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EVALUATION OF GEF INTERVENTIONS IN THE CHEMICALS AND WASTE FOCAL AREA GEF-5 TO GEF-8

(Prepared by the Independent Evaluation Office)

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ACRONYMS

ADB	Asian Development Bank
APR	Annual Performance Report
ASGM	Artisanal and Small-scale Gold Mining
BAT	Best Available Techniques
BCRC	Basel Convention Regional Centre
BEP	Best Environmental Practices
BMC	Basel Management Committee
CEO	Chief Executive Officer
COP	Conference of the Parties
CRC	Chemical Review Committee
DC	Direct Current
DDT	Dichlorodiphenyltrichloroethane
ECW	Expanded Constituency Workshop
EHPMP	Environmental Health and Pollution Management Program
EPR	Extended Producer Responsibility
EUR	Euro
FAO	Food and Agriculture Organization
FARM	Framework for Agricultural Resource Management
GEF	Global Environment Facility
GN	Guidance Note
HCW	Healthcare Waste
HCWM	Healthcare Waste Management
IDB	Inter-American Development Bank
IEA	International Energy Agency
IEO	Independent Evaluation Office
ISLANDS	Implementing Sustainable Low and Non-Chemical Development in SIDS
MIA	Minamata Initial Assessment
MTR	Mid-term Review
NAP	National Action Plan
NIP	Stockholm Convention National Implementation Plan
ODS	Ozone-depleting Substances
OECD	Organization