related to laws, political commitments, political situations, financing, etc.
Baseline	The situation prior to a development intervention against which progress can be assessed or comparisons made.
Conclusions	Conclusions point out the factors of success and failure of the evaluated intervention, with special attention paid to the intended and unintended results and impacts and more generally, to any other strength or weakness. A conclusion draws on data collection and analyses undertaken through a transparent chain of arguments.
Effectiveness	The extent to which the development intervention's objectives were achieved or are expected to be achieved, taking into account their relative importance.
Efficiency	A measure of how economic resources/inputs (funds, expertise, time, etc.) are converted to results.
External evaluation/review	The evaluation/review of a development intervention conducted by entities and/or individuals outside the donor and implementing organizations.
Formative evaluation/review	Evaluation/review intended to improve performance, most often conducted during the implementation phase of projects or programs.
Gender mainstreaming	The process of assessing the implications for women and men of any planned action, including legislation, policies, or programmes, in all areas and at all levels. It is a strategy for making women's as well as men's concerns and experiences an integral dimension of the design, implementation, monitoring, and evaluation of policies and programmes in all political, economic, and societal spheres so that women and men benefit equally and inequality is not perpetuated. The ultimate goal is to achieve gender equality
Impacts	Positive and negative, primary and secondary long-term effects produced by a development intervention, directly or indirectly, intended or unintended.

Term	Definition
Indicator	<p>Quantitative or qualitative factor or variable that provides a simple and reliable means to measure achievement, to reflect the changes connected to an intervention, or to help assess the performance of a development actor.</p> <p>Means by which a change will be measured. Example: Total wastewater in t/yr.</p>
Institutional development impact	<p>The extent to which an intervention improves or weakens the ability of a country or region to make more efficient, equitable, and sustainable use of its human, financial, and natural resources, for example, through (a) better definition, stability, transparency, enforceability and predictability of institutional arrangements and/or (b) better alignment of the mission and capacity of an organization with its mandate, which derives from these institutional arrangements. Such impacts can include the intended and unintended effects of an action.</p>
Lessons learned	<p>Generalizations based on evaluation experiences with projects, programs, or policies that abstract from the specific circumstances to broader situations. Frequently, lessons highlight strengths or weaknesses in preparation, design, and implementation that affect performance, outcome, and impact.</p>
Log frame	<p>A management tool used to improve the design of interventions, most often at the project level. It involves identifying strategic elements (inputs, outputs, outcomes, impact) and their causal relationships, indicators, and the assumptions or risks that may influence success and failure. It thus facilitates the planning, execution, monitoring, and evaluation of a development intervention.</p>
Milestones	<p>Interim targets; points in the lifetime of a project by which certain progress should have been made.</p> <p>They provide an early warning system and are the basis for monitoring the trajectory of change during the lifetime of the project.</p>
Monitoring	<p>A continuing function that uses systematic collection of data on specified indicators to provide management and the main stakeholders of an ongoing development intervention with indications of the extent of progress and achievement of objectives and progress in the use of allocated funds.</p>
Outcome	<p>The likely or achieved short-term and medium-term effects of an intervention's outputs. This is also the concrete benefits (environmental, social, economic) achieved through the Project.</p>
Outputs	<p>The products, capital goods, and services that result from a development intervention; may also include changes resulting from the intervention which are relevant to the achievement of outcomes.</p>

Term	Definition
Recommendations	Proposals aimed at enhancing a development intervention's effectiveness, quality, or efficiency, redesigning the objectives, and/or reallocating resources. Recommendations should be linked to conclusions.
Relevance	The extent to which the objectives of a development intervention are consistent with beneficiaries' requirements, country needs, global priorities, and partners' and donors' policies. Note: Retrospectively, the question of relevance often becomes a question as to whether the objectives of an intervention or its design are still appropriate given changed circumstances.
Results	The output, outcome, or impact (intended or unintended, positive and/or negative) of a development intervention.
Results-Based Management (RBM)	A management strategy focusing on performance and achievement of outputs, outcomes, and impacts.
Review	An assessment of the performance of an intervention, periodically or on an ad hoc basis. Note: Frequently "evaluation" is used for a more comprehensive and/or more in-depth assessment than "review". Reviews tend to emphasize operational aspects. Sometimes the terms "review" and "evaluation" are used as synonyms.
Sustainability	The continuation of benefits from a development intervention after major development assistance has been completed. The probability of continued long-term benefits. The resilience to risk of the net benefit flows over time.
Target	Definite ends to be achieved. Specifies a particular value that an indicator should reach by a specific date in the future. Example: Reduce by 50% the amount of wastewater in t/yr between 2015 and 2020.
Theory of change	The theory of change or programme theory is similar to a logic model but includes key assumptions behind the causal relationships and sometimes the major factors (internal and external to the intervention) likely to influence the outcomes.

Project factsheet

Project Title	Development and Implementation of a Sustainable Management Mechanism for POPs in the Caribbean
UNIDO project No.	150049
GEF project ID	5558
Region	Caribbean Region
Country/ies	Antigua and Barbuda (ANU), Barbados (BDOS), Belize (BZE), Saint Kitts and Nevis (SKN), Saint Lucia (SL), Saint Vincent and the Grenadines (SVG), Suriname (SUR), Trinidad and Tobago (TT)
GEF focal area(s) and operational programme	GEF-5, Persistent Organic Pollutants
GEF implementing agency(ies)	UNIDO
GEF executing partner(s)	Ministries of Environment of Antigua and Barbuda (ANU), Barbados (BDOS), Belize (BZE), St Kitts and Nevis (SKN), St. Lucia (SL), St Vincent and the Grenadines (SVG), Suriname (SUR), Trinidad and Tobago (TT) Basel Convention Regional Centre for Training and Technology Transfer for the Caribbean Region (BCRC-CARIBBEAN)
Project size (FSP, MSP, EA)	FSP
Project CEO endorsement / Approval date	May 27, 2015
Project implementation start date (first PAD issuance date)	July 2015 (WB letter) Dec 2015 (UNIDO Database)
Expected implementation end date (indicated in CEO endorsement/Approval document)	December 2020
Revised expected implementation end date	December 2022
Actual implementation end date	60 months
GEF project grant (excluding PPG, in USD)	USD 8,839,000
GEF PPG (in USD)	USD 200,000
UNIDO co-financing (in USD)	USD 178,000 (cash) and USD 250,000 (in-kind)
Total co-financing at GEF CEO endorsement (in USD)	USD 21,124,103 ¹
Expected materialized co-financing at project completion (in USD)	USD 20,471,154
Materialized co-financing at completion (in USD)	USD 9,030,185
Total project cost (excluding PPG and agency support cost, in USD; i.e., GEF project grant + total co-financing at CEO endorsement)	USD 17,869,185
Mid-term review date	July 2019
Initially planned terminal evaluation date	December 2020
Completion of terminal evaluation	March 2023

¹ Note: This sum is taken from the GEF Project Document however there is an error in the calculation. The sum of the co-financing contributions is actually 20,471,154.

Executive summary

The project sought to reduce the risks related to POPs in Antigua and Barbuda, Barbados, Belize, Saint Kitts and Nevis, Saint Lucia, Suriname, and Trinidad and Tobago by supporting systems for integrated chemicals management (ICM) in the region. The GEF approved the project in December 2015, and the project ended in December 2022 after a two-year extension. This was a sensible decision, allowing the project some time to achieve most of its outputs and to use surplus funds in demonstration projects selected by the countries². The few outstanding outputs were expected to be completed by the end of the first quarter of 2023.

The project was implemented by UNIDO. The Basel Convention Regional Centre for Training and Technology Transfer for the Caribbean Region (BCRC-CARIBBEAN) executed the regional activities, while UNIDO executed the technology demonstration activities. The project had five components:

- Creation of enabling mechanisms in the Caribbean for effective implementation of the Stockholm Convention on POPs.
- Reduction of u-POPs emissions by improving poor waste management practices at landfills.
- Assessment of potentially contaminated sites to determine the level of contamination by POPs and development of appropriate remediation strategies.
- Management and disposal of PCBs.
- Impact Monitoring and Evaluation.

Integrated chemicals management requires changes in the behaviour of multiple agents operating in different sectors and with diverse interests. Change in such a complex system can be expected to take place in temporal and spatial horizons that exceed the reach of any single project. Thus, meaningful behavioural and system change can only be expected years after a project ends. While it is not possible to assess a project's full effect on behavioural changes and the project's impact on the system, it is possible to explore the extent to which projects contribute to conditions that are likely to enable a development trajectory in the direction of such behaviours and impacts.

The project is the first comprehensive initiative targeting root causes, contributing to reducing poor management and risks associated with toxic chemicals in the region, including POPs. The project contributed to advancing legal and institutional frameworks, improving information for decision-making, and raising awareness of the risks associated with POPs. The project developed a Regional Model Integrated Chemicals Management Act (ICM Act) that included a comprehensive legal and institutional framework that countries could use to develop or modify their legislation. In addition, to update legislation related to POPs management and the Stockholm Convention, the ICM Act also incorporated elements key to the Minamata Convention, thus helping countries to meet the relevant commitments. By December 2022, at project end, Antigua and Barbuda and Suriname had adopted new legislation. Most countries had presented a draft document for ministerial approval or had sent their documents for review and approval of the cabinet. Only

² Causes of delays include the time it takes for political uptake – for example, in the Model ICM Act and the NIPs – and the need to change, renegotiate, or streamline activities in response to changing country priorities. While contributing to project delays, such flexibility helped ensure country ownership and, thus, in the long run, more efficient use of resources.

Saint Lucia and Saint Vincent and the Grenadines had held the Act at the Ministers' office due to administrative factors but planned to follow up the process under the GEF Islands program.

Access to sound information is an essential condition for sound policy-making programming. All project activities had an important training component that included information that was often new for participants. Three major project activities that contribute to information and knowledge for decision-making are:

One, ***updating the Stockholm Convention National Implementation Plans (NIPs)***. Countries often reported that updating the NIP was very helpful as it helped countries meet some of their reporting requirements to the convention. They also found the information useful during the development of the ICM legal framework.

Two, ***inventories of contaminated sites and prioritization of sites for treatment***. The inventories provided critical information for developing national waste management strategies in all participating countries.

Three, the ***Regional Information System (RIS)***. The RIS was intended to address the lack of easily available information on POPs in the region and was expected to assist countries in capturing, maintaining up-to-date data, and analyzing POPs conditions to inform the management of toxic chemicals. The RIS was designed to facilitate information to the Stockholm Convention, and it includes Geographic Information System features that allow easier communication with policymakers and the public. At the time of the evaluation, the RIS was designed but few countries had uploaded information; follow-up training to countries was scheduled for the first quarter of 2023.

The project demonstrated state-of-the-art technologies and approaches to eliminate or prevent POPs and improve land fill waste management and practices. Demonstrations of technology and landfill management directly resulted in the safe disposal or prevention of POPs in the region, such as the disposal of known PCBs and the reduction of u-POPs by promoting waste separation and preventing landfill fires.

In Antigua and Barbuda and Belize, the project made direct contributions to the additional reduction of POPs by safely disposing of more than 1.87 tons of equipment contaminated with PCBs and 1.14 tons of PCB oil-contaminated equipment, while in Santa Lucia and Suriname, no devices were considered contaminated and to be disposed of. The disposal of PCB-contaminated devices and oil for Barbados, Belize, Suriname, and Trinidad and Tobago, along with other devices for Antigua & Barbuda and Belize, was previously carried out in the framework of a dedicated FAO project.

The introduction of autoclaves to treat medical waste is also highly likely to contribute to a lasting reduction of POPs, avoiding using incinerators with poor technology. Belize, Antigua and Barbuda³, Saint Kitts and Nevis, and Trinidad and Tobago have constructed the facilities to house the autoclaves, have 1) defined the institutions responsible for the operation of the facilities, 2) undertaken systems and protocols for collection of waste from hospitals and laboratories, and 3) only lacked electrical connections to begin operations.

Most countries also benefited from improved waste management practices either for their landfill or waste separation initiatives. The calculated u-POPs reduction is almost the same as projected in the project design (13.34 gTEQ/a). However, a new assessment of the emissions at the baseline scenario was carried out (giving higher values), showing the reduction of emissions

³ In the case of Antigua and Barbuda the facility to house the autoclave was still under construction.

foreseen for the Ornamibo landfill was significantly lower than projected due to the decision of the government of Suriname to postpone the renovation and upgrade works.

In conclusion, the project's main contributions have been on the legal and institutional frameworks, awareness raising, and technology. Also, capacity development and information activities supported the project work in these three domains.

Much less was accomplished on financing, which affected progress in the adoption of technology and placed significant constraints on the functioning of institutions and the ongoing support for awareness raising. Access to financing was not included as a component in the project design. In addition, low budgets hamper public sector investment and action in the field of POPs management, while chemical manufacturers, distributors, farmers, and other stakeholders do not see added value in incorporating environmental sustainability into their actions and activities. Yet the project accomplishments took place in a very challenging context of low country financing and weak and low staffing in national partner institutions. While work remains to be done to achieve a sustained development trajectory towards sound ICM in the Caribbean, the project has made important contributions to strengthening BCRC-CARIBBEAN as a regional mechanism for continuity and supporting countries in ICM development efforts. Strongly supported by the countries, BCRC-CARIBBEAN is well positioned to tap into technical knowledge and funding from GEF, such as the GEF Islands program and other programs, which will continue to build on the accomplishments of this project.

The evaluation makes the following four recommendations, all of which apply to UNIDO's future operations. Still, they also apply to the follow-up projects approved under the GEF Islands program.

- 1. To BCRC-CARIBBEAN: Further strengthen the results monitoring capacities of BCRC-CARIBBEAN**, in order to provide an overall picture of progress to outcomes and contributions while supporting strategic discussions in the PSC.
- 2. To BCRC-CARIBBEAN: In the new projects, BCRC-CARIBBEAN should ensure that training activities more fully consider country conditions in the planning and implementation.** Training workshops should continue to be conducted by trainers with competency in technical knowledge and supplemented by competency in training methods for easy transfer of knowledge.
- 3. To BCRC-CARIBBEAN: More aggressively engage private sector operators in the new GEF projects.** Given that this project made progress in advancing mechanisms for sustainable management of POPs in the Caribbean, it is crucial that subsequent follow-up support work more closely with private-sector operators that directly managed many of the activities pertaining to toxic chemicals and POPs.
- 4. To UNIDO and BCRC-CARIBBEAN: should give more attention to ensuring the synchronization of project implementation cycles with country absorption capacities.** It is important for donors, implementers, and executors to make the necessary provisions to adapt the implementation cycles to the evolving in-country absorptive capabilities through the implementation of appropriate and systematic M&E and analysis of factors affecting the attainment of results.

There are some lessons learnt from this project:

- 1. Regional activities, while appropriate to initiate processes in Small Island Developing States (SIDS), require follow-up and country-level support.**
- 2. The regional mechanism is an effective approach to address challenges in supporting SIDS, as it can help establish a network across countries while building**

in-country capacity as well as developing and testing cost-effective approaches in response to country needs.

3. Address social and equity considerations in the planning and implementation of POPs management by, for example, considering people living around the landfills who often complement their income with the collection of metals or plastics that can be sold in the market.

PROJECT EVALUATION RATINGS⁴		
#	<u>Evaluation criteria</u>	<u>Rating</u>
A	Impact (progress toward impact)	5
B	Project design	
1	• Overall design	5
2	• Logframe	5
C	Project performance	
1	• Relevance	5
2	• Coherence	5
3	• Effectiveness	5
4	• Efficiency	5
5	• Sustainability of benefits	5
D	Cross-cutting performance criteria	
1	• Gender mainstreaming	5
2	• M&E: ✓ M&E design ✓ M&E implementation	5
3	• Results-based Management (RBM)	5
E	Performance of partners	
1	• UNIDO	5
2	• National counterparts	5
3	• Donor	5
F	Overall assessment	5

⁴ Annex A includes the evaluation criteria for which the evaluation team provided ratings as requested in the TORs for this evaluation.

1. Introduction

1.1. Evaluation objectives and scope

As per the evaluation's Terms of Reference for this evaluation and in line with the UNIDO Evaluation Policy⁵, this evaluation has two main objectives: First, to assess the project performance in terms of relevance, coherence, effectiveness, efficiency, sustainability, and progress to impact. Key in this assessment is the examination of the extent to which the project helped to put in place the conditions likely to overcome barriers and contribute to a development trajectory conducive to the sustainable management of POPs in participating countries. The second objective is to identify useful findings, lessons, and recommendations for enhancing the design of new and implementation of ongoing projects by UNIDO. The Terminal Evaluation included an assessment of project design and covered the project's full duration from December 2015 to December 2022.⁶

1.2. Project Context

In recent decades the economy of the Caribbean countries has changed from a strong agricultural base to tourism, manufacturing, and commercial expansion. This shift has resulted in rapid economic growth and the improvement of living standards across the region. Yet, economic growth and consumption were not matched with the country's capabilities to prevent and manage waste. This has led to the generation of much larger and more complex categories of solid, hazardous, and chemical waste that is often not treated and ends up in dumps or poorly managed landfills. Such conditions have resulted in growing risks to human health and an increasing environmental impact (air, water, groundwater, soil, and ecosystem).

Before the project document (2015), several initiatives had addressed sound chemical and waste management in the region, often with the assistance of international agencies. These include the Food and Agriculture Organization (FAO) Technical Assistance for Pesticides Management to Caribbean Countries conducted under the European Commission-funded project GCP/INT/063/ and the national-level activities executed under the Strategic Approach to International Chemicals Management (SAICM), and Quick Start Programme (QSP) across the region. In addition, the Basel Convention Regional Centre for Training and Technology Transfer for the Caribbean (BCRC-CARIBBEAN), alongside the Regional Centre for Central America and Mexico, previously supported the development of a regional strategy for the environmentally sound management of used lead-acid batteries (ULABs) in the Caribbean Island states and Central America.

In 2013, the CARICOM ACP/MEA Unit (Caribbean Community and Common Market (CARICOM) Multilateral Environmental Agreements (MEAs) in the African, Caribbean, and Pacific (ACP)) and the BCRC-CARIBBEAN conducted a review of Legislative and Regulatory Frameworks for the implementation of the Basel, Rotterdam, and Stockholm Conventions. Various regional capacity-building workshops related to the sound management of chemicals and waste management have also taken place across the region over the years. Previous projects in the Caribbean had also identified provable locations with POPs contamination and locations of temporary storage of contaminated materials. But inventories were incomplete, and information in NIPs of potentially contaminated sites was inconsistent. Inventories only included the original 12 POPs in the

⁵ UNIDO. (2021). Director General's Bulletin: Evaluation Policy (UNIDO/DGB/2021/11)

⁶ With regard to the results expected during November and December of 2022, the evaluation team provided an assessment of the likelihood of these results being achieved.

Stockholm Convention. Also, by 2015 little work had taken place on adopting environmental pollution limits, updating the national laws, monitoring/enforcement programs, identifying new contaminated locations, or removing and disposing of POPs. Nor had there been support for a comprehensive regional initiative to support countries in managing toxic chemicals.

1.3 Project objectives

The project objective was to develop and implement Sustainable Management Mechanisms for POPs in the Caribbean to reduce and eliminate the threats of POPs in the region. The project took a comprehensive approach that intended “to bring together all the necessary stakeholders to update the countries’ POPs inventories and NIPs, improve landfill management practices to reduce u-POPs, improve countries’ legislative frameworks and human resource capacity to manage POPs, develop management plans for site remediation and assist with PCB disposal.”⁷ Key to this process was “to build capacity at the regional level for planning clean up and/or remediation of contaminated locations”. Remediation measures will be demonstrated at one location with confirmatory sampling and long-term monitoring.”⁸ The project targeted activities in eight Caribbean Countries: Antigua and Barbuda; Barbados; Belize; the Federation of Saint Kitts and Nevis; Saint Lucia; Saint Vincent and the Grenadines; the Republic of Trinidad and Tobago; and the Republic of Suriname.

The project included five components leading to specific project outcomes that are likely to contribute – to varying extents - to the key six enabling conditions identified above. The blue lines in Figure 3 (Theory of Change (TOC)) indicate the likely contribution of the activities of each project component to each of the enabling conditions⁹.

- **Component 1: Create the enabling mechanisms in the Caribbean for effective implementation of the Stockholm Convention on POPs.** This consisted in strengthening the capabilities of BCRC-Caribbean as an executing agency to support country conditions conducive to sound integrated toxic chemicals management (ICM).
- **Component 2: Reduction of u-POPs emissions by improving poor waste management practices at landfills.** This component introduced approaches and demonstrated technologies to improve the management of toxic chemicals and waste.
- **Component 3: Assessment of potentially contaminated sites to determine the level of soil and groundwater contamination by POPs and ODS and develop and carry out the appropriate remediation strategies.**
- **Component 4: Management and disposal of PCBs.** This component included updating inventories based on standardized data collection and analysis and the safe disposal of existing PCBs.
- **Component 5: Impact Monitoring and Evaluation.**

⁷GEF 2015. Development and Implementation of a Sustainable Management Mechanism for POPs in the Caribbean: 10 (GEF 5558):10

⁸GEF 2015. Development and Implementation of a Sustainable Management Mechanism for POPs in the Caribbean: 10 (GEF 5558):31

⁹ The project also included a component in Monitoring and Evaluation which is mentioned further.

Figure 1: Project components, key objectives, and their applicable countries¹⁰

Support implementation of the Stockholm Convention		Reduce UPOPs at landfills		Assess and remediate contaminated sites		Manage and dispose of PCBs
<ol style="list-style-type: none"> 1) Updated NIPs 2) National policies on sound chemicals management 3) Regional Information system 4) Institutional structures 5) Training and capacity building 6) Regional and national communications campaigns 		<ol style="list-style-type: none"> 1) Better waste management practices at the national level (better landfilling) 		<ol style="list-style-type: none"> 1) Identification, assessment) and prioritization 		<ol style="list-style-type: none"> 1) ESM implemented
<ul style="list-style-type: none"> • Antigua and Barbuda • Barbados • Belize • St. Kitts and Nevis • St. Lucia • St. Vincent and the Grenadines • Suriname • Trinidad and Tobago 		<ul style="list-style-type: none"> • Antigua and Barbuda • Barbados • Belize • St. Kitts and Nevis • St. Lucia • St. Vincent and the Grenadines • Suriname • Trinidad and Tobago 		<ul style="list-style-type: none"> • Antigua and Barbuda • Barbados • Belize • St. Kitts and Nevis • St. Lucia • St. Vincent and the Grenadines • Suriname • Trinidad and Tobago 		<ul style="list-style-type: none"> • Antigua and Barbuda • Barbados • Belize • St. Lucia • Suriname
		<ol style="list-style-type: none"> 2) Source Separation and hazardous waste facilities activities 		<ol style="list-style-type: none"> 2) Remediation demonstrated 		<ol style="list-style-type: none"> 2) Lab upgrade for PCBs

¹⁰ UNIDO 2019. Report of the mid-term review of the UNIDO project Development and Implementation of a Sustainable Management Mechanism for POPs in the Caribbean. GEF 5558 (August 13, 2019)

Support implementation of the Stockholm Convention		Reduce UPOPs at landfills		Assess and remediate contaminated sites		Manage and dispose of PCBs
		<ul style="list-style-type: none"> • Antigua • Barbados • St. Lucia 		<ul style="list-style-type: none"> • Trinidad and Tobago 		<ul style="list-style-type: none"> • Antigua and Barbuda • Belize • Suriname
		3) BAT/BEP demonstrations on existing landfill facilities				3) PCB disposal activities
		<ul style="list-style-type: none"> • Antigua and Barbuda • Barbados • Belize • St. Kitts and Nevis • St. Lucia • St. Vincent and the Grenadines • Suriname • Trinidad and Tobago 				<ul style="list-style-type: none"> • Antigua and Barbuda • Barbados • Suriname • Trinidad and Tobago
		4) Autoclave technology implemented				
		<ul style="list-style-type: none"> • Antigua and Barbuda • St. Kitts and Nevis • St. Lucia • Suriname • Trinidad and Tobago 		 Executed by BCRC-CARIBBEAN  Executed by UNIDO		

The project results framework (Annex C) described the project activities and expected outputs which can help track the extent to which the project delivers the expected results. While some of the activities identified during project design had to be substituted for other activities (typically at the requests of the host governments), there were no major changes in the log frame and result framework during project implementation.

1.4 Project Implementation arrangements, stakeholders, and funding

1.4.1 Implementation arrangements

UNIDO was the project Implementing Agency responsible for supervising its progress and providing technical, administrative, and financial oversight on behalf of the GEF. A project manager was appointed by UNIDO to oversee the implementation of the project and was assisted by a support staff. UNIDO was also responsible for the execution of demonstration projects. This included the recruitment of consultants and coordination with governments in countries where pilot demonstrations took place.

The Basel Convention Regional Centre for Training and Technology Transfer for the Caribbean Region (BCRC--CARIBBEAN) executed other national and regional activities and was responsible for the management and reporting of such activities. BCRC-CARIBBEAN aims to support Contracting Caribbean Parties to the Basel, Rotterdam, Stockholm, and Minamata Conventions with implementing their international obligations to sustainably manage chemicals and waste to protect human health and the environment. To meet its project responsibilities, the BCRC-CARIBBEAN created a Regional Project Management Unit to execute regional activities and carry out monitoring and reporting.

Figure 1: Project implementation arrangements¹¹



¹¹ GEF 2015. Development and Implementation of a Sustainable Management Mechanism for POPs in the Caribbean: 10 (GEF 5558):48

The Project Steering Committee (PSC) was established to guide the execution of the project and to approve annual work plans and budgets based on the approved project document. The PSC was a regional body comprised of UNIDO representatives, the project's Regional Coordinator, each of the participating country's National Project Coordinator, and the Chair of each country's Project Working Committee (PWC).

At the country level, the project established the PWCs, which included representatives of the national agencies with responsibilities for aspects of chemicals and waste management and relevant experts as required. These committees provided guidance on the local implementation of project elements. Country-based co-executing and co-financing agencies were also included in the PWC. Figure 1 presents the project implementation and execution arrangements.

1.4.2 Project stakeholders

The project document identifies the government execution partners in each country as the key stakeholders for the project. Nevertheless, after the midterm, in response to the midterm review (MTR), the project made more systematic use of the project working groups (PWG) in each country, which typically included representatives from different sectoral ministries. Some also included representatives of the private and non-governmental sectors, such as utility companies, other private entities, and universities.

1.4.3 Project budget

The total project budget at approval was USD 29,963,103. This included a GEF grant of USD 8,839,000 and USD20,471,154 of co-financing. At project closing total GEF grant obligations and disbursements by December 2022, were 8,548,805. Table 1 presents a breakdown of the project budget by component and the utilization of such resources. Expected co-financing at approval was USD 20,471,154. The reported realized co-financing was just under half at USD 9,030,185 (Annex G). This is because USD10,012,382 of co-financing was not realized as the Solid Waste Management Company Limited in Trinidad and Tobago decided not to open a new landfill for which the project was to collaborate.

Table 1: Project budget from GEF grant (USD)

Description	Approved Budget	Obligations and disbursements	Total Expenditure
Enabling Mechanisms Partnering Countries	2,003,982.76	2,003,982.76	2,194,361.11
Reduce u-POPs Emissions	3,827,833.35	3,637,109.12	3,980,909.49
Assess Potential Contaminated Sites	1,102,595.99	1,101,943.13	1,206,625.80
Managing and Disposing of PCBs	477,051.68	473,307.80	518,271.93
Project Management	792,265.25	786,288.98	860,832.65
Evaluation and Monitoring	635,270.97	546,173.33	597,965.43
USD TOTAL	8,839,000.00	8,548,805.12	9,358,966.41

Source: Elaborated by the evaluation team with information provided by the UNIDO management team.

1.5. Evaluation Methodology

The evaluation team conducted the terminal evaluation consistent with the UNIDO Guidelines for the Technical Cooperation Project and Project Cycle¹². The team was composed of a lead specialist with experience in evaluating environmental projects, a regional expert, and a POPs technical expert. The evaluation team leader liaised with the UNIDO Independent Evaluation Unit during the evaluation. While assessing the extent to which the project delivered the project outcomes promised at inception, the evaluation team focussed on the extent to which the project used the grant resources as intended in the context. To achieve this, the evaluation team used a theory of change framework (TOC) to determine the extent to which project outputs address root causes and contribute to conditions enabling a development trajectory conducive to the integrated management of toxic chemicals.

Evidence was collected and triangulated using mixed methods. Two team members attended the regional workshop held in Trinidad and Tobago in Early October (one in person and the other remotely). This workshop provided a useful introduction to the project. Subsequently, during the inception phase, the evaluation team carried out desk reviews of documents provided by the project team and identified questions and issues for further research during country visits. The evaluation assessed the extent to which the project used the GEF grant as it was intended and the extent of materialization of co-financing for the intended purposes. The evaluation team visited project sites in Antigua and Barbuda, Saint Lucia, Barbados, and Trinidad and Tobago from December 2nd to 17th, 2022. Annex D includes the list of stakeholders interviewed during the evaluation, and Annex E presents the evaluation timetable. The team also had meetings in Trinidad and Tobago with the BCRC-CARIBBEAN and held telephone calls with UNIDO's management team and country project coordinators in Belize. Given the large number of activities in the project spread over eight countries, the project team could not examine all aspects of the project in depth. An important limitation is that the team visited only four countries (half of those participating in the project). Deficient and inconsistent monitoring data also made it difficult to get a granular picture of project accomplishments in all components. The evaluation team sought to mitigate this limitation by holding teleconferences with country project coordinators in Belize, one of the larger countries engaged in the project, and by choosing to examine a purposeful sample of activities representative of the project. The evaluation assessment pertaining to Saint Vincent and the Grenadines and Saint Kitts and Nevis is mostly based on desk review.

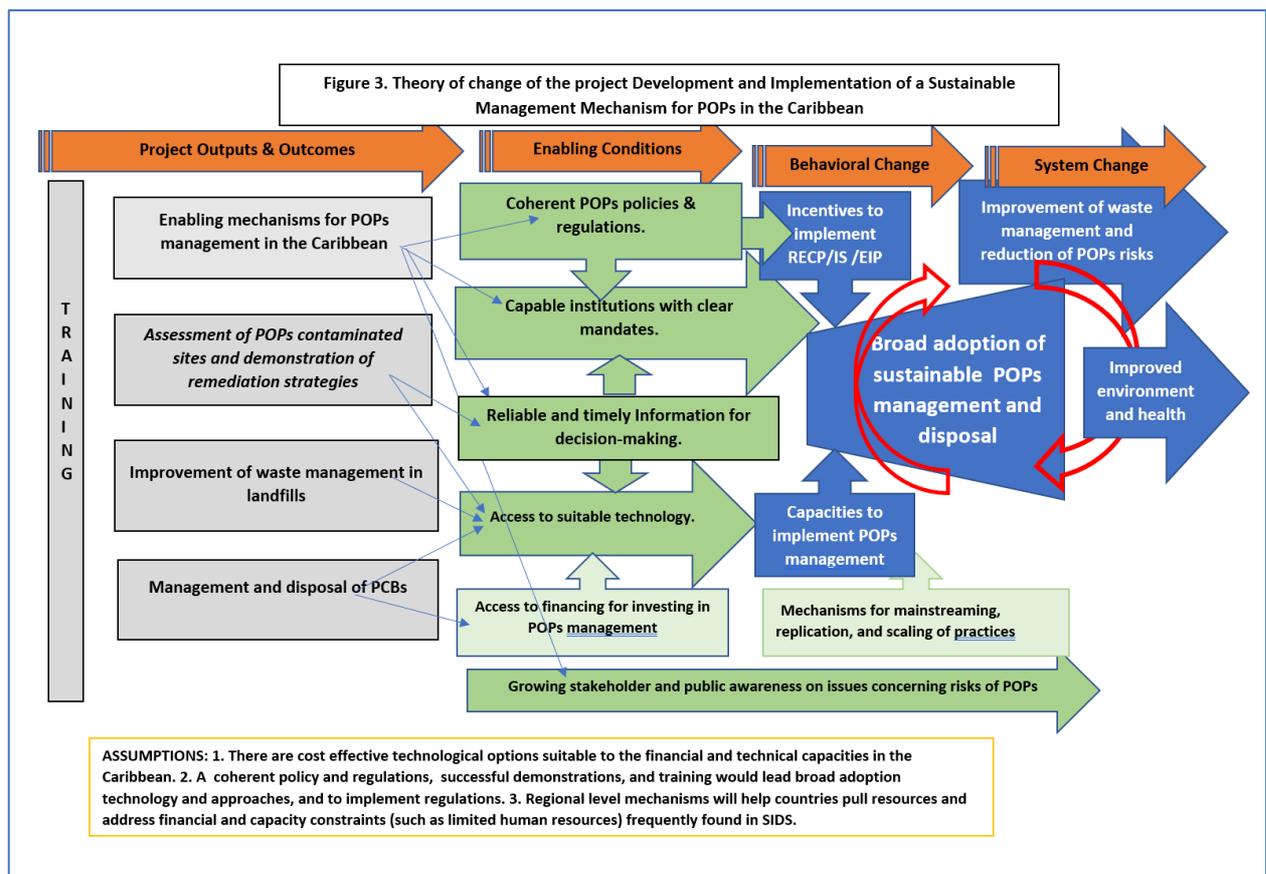
1.6 Theory of Change

Project design and implementation typically use logical frameworks as a tool to identify chains of causality expected from the project, which include project activities, outputs, and outcomes. Such models seek to clarify the logical causality within the project. A theory of change (TOC), while also a model, shifts the attention from the project's internal causality to the interactions between a project and the phenomena that are targeted for change. A critical implication is that the focus of the evaluation shifts from assessing the extent to which the project was implemented as planned to the assessment of the extent to which the outputs are likely to contribute to a broader system change. In the case of this Project, the key evaluation concerns are the extent to which the project activities are conducive to the sustainable management of POPs in the Caribbean. These processes require a behavioural change of multiple agents and confronting unforeseen factors, both of which require flexibility to adapt project activities. Moreover, meaningful change at the system level is likely to occur years after a project ends. While it is not possible to assess behavioural changes that have not taken place, it is possible to explore the extent to which projects help put in place conditions that are likely to contribute to a development trajectory in

¹² UNIDO. (2006). Director-General's Administrative Instruction No. 17/Rev.1: Guidelines for the Technical Cooperation Programme and Project Cycle (DGAI.17/Rev.1, 24 August 2006)

the direction of the long-term objective (which in the case of this project is the sound management of toxic chemicals and POPs in the Caribbean). Given the temporal mismatch between the project duration and system change, it is also important to put in place mechanisms that will help maintain and accelerate the change momentum towards the desired development trajectory after the project ends.

From this perspective, TOCs are best approached as models composed of hypotheses about the conditions affecting system change. TOCs also identify key assumptions and the mechanisms that are put in place to help sustain, accelerate change, and adapt to unexpected developments during implementation and beyond. Approached in this way, a TOC provides a framework to assess how the project has adapted to respond to unforeseen circumstances to ensure the trajectory of the intended long-term project objectives.



Source: Elaborated by the evaluation team and consulted with the project implementation team

While no explicit TOC was included in the project document, TOCs were not a requirement for GEF 5 projects. Nevertheless, the project document at approval provides sufficient information that allowed the evaluation team to build a TOC retroactively. Using this information, the evaluation team developed a TOC for the project which was presented to the project team for verification. A pervasive baseline condition reported in NIPs points to an inadequate management of chemicals across the region, the poor management of POPs, and a poor waste management practice, which contribute to unintentional POPs (u-POPs) threats to human health and the environment. The project intended to help the participating countries to reduce and eliminate such threats. Drawing from information in the country NIPs, the project document summarized the key barriers that hamper progress to safe and efficient use, management, and disposal of POPs in the region. The opposite of the barriers identified in NIPs can be postulated as hypotheses of the conditions that are likely to enable the desired development trajectory in

POPs management in the region. Such hypotheses are as follows, and their interactions are illustrated in Figure 3.

- **Coherent policies and regulations.** Existing policies, plans, and strategies have a sectoral outlook, are incoherent from the standpoint of POPs, and encourage actions that contradict or duplicate the work of other policies and plans.
- **Capable institutions with clear mandates.** Institutional responsibilities concerning chemicals are generally overlapping, and, in many cases, there are conflicts of interest or loopholes. There is low enforcement of the law and customs regulations. The role and mandate of enforcement agencies are not always clear, nor do they have the necessary human resources and hardware infrastructures for efficient inspections and monitoring. No systems are in place to safely dispose of used and obsolete stocks and clean up contaminated sites. There is also insufficient intergovernmental coordination in regulations of chemicals and enforcement across economic sectors.
- **Reliable and timely information for decision-making.** The information management system that would help understand trends and make informed decisions is lacking. The maintenance of such computerized data stores and analytical interfaces most probably was beyond the countries' technical and financial capacities.
- **Access to suitable technology and knowledge.** Countries have insufficient access to knowledge of toxic chemical residues in the environment and of their interaction with human and ecosystem health, and lack the technology or approaches for their proper management.
- **Public awareness.** There is low public awareness of the environmental and health hazards associated with POPs and u-UPOPs.
- **Access to financing for investing in POPs management.** Low budgets hamper public sector investment and action in the field of POPs management. Chemical manufacturers, distributors, farmers, and other stakeholders do not see added value in incorporating environmental sustainability into their actions and activities.

Of the conditions in the six domains mentioned above, access to financing was mentioned but was not identified as a separate project component, although it was partially addressed under the assumption that project co-financing would materialize as planned. The evaluation team has raised financing to the status of the key enabling conditions.

Having identified the key system conditions influencing behaviour pertinent to the desired development trajectory, the team sought to identify how the project (through its different components and activities) was likely to contribute or detract from such conditions.

The implicit TOC for the project had three key assumptions that were also not explicit:

- There are cost-effective technological options to manage POPs that are suitable for the financial and technical capacities in the Caribbean.
- A coherent policy and regulations, successful demonstrations, training, and awareness raising would lead to the broad adoption of technology and approaches to implementing regulations conducive to the sustainable management of POPs in the region.
- Regional-level mechanisms will help countries pool resources and address financial and capacity constraints (such as limited human resources and low government budgets) frequently found in SIDS.

2. Project's contribution to development results - Effectiveness and impact

2.1. Eastern Caribbean - Project contributions to sound integrated chemicals management

The project's effectiveness is rated as satisfactory. As pointed out in the TOC presented above, the project activities targeted conditions in five domains which were meant to bring about systemic changes in POPs and toxic chemicals management across the region. This was the first project with a comprehensive approach to address root causes specific to the region. While levels of accomplishment varied across the countries and areas of intervention, the project successfully captured the attention of country officials and the public in most of the 8 countries. Particularly important were the project's support for the improvement of legal and regulatory frameworks pertaining to toxic chemicals, the generation of information for decision-making, and the development of awareness of the risks of POPs among the population. The elimination of PCBs, the introduction of firefighting foams, and the Autoclave demonstrations will result in the reduction of POPs. Also, the project provided considerable support to the introduction of technology to improve waste management, some of which resulted in or will result in the reduction of POPs in the region. Adoption pertaining to aspects of the waste management plans, the source separation and material recovery demonstrations, hazardous storage facilities, and other technology demonstrations focused on aspects pertaining chemicals management that were within reach of the existing country capacities and available resources. Despite the significant contributions of the project, sufficient enabling conditions are not yet in place. There is a need for further advances toward robust regulatory frameworks, capable institutions, available financing, and private sector engagement, especially in the recovery and reuse of recyclables and in the implementation of BAT/BEP. These are conditions that cannot be expected to be achieved by one project in a relatively short time. Nonetheless, the project enhanced progress on some enabling conditions and has set the stage for subsequent support in the region by GEF and other funders.

2.2. Progress toward impact

2.2.1 Contributions to the legal and institutional framework for ICM

At project entry, the participating countries were at different levels of legal and institutional development with regard to chemicals management and POPs. In this context, the project sought to adopt a flexible approach to support countries in developing or updating their legislation. To accomplish this, the project developed a Regional Model Integrated Chemicals Management Act (ICM Act) that included a comprehensive legal and institutional framework that countries could use to develop or modify their legislation. In addition, to update legislation related to POPs management and the Stockholm Convention, the ICM Act also incorporated elements key to the Minamata Convention, thus helping countries to meet the relevant commitments. The ICM Act was developed in consultation with representatives of all 8 countries from May to October 2018. In parallel, the project supported the review and identification of gaps in the legislation of each country, with the assistance of hired experts. The project advised countries to take one of two strategies to adapt the ICM Act, either replacing the existing national laws or adopting elements of the ICM Act by amending the existing national legislation. The project also helped each country develop a roadmap for the adoption of the legislation, which included the identification of champions to promote the changes and a series of steps to prepare and review the legislation's drafts with the relevant stakeholders' engagement. All countries ended up choosing to adopt aspects of the ICM Act to fill in gaps in their legislation or replace obsolete regulations.

The requirements and processes by which legal reforms take place in the participating countries are very diverse and require considerably more time and consultation than initially expected. In the case of Barbados and Trinidad and Tobago, for example, by law, the legislation must be drafted by a government ministry (not a consultant); in this case, the process was slowed down. By December 2022, at the project's end, Antigua and Barbuda and Suriname had adopted new legislation. Most countries had presented a draft document for ministerial approval or had sent their documents for review and approval of the cabinet. Only Saint Lucia and Saint Vincent and the Grenadines had held the Act at the Minister's office due to administrative factors but planned to follow up the process under the GEF Islands program.

While all country representatives interviewed considered the Model ICM Act an important reference to update their legal and regulatory systems, they also indicated that the parallel GEF/FAO 3407 project also supported separate legislation on pesticides. This contributed to slowing down the process of adoption. These two GEF funding initiatives were not coordinated, and countries had to pause to assess whether to combine the two acts into one or adopt separate legislation. While there is a need to coordinate the regulation of chemicals and fertilizers, it is recommended that countries have different regulatory regimens. In western countries, specific Acts or decrees regulate toxic chemicals and pesticides. This is mainly because pesticides are of different natures, not only “chemicals” but also biocides, made by a virus, for instance, and have a different and more severe impact on food and agriculture than “normal” chemicals, even of those considered hazardous. Most countries managed to coordinate as the Chair of the Pesticides Board was typically part of the group reviewing the ICM Act drafts. In the case of Belize, such coordination took place through the consultant that drafted the ICM legislation, who also assisted the Pesticides Board in drafting the pesticide regulations. In the case of Barbados, which is still drafting the legislation, the intention is to propose a comprehensive framework for chemicals management that addresses pesticides and industrial chemicals. In Saint Kitts & Nevis the BCRC-Caribbean provided support through an initial consultancy and has produced a draft chemicals and pesticides policy with the support of a local lawyer.

Clarification of the institutional roles and responsibilities in the management of chemicals.

Most countries at project entry lacked a sufficiently clear definition of responsibilities regarding hazardous chemicals management across agencies. The Model ICM Act provided a roadmap for the definition of such responsibilities in several countries. In Antigua and Barbuda, the Pesticides and Toxic Chemicals Act was amended to facilitate the creation of a Pesticides Board to serve as an independent regulating authority. In Suriname, the driving force at the time of revision was the National Institute for Environment and Development (NIMOS), now under the Ministry of Spatial Planning and the Environment. NIMOS is expected to become the National Environment Authority under the Act. The Suriname Act also called for an Environment Fund. In Trinidad and Tobago, the new legislation expands the authority of the Ministry of Health by incorporating changes in the Toxic Chemicals and Pesticides Act (which assigns responsibility to the Ministry of Health). In Saint Kitts and Nevis, the Model ICM Act has been used to clarify the legal mandates at different institutional levels. In Saint Lucia, where the act has been delayed, one of the issues prior to the project was that there was no clarity in the institutional roles regarding toxic chemicals. The process promoted by the project has led to discussions on the roles of different entities in chemicals management. Two entities that have been engaged are the Ministry of Health (traditionally mostly focused on disease vector control and pharmaceuticals) and the role of the Customs Department. Belize and Barbados reported no changes in the institutional roles. While the country working groups (CWGs) established to support the project in each country were largely comprised of government entities, and they varied from country to country, the CWGs presented an option to overcome the coordination barriers among agencies, which is a frequent obstacle in the clarification of institutional roles and the implementation of environmental regulations. CWGs or a reconfiguration of these groups will likely continue to operate in the future in the context of the GEF Islands project.

2.2.2 Strengthening capacities of toxic chemicals management institutions to fulfill their roles and responsibilities

As laws have only recently been developed or are yet to be adopted, the phase of implementation of the law and full setting up of institutional arrangements has not taken place. All eight countries are facing major challenges in the implementation of the new laws. Implementation of the law will require a considerable investment in capable staff and financing. The project reports training over 550 persons (285 females and 270 males) on topics related to project activities. This includes aspects related to the Stockholm Convention, NIPs, inventory of toxic sites, the development of the Model ICM Act, technological demonstrations, PCB testing, landfill management, and awareness raising campaigns. Typically training workshops were well-integrated project activities. In Trinidad and Tobago, the project also developed a communication plan for the Guanapo landfill, which included a workshop and information for the surrounding communities on the management of household risks associated with the landfill. The project also introduced methods to carry out a risk assessment and studies related to POPs and POPs disposal in Belize and Suriname. The Project Steering Committee and the Country Working Groups also contributed to coordination among different government agencies – this was most apparent in the case of the analysis and incorporation of the ICM Act by the countries

Table 2: Number of male and female participants at the project's training workshops 2017-2022

Title of Training Workshop	Location	Male	Female
Regional Inception Meeting and Training Workshop	Trinidad and Tobago	11	11
National POPs Inventory Initiation Workshops	Antigua and Barbuda	13	2
National POPs Inventory Initiation Workshops	Barbados	12	9
National POPs Inventory Initiation Workshops	Belize	18	10
National POPs Inventory Initiation Workshops	Saint Kitts and Nevis	15	13
National POPs Inventory Initiation Workshops	Saint Lucia	8	7
National POPs Inventory Initiation Workshops	Saint Vincent and the Grenadines	21	9
National POPs Inventory Initiation Workshops	Suriname	21	37
National POPs Inventory Initiation Workshops	Trinidad and Tobago	15	14
Train-the-Trainer Workshop: Thematic Area 1 - ESM And Disposal Of POPs And Inventory Management	Antigua and Barbuda	10	7
2nd Regional Stakeholder Workshop towards a Model Legal Framework for Chemicals Management	Trinidad and Tobago	7	13

Title of Training Workshop	Location	Male	Female
Train-the-Trainer Workshop: Thematic Area 4 - Analytical Methods/ Sampling Screening and Testing of POPs	Trinidad and Tobago	13	19
Train-the-Trainer Workshop: Thematic Area 5 - Human Health and Ecological Risk Assessment of POPs	Trinidad and Tobago	11	21
Regional Training Workshop on the Article 15 reporting requirements under the Stockholm Convention	Trinidad and Tobago	9	28
Reduction of u-POPs emissions by improving waste management practices at landfills	Antigua and Barbuda	14	16
Reduction of u-POPs emissions by improving waste management practices at landfills	Barbados	17	14
Reduction of u-POPs emissions by improving waste management practices at landfills	Saint Lucia	22	17
Reduction of u-POPs emissions by improving waste management practices at landfills	Saint Kitts and Nevis	19	17
Reduction of u-POPs emissions by improving waste management practices at landfills	Saint Vincent and the Grenadines	No list found	No list found
Online Comms Training and Capacity Building Workshop (Online)	Antigua, Barbados, Saint Lucia	No list found	No list found
POPs -RIS Training Workshop (Online)		14	21
Total		270	285

Source: BCRC-CARIBBEAN

Stakeholders reported that the utility of training and the quality of the training workshops varied. Several stakeholders indicated that the workshops on the Stockholm Convention were very helpful in understanding the country's commitments to the convention. Similarly, stakeholders reported benefits from their engagement in the inventory of toxic sites and PCBs. Typically, there was the feeling that face-to-face and "hands-on" workshops were much more useful than remote workshops. Train the Trainer workshops seemed not to have worked as planned; while it is possible that workshop attendees shared their knowledge informally with some colleagues, the Evaluation Team found no evidence that workshops were replicated in each country. The Midterm Review mentioned shortcomings of some of the training workshops: while trainers were competent in their technical fields, the information shared did not fully transfer into participants' knowledge and understanding. Yet, the selection of staff participating in workshops was also a factor that affected the efficacy of the workshops. The country partners nominated participants. Sometimes they selected persons with no background to understand the technical material.

The small number of dedicated staff within the responsible government entities presented a key challenge. It was a recurrent theme during the interviews, most pronounced in countries such as Antigua and Barbuda, Barbados, Saint Lucia, and Trinidad and Tobago, where only two professionals were part of the staff in the government office coordinating the project. Such staff

often had responsibilities related to other conventions on top of other roles in their ministries. The low level of human resources available is characteristic of small island states and affects the future enforcement of the new regulations, which need skilled technical staff for monitoring (sampling and analysis), and for inspection and investigation (with related administrative and civil action/sanctions). Several countries also indicated that there was a need to set up a continuous process to update legislation and regulations as new chemicals were added to conventions. Some officers indicated that countries had not had the time or resources to absorb the outputs of the project and hoped that the GEF Islands Program would consider providing support to counties to absorb the contributions made by the project more fully.

2.2.3 Technologies to improve the management of POPs

The project was most active in the introduction of technologies to manage POPs. Not all of the activities identified at inception were implemented (mostly due to changes in priorities by governments). Yet the project introduced multiple technologies and contributed to knowledge to reduce POPs and improve landfill waste management in the region. The introduction of technologies often took place through demonstration or pilot projects, hands-on training, and the development of operational manuals. Care was also taken to carry out activities safely (such as the disposal of PCBs).

In some cases, the project also supported countries with the formation of regulations and awareness campaigns to support the new technologies. For example, the project reviewed Belize's regulations for licensing healthcare institutions and proposed measures to avoid the improper disposal of medical waste, which was accompanied by an awareness-raising campaign for medical waste and the development of a medical waste disposal plan. Further is an account of the main types of technologies introduced by the project in the 8 countries.

Autoclaves (Belize, Antigua and Barbuda, Saint Kitts and Nevis and Trinidad and Tobago)

The use of autoclaves was implemented in order to reduce the uncontrolled disposal of medical waste in open dumpsites or even controlled but not sanitary landfills, which often results in the open burning of waste that produces uncontrolled releases of u-POPs. Another motivation was to begin reducing the use of uncontrolled batch incinerators (mostly simple ovens) that are not equipped with air pollution control devices and that operate in low-temperature conditions, not sufficient to impede the release of u-POPs formed during combustion.

Autoclaves were installed by the Chinese company Gient in four countries (although there are still delays in their effective installation, sometimes due to administrative constraints in delivering the promised infrastructures, other times do to the delay in the installation of power or water supply). They are designed to treat infectious waste some pathological wastes or other regulated medical waste as per local authority. The sterilization temperature is optimal for the scope and is far below the critical value for the combustion process, so only volatile organic compounds could be emitted during venting (but not u-POPs). The autoclaves include a pre-vacuum air emissions control system.

According to the documentation provided and available to UNIDO, the company and its products have received several certifications from international bodies, including ASME (The American Society of Mechanical Engineers), ISO9001/ISO14001/ISO45001 for environmental management, and from CNAS (China National Accreditation Service for Conformity Assessment) as far as occupational health and safety management process is concerned, thus assuring a good quality of the product at least by the formal point of view. The contracts foresee two years of

spare parts and assistance. Even though not included in the contract, a sewage/waste gas treatment system can be applied by the user when needed or if required by stricter regulations. The aim is to sterilize the infectious waste and thus recover or safely dispose of the used items in a controlled landfill without the need to burn them. Indeed, a controlled space of the landfill or the site should be dedicated to the final disposal of some sterilized items. The pending question in the selected sites is where the sterilized items will be disposed of because extra work is needed to prepare the site for final disposal.

By avoiding open burning or using old and technically poor ovens (wrongly called incinerators), these autoclaves could reduce the emission of u-POPS from the medical waste sector by 90%, diverting them from open burning. It must be mentioned that the installed capacity in the four countries is generally higher than the produced amount of waste, assuring a broad use of the equipment without stressing the machine. But an increase in the amount should be considered, especially in the last two years due to the Covid-19 pandemic.

The calculation on the potential reduction of u-POPS (exclusively for Dioxins and Furans, PCDD/PCDFs and partially PCBs) is based on the calculation carried out using the emission factors provided by the UNEP (2013) Standardized Toolkit for Identification and Quantification of Dioxin, Furans and Other Unintentional POPs. Emissions are reported as gTEQ (meaning a toxicity factor is applied). The amounts of waste for calculations are reported in the specific national medical waste management plans and the related UNIDO reports.

Antigua and Barbuda

Currently, there are two means of disposal of medical waste in Antigua and Barbuda: through the medical incinerator located at the SLBMSJ Hospital or through disposal at Cook's Landfill Site. Approximately 222 tons/a (metric tons per year) of medical waste were generated in 2021, of which 196 tons were reported to be burnt in the incinerator at the hospital, and 26 tons/a were disposed of in landfills (Cook and Plantation). The potential releases to air and residue due to incineration and open burning using the Toolkit were 1.473 g TEQ/a. The newly installed autoclave (provided by GIENIT) has a maximum capacity of 1.8 tons/d, meaning an annual capacity of some 650 tons/d, much more than the annual specific waste production. For this reason, it could be possible to address also a potential increase in waste production; on the other hand, the national medical waste management plan accounts for only a minor extent for the near future. The installation of the autoclave can potentially reduce the use of open burning of medical waste to a considerable extent. While this is the case for infectious waste it does not apply to household medical-related waste in the broader sense.

Belize

Belize was the first country in the project to introduce the autoclave system for medical waste disposal. The National Medical Waste Management Plan indicated that the amount of infectious waste produced is about 200 tons/a with 112 tons of medical waste incinerated for facilities in the Belize District and 74 tons open burnt in the Cayo District in 2017, respectively. Nowadays, the main part of medical waste is collected in three large hospitals, and it is disposed of by incineration; previously, an old batch incinerator was used, while since 2018, a new batch incinerator without a minimal gas emission control is used. This situation was likely a source of emissions of u-POPs on account of the poor technology used for waste disposal. Moreover, other medical facilities dispose of their medical waste in a landfill or burn them in pits, increasing the risk of environmental concern. The potential releases to air and residue due to incineration and

open burning were calculated as 3.313 g TEQ/a, which is higher than the figures reported in the updated NIP.

Belize Solid Waste Management Authority was selected as the operator of the medical waste treatment facility. It was agreed to install the equipment in the Belize City Waste Transfer Station (Mile 3) rather than locate the new facility at the Mile 24 landfill. The autoclave installed in Belize is provided by GIANT, with a Capacity of 1.2 tons/day (shift of 8 working hours), with automatic state-of-the-art steam sterilization. This means an annual capacity (at full load) of some 400-420 tons/a, which is higher than the produced amount of waste, assuring a broad use of the equipment without stressing the machine. In case the whole amount of medical waste could be collected and transferred to the facility center, it could be possible to treat it in an environmentally sound manner and then dispose of it in a safe way. The National Plan predicts an increase of the waste amount of about 40 % in the next 15 years, which the installed facility could still address. The project also supported the development of medical waste regulations, and a five days training course was carried out by Enviro Andinos for the plant operation and implementation of operating and safety protocols. The contract also included a set of two years of consumables and spare parts and the strengthening of a local technical service for routine autoclave maintenance to ensure proper operation of the autoclave in Belize to treat medical waste.

It must be noted that the presence at Mile 3 of a transfer station could also be positive for sorting out the medical waste and further enhance the reduction of u-POPs sources (already present in waste or produced if burnt). On the other hand, since the weight could not be decreased, a dedicated controlled landfill would also be necessary.

Saint Kitts & Nevis

In Saint Kitts & Nevis, the autoclave was installed in the Solid Waste Conaree Landfill. The National Medical Waste Management plan and the medical waste country assessment prepared by UNIDO mention that 155 tons/a of medical waste are disposed of by incineration (both the Ross University and the Joseph N France (JNF) General Hospital house incinerators), whereas 53 tons/a of medical waste are disposed of at the landfill. It was decided to apply the highest emission factors of medical waste incineration provided in the UNEP Standardized Toolkit for both waste streams. This results in some 6.23 g TEQ/a being identified as coming from medical waste incineration and 2.12 g TEQ/a from open burning. It is also mentioned that installing an autoclave with a capacity of 1 ton/day would reduce emissions by 85%. The installed autoclave has a 1.8 tons/d capacity, meaning it would be able to treat almost all the produced medical waste in the two islands.

Trinidad & Tobago

The project supported the installation of an autoclave in San Fernando Hospital in the city of San Fernando (the second biggest city in the country) to treat the medical waste generated in the island's western region. The region generates from 15-20 tons/day of Medical waste, 5400-7300 tons/a. The Autoclave will handle only 1.2 tons/day (400 tons/a) when in operation. Currently, the incinerator has a variable capacity of 250 Kg per hour (about 1250-1500 + Kg/day considering a 6 hours shift. This results in some 450 -540 tons/a. It was not possible to find any document on the national medical waste management plan for Trinidad and Tobago among the

documents provided to the evaluation team. Still, from the World Bank document of 2018 (Minamata Convention), it was extrapolated to a value of some 220 tons/a of incinerated medical waste, which is much less than the produced amount. In order to account for a high load of waste, it was decided to set the baseline capacity of the incinerator at 500 tons/a, in order to evaluate the baseline emissions. This gives a baseline of 1.51 gTEQ/a.

However, in Trinidad and Tobago, the autoclave will not completely replace the incinerators. Incinerators might also be used to soften the sharpness of needles. Currently, the plan is to dispose of medical waste by burying it deep in a landfill. The autoclave is installed, tested, and housed in an adequate facility. Still, it is not yet in use because the electrical company required a dedicated kiosk previously to connect the electrical service. There is also a need to finish the draining system to prevent flooding. Staff at the hospital reported that the autoclave would be operating in early 2023. In addition to the assistance in acquiring the autoclave, the project has also provided training. The San Fernando Hospital already has a collection system of medical waste that covers all hospitals, laboratories, and clinics in the area.

Landfill upgrade and waste management

Antigua and Barbuda

Tourism is the most important economic sector in Antigua. To promote this sector, Antigua is undergoing a national beautification project which generates a lot of green waste. The project is supporting this broader program by separating green waste, including tree cuttings and grass composted and sold, creating an income-generating waste stream for the National Solid Waste Management Authority.

The project also coordinates with the recycling company Will's Recycling in the Cook landfill. This company received a GEF small grant to acquire a wire stripper that separates copper and plastic coating from discarded electrical wires. The company works with informal pickers who typically burn wires to extract the copper, sell it, and generate u-POPs as a by-product. The safe collection of reusable copper should be strongly encouraged, as this metal is one of the potential catalysts occurring during the chemical formation of unintentional POPs (specifically Dioxins and furans). Avoiding the open burning of waste containing copper is highly recommended on all the guidelines that propose "soft" preliminary and preventive action, at low cost, to reduce u-POPs by eliminating all the potential sources (chlorine, copper, hydrocarbons). While this activity is in its early stages, the manager calculates that at any time, half of the pickers in the landfill deliver wire to his company. This option has considerable potential to reduce u-POPs generated in ways that generate opportunities for informal pickers.

Suriname

In Suriname, the demonstration of the re-engineered landfill planned at project inception did not occur because of a change of government plans. The project supported a pilot waste separation project in Greater Paramaribo in the Paramaribo District instead, specifically in the Blauwgrond Resort. Among others, the aim was to reduce waste dumped at the Ornamibo dumpsite and divert as much as possible (as a pilot project) the type of waste, sorting out not only the recyclables (in order to support local market opportunities) but also to reduce the potential sources of contamination and sources of Unintentional POPs if open burning takes place. ILACO Suriname N.V. (ILACO) conducted a field survey on waste composition and designed and coordinated the recyclables collection and transport. The following types of waste were identified:

- Empty plastic bottles (all types, PP, PET, HDPE, LDPE) (representing the main fraction)
- Empty plastic bags (all types, LDPE, PP, and HDPE) (60% processed in new recyclable material)
- Empty aluminium cans (a small fraction)

In the initial pilot proposal from ILACO, the collection of organic waste and paper & cardboard were included. However, due to the high costs associated with the separation, collection and recycling of the wastes, it decided to not include these wastes in this pilot project. ILACO estimated an involvement of 12,500 households and a reduction of some 13 tons/month and roughly 160 tons/a of recyclables, as described in the Final technical report prepared during the preparation phase in 2021, specifically 159 Tons/a of plastic bottles and plastic bags and 0.960 tons/a of aluminium cans. It is of the utmost importance to divert these materials, as plastics combined with chlorine naturally present other waste that, if burnt, can represent the primary source for the potential formation of Dioxins. While the government has indicated a commitment to the construction of a re-engineered landfill in Ornamibo, the upgrade of the current landfill was not carried out due to the changing priorities of the incoming administration. Moreover, the UNIDO project planned some sorting of Waste from Electrical and Electronic Equipment (WEEE) and metals in Ornamibo landfill, but this activity was not carried out.

The pilot waste separation project lasted 8 months, with 6 month of waste collection involving a number of households in the Blauwgrond Resort much lower than estimated in the preparation phase (only 4855). ILACO describes the achievements of the pilot project in a Final report for UNIDO dated October 2022.

A total of 21.37 tons of recyclables (plastics and cans) were collected in 6 months, much lower than the expected 160 tons foreseen in the preparation phase. It can be assumed a double amount on yearly basis (42 tons/a). The collected waste was transported to the recycling facility Green Circle Recycling NV/Clear Packaging & Recycling NV, processed as semi-fabricated product and exported to USA and the Netherlands for further processing, while plastic bags were reused.

In the initial project document, a baseline emission of u-POPs from the current Ornamibo landfill was estimated in 11.07 gTEQ7/a, based on the assumption that some 9% of the total waste generated in the demonstration area was openly burnt and 3% of the burnt waste was metal. The UNIDO project document described in Annex K the planned interventions, such as a pre-treatment technology for dismantling, crashing, cleaning, sorting, compacting metal rich, WEEE and polybrominated diphenyl ethers (PBDEs) containing wastes streams into recyclables fractions and fuel for the waste to energy facility, that the Government of Suriname was planning before the beginning of the project. By applying such measures, a reduction of 8.86 gTEQ/a was mentioned in the project document (from 11.07 to 2.21 gTEQ/a). Since only a small demonstration on waste segregation in the Blauwgrond Resort was carried out, due to the lack of implementation of the planned measures, it is difficult to assess the real potential reduction of u-POPs. Only 42 tons of plastics and metals were diverted from dumping, which is a very small fraction of the amount of waste disposed of in the Ornamibo landfill, and potentially, it can be assumed that this amount was excluded from open burning. In terms of the reduction of PCDD/Fs, this action accounts for only some 0.013 gTEQ/a.

Trinidad & Tobago

In Trinidad and Tobago, the project initially intended to support the Trinidad and Tobago Solid Waste Management Company (SWMCOL) in the remediation of the Guanapo Landfill. Nevertheless, the government and the Solid waste management Company (SWMCOL) decided that the conditions to close the land field were not suitable because of the lack of practical alternative sites where to dispose of the waste and for the high costs of setting up a new landfill. Instead, they supported a remediation plan and the design of a demonstrative remediation project..

Three consultancy rounds were executed by the company EMGRISA and preliminary studies were carried out to evaluate the potential contamination of the landfill site. Short and medium-chain chlorinated kinds of paraffin were detected in leachate and groundwater; also, heavy metals, pathogens, hydrocarbons, and phenols were detected in previous studies. PCBs were detected in soils and sediments, exceeding the US Environmental Protection Agency (USEPA) standards, and PCBs were also detected in the leachate. In contrast, Dioxins and Furans were detected in soils, leachate, and sediments (at a higher concentration than allowed by the US, Canadian, and Dutch standards). Perfluorooctanoic acid (PFOA) and perfluorooctanoic sulfonate (PFOS) have been detected in landfill soils and sediments with low concentrations. These compounds were also detected in the leachate and in groundwater. The concentration of perfluoroalkyl and poly-fluoroalkyl substances (PFAS) exceeded the indicative value for strong contamination in groundwater used for drinking water. It was concluded that the Guanapo landfill is not a direct source of POPs contamination since there is no evidence of pesticides, PCBs, etc., dumped in the landfill. Still, the presence of POPs could come from accidental or intentional fires caused by the scavengers for material recovery, another source of newly generated unintentionally produced POPS contaminating several environmental matrices as explained above and affecting the quality of two rivers that surround the site.

The studies showed that leachate is one of the sources of contamination. The presence of Dioxins and Furans was documented, though to a lower extent concerning heavy metals and some types of hydrocarbons. Indeed, Dioxins and Furans are mainly adsorbed onto particles and can hardly be found in water. The above results indicated the necessity to focus on minimizing and treating the landfill leachate, avoiding direct discharges into surrounding waterways, and implementing effective measures to manage the environmental risk. As indicated in the report of the European consulting firm TAUW (December 2021), the current leachate collection system collects approximately 34 % of the generated leachate and contaminated runoff, while the remaining fractions flow uncontrolled towards the rivers. In order to reduce the dispersion of leachate, the report suggested to implement some measures, such as the update of the current leachate collection system, the installation of a leachate collection system at the western edge of the landfill, the rehabilitation of the final cap of the landfill and the reduction of the size of the active tipping zone. For the treatment of leachate, a Reverse Osmosis system was suggested with the recirculation of concentrated leachate, but with the simultaneous implementation of the above mentioned measures.

The proposed technique generally consists of a partially permeable membrane that can separate larger particles from leachate streams, using pressure to overcome osmotic pressure. POPs, for their chemical properties, can be adsorbed on particles, and for Dioxins and Furans, this is true, especially for heavier congeners that were found in the collected samples. In this case, it is

coupled with leachate recirculation in order to concentrate the contaminants and treat them more efficiently. Several scientific studies are showing that the removal efficiency for Dioxins is quite high if coupled with other techniques. The use of a reverse osmosis technique should be adopted along with other preliminary measures, such as settling and equalization basins, filtering systems, and the last two stages of reverse osmosis. In non-engineered landfills, this technique requires good geo-hydrological knowledge to restrict the uncontrolled dispersion of leachate. In the Guanapo landfill, strong fluctuations of leachate level can be expected, especially for the hypodermic leachate (the fraction running under the waste mass), representing 75% of the total stream. The report by the consultancy firm TAUW shows that the reinjection of untreated leachate is not necessary to stabilize the moisture content in the waste mass to optimize its bio-reactive capacity. Thus, recirculated leachate volumes should be kept as minimal as possible. Since the landfill presents many points of leaks and does not have a proper containment system, an increased volume of leachate will likely disperse, increasing the contaminant load to the rivers. The absence of other measures could hamper the POPs removal efficiency.

The demonstration also included a communication to convey the health risks of using water from contaminated rivers to members of the surrounding communities (roughly 500 homes). House-to-house visits were conducted by SWMCOL and TAUW and books and pamphlets were distributed. The approach included practical tools to reach the local population, such as a calendar that indicated tips on how to minimize the POPS risks across the year or under different weather conditions. The project also established a website that provides information on the contamination levels.

The project's contributions helped to push through efforts made by SWMCOL in 2016, where a study commissioned by The University of West Indies (UWI) also proposed a remediation plan and a leachate treatment system for Guanapo. The government rejected this at the time. The project built on this initial proposal by providing additional information, and SWMCOL is now at the procurement stage with government funding of 3.2 M TTD to implement.

Saint Lucia

The Terminal workshop held in October 2022 mentioned the Deglos landfill in Saint Lucia, the composting plant that was foreseen by the project. Still, no documentation has been found on this topic. If the source separation of green waste at the Deglos Landfill is ongoing, it would be interesting to have information on the quality of compost produced. Given that the removal of organic waste has the positive effect of reducing moisture from the waste, in the accidental or voluntary case of open burning, the combustion can take place more efficiently and avoid a source of chlorine for u-POPs formation. While not optimal, this approach shows that minor and effortless preventive actions (like diverting types of waste) can prevent unwanted contaminants' emission, where other more advanced and technologically sound techniques cannot be used. The project supported the green separation campaign, some equipment (chain saw, water tank, sifter), and training to help coordinate and implement composting. The project provided the opportunity to test approaches and implement activities and not just the development of methods, training, plans, or manuals.

Barbados

The project explored several options to improve landfill management with the Barbados Sanitation Service Authority (SSA). The project supported studies for selecting the equipment for pressing oil filters to extract the waste oil, with the intention of the SSA to sell the pressed pressing filters as metal. This option was stopped because the available technology for the treatment of filters did not allow for a recover of the filters metal content in a way that could be

sold, due to the multiple materials in the filter. Subsequently, the project supported the SSA in a tender to acquire a tire shredder. Used tire management is one of the main challenges of the landfill. There are 500,000 tires in the landfill, and the landfill receives 8000 more every month. Tires are a major hazard as they can catch fire and contribute to the generation of u-POPs. Once the bid was opened, the SSA decided against purchasing the equipment because the costs were much higher than budgeted. The project had contributed 150,000 USD to support this activity, SSA staff reported that this organization had allocated 400,000 USD, but the cost was over one million dollars. The project ended up providing advice on tire management to prevent fires. SSA staff reported that while the information provided was sound, they did not consider that the approaches suggested were appropriate for the conditions of the landfill.

Hazardous waste storage facilities (Antigua & Barbuda, Barbados, and Santa Lucia)

Barbados

For Barbados, the resources were reallocated for this activity to support a waste tire management system for u-POPs reduction as described above.

Saint Lucia

The project helped the Saint Lucia Fire Service Department devise and carry out a strategy to substitute hazardous firefighting foams for green foams. This project largely took place because of the championing Fire Services Department officer who had participated in the awareness-raising activities of the project. The project has consisted of safety training in using firefighting foams and purchasing new foams to replace the hazardous foams. In addition to the technical assistance, support in procurement, and training, the project contributed 150,000 USD to this project. At the time of the evaluation, the project had agreed to approve the 400,000 USD purchase of the green foams and the containers to store the old foams. Negotiations are also underway to dispose of 11,000 gallons of toxic foams stockpiles outside of Saint Lucia to prevent future use. To accommodate the use of foams, the Fire Services Department also modified its protocols to maintain the same service standards by reducing their response time, as green foams take longer (1:40 minutes compared to one minute) to extinguish fires.

Antigua & Barbuda

The field mission carried out in 2019 revealed that the existing storage site at the Department of Analytical Services is very small in extension with respect to real needs, and the premises are in deplorable condition, both for the safety of workers and for possible leaks.

The major hazardous waste in Antigua and Barbuda includes chemical, medical, agricultural, industrial (oil and acid batteries), and other electrical waste. It was extrapolated that the amount of such waste to be disposed of in the next year will range from about 185-215 tons/a (800-1000 drums with 210 litres capacity). The project supported the construction of a new hazardous waste storage facility for Antigua at the Cooks landfill site that already has the main infrastructure (access road, weighbridge, electricity, etc.). From the analysis of the documents available, all the international standards are being applied in the construction.

The waste storage facility was still under construction during the evaluation. It will be formed by four distinct sections, three separate storage sections for the interim storage of hazardous waste, and one separate section for waste reception, labelling, and storing in appropriate containers. The area will be fenced, and the buildings will be equipped with a collection tank for leakages of

liquid waste recovery and a shed for gas cylinders. Special consideration must be highlighted for the storage of used oil. This represents the main part of hazardous waste in the country. The Cook landfill has an area dedicated to this type of waste, so it would be reasonable to expect an improvement in the collection capacity. Most of the used oil (150 Tons vs. 200) in the country comes from the Antigua Power Company (APC).

The final report of this activity mentions that the hazardous waste interim storage facility is mainly designed for storing smaller quantities of hazardous waste collected from several small producers, which lack storage and shipment capacity. On the other hand, the report mentions that the oil sludge from APC (150 tons) should be managed by the company itself rather than stored in the Cook landfill. This has the consequence of dramatically decreasing the total hazardous waste that requires storage in the new facility. It is finally mentioned that the oil produced by APC should be packed and labelled with the support of the staff of the Cook landfill storage facility. In conclusion, the project will support a facility for only 50 tons/a of waste, but in an environmentally sound manner and integrated with the existing Cook landfill, which is interested in renovation works.

Elimination or prevention of POPs in the region

The pilots and demonstrations supported by the project have contributed directly to the elimination or prevention of POPs in the region. The project initially projected the elimination of 13.93 gTEQ/a of PCDD/Fs; at project end, the calculated reduction was 13.34 g TEQ/a, mostly through the autoclaves in Antigua & Barbuda, Belize, St. Kitts & Nevis and Trinidad & Tobago, while the reduction of open burning in land fields is expected to contribute too. Annex F describes the methodology used to calculate the baseline figures for PCDD/F based on the calculation made with the UNEP Toolkit 2013. As described above for each country, it is assumed that the installed autoclaves could generally have the capacity to dispose of the main part of medical waste, so a reduction of at least 90% of PCDD/F emission from both incinerators and open burning can be reasonably proposed.

A summary table 3 is presented hereafter to compare the baseline emissions of PCDD/Fs with the potential decrease after the implementation of BAT/BAP.

Table 3. Contributions to UPOPs reductions

A	B: Site or category of emission	C: Incinerated or open burnt waste before BAT/BEP Tons/a	D: Estimated baseline U-POPs before BAT/BEP gTEQ/a	E: projected u-POPs reduction after BAT/BEP in ProDoc	F: Potential Waste reduction after BAT/BEP (90%)	G: U-POPs reduction expected after applying BAT/BEP gTEQ/a	H: U-POPs after BAT/BEP gTEQ/a
Antigua & Barbuda	Medical waste incineration (Antigua)	196	0.592	-	Potential 90% reduction	1.47	0.167
	Medical waste open burning in Barbuda	26	1.045				
Belize	Medical waste incineration (In Belize district)	112	0.338	5.07	Potential 90% reduction	2.98	0.333
	Medical waste open burning (in Cajo district)	74	2.975				
Suriname	uncontrolled domestic waste open burning	42 (rough estimation for (Ornamibo landfill))	0.013 (only for diverted waste) (11.7 in ProDoc)	8.86 (with landfill upgrade)	Reduction of 100% open burning of 42 Tons (plastics and metals) diverted in the Pilot project.	0.013 (without landfill upgrade)	11.69 (from baseline ProDoc)
St. Kitt&Nevis	Medical waste incineration	155	6.23	-	Potential 90% reduction	7.52	0.835
	Landfill (open burnt)	53	2.12				
Trinidad & Tobago	Medical waste incineration	500 (estimated)	1.51	-	Potential 90% reduction	1.36	0.15
TOTAL			26.51	13.93		13.34	13.17

As far as PCBs are concerned, the project carried out the inventories and disposal action along with a concomitant FAO project, so it directly addressed only Antigua and Barbuda and Belize and made direct contributions to the additional reduction of POPs by safely disposing of more than 1.87 tons of equipment contaminated by PCBs and 1.137 tons of PCB oil. In Saint Lucia and Suriname, no devices were considered contaminated and none were disposed of. The disposal of PCB-contaminated devices and oil for Barbados, Belize, Suriname, and Trinidad and Tobago, along with other devices for Antigua & Barbuda and Belize, was carried out in the framework of the FAO project. Table 4 reports the results of PCB disposal

Table 4: PCB disposal

Countries	number of devices analyzed during inventory	transformers found with PCB concentration > 40mg/kg	Total Weight (including oil and devices) Tons	Oil weight Tons
Antigua & Barbuda	10	2	n.a.	0.430
Belize	161	12	1.87	0.707
Santa Lucia	31	0 all samples with lower concentrations		
Suriname	237	0 all samples with lower concentrations		
TOTAL			> 1.87	> 1.137

2.2.4 Information and Knowledge for decision-making

Access to sound information is an important condition for sound policy-making programming. All project activities involved important training elements, which included information often new to participants. Three major project activities focused on information to support policymaking and planning.

Stockholm Convention National Implementation Plans (NIPs).

Article 7 of the Stockholm Convention specifies that parties to the convention must submit a plan to implement its obligations, which should be linked to their national sustainable development strategy. In addition to presenting plans to meet their commitments to the convention, the NIPs present information on the condition of POPs in the countries. As indicated by the MTR, the countries have made little progress in implementing their NIPs. Moreover, the information in the NIPs was very outdated as most NIPs had been developed in the early to mid-2000s. By December 2022, when the evaluation took place, all eight participating countries had updated their NIP with the support of the project, five had submitted their NIPs to the Stockholm Convention, and only two (Antigua and Barbuda and Barbados) were waiting for the Project Working Committee to approve the document prior to submitting it to the Stockholm Convention. While some of the countries were initially unhappy with the quality of NIPs submitted by the consultants, they were satisfied with the outputs once BCRC-CARIBBEAN directly assisted countries in developing the NIPs. Countries often reported that the updating of the NIP was very helpful as it helped countries

meet some of their reporting requirements to the convention. They also found the information useful during the development of the ICM legal framework.

Inventories of contaminated sites and prioritization of sites for treatment

This project activity intended to fill in an information gap regarding the existence of POPs and sites contaminated with toxic chemicals. The report on contaminated sites was completed and is available for five countries. By December 2023, three countries (Barbados, Belize, and Saint Lucia) had completed the inventory and site identification. In the remaining five countries (Antigua and Barbuda, Saint Kitts and Nevis, Saint Vincent and the Grenadines, Suriname, and Trinidad and Tobago), the report was drafted and was being reviewed by the PWC. This exercise was carried out mostly by consultants with the help of country staff, including training workshops in each country. Country stakeholders reported that the information was very useful in identifying priority sites. Several Country Project Coordinators also found the GIS maps developed by the project particularly effective in communicating with policymakers. In Barbados, the inventory was linked to training on the Stockholm Convention and with the participation of officers from several ministries. This helped to develop a better understanding of the country's commitments to the Convention. Also, a local NGO (Blue Green Initiative) was hired to gather data, which helped create country capacities. The inventories and prioritization of contaminated sites provided important information in developing national waste management strategies in all participating countries.

Introducing green firefighting foams in Saint Lucia: A Decision maker act on new information.

In Saint Lucia, a firefighting officer that attended a study tour sponsored by the project learned about the dangers of firefighting foams containing PFOS, commonly used in Saint Lucia. Having learned of the dangers to himself, his colleagues, and the environment, he ensured the procurement of safety equipment for the use of fire foams and trained his colleagues on the use of the equipment. He also lobbied the government to approve the purchase of green firefighting foams. The government has agreed to allocate 400,000 USD to match 150,000 USD of project funds for the purchase of the improved foams and to pay for containers to store 11000 gallons of old foams safely. He is also in the process of negotiating a commitment from the government to safely dispose of the old foams to prevent their use in the future.

Regional Information System (RIS)

The RIS was intended to address the lack of easily available information on POPs in the region and was expected to assist countries in capturing, maintaining up-to-date data, and analyzing POPs conditions to inform the management of toxic chemicals. The RIS was designed to facilitate information to the Stockholm Convention, and it includes GIS features that allow easier communication with policymakers and the public. In addition to the POPs covered by the Stockholm Convention, the RIS will cover other chemicals that countries need to monitor to provide a comprehensive tool for ICM. The system was also developed to control the level of access to different stakeholders to guarantee the data's integrity while making information available to the public.

The system will be maintained and managed by the BCRC-CARIBBEAN as a service to the countries. At the same time, countries will be responsible for feeding information into the system. BCRC-CARIBBEAN will also be responsible for ensuring the quality of the data. BCRC-CARIBBEAN hired consultants to develop a RIS operational manual and conduct remote training for country stakeholders responsible for using the system. The system also has online links that explain the various functions and information entries. Countries appreciate that the RIS introduced measurement and reporting systems and has helped standardize information management to report and compare across countries and time.

By the date of this evaluation in December 2022, the RIS was set up, but few countries had uploaded information – in the interviews, only Trinidad and Tobago reported that an agency had been assigned the responsibility for uploading the information. Stakeholders reported that while they see the potential utility of the RIS, most do not sufficiently understand how to operate it. They attribute this to the limitations of the training they received, which was conducted remotely due to the COVID-19 travel restrictions. Another factor at play is that the RIS was mostly developed in the project's last phase, and the training time was short and did not have “hands-on” learning opportunities. However, in Trinidad and Tobago, where it was possible to carry out face-to-face training, the Institute of Marine Affairs (IMA) was responsible for uploading the information to the RIS and has developed sufficient capacity to navigate and manage the platform. The country project coordinator also indicated that the RIS is a useful tool for monitoring data to implement the countries' Waste Management Rules. BCRC-Caribbean is aware of this situation. To resolve this, it has scheduled more in-depth training using remote small group hands-on workshops for the first quarter of 2023.

2.2.5 Public awareness campaigns

Awareness of the risks or benefits of a situation or event can provide powerful motives for behavioural change. While awareness does not require a deep technical knowledge of how dangers and opportunities come about, it does require an acknowledgment that a situation or event has consequences that affect the self, other people, or the environment. The promotion of awareness is also important because it can contribute to public support of policies and regulations that imply trade-offs in the use of public resources. The project carried out the Stopping the POPs campaign to inform the public about risky behaviours related to POPs, such as burning trash or inappropriate handling of PCBs.

Stopping the POPs was a campaign coordinated by the eight participating countries and supported by a strategy, training, and materials developed by BCRC-Caribbean. Country strategies identified the main POPs problem, audiences to be targeted, communication strategies to reach such audiences, capacities or resources to carry out the campaigning, and main barriers. The strategies also identified other country partners. Countries were supported to use multiple media to reach different populations by using a range of approaches that included spots on the television and radio, development of posters and talks at events, engagement of teachers and students, and social media. The project also developed a toolkit that countries used in planning their campaigns. Given COVID-19, much of the campaigns took place through the media and the web.

The evidence so far indicates that the materials developed and the strategies carried out for the Stopping the POPs campaign are helping overcome the technical barriers inherent to communication about POPs. The project contracted Knowledge, Attitude, and Practice (KAP) surveys before and after the campaign. By the time the evaluation took place in December 2022, the public awareness campaigns had been completed in Belize, Saint Kitts and Nevis, Saint Vincent and the Grenadines, and Trinidad and Tobago. The KAP Survey campaigns in these four countries concluded a 30% improvement in POPs awareness. The project also programmed post-campaign KAP surveys for the remaining four countries.

Despite the challenges of implementing the campaigns during the COVID-19 lockdowns, this project component is perhaps the component where country stakeholders reported the most enthusiasm and potential for follow-up. While respondents indicated they did not have the resources to continue the comprehensive approach followed during the campaign, respondents

from most countries indicated that they were planning to continue on aspects of public awareness within their means.

In Antigua and Barbuda, for example, the public awareness campaign is considered a major success of the project as it largely introduced POPs to the population. The Communications Officer, Department of Analytics, met with heads of secondary schools on the island to integrate information on POPs into the school curriculum. At the time of the evaluation, there was also an initiative under discussion to integrate messaging on POPs into the curriculum at the Antiguan State College's environmental program. Similarly, respondents in Barbados reported that the awareness-raising campaign had been very important in moving the overall national agenda on POPs forward. The plan is to continue at a less intense pace as there are limited financial resources and the staff in the responsible government office in Antigua and Barbuda is very limited. In Trinidad and Tobago, the campaign focused on the risks associated with POPs and produced several materials to target specific populations. The Environmental Management Authority (EMA) has included funding in its 2023 budget to work with the Public Education and Communications Unit to include, in 2023, POPs materials in the school curriculum and in the Eco-Clubs established in most primary and secondary schools.

2.2.6. Broader adoption

Sustaining a development trajectory towards sound POPs and Chemicals management in the region

By the end of the project in December 2022, the project had achieved or was on its way to achieving all of its outputs by the end of the first quarter of 2023. In general, stakeholders reported that the project provided extensive information on POPs, much of which was new and which they found very valuable. While they benefited by developing a better understanding and awareness of the risks and implications of POPs, they reported that they could not act on all the information. Some recommendations could not be implemented because of a lack of equipment or because of competing priorities. Yet, stakeholders reported that they would consider putting into action recommendations and knowledge gained when opportunities arise, for example, when requesting equipment or introducing changes in waste management.

Thus, by the end of the project, the broad adoption of technologies and behavioural change had not occurred. Nor was there a redirection of the country's development trajectory towards ICM. The key enabling conditions for change were not sufficiently mature. But when considering the country conditions at project entry, it is unrealistic to expect otherwise. Given the temporal mismatch between the project duration, the complexity of waste management systems, and the time required for systems to change, there is a need to put in place mechanisms to continue to support countries to maintain and accelerate the trajectory toward ICM. For example, while the Model ICM Act was an important contribution to the region, there is still a need to enhance further and implement legal frameworks on toxic chemicals as countries still need to develop regulations and standards. Similarly, the awareness-raising achievements of the "Stopping the POPs" campaign still needed to be replicated and mainstreamed by integrating some aspects into the schools' curricula or by applying new methods and reactivating institutional links developed during the campaigns.

Regional mechanisms to catalyze mainstreaming, replication, and broader adoption

Two promising mechanisms in place will continue to cultivate the enabling conditions for ICM. One such mechanism is the BCRC- Caribbean which the project strengthened to continue to support country capacities to manage toxic chemicals in the region. During the project, the organization established administrative systems, instituted an annual auditing process, and grew

from a staff of 4 persons to 14, often recruiting staff from the region and developing internal capacities that helped reduce hiring international consultants. BCRC- Caribbean developed capabilities to achieve economies of scale and help countries overcome fiscal and capacity constraints by coordinating regional training and developing models and handbooks that country officers could adapt. Given the multiple responsibilities of country project coordinators, BCRC- Caribbean played a key role in capturing country officers' attention and keeping countries engaged. BCRC-Caribbean emerged as a reputable organization that is well-positioned as a regional catalyst for ICM. County stakeholders interviewed across the region indicated that BCRC-Caribbean has the knowledge of the conditions in the region and the links with governments and across ministries that can help countries address challenges such as ICM. BCRC-Caribbean's reputation and credibility are also extended to other international organizations and conventions which have partnered with BCRC- Caribbean for the execution of a growing number of activities related to toxic chemicals in the region. Similarly, BCRC has been proposed as the regional representative of the Rotterdam Convention in the Caribbean.

The second important mechanism to continue to support the enabling conditions and broader adoption of ICM in the region is the approval of two GEF projects that will be executed by BCRC-Caribbean. The first is the GEF project 10279 which is a part of the program *Implementing Sustainable Low and Non-chemicals Development in Small Island Developing States (ISLANDS)* (implemented by UNEP and FAO and focused on the Caribbean). This project will be executed by BCRC-Caribbean and provide support to build on the accomplishments of this project, as well as of other projects in the region.

The GEF Islands- Caribbean project plans to continue to address legislative and regulatory gaps related to waste flows of electrical and electronic equipment, End of Life Vehicles, mercury-added products and plastics, and to further coordinate pesticide and POPs legislation. Building on the approach introduced by this project, the GEF Islands project intends to continue to develop a regional model that promotes harmonization of the national efforts across the region while also allowing individual countries to customize the model policies and regulations to enhance their existing framework. The new project will also support BCRC to continue developing tools and to build country capacities to promote public awareness and improve waste management through waste source segregation, improved hazardous waste storage, and introduce the treatment of plastics (PVCs) in the management of medical waste. The GEF Islands- Caribbean also proposes to replicate successful initiatives of this project, such as the promotion of firefighting foams carried out in Saint Lucia.

The second project, recently approved in 2021, is the Inter-American Development Bank (IDB) implemented "child" GEF 10258 *Islands-Caribbean Incubator Facility* project. The project will address financial conditions, which represent a major constraint to broader adoption. The delivery of outcomes will be addressed in a follow-up phase which is also part of the GEF Islands Program. Effective interagency coordination will be a key factor to ensure that the UNEP and FAO implemented GEF project 10279 and the IDB-implemented project will be mutually supportive.

While this evaluation does not intend to pass judgment on these two projects, the mention of these two projects is appropriate to this evaluation because this project GEF 5558 set the stage for these two projects by making important contributions to ICM in the countries and supporting the strengthening of BCRC. This combined approach that links continuity in financing with project execution that strengthens a catalyst organization is a proven strategy to accelerate a given development trajectory. Particularly important is strengthening the capacities and reputation of the catalytic organization. This GEF strategy has yielded important results in other GEF-supported regional and national initiatives. One example is the support provided by the GEF for

nearly three decades to manage the South China Sea and the Seas of East Asia.¹³ Another example is the strengthening of the protected areas system in Mexico.¹⁴

3. Project's quality and performance

3.1. Design

The project design is rated satisfactory because it adopted a comprehensive approach that allowed countries to move in several ICM aspects simultaneously. Yet, more time to allow for country processes and internalization of project outcomes was needed. The MTR points out that while the project was quite comprehensive and included activities that addressed multiple conditions to enable ICM in the region, it was also output driven when taking into account the human and financial capacities of the counterparts in the eight Caribbean countries. The project consisted of a broad range of activities to be undertaken in a relatively short period in the context of time-consuming administrative rules and the government's approval process. While agreeing with the comprehensive treatment of POPs management, there is a sense among stakeholders that there was much emphasis on the production of outputs and that activities had to be rushed. For example, the project was programmed to identify contaminated sites (inventory) for three months. This was too short of a time as many organizations had to first understand the information that was requested and then had to organize a series of tasks. In the opinion of some of the stakeholders, this activity should have lasted at least six months. While agreeing that the project outputs have been of high quality, country partners also reported that project outputs require time to be internalized into their institutions. For example, the Model ICM Act was reported to be one of the region's most important contributions to the project. Still, it has also required time to conduct a deep analysis and considerable tailoring by the countries. For some country partners, the transition from the GEF POPs to GEF Islands-Caribbean has also been challenging because while they are still trying to absorb GEF POPs, they feel it is unlikely that they will have the time or resources to match the pace of the new project. Notwithstanding the comments of the MTR and the stakeholders, it is important to point out that the objectives of the project required a comprehensive approach and the implementation of concurrent activities. While more time would have improved the absorption of project outcomes by the participating institution the trade-offs made in adopting the comprehensive approach paid off for the countries.

3.2. Relevance

Project relevance is rated satisfactory.

Relevance to country priorities and commitments to environmental conventions

¹³ Such an approach was documented by the GEF IEO evaluation *GEF Support in the South China Sea and Adjacent Areas*, October 2012. GEF Independent Evaluation Office. <http://www.gefio.org/evaluations/gef-south-china-sea-scs-and-adjacent-areas>. The conclusions of this evaluation were corroborated by a follow up review financed by the GEF IEO and published as Zazueta, Aaron E, Jeneen Garcia. (2021). Multiple actors and confounding factors. Evaluating impact in complex social-ecological systems. In *Evaluating Environment in International Development*. Second Edition. Edited by Juha Uitto, Routled. New York. DOI:[10.4324/9781003094821-2](https://doi.org/10.4324/9781003094821-2).

¹⁴ *Impact Evaluation of GEF Support to Protected Areas and Protected Area Systems*, October 2015. GEF Independent Evaluation Office. <https://www.gefio.org/sites/default/files/ieo/evaluations/files/BioImpactSupportPAs-2016.pdf> Presentation at the Green Climate Fund: <https://www.youtube.com/watch?v=ChPSdXdrPKU&feature=youtu.be>

During project preparation, UNIDO carried out a detailed analysis that identified the specific country Stockholm Convention NIP priorities the project would address. Country partners reported that while the project implementation process was highly demanding, the project outputs were mostly of high quality and very relevant. During the evaluation project, stakeholders indicated that the project results remained highly relevant (updated POPs information, legal reforms, and awareness-raising). Country stakeholders also reported that an important result of this project is that countries have, for the first time, developed a reliable picture of the state of POPs and can report to the Stockholm Convention reliable information on their POPs conditions. The project has also supported countries in making progress on their commitments to the Basel Convention on the Control of Transboundary Movement of Hazardous Waste and their Disposal and the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade.

Relevance to GEF

This project contributes to GEF-5 Chemicals FA Objective CHEM-1 Phase out POPs and reduce POPs releases, Outcome 1.3 POPs releases to the environment reduced, Outcome 1.4 POPs waste prevented, managed, and disposed of, and POPs contaminated sites managed in an environmentally sound manner, Outcome 1.5 Country capacity built to effectively phase out and reduce releases of POPs, and FA Objective CHEM-4, Outcome 4.1: NIPs prepared or updated or national implications of new POPs assessed.

Relevance to UNIDO

The project is consistent with UNIDO's mandate of promoting inclusive and sustainable industrial development. UNIDO is also committed to assisting countries to develop systems to close the loop of harmful chemicals and prevent pollution at source by engaging manufacturers and consumers. The project is also consistent with UNIDO's support to Small Island Developing States (SIDS), which focuses on the potential of SIDS to pursue sustainable economic development by steadily increasing economic productivity while sustainably managing their environment and human resources.

3.3. Coherence

Project coherence is rated satisfactory.

The project was the first comprehensive regional initiative seeking to bring chemicals management in the Caribbean closer to international standards. The project was built on initiatives that had addressed specific aspects of chemical management (such as NIP support). The project overlapped with the implementation of the FAO project GEF5407 which addressed toxic chemicals in the agricultural sector. These two projects coordinated activities related to the transportation and destruction of PCBs. Some countries' representatives indicated to the evaluation team that UNIDO and FAO followed two separate approaches in the formulation of the legal frameworks. While this slowed down the process, from the technical standpoint, industrial and agricultural chemicals (the latter also including biological agents) require different types of regulations. Changing social and economic conditions in the participating countries required that the project adapt and, in dialogue with the countries, find ways to improve their capacities to manage hazardous chemicals while also delivering the environmental benefits (in terms of the elimination of POPs and UPOPs) promised at CEO endorsement project document. The project demonstrated technologies that are within the reach and capacities of the participating countries and contributed to regional integration by helping the countries build mutual support networks across the region.

Project design identified the key drivers affecting the management of toxic chemicals in the Eastern Caribbean. While the project document did not include a theory of change, the project did adopt a system-based approach that focused on helping countries put in place foundations that future initiatives could build on. These include an updated legal framework, institutional capacities to engage the private sector, including the capacities to promote public awareness related to toxic chemicals and their risks. This project is among the pioneers in UNIDO to systematically address legal and regulatory frameworks, an important lesson derived from other GEF Projects. The project most important and probably the most consequential contribution is that it helped build CBRC- Caribbean catalytic capacities to support countries to improve their management of toxic chemicals. CBRC-Caribbean is now a key agent in the region that will help ensure coherence and continuity of support to chemicals management in the region.

3.4. Efficiency

The project efficiency is satisfactory. While the project was originally scheduled to last 60 months to end in December 2020, it was extended for two years and closed in December 2022. These types of no cost extensions are common in GEF projects, and it was sensible given the large number of activities referred to in the section on project design. Despite COVID-19 lockdowns that took place throughout 2020, the project activities were mostly completed within the time extension. The project also achieved most of the outputs identified at the project inception and is well on its way to achieving the few delayed outputs by the end of the first quarter of 2023 (Annex H). The delayed outputs were caused by factors beyond the control of the implementing and executing agency or national project teams. Such delays were caused mostly by the time it took for political uptake – in the case of the approval of the ICM legislation and the NIPs. The project activities that were changed or streamlined mostly in account of requests by the country partners. In all cases remaining funds were relocated by instructions of the PSC and in consultation with country governments. Remaining funds also allowed the project to increase the number of demonstration projects. While contributing to project delays, changes and streamlining of project activities also helped ensure the efficient use of resources. The remediation of the Guanapo Landfill in Trinidad and Tobago had to be dropped because the government considered that the conditions were not such that allowed the closing of the landfill. Instead of upgrading the Orinambo Landfill in Suriname, the project demonstrated waste separation in a community of 800 households. The project also redirected funds earmarked for the hazardous waste facilities in Barbados and Saint Lucia to improve waste management and introduced green firefighting foams in Saint Lucia instead. In all cases, these shifts responded to government request for changes related to a lack of co-financing from the governments.

This mixed regional-country approach adopted by the project allowed economies of scale and participants to share experiences and expand their professional networks across the region while also allowing for country-specific interventions. For example, the Model ICM Act, RIS, and most training activities were coordinated by BCRC-CARIBBEAN at the regional level, while technology demonstrations took place at the country level. Learning opportunities were also increased by making available materials developed by specific countries under the project to all countries. The project has also facilitated networking and has helped countries share technical capacities within the region. The regional support structure developed by the project was also important in adapting to the COVID-19 country lockdowns, which helped avert further project delays.

3.5. Gender mainstreaming

This evaluation assessed the project performance on gender and youth as indicated in the UNIDO Policy on gender equality and the empowerment of women of April 2009 and revised in March

2015 and again in 2019. Mainstreaming a gender perspective, according to UNIDO, is fundamental to sustainable growth and poverty reduction and has important implications for women and men in any planned action, including legislation, policies, or programs. The UNIDO Policy on gender equality and the empowerment of women and its addendum provide the overall guidelines for establishing a gender mainstreaming strategy and action plans to guide the process of addressing gender issues in the Organization’s industrial development interventions. The UNIDO Policy refers to the equal rights, responsibilities, and opportunities of women and men and girls and boys. Equality does not suggest that women and men become ‘the same’ but that women’s and men’s rights, responsibilities, and opportunities do not depend on whether they are born male or female. Gender equality implies that the interests, needs, and priorities of both women and men are considered. It is, therefore, not a ‘women’s issue’. On the contrary, it concerns and should fully engage both men and women and is a precondition for and an indicator of sustainable people-centered development. Empowerment of women signifies women gaining power and control over their own lives. It involves awareness-raising, building self-confidence, expanding choices, and increasing access to and control over resources and actions to transform the structures and institutions that reinforce and perpetuate gender discrimination and inequality.

The project’s gender marker was assigned as 1 at approval, meaning that the project was expected to have limited contribution to gender equality¹⁵. Nevertheless, the project document identified gender balance in opportunities and positions of decision-making as an important aspect of the project. The project sought and achieved gender balance in aspects related to decision-making by ensuring gender parity in the composition of the project execution team, the project steering committee, and the country working committees and by engaging women and men in the planning and execution of public awareness events and other decision making roles in the project. While consultants, particularly those in technical areas, were mostly men, the project management unit was formed mostly by women. The Project Steering Committee was formed by 17 females and 9 males. In contrast, the Country Working Committees were formed by 50 females and 54 males (Table 5 and table 6). Training is often associated with opportunities for professional development. The project carried out 21 workshops on multiple topics. Participants in these workshops included 285 females and 270 males.¹⁶

Table 5: Gender composition within the Project Steering Committee 2017-2022

PSC	Male	Female
UNIDO	1	1
Antigua and Barbuda	1	2
Barbados	1	2
Belize	2	0
Saint Kitts and Nevis	2	1

¹⁵ Since 2015 all UNIDO technical assistance projects have been assigned a gender marker and their design are screened based on a gender mainstreaming check-list before approval. UNIDO’s gender marker is in line with UN System-wide action plan (SWAP) requirements, with four categories: 0 – no attention to gender, 1 – some/limited attention to gender, 2a – significant attention to gender, 2b – gender is the principal objective (<https://www.unido.org/sites/default/files/files/2019-11/UNIDO%20Gender%20Strategy%20ebook.pdf>)

¹⁶ While the project reported overall numbers of trained participants by gender, participant lists made available to the evaluation were not properly formatted to show disaggregation by gender. A column should have been included for printed names and gender. In some instances, no participant lists were attached to the workshop reports.

PSC	Male	Female
Saint Lucia	0	2
Saint Vincent and the Grenadines	0	1
Suriname	1	2
Trinidad and Tobago	1	2
BCRC	0	4
Total	9	17

Table 6: Gender distribution among Project Working Committees in the project countries 2017-2022

PWC	Male	Female
Antigua and Barbuda	12	12
Barbados	5	6
Belize	8	2
Saint Kitts and Nevis	12	7
Saint Lucia	8	6
Saint Vincent and the Grenadines	6	5
Suriname	1	7
Trinidad and Tobago	2	5
Total	54	50

Project activity **1.2.6: Develop gender sensitive public awareness/public education materials on POPs** was the only project activity that specifically referenced the promotion and empowerment of women or gender equality. Gender consideration was included in the Regional POPs Communications Strategy, with gender-specific messaging included throughout the products developed. Yet, an opportunity was missed to fully convey messaging on the effects of POPs on human health and any specific effects of exposure on women.

The project document (2015) addressed the important gender issues mentioned above. The project document also established the link between health benefits by reducing the human exposure to POPs and PCBs and the POP campaigns also addressed some gender issues. Beyond this the project did not have any specific activities that addressed women's role in waste management, separation, and disposal and in the implementation of the three demonstration/pilot sites, which are core project activities. Nevertheless, the project focused mostly on support that is more of a foundational nature (such as regulations, plans and capacities) and that provide a condition that future projects can build on. Moreover, the gender related topics have been identified and are addressed in the GEF Islands-Caribbean project.

4. Performance of Partners

4.1. UNIDO

UNIDO performance is rated as satisfactory. Project design adopted a comprehensive approach that included interventions related to policy frameworks, awareness, and institutional capacities in addition to demonstrating technologies. The project design was heavily focused on the

generation of outcomes, and this affected the uptake by countries due to a low number of staff and budgets. Nonetheless, support was provided to ensure that at project completion, most project activities were completed. Country partners also reported satisfaction with UNIDO's high-quality technical support (UNIDO was responsible for the execution of demonstrations). UNIDO also showed flexibility to respond to changes requested by the participating countries and initiative in the use of remaining funds in ways that responded to country priorities. Despite the output orientation of the project, during its implementation, UNIDO did not lose sight of the importance of capacity development in the participating countries and in the critical role of BCRC-Caribbean as a catalyst to continue the improvement of the management of toxic chemicals and POPs in the region.

4.2 BCRC- Caribbean

BCRC- Caribbean performance is rated as satisfactory. This organization was responsible for the execution of the regional activities of the project. BCRC-Caribbean was the executor and beneficiary of the project. One of the project's key objectives was strengthening a regional mechanism, an objective that was achieved by the project and for which BCRC- Caribbean management and staff had much credit. This is one of the most significant and consequential achievements of the project. BCRC- Caribbean is now a reputable organization highly respected by its counterparts in the countries. Despite their initial missteps in hiring consultants (for NIPs), BCRC-Caribbean has learned and found ways to build internal capacities to provide key services over time.

4.3. National counterparts

The project established the Project Steering Committee (PSC) and Project Working Groups (PWGs) in each country, including stakeholders from multiple agencies. After the MTR the PSC had an important role in project oversight and in approving annual plans and budgets. PWGs helped to coordinate and report on country activities with government. Yet, administration changes and shifting government priorities required considerable effort to renegotiate and confirm countries' commitments – this was particularly the case when project demonstrations had been designed with high co-financing. Country counterparts also found it challenging to respond to the pace of the project given the low number of staff that the countries could assign to the project and the multiple tasks of such staff.

4.4. The GEF

The GEF performance is rated as satisfactory. In the GEF system, the GEF Secretariat and STAP play a role in the definition of programs and in ensuring that projects meet the requirements established by the GEF Council during the approval process. GEF's role was particularly important in supporting the GEF-Islands program and in the inclusion of two projects that will provide follow-up to the accomplishments of this project GEF 5558. Given that the project initiated the steps in the adoption of a comprehensive approach, the follow-up by the new GEF projects is critical to sustain and accelerate the sound management of toxic chemicals and POPs in the region. One consideration that could have improved the transition to the new projects is to have consulted with UNIDO during the process.

5. Factors facilitating or limiting the achievement of results

5.1. Monitoring & evaluation

The GEF require an M&E plan outlining specific M&E activities, responsible parties, budgets, and time frames in Project Document at Approval. The Project M&E plan is expected to include a log frame, the annual work plans, and detailed progress reports on activities, outputs and outcomes, a Midterm Review (MTR) and Terminal Evaluation. The GEF also requires that the M&E plan be implemented.¹⁷

The project document indicated that targets and indicators from the project results framework would be reviewed annually as part of the project team's internal evaluation and planning processes. The project document specifically included expected results and indicators for the demonstration projects in Suriname (J in the project document) and Belize (Annex K in the project document). There was no separate Annex in the project document with the proposal, expected results, or indicators for the demonstration project in Trinidad and Tobago since this demonstration project was selected after the approval of the project document. Annex A of the Project Document presents the project results framework completed for components 1 to 4 but not for component 5 on impact monitoring and evaluation. The project budgeted 1.8 million dollars for M&E activities (600,000 USD and 1,200,000 USD of co-financing).

5.2 Results-based management and monitoring

During implementation M&E included monthly quarterly and annual reporting by BCRC-CARIBBEAN to UNIDO on progress in activities and outputs achieved. BCRC-CARIBBEAN and UNIDO also kept record final reports of consultancies. Typically, BCRC-CARIBBEAN reporting focused on activities and outputs while UNIDO translated such reports to progress to results presented in yearly in the PIR. The MTR was carried out in a timely fashion and included visits to field sites to verify reports. The Project Steering Committee (PSC) was established to review, discuss and take action on the progress reports submitted by UNIDO and BCRC-Caribbean. The PSC meetings were held annually throughout the project.¹⁸ The Project is also required to complete the GEF-5 POPs Tracking Tool and submit it online to GEF. The GEF also allows projects approved under GEF 5 to retrofit result reporting using the *GEF 7 Core Indicator Worksheet* which includes core indicators reporting at midterm and at project closing. While reporting did not take place at midterm, the Core Indicator Worksheet (including results at midterm and project ending) was submitted at the time of the Terminal Evaluation (Annex I).

The project document included regular country supervision visits by the project execution unit at BCRC-Caribbean to provide oversight and support to country partners. Up to 2019, UNIDO and BCRC-CARIBBEAN carried out regular supervision and monitoring visits to the countries to assess contractual delivery of services. UNIDO and BCRC-Caribbean discontinued field visits in 2020 in account of travel restrictions related to COVID 19. Instead of field supervision visits BCRC hired national consultants to support the country's project coordinators and facilitate reporting. This approach helped relieve the human resources challenges in the country teams (typically overburdened in responsibilities) and to cope with the travel restrictions imposed by sanitary

¹⁷ The GEF Evaluation Policy Minimum Requirement 2 requires projects apply the Monitoring and Evaluation Plans

¹⁸ PSC meetings were carried out as follows: PSC Mtg 1 (TT, April 2016), PSC Mtg 2 (BZE, May 2017), PSC Mtg 3 (ANU, May 2018), PSC Mtg 4 (SLU, April 2019), PSC Mtg 5 (Virtual, June 2020), PSC Mtg 6 (Virtual, June 2021) and PSC Mtg 7 (TTO, October 2022).

measures related to COVID-19. PSC were also carried out virtually while travel restrictions remained. While carried out mostly remotely, country project coordinators and other stakeholders reported that BCRC-Caribbean support and supervision were very effective as “BCRC-CARIBBEAN staff were on top of us to get things done.”

5.3. Other factors

Competing country priorities. A critical factor affecting the broader adoption and system change is that despite the project's achievements in generating information, raising awareness, and demonstrating technological options conducive to sound ICM, there is still not enough attention from policymakers to POPs. Some respondents pointed out that while starting to understand POPs, policymakers still do not see their management as a priority in the face of multiple and competing challenges their countries face. A key factor is that there is still insufficient information about the situation on POPs and other toxic chemicals. Thus, it is difficult to make a case for the extent to which POPs represent a threat to public health and the economic risks that POPs carry. Before the project, most countries were working with decades-old information. The project has helped fill in some information gaps and to identify contaminated sites. But countries don't have a robust enough mechanism to regularly monitor, conduct analysis, and report on toxic chemicals, their risks, and effects. Without the monitoring, analysis and reporting system, it is difficult to make a case for the urgency posed by toxic chemicals to capture the public's attention and the willingness of policymakers to adopt the necessary regulations and allocate the necessary resources to strengthen institutions to address ICM challenges. Similarly, countries will not be able to report reliable information to the conventions, and there will be no way to tell if the conventions are improving the management of POPs and other toxic chemicals.

Access to financial and staff resources. Financing was also a factor that affected project results and which is critical to sustaining the progress of the ICM development trajectory. The MTR and other reports indicate that financing for NIP implementation was one of the critical challenges affecting the implementation of the initial NIPs in the region. Access to financing continued to be a hampering factor during this project GEF 5558. As indicated in the TOC analysis, aside from co-financing from governments, the project did not include a financing of investments component. Countries that received autoclaves to treat medical waste financed the facility to house the autoclave and committed to paying for the equipment's maintenance and operation costs. Yet in cases that required larger investments, such as the engineered landfill in Suriname or the landfill remediation in Trinidad and Tobago, the countries could not allocate the needed fiscal resources, and instead, the project funds were redirected to other activities such as a waste sorting and recycling project in Suriname and a POPs risk assessment in Trinidad and Tobago. Similarly, in Barbados, the installation of the tire shredder could not go forward due to budgetary concerns from the Sanitation Service Authority, even though the management of used tires is one of the main challenges of the landfill.¹⁹ In Belize, the project had to modify its plans (to a medical waste treatment facility) because the private company decided to invest in an incinerator that did not meet the project standards. Finances also affected the project via low government budgets to staff country counterpart institutions. Partner agencies of the project repeatedly stated during MTR and terminal evaluation interviews that they do not have enough time to deal at the depth required with project matters due to other multiple commitments and that their agency does not have the resources to assign sufficient staff to the project. Some countries are starting to set up systems that, in the long run, can help address the financial constraints faced by the government. For example, in Barbados, the Act that created the Chemical Board also provides a funding

¹⁹ Landfill staff reported that there are some half a million tires piled up in the landfill and an average of 8,000 additional tires come into the landfill every month.

mechanism to properly resource the Chemical Board. In Trinidad and Tobago, there are indications that the government will increase the Environment Management Authority (EMA) funding.

Financial and staff constraints in Barbados. The case of Barbados illustrates the small countries in the Caribbean face in meeting commitments to international environment projects. During the project's life, the country faced several crises that limited the government's flexibility to hire and retain people. This is a condition affecting all public administration in the country. The current administration was voted into office to address a troubled economy. They made much progress up to 2019. But as it seemed that the economy had picked up, the COVID pandemic lockdowns resulted in a rapid contraction of the tourist sector (the major contributor to the countries' economies) which required government intervention to prevent massive laying off of workers. During the project, Antigua also had to address destruction caused by hurricanes and suffered ash fallout from a volcanic eruption in St. Vincent in 2021. This series of crises limited the reaction capacity, forced the government to cut costs, and affected the government's hiring ability of civil servants. When the project started operations in 2016, the Environmental Protection Department (EPD), the counterpart of the project, was one of the best-staffed partner agencies of the project. Yet, over the years, there were no new hires as staff retired, shifted to other jobs, or were terminated. As a result, they went from having 14 staff in 2016 to three. Under these conditions, two persons – the director and the deputy director—are faced with responding to at least 17 different projects.

Low engagement of the private sector. The project mostly focused on the strengthening of public sector institutions; most members of PWCs were also representatives from public institutions.²⁰ Two project components with a promising collaboration with the private sector were PCBs disposal and operation of the autoclaves. In Antigua, a key factor in PCBs was the collaboration of the two electricity supply companies. The Antigua Public Utilities Company assisted in identifying older transformers and contaminated equipment. There is a national commitment to identify, test and dispose of all PCBs on the island. The West Indian Oil Company collaborated with the project and the Department of Analytical Services to provide a stockpile of mercury waste and devices. In Belize, the government is also exploring Public Private Partnership options to operate the medical waste treatment facility. While some stakeholders believe that the project could have worked more with the private sector, it is also important to point out that the project made efforts to engage with the private sector which did not work out as intended. One example is the case in Belize where the government reported that the private company initially identified to operate the autoclave was installing a polluting incinerator, which is contrary to this project's objectives. The government thus looked for an alternative partner and settled for decentralized public agency. In this context it is also important to stress the significance of the project contributions the strengthening public sector institutions, regulations and a regional mechanism which provide conditions for a more effective public sector agents' engagement with private sector agents. This is an aspect in which the project helped built conditions on which the GEF Islands Caribbean project and other GEF support can build on.

5.4. Overarching assessment

The project's overall rating is satisfactory. The project is the first comprehensive initiative to target root causes contributing to the poor management and risks associated with toxic chemicals

²⁰ The UNIDO management team indicated that the decision to include only public servants in the CWGs was made by the countries.

in the region, including POPs. The project made important contributions to advancing legal and institutional frameworks, improving information for decision-making, raising awareness on the risks associated with POPs, demonstrating technologies to manage POPs, and reducing POPs in the region. Similarly, the project helped strengthen BCRC-Caribbean as a mechanism to continue supporting countries in the improvement of POPs in the region.

6. Conclusions, recommendations, and lessons learned

6.1. Conclusions

The project is the first comprehensive initiative seeking to target root causes contributing to the poor management and risks associated with toxic chemicals in the region, including POPs. The project contributed to advancing legal and institutional frameworks, improving decision-making information, and raising awareness of the risks associated with POPs. The project demonstrated state-of-the-art technologies and approaches to eliminate or prevent POPs and improve landfill waste management and practices. The support provided in each of these domains included different training activities, which also helped raise capacities in the participating countries. Demonstrations of technology and landfill management directly resulted in the safe disposal or prevention of POPs in the region, such as the disposal of known PCBs and the reduction of u-POPs by preventing landfill fires and promoting waste separation.

The project was extended for two years and closed in December 2022. This was a sensible decision, allowing time to achieve most of its outputs and to use surplus funds in demonstration projects selected by the countries. The few outstanding outputs were expected to be completed by the end of the first quarter of 2023. The project had a slow start and some country stakeholders mentioned slow procurement processes as an issue. Yet as BCRC-Caribbean capacities were strengthened the efficiency in implementation picked up. Factors beyond the control of the implementing and executing agency or national project teams also delayed the achievement of outstanding activities. Causes of delays include the time it takes for political uptake – for example, in the Model ICM Act and the NIPs – and the need to change, renegotiate, or streamline activities in response to changing country priorities. While contributing to project delays, such flexibility helped ensure country ownership and, thus, in the long run, and more efficient use of resources.

While all countries reported benefits in all the domains that the project supported, country stakeholders also reported that they found it difficult to keep up with the pace of the project. Some felt that this put at risk the extent of uptake of the project outputs in the country. Factors contributing to the slow uptake were the large number of project outputs, the quick succession of activities, and the limited staff time country counterparts could dedicate to the project. One of the key factors underlying the differences in the extent to which countries benefited from the project is the extent to which a country engaged in the project.

Competing country priorities are a critical factor affecting the likelihood of a sustained ICM development trajectory, broader adoption, and system change. Despite the project achievements of supporting legal changes, strengthening country and regional capacities, raising awareness, and demonstrating technological options conducive to sound ICM, there is still not enough attention from policymakers to POPs. Some respondents pointed out that while starting to understand POPs, policymakers still do not see them as a priority in the face of multiple and competing challenges their countries face. This typically translates into giving more priority to sectors that will directly contribute to economic growth and to lower staffing and budgets to address risks related to POPs. The effects on the project of conflicting policy priorities were most

apparent in cases in which fiscal and financial limitations contributed to the changes in activities that required high co-financing.

Except for co-financing, the project did not include a component to address financing. The MTR recommended supporting countries in the search for financing. Except for a case in which the project sought to assist a country in requesting co-financing (which did not work out), the project could not address the lack of financing as this was not foreseen at project design. This likely affected the extent to which technologies and approaches for ICM and waste management will be replicated or mainstreamed and the extent of activities on awareness raising. Yet it is important to point out that the project took place in a very challenging context (competing policy priorities, low country financing, insufficient staffing of country partner institutions, and the Covid-19 pandemic). While much remains to be done to reach a point of self-sustained development trajectory toward sound ICM in the Caribbean, the strengthened BCRC-Caribbean as a regional mechanism is a critical factor in continuing supporting countries in their ICM development efforts. Strongly supported by the countries and highly regarded internationally (including by GEF and other implementing agencies and conventions), BCRC-CARIBBEAN is well positioned to tap into technical knowledge and funding from the GEF Islands Program as well as other funders and to continue to build on the accomplishments of this GEF 5558 project.

6.2. Recommendations

- 1. To BCRC-CARIBBEAN: Further strengthen the results monitoring capacities of BCRC-CARIBBEAN.** The M&E plan at Approval included a fully funded results monitoring of the various components and regular reporting. BCRC CARIBBEAN kept well organized records of activity reports and regularly reported to UNIDO on project activities and outputs. UNIDO also reported regularly on the components it executed and elaborated and submitted annually to the GEF secretariat the Project Implementation Reports. Activity reports were critical to engage country partners in decisions made during PSC meetings. Yet, the reporting carried out by BCRC-CARIBBEAN was mostly focused on specific project activities and outputs. Reporting that provided an overall picture of progress to outcomes and contributions to broader change took place twice (once during the MTR and at the end of the project by UNIDO). Ongoing reporting of progress to project outcomes (similar to that conducted at project midterm and to that presented in the final project workshop by UNIDO) would provide an overall picture to further support strategic discussions in the PSC. The evaluation team recommends that BCRC-Caribbean further strengthens its capacities to report on project outcomes to provide the PSC and ongoing overall picture of project achievements, constraints, and opportunities. This is a function which will be increasingly important as the number of complexity of projects implemented by BCRC-CARIBBEAN grow.
- 2. To BCRC-CARIBBEAN: In the new projects, BCRC-CARIBBEAN should ensure that training activities more fully consider country conditions in the planning and implementation.** Every major project activity was accompanied by training. Country stakeholders appreciate the information presented in training workshops. Country stakeholders also reported that trainers were competent in their technical knowledge. Yet, several recommended that future training sessions include more than two or three persons per country and that workshop should be carried out by experts who, in addition to being technically competent, are also proficient in training methods and in transmitting their technical knowledge in a way that it can be absorbed easier by the targeted audience. In the cases of the training of trainer's workshops, stakeholders recommended giving more attention to the tools and strategies by which trained trainers can implement workshops back in their countries. Stakeholders also suggested that training of trainers' workshops should highlight the importance and give more attention to the different training approaches that

trained trainers can use to ensure that the technical knowledge is properly transmitted so that it can be understood easier by other learners in their organizations.

3. **To BCRC-CARIBBEAN: More aggressively engage private sector operators in the new GEF projects.** The project used the project steering committee (PSC), which operated at the regional level, to report, in the context of the project's framework, on the annual project accomplishments and to approve the budget and activities of the upcoming year. The project working groups (PWG) operated to coordinate project activities at the country level. Most of the members of both groups represented government institutions. There was much less engagement of private sector operators. This was the first GEF-funded Chemical and Waste project in the Caribbean. Its main task was the "Development and Implementation of a Sustainable Management Mechanism for POPs in the Caribbean." Given that this project made progress in advancing such mechanisms, it is crucial that subsequent follow-up support work closer with private-sector operators that directly managed many of the activities pertaining to toxic chemicals and POPs.
4. **To UNIDO and BCRC-CARIBBEAN: should give more attention to ensuring the synchronization of project implementation cycles with country absorption capacities.** Support for broad behavioural and system change requires a careful balance between project implementation (efficiency) and the absorption capacity of counterparts. Ultimately, an intervention's most valuable contribution to development pertains to the extent to which it advances mechanisms and capabilities to sustain a development trajectory in the direction of long-term-goals. A successful development approach needs to carefully balance the delivery of activities and outputs (efficiency) with the needed timing and support required for the country to absorb and mainstream project contributions. In this case, the project contributed to such a support mechanism. Yet there was less flexibility to adapt the project cycles of deliverables to the cycles by which countries absorbed such deliverables. At the same time, this is, to a great extent, a response from project managers to a rigid results framework inherited in most development interventions. Thus, it is important for donors, implementers, and executors to make the necessary provisions to adapt the implementation cycles to the evolving in-country absorptive capabilities. In the case of this project, appropriate and more systematic M&E and analysis of factors affecting the attainment of results could have assisted in applying timely adaptive management approaches to these implementation challenges.

6.3. Lessons learned

There are some lessons that could be learnt from this project:

Regional activities, while appropriate to initiate processes in Small Island Developing States (SIDS), require follow-up and country-level support. Regional programs make good sense for small countries that share similar challenges as in the case of the Caribbean countries. Nevertheless, country institutions in the region are typically understaffed to meet their multiple responsibilities. In the case of highly technical interventions such as those related to the management of POPs, it is also likely that country counterpart organizations lack the range of expertise needed. Thus, while regional programs can help to initiate and kick start national processes to ensure country uptake (by supporting studies, priority setting and action plans, models, handbooks, etc.), it is also important to follow up by supporting deeper processes at the national level. For example, the project support to the strengthening of legal and institutional frameworks by developing the regional Model ICM Act, the Act required considerable work and expertise to adapt to country conditions. Similarly, in the case of the NIPs, governments will require country-level technical assistance and, most importantly, financial support to prevent a lack of action in NIP implementation (as was the case with earlier NIPs).

The regional mechanism is an effective approach to address challenges in supporting SIDS.

The project's main objective was to develop a mechanism to support the management of POPs in the Caribbean. This included the strengthening of BCRC-Caribbean to become a facilitator and service provider to the partner states. The project helped BCRC-Caribbean develop its administration systems and audit procedures and during the project helped build staff capacities to support member countries. BCRC-Caribbean is now a highly regarded organization that has strong country support and is financed by multiple organizations. While BCRC-Caribbean is a key component of the regional mechanism, another important component is the establishment of a network across the eight countries for mutual support and exchange of expertise. The project also developed and tested cost-effective approaches to address country needs which could be further developed and strengthened. The regional mechanism is thus a model that can be adapted and tested in other regions concerning Small Island States and Less Developed Countries.

Address social and equity considerations in the planning and implementation of POPs management.

While the project document linked the elimination of POP's with the reduction of health risks and project implementation incorporated some gender aspects of POPs management, few project activities directly addressed equity considerations related to the sound management of POPs. Yet equity considerations can be closely related to technologies well suited for POPs reduction in developing countries. Effective and sustainable approaches to reduce u-POPs, especially from open burning, need to consider social conditions. Such approaches are particularly applicable when considering people living around the landfills who often complement their income with the collection of metals or plastics that can be sold in the market. Allowing picking of plastics is a typical example of waste segregation that can be useful to reduce the potential sources of u-POPs, of waste that is burnt. Picking of metal is a practice that is often accompanied by burning electrical wire and other materials to render the metal in a condition that can be sold. Yet even though the burning of waste is known to be one of the main generators of u-POPs, during the evaluation staff in several landfills reported that they have a policy of not engaging waste pickers. Only the landfill visited in Antigua included an activity financed by the GEF Small Grants Program to work with pickers; this included introducing technology for the safe extraction of copper from wires and other recycling activities carried out by an independent entrepreneur. In other landfills, operators indicated that pickers were discouraged from entering the landfill because of safety precautions and the runaway fires sometimes caused by metal extraction. The Antigua example illustrates that landfills can establish partnerships to incorporate equity considerations by establishing alliances with entrepreneurs or non-governmental organizations that can promote approaches that prevent u-POPs while opening up new opportunities for the disadvantaged.

ANNEXES:

Annex A: Project evaluation criteria

Score		Definition	Category
6	Highly satisfactory	Level of achievement clearly exceeds expectations, and there is no shortcoming.	SATISFACTORY
5	Satisfactory	Level of achievement meets expectations (indicatively, over 80-95 percent), and there is no or minor shortcoming.	
4	Moderately satisfactory	Level of achievement more or less meets expectations (indicatively, 60 to 80 percent), and there are some shortcomings.	
3	Moderately unsatisfactory	Level of achievement is somewhat lower than expected (indicatively, less than 60 percent), and there are significant shortcomings.	UNSATISFACTORY
2	Unsatisfactory	Level of achievement is substantially lower than expected, and there are major shortcomings.	
1	Highly unsatisfactory	Level of achievement is negligible, and there are severe shortcomings.	

Annex B: Evaluation Terms of Reference:

Available online at: https://www.unido.org/sites/default/files/files/2022-12/TOR_GFLAC-150049_TE-2022.pdf

Annex C: Project Results Framework

Project Objective: To develop and implement a Sustainable Management Mechanism for POPs in the Caribbean		
Project Components	Expected Outcomes	Expected Outputs
1. Create the enabling mechanisms in the participating Caribbean countries for the effective implementation of the Stockholm Convention on POPs;	1: Enabling mechanism for effective implementation of the Stockholm Convention on Persistent Organic Pollutants created	1.1 Updated NIPs, including the conduct of in-country inventories of new POPs added to the Stockholm Convention
		1.2: Sound chemicals management mainstreamed into national policies and plans
		1.3: Regional information system available for all countries
		1.4 Strong institutional arrangements and structures established to support regional collaborative and cooperative approaches to management of POPs and UPOPs among participating countries.
2. Reduce UPOPs emissions by improving poor waste management practices at landfills	2: U-POPs emissions reduced by improving poor waste management practices at landfills resulting in improved human health	2.1: Systems for the collection and disposal of POPs wastes resulting in better waste management practices implemented at a national level
		2.2: BAT/BEP demonstrated in a pilot (existing) landfill facility
3. Assess potential contaminated sites to determine the level of contamination by POPs and develop appropriate remediation strategies;	3: Identification and remediation of contaminated sites	3.1: Contaminated sites identified, assessed and prioritized for treatment
		3.2. Remediation demonstrated in a prioritized contaminated site
4. Managing and disposing of PCBs;	4: ESM of PCBs established in the countries	4.1: ESM of PCBs implemented
5. Impact Monitoring and Evaluation	5. Adherence to project document and achievement of project	5.1 Project impact monitoring system, evaluation of the achieved results, and introduction of corrections (as required)

Project Objective: To develop and implement a Sustainable Management Mechanism for POPs in the Caribbean

Project Components	Expected Outcomes	Expected Outputs
	objectives	5.2 Dissemination of project-related information and results to stakeholders

Annex D: List of Stakeholders Interviewed

COUNTRY	DATE	NAME	ORGANIZATION	TITLE
ANTIGUA AND BARBUDA	5 th December	Ms. Lael Bertide-Josiah	Department of Analytical Services Ministry of Agriculture, Land, Fisheries and Barbuda Affairs	National Project Coordinator
ANTIGUA AND BARBUDA	5 th December	Mr. Sherwin Wiltshire	National Solid Waste Management Authority (NSWMA)	Landfill Manager (Ag.)
ANTIGUA AND BARBUDA	5 th December	Mr. Harsani Williamson	Wills Recycling	Owner/ Private Sector
SURINAME	6 th December	Mr. Leo Sosa (Virtual)	Project Execution Unit, Department of the Environment	Environmental Officer
SURINAME	6 th December	Mr. Anthony Mai (Virtual)	Project Execution Unit, Department of the Environment	Unit Head
TRINIDAD AND TOBAGO	6 th December	Ms. Jewel Batchasingh (Virtual)	BCRC-Caribbean	Director
SAINT LUCIA	8 th December	Mr. David Polean	Desglo Landfill, Saint Lucia Solid Waste Authority	District Supervisor
SAINT LUCIA	8 th December	Ms. Emlyn Jean	Saint Lucia Solid Waste Management Authority	Information and Communications Manager
SAINT LUCIA	8 th December	Mr. Cletus Alexander	Pesticide and Toxic Chemical Control Board	Registrar
SAINT LUCIA	8 th December	Mr. Jermaine Williams	Saint Lucia Fire Services	Assistant Divisional Officer, Fire Services Department
SAINT LUCIA	8 th December	Ms. Yasmin Jude	Department of Sustainable Development Ministry of Sustainable Development, Energy, Science and Technology	National Project Coordinator/ Sustainable Development and Environment Officer

COUNTRY	DATE	NAME	ORGANIZATION	TITLE
SAINT LUCIA	8 th December	Ms. Annette Leo	Department of Sustainable Development Ministry of Sustainable Development, Energy, Science and Technology	PWC Chair/ Chief Sustainable Development and Environment Officer
BARBADOS	12 th December	Mr. Guy Mathurin	Subregional Office for the Caribbean Food and Agriculture Organization of the United Nations	Regional Project Coordinator
BARBADOS	12 th December	Mr. Bruce Gopaul	Portvale Sugar Factory Barbados Agricultural Management Company	Electrical Engineering Manager
BARBADOS	12 th December	Mr. Charley Browne	Ministry of Environment and National Beautification, Green and Blue Economy	Permanent Secretary, GEF Operational Focal Point
BARBADOS	12 th December	Mr. Anthony Headley	Environmental Protection Department Ministry of Environment and National Beautification, Green and Blue Economy	Director- (PWC Chair)
BARBADOS	12 th December	Ms. Leona Deane	Sanitation Services Authority	Assistant Manager Engineering (Ag)
BARBADOS	12 th December	Mr. McDonald Thompson	Sanitation Services Authority	Landfill Operator
BARBADOS	12 th December	Ms. Gennia Oxley	Pesticides Control Unit Ministry of Agriculture, Food and Nutritional Security	Registrar of Pesticides
BARBADOS	12 th December	Ms. Lisa Senhouse	Environmental Protection Department	Deputy Director (ag)/ National Project Coordinator
TRINIDAD	15 th December	Ms. Maria Allong	Solid Waste Management Company Limited	Quality Health and Safety Manager (PWC member)
TRINIDAD	15 th December	Mr. Carlos John	Solid Waste Management Company Limited	Site Supervisor
TRINIDAD	15 th December	Ms. Jiselle Joseph	Environmental Management Authority	Assistant Manager – Technical Services

COUNTRY	DATE	NAME	ORGANIZATION	TITLE
TRINIDAD	15 th December	Ms. Trisha Beejai	Environmental Management Authority	Technical Officer II- Waste Unit
TRINIDAD	15 th December	Mr. Jovan Ramnarine	San Fernando General Hospital Autoclave for Medical Waste	Plant Engineer
TRINIDAD	15 th December	Mr. Anthony Marcano	San Fernando General Hospital Autoclave for Medical Waste	Project Coordinator
TRINIDAD	15 th December	Ms. Jewel Batchasingh Ms. Maurissa Charles Ms. Rachel Ramsey Ms. Laura Texiera Mr. Maurice Alexander	BCRC-Caribbean	Director and Project Team

Annex E: Methods used to calculate the reduction of POPs

The calculation for the emissions of u-POPs (namely PCDD/PCDF) is based on the emission factors provided by the UNEP Toolkit 2013 in the relevant tables for (medical) waste incineration and open burning.

Calculations for PCDD/Fs are based on the equation:

$$\text{Annual releases} = \text{EFAir} \times \text{Activity Rate} + \text{EFresidue} \times \text{Activity Rate}$$

where the EF = release to air per unit of activity in units of $\mu\text{g I-TEQ/t}$ and Activity Rate = amount or quantity of waste generated/burnt per year (in tons).

The Toolkit recommends the use of different EFs depending on the technique/technology used to incinerate the waste (incineration classes) or for open burning. Hereafter the tables from the UNEP Toolkit are presented.

Table II.1.5 PCDD/PCDF emission factors for source category 1c Medical Waste Incinerators

1c	Medical Waste Incinerators	Emission Factors ($\mu\text{g TEQ/t MW}$ incinerated)	
		Air	Residue
Classification			
1	Uncontrolled batch type combustion, no APCS	40,000	200*
2	Controlled, batch type combustion, no or minimal APCS	3,000	20*
3	Controlled, batch type combustion, good APCS	525	920**
4	High technology, continuous, controlled combustion, sophisticated APCS	1	150**

* Refers only to bottom ash left in the combustion chamber

** Refers to combined bottom and fly ashes.

Table II.6.5 PCDD/PCDF emission factors for source category 6b Open Burning of Waste and Accidental Fires

6b	Open Burning of Waste and Accidental Fires	Emission Factors ($\mu\text{g TEQ/t material burned}$)				
		Air	Water	Land	Product	Residue
1	Fires at waste dumps (compacted, wet, high organic carbon content)	300	ND	10*	NA	NA
2	Accidental fires in houses, factories	400	ND	400	NA	NA
3	Open burning of domestic waste	40	ND	1*	NA	NA
4	Accidental fires in vehicles ($\mu\text{g TEQ}$ per vehicle)	100	ND	18	NA	NA
5	Open burning of wood (construction/demolition)	60	10	10	NA	NA

* Based on a few field measurements and consistent with the biomass burn EF_{Land} where the release in the ashes is 5%-10% of the EF_{Air} .

It must be noted that in almost all the national waste management plans, it was decided to use the emission factors class 1 for medical waste incineration to evaluate the emissions of open

burning, as the waste is not wet and not compacted, so a higher EF was considered more appropriate. Instead, the normal EF was used for waste in Ornamibo landfill.

Therefore, the calculations presented are slightly different from those in the national waste management plans applying the above and the following considerations.

In Antigua & Barbuda the estimated burned waste in the incinerator is 196 Tons/a. As stated in the national waste management plan, we can assume that the incinerator has controlled combustion and an afterburner but still operates in a batch-type mode, so class 2 can be applied. 26 tons are openly burnt, and in this case, Class 1 EF of waste incineration is applied.

Waste incineration

Emission to air = $196 \text{ t/a} \times 3000 \text{ } \mu\text{gTEQ/t} \times 10^{-6} = 0.588 \text{ g TEQ/a}$

Emission for bottom ash = $196 \text{ t/a} \times 20 \text{ } \mu\text{gTEQ/t} \times 10^{-6} = 0.00392 \text{ g TEQ/a}$

Annual release = Emissions for air + emissions for residues = $(0.588+0.00392) \text{ g TEQ/a} = 0.592 \text{ g TEQ/a}$

Open burning

Emission to air = $26 \text{ t/a} \times 40000 \text{ } \mu\text{gTEQ/t} \times 10^{-6} = 1.04 \text{ g TEQ/a}$

Emission for bottom ash = $26 \text{ t/a} \times 200 \text{ } \mu\text{gTEQ/t} \times 10^{-6} = 0.0052 \text{ g TEQ/a}$

Annual release = Emissions for air + emissions for residues = $(1.04+0.0052) \text{ g TEQ/a} = 1.045 \text{ g TEQ/a}$

In Belize, in the waste management plan, the burning of medical waste was assessed by applying the emission factors for incineration for each district. Since 2018 a new batch incinerator has been used for waste incineration, but in very simple way and with minimal gas emission control, so Class 2 is applied, as also reported in the national waste management plan. For Cayo district, in the national waste management plan, it was decided to use the EF for waste incineration (class 1) rather than the EF for open burning:

Belize District:

Emission for air = $112 \text{ t/a} \times 3000 \text{ } \mu\text{gTEQ/t} \times 10^{-6} = 0.336 \text{ g TEQ/a}$

Emission for bottom ash = $112 \text{ t/a} \times 20 \text{ } \mu\text{gTEQ/t} \times 10^{-6} = 0.00224 \text{ g TEQ/a}$

Cayo District (mainly open burning, but using higher EF, as those for waste incineration class 1):

Emission for air = $74 \text{ t/a} \times 40000 \text{ } \mu\text{gTEQ/t} \times 10^{-6} = 2.960 \text{ g TEQ/a}$

Emission for residues = $74 \text{ t/a} \times 200 \text{ } \mu\text{gTEQ/t} \times 10^{-6} = 0.0148 \text{ g TEQ/a}$

Western Corridor Total:

Emission for air = $0.336 \text{ g TEQ/a} + 2.960 \text{ g TEQ/a} = 3.296 \text{ g TEQ/a}$

Emission for ash (bottom + fly ash) = $0.00224 \text{ g TEQ/a} + 0.0148 \text{ g TEQ/a} = 0.01704 \text{ g TEQ/a}$

Annual release = Emissions for air + emissions for residues = $(3.296 + 0.01704) \text{ g TEQ/a} = 3.313 \text{ g TEQ/a}$

In **St. Kitts & Nevis** the estimation of incinerated medical waste gives some 155 Tons/a and 53 disposed of in landfill (probably open burnt). According to the UNIDO Medical Waste Country Assessment Report, the incinerator functions only as a holding container for the waste whilst it is

burnt without the provision of supplemental fuel. Therefore, it can be assimilated into a Class 1 device (higher than reported in the national waste management plan). Open burning can also be assimilated to incinerator class 1.

Emission to air (for waste incineration) = $155 \text{ t/a} \times 40000 \text{ } \mu\text{gTEQ/t} \times 10^{-6} = 6.20 \text{ g TEQ/a}$

Emission for bottom ash = $155 \text{ t/a} \times 200 \text{ } \mu\text{gTEQ/t} \times 10^{-6} = 0.031 \text{ g TEQ/a}$

Emission to air (for open burning) $53 \text{ t/a} \times 40000 \text{ } \mu\text{gTEQ/t} \times 10^{-6} = 2.12 \text{ g TEQ/a}$

Emission for residues = $53 \text{ t/a} \times 200 \text{ } \mu\text{gTEQ/t} \times 10^{-6} = 0.0011 \text{ g TEQ/a}$

Total Annual release = Emissions for air + emissions for residues = 8.35 g TEQ/a

In **Suriname**, only 42 tons of plastics and metals were diverted from dumping, which is a very small fraction with respect to the amount of waste disposed of in the Ornamibo landfill, and it can be assumed that this amount was excluded from open burning. In this case, since the recycled waste was mixed with general waste, the EF for open burning is used instead of waste incineration.

Emission to air $42 \text{ t/a} \times 300 \text{ } \mu\text{gTEQ/t} \times 10^{-6} = 0.013 \text{ g TEQ/a}$

Emission for land = $42 \text{ t/a} \times 10 \text{ } \mu\text{gTEQ/t} \times 10^{-6} = 0.0004 \text{ g TEQ/a}$

Total Annual release: 0.013 g TEQ/a

In **Trinidad & Tobago**, the estimated annual production of medical waste is 5400-7600 tons, but there is a lack of information on the amount incinerated or open burnt. So it was decided to rely on the only available data related to the San Fernando Hospital incinerator, where estimated 500 Tons/a are incinerated in a Class 2 device. Data have a wide range depending on the capacity of the incinerator, working at full load or not. The highest figure can be assumed.

Emission to air = $500 \text{ t/a} \times 3000 \text{ } \mu\text{gTEQ/t} \times 10^{-6} = 1.50 \text{ g TEQ/a}$

Emission for bottom ash = $500 \text{ t/a} \times 20 \text{ } \mu\text{gTEQ/t} \times 10^{-6} = 0.01 \text{ g TEQ/a}$

Annual release = Emissions for air + emissions for residues = 1.51 g TEQ/a

Annex F: Reported co-financing

Source of co-financing (name of specific co-financiers)	Type of co-financier (e.g. government, GEF) agency(ies), Bilateral and aid agency (ies), multilateral agency(ies), private sector, NGO/CSOs, other)	Type of co-financing	Co-financing during project preparation – CEO endorsement/ approval stage (in USD) ²¹		Additional co-financing added during project implementation stage (in USD)		Total co-financing (in USD)	
			Expected	Actual as of November 30 2022	Expected	Actual as of 30 November 2022	Expected	Actual as of 30 November 2022
National Solid Waste Management Authority, Antigua and Barbuda	National Government	In-kind	5,600,000	2,330,110.00	None	-	5,600,000	US\$ 2,330,110 ²²
Ministry of the Environment and Drainage, Barbados	National Government	In-kind	60,000	60,000	None	586,181	60,000	US\$ 646,181 ²³
Ministry of Forestry, Fisheries & Sustainable Development, Belize	National Government	In-kind	1,762,000	700,129.97	None	-	1,762,000	US\$ 700,130 ²⁴
Solid Waste Management Authority, Belize	National Government	In-kind	300,000		None	-	300,000	
St. Kitts and Nevis Solid Waste Management Corporation	National Government	In-kind	384,087	384,087	None	1,407,089	384,087	US\$ 1,791,176 ²⁵
Ministry of Education, Innovation, Gender Relations and Sustainable Development, Saint Lucia	National Government	In-kind	195,274	195,274	None	1,030,519	195,274	US\$ 1,225,793 ²⁶

²² In-kind contribution reported up to Y3 ending November 30, 2018; unreported co-financing for the construction of an interim Hazardous Waste Storage Facility (Y6-Y7).

²³ In-kind contribution reported up to Y3 ending November 30, 2018.

²⁴ In-kind contribution reported up to Y6 ending November 30, 2021; unreported co-financing for the installation of GC-MS (Y7).

²⁵ In-kind contribution reported up to Y4 ending November 30, 2019.

²⁶ In-kind contribution reported up to Y7 Q1 ending February 28, 2022.

Source of co-financing (name of specific co-financiers)	Type of co-financier (e.g. government, GEF) agency(ies), Bilateral and aid agency (ies), multilateral agency(ies), private sector, NGO/CSOs, other)	Type of co-financing	Co-financing during project preparation – CEO endorsement/ approval stage (in USD) ²¹		Additional co-financing added during project implementation stage (in USD)		Total co-financing (in USD)	
			Expected	Actual as of November 30 2022	Expected	Actual as of 30 November 2022	Expected	Actual as of 30 November 2022
Ministry of Health, Wellness and the Environment, St Vincent and the Grenadines	National Government	In-kind	176,294	85,728.25	None	-	176,294	US\$ 85,728 ²⁷
Coordination Environment Cabinet of the President of the Republic of Suriname, Suriname	National Government	In-kind	389,000	334,794.85	None		457,062	US\$ 334,795 ²⁸
Ministry of Agriculture, Animal Husbandry and Fisheries, Suriname	National Government	In-kind	68,062		None			
Ministry of Planning and Development, Trinidad and Tobago	National Government	In-kind	16,055	16,055	None	146,045	16,055	US\$ 162,100 ²⁹
Solid Waste Management Company Limited	National Government	In-kind	10,012,382	52,509.89	None	-	10,012,382	US\$ 52,510 ³⁰
UNIDO	GEF Agency	Cash	178,000		None		178,000	
UNIDO	GEF Agency	In-kind	250,000		None		250,000	

²⁷ In-kind contribution reported up to Y7 Q1 ending February 28, 2022.

²⁸ In-kind contribution reported up to Y6 ending November 30, 2021.

²⁹ In-kind contribution reported up to Y7 Q1 ending February 28, 2022.

³⁰ In-kind contribution reported up to Y7 Q1 ending February 28, 2022.

Source of co-financing (name of specific co-financiers)	Type of co-financier (e.g. government, GEF) agency(ies), Bilateral and aid agency (ies), multilateral agency(ies), private sector, NGO/CSOs, other)	Type of co-financing	Co-financing during project preparation – CEO endorsement/ approval stage (in USD) ²¹		Additional co-financing added during project implementation stage (in USD)		Total co-financing (in USD)	
			Expected	Actual as of November 30 2022	Expected	Actual as of 30 November 2022	Expected	Actual as of 30 November 2022
BCRC-Caribbean	Multi-lateral Agency	Cash	250,000	84,259	None	-	250,000	US\$ 84,259 ³¹
BCRC-Caribbean	Multi-lateral Agency	In-kind	800,000	800,000	None	539,204	800,000	US\$ 1,339,204
Greening the Caribbean, Saint Lucia	Private Sector	Cash	30,000	27,453	None	-	30,000	US\$ 27,453
Total co-financing (in USD)			21,124,103*		None		20,471,154	8,779,439
Department of Environment, Antigua and Barbuda	National Government	In-kind	None	None	None	250,746	None	US\$ 250,746
Saint Kitts and Nevis Bureau of Standards	National Government	In-kind	None	None	None	<i>* Reported with SWMC above</i>	None	-
Sub-Total, Additional Agencies, co-financing (USD)								
Total co-financing (in USD)							20,471,154	9,030,185

Expected amounts are those submitted by the GEF agencies in the original project appraisal document. Co-financing types are grant, soft loan, hard loan, guarantee, in kind, or cash.

Note: **This total co-financing sum is taken from the GEF Project Document however there is an error in the calculation. The sum of the above co-financing contributions is 20,471,154.*

Source: CBRC. This was the co-financing reported by CBRC to the evaluation team on March 2, 2023.

³¹ Estimated sum of cash contribution up to May 2022.

Annex G: GEF 5558-Project Outputs Verification Table

Green= Achieved Yellow= On track to be achieved Red= Not achieved

Outcome/Output	Target achieved as at December 31 st 2022	ANU	BAR	BZE	SKN	SLU	SVG	SUR	TT	COMMENTS	% ACHIEVED
Component 1: Enabling mechanism for effective implementation of the Stockholm Convention on Persistent Organic Pollutants created.											
Output 1.1: National Implementation Plans (NIPs) updated.	8 NIPs updated	x	x	x	x	x	x	x	x	Completed	100%
	2 Awaiting PWC approval (ANU, BDOS)	x	x							Both should get approval by end of 1 st Quarter 2023	
	5 NIPs submitted to SC Secretariat (BZE, SKN, SLU, SUR, TTO)			x	x	x		x	X	Once ANU and BAR is approved will be submitted. SVG is awaiting national Cabinet approval, expected 1 st Quarter 2023	
Output 1.2: Sound chemicals management mainstreamed into national policies and plans.	45% of the participants at the public awareness workshops are female.									Completed (verified through participant lists)	100%
	8 national training sessions conducted in support of the Communications Strategy									Completed (Verified through reports and interview with BCRC)	100%
	Five thematic area developed based on									Completed (verified through report and	100%

Outcome/Output	Target achieved as at December 31 st 2022	ANU	BAR	BZE	SKN	SLU	SVG	SUR	TT	COMMENTS	% ACHIEVED
	training needs assessment.									interview with BCRC)	
	For each training activity at least 2 representatives per project country has been trained - Customs Training - Development of SOP for Inspectors									Completed (Verified through reports and interview with BCRC)	100%
	Lab capacity upgrades for PCBs in ANU, BZE and SUR	x		x				x		Equipment purchased and staff trained	100%
	Pre-KAP survey completed, Post-KAP survey reporting ongoing									All pre-KAP surveys completed. Status of Post-KAPs: BZE, SKN, SVG, TTO- Completed ANU, BAR, SLU – Ongoing/under review SUR- not completed	
	Regional model Integrated Chemicals Management (ICM) Act developed and approved by country PWCs Use of the model ICM to draft legislation in Belize, Saint Kitts and Nevis, and Suriname. In Suriname, the national	X	X	X	X	X	X	X	X	All countries benefitted from the ICM which was used as a base for national legislative review and update	100%

Outcome/Output	Target achieved as at December 31 st 2022	ANU	BAR	BZE	SKN	SLU	SVG	SUR	TT	COMMENTS	% ACHIEVED
	customization led to the cabinet approved Environmental Management Act. For SKN, the model ICM has been streamlined with existing national legislation. A draft national ICM legislation, policy brief and cabinet paper has been prepared for government consideration through the Pesticides and Toxic Chemicals Control Board.										
	Subject to country uptake for government approval									This goes beyond the scope and timeline of project. Countries interviewed are optimistic that legislation will be approved in short time	
	At least two (2) inspectors at enforcement authorities are trained in each country for efficient implementation of the	x	x	x	x	x	x	x	x	Completed. Verified through reports and interview with BCRC	100%

Outcome/Output	Target achieved as at December 31 st 2022	ANU	BAR	BZE	SKN	SLU	SVG	SUR	TT	COMMENTS	% ACHIEVED
	hazardous waste related legislations.										
	One (1) tool kit for site inspection procedures for hazardous waste management enterprises.									Completed. Verified through reports and production of tool kit	100%
	Eight (8) trained environmental specialists in POPs inventories.	x	x	x	x	x	x	x	x	Completed	100%
	At least 40% of the trained specialists are female.									Verified through workshop reports and participants list.	100%
	POPs, u-POPs are integrated into general, gender sensitive public awareness campaigns.									Completed. Regional Awareness campaign developed and integrated gender sensitive messaging	100%
Output 1.3: Regional information system available for all countries	POPs-RIS developed Regional Training Workshop completed	x	x	x	x	x	x	x	x	Completed. Confirmed by BCRC and through in country missions	100%
	Upload and issuing of credentials to countries	x	x	x	x	x	x	x	x	Participants and core staff provided with credentials. General public will be provided with access once website is launched later 2023	100%

Outcome/Output	Target achieved as at December 31 st 2022	ANU	BAR	BZE	SKN	SLU	SVG	SUR	TT	COMMENTS	% ACHIEVED
	Additional knowledge transfer plan									Consultants re-engaged by BCRC. Activity expected to be completed in April 2023	
Outcome 2: U-POPs emissions reduced by improving poor waste management practices at landfills.	SURINAME -Detailed design for Ornamibo landfill upgrade and Tender Documents were completed.The Government re-confirmed its commitment to the Ornamibo Landfill upgrade, however, lacks financial means. Government is focused on waste separation alternatives. Waste separation pilot project in Greater Paramaribo, was completed.							x		Completed	100%
	Two source separation projects for green waste initiated in ANU and SLU	x				x				Antigua- initiative undertaken. Green waste is separated from municipal waste and composted. Sensitization of population required for assistance with	100%

Outcome/Output	Target achieved as at December 31 st 2022	ANU	BAR	BZE	SKN	SLU	SVG	SUR	TT	COMMENTS	% ACHIEVED
										waste separation at source. Saint Lucia- green waste is collected and processed at landfill	
	BELIZE- Medical waste treatment plant (autoclave) fully operative, under responsibly of the Department of Environment. New scenario: DoE is negotiating with BWC (private company) the operation of the plant.			X						Fully installed but management responsibilities to be confirmed by 1 st Q 2023	100%
Output 2.1: Systems for the collection and disposal of POPs wastes resulting in better waste management practices implemented at a national level.	3 Hazardous waste storage facilities designed for ANU, BDOS and SLU	x	x			x				SLU and BDOS failed to secure co-financing to support the US\$150K earmarked to each under the project for the construction of the HWSF. Funds were reallocated to improving landfill operations in both countries. Antigua was able to secure co-financing and construction is	100% completed-design plans.

Outcome/Output	Target achieved as at December 31 st 2022	ANU	BAR	BZE	SKN	SLU	SVG	SUR	TT	COMMENTS	% ACHIEVED
										underway to be completed 1 st quarter 2023.	
	3 source separation programmes designed (ANU, BDOS, SLU). 2 programmes were initiated for source separation demonstration sites	x	x			X				Completed	100%
	1 country (ANU) has provided co-financing to support the construction of the facility.	x								A Cabinet note confirming the Government's commitment was issued under the Ministry of Public Works to complete construction.	100%
Output 2.2: BAT/BEP demonstrated in a pilot (existing) landfill facility	A certain degree of progress is assumed based on awareness and capacity building activities. Complementary legislative actions should be necessary (SURINAME)							X		A BAT/BEP for waste separation through a pilot was completed.	100%
	Control mechanisms need to be fully implemented (SURINAME)							X			100%

Outcome/Output	Target achieved as at December 31 st 2022	ANU	BAR	BZE	SKN	SLU	SVG	SUR	TT	COMMENTS	% ACHIEVED
	Medical waste treatment plant (autoclave) fully operative, under responsibly of the Department of Environment (BELIZE)							X		Operation and maintenance under negotiation	100%
	In addition, same technology was installed in SKN.				x					Yes but awaiting a power supply. A generator is being procured under the project	100%
	In addition, same technology was installed in ANU.	x								Completed	100%
	In addition, same technology was installed in one hospital in TT.								x	Completed	100%
Component 3: Assess potential contaminated sites to determine the level of contamination by POPs and develop appropriate remediation											
Outcome 3: Identification and remediation of contaminated sites.	Participating countries have capacity in managing contaminated sites.									Country representatives were trained and manuals produced.	
	Regional support and network of experts are available for contaminated site management.									Yes there is an informal network built under the project. BCRC has a database of consultants and	100%

Outcome/Output	Target achieved as at December 31 st 2022	ANU	BAR	BZE	SKN	SLU	SVG	SUR	TT	COMMENTS	% ACHIEVED
										experts engaged under project.	
Output 3.1: Contaminated sites identified, assessed and prioritized for treatment.	Reports to all be finalized by end of Oct 2022			x		x				BZE and SLU-completed ANU, BDOS and SUR – draft finals SKN, SVG and TTO-ongoing ALL reports expected to be finalized by March 2023	
	One contaminated site is selected for remediation.										100%
Output 3.2: Remediation demonstrated in a prioritized contaminated site.	Trinidad- Guanapo. Landfill lifespan was extended so closure actions are not viable at this time. All remediation measures were designed. Tender documents for Leachate Treatment Plan were completed and tender process are ongoing. An Environmental Risk Management Program was fully developed and implemented.								x	Guanapo landfill is undergoing phased remediation	100%

Outcome/Output	Target achieved as at December 31 st 2022	ANU	BAR	BZE	SKN	SLU	SVG	SUR	TT	COMMENTS	% ACHIEVED
	Remediation plan for the Guanapo Landfill completed.									Completed. Plan produced.	100%
Component 4: Managing and disposing of PCBs											
Outcome 4: PCBs managed and disposed of	An ESM manual is also available with detailed information for inventory, ESM and disposal of PCBs.									Completed. Verified with documents and reports shared for the TE	100%
	Disposal Plans prepared for ANU, BZE, SLU, SUR under Component 4	x		x		x		X		Completed. Verified with documents and reports shared for the TE	100%
	One regional PCB database is in place, where each country can store its own PCB inventory.										100%
Output 4.1: ESM of PCBs implemented.	55.2 metric tons of PCBs disposed of by 2021 under GEF 5407 (FAO procurement) <ul style="list-style-type: none"> • ANU - 11.65 MT • BDOS - 0.26 MT • SUR - 30.22 MT • TTO - 13.12 MT Ongoing Disposal under GEF 5558 UNIDO procurement <ul style="list-style-type: none"> • ANU (2022-Ongoing) - • BZE (2022 - Ongoing) - 										100%

Outcome/Output	Target achieved as at December 31 st 2022	ANU	BAR	BZE	SKN	SLU	SVG	SUR	TT	COMMENTS	% ACHIEVED
	All identified PCB-containing transformers in the inventories were well labelled									Completed	100%
Component 5: Impact Monitoring and Evaluation											
Output 5.1: Project impact monitoring system, evaluation of the achieved results and introduction of corrections if required	Completed in August 2019. 1 External mid-term evaluation completed.									Completed	100%
	Procurement of Terminal Evaluators ongoing UNIDO									Completed	100%
	Project Working Committees established for each country									Completed	100%
	Seven PSC meetings hosted and one extraordinary meeting in Dec 2021									Completed	100%
Output 5.2: Dissemination of project related information and results to local stakeholders.	1 Regional Inception Meeting Held									Completed	100%

Outcome/Output	Target achieved as at December 31st 2022	ANU	BAR	BZE	SKN	SLU	SVG	SUR	TT	COMMENTS	% ACHIEVED
	Regional Project Terminal Workshop held - October 03, 2022									Completed	100%
	Project Management Training for Project Management Staff at the first PSC Meeting									Completed	100%

Annex H: Core Indicators

GEF-8 Results Measurement Framework Worksheet

	GEF ID:	5558
	Agency ID:	130211
	Reported by:	Alfredo Cueva
	Date:	14/March/2023

Core Indicator Chemicals of global concern and their waste reduced					
		Metric Tons (9.1 + 9.2 + 9.3+9.7)			
		Expected (metric tons)		Achieved (metric tons)	
		PIF Stage	Endorsement	MTR	TE
		-	70.0	-	58.2
Indicator 9.1 Persistent Organic Pollutants (POPs) removed or disposed (POPs type) (in metric tons)					
POPs Type to choose from:		Expected (metric tons)		Achieved (metric tons)	
		PIF Stage	Endorsement	MTR	TE
PCB			70.0		58.2
<pls select>					
<pls select>					
Sum >>>		-	70.0	-	58.2
Indicator 9.4 Countries with legislation and policy implemented to control chemicals and waste					
Stockholm Convention National Implementation Plans updated		Number of Countries			
		Expected		Achieved	
		PIF Stage	Endorsement	MTR	TE
			8	5	8
Core Indicator 10 Persistent organic pollutants to air reduced					
Autoclaves for medical waste (installed in Belize, T&T, Saint Kits, and Antigua) Ornamibo landfill in Suriname - Design for upgrade + waste separation pilot project in Greater Paramaribo		Expected (grams of toxic)		Achieved (grams of toxic equivalent)	
		PIF Stage	Endorsement	MTR	TE
			13.93 gTEQ/a		13.92 gTEQ/a
Indicator Countries with legislation and policy implemented to control emissions of POPs to air					
		Number of Countries			
		Expected		Achieved	
		PIF Stage	Endorsement	MTR	TE
Indicator Emission control technologies/practices implemented					
Autoclaves for medical waste (installed in Belize, T&T, Saint Kits, and Antigua)		Number			
		Expected		Achieved	
		PIF Stage	Endorsement	MTR	TE
			2		4

Core Indicator Chemicals of global concern and their waste reduced					
		Metric Tons (9.1 + 9.2 + 9.3+9.7)			
		Expected (metric tons)		Achieved (metric tons)	
		PIF Stage	Endorsement	MTR	TE
		-	70.0	-	58.2
Indicator 9.1 Persistent Organic Pollutants (POPs) removed or disposed (POPs type) (in metric tons)					
POPs Type to choose from:		Expected (metric tons)		Achieved (metric tons)	
		PIF Stage	Endorsement	MTR	TE
PCB			70.0		58.2
<pls select>					
<pls select>					
Sum >>>		-	70.0	-	58.2
Indicator 9.4 Countries with legislation and policy implemented to control chemicals and waste					
Stockholm Convention National Implementation Plans updated		Number of Countries			
		Expected		Achieved	
		PIF Stage	Endorsement	MTR	TE
			8	5	8
Core Indicator 10 Persistent organic pollutants to air reduced					
Autoclaves for medical waste (installed in Belize, T&T, Saint Kits, and Antigua) Ornamibo landfill in Suriname - Design for upgrade + waste separation pilot project in Greater Paramaribo		Expected (grams of toxic		Achieved (grams of toxic equivalent)	
		PIF Stage	Endorsement	MTR	TE
			13.93 gTEQ/a		13.92 gTEQ/a
Indicator Countries with legislation and policy implemented to control emissions of POPs to air					
		Number of Countries			
		Expected		Achieved	
		PIF Stage	Endorsement	MTR	TE
Indicator Emission control technologies/practices implemented					
Autoclaves for medical waste (installed in Belize, T&T, Saint Kits, and Antigua)		Number			
		Expected		Achieved	
		PIF Stage	Endorsement	MTR	TE
			2		4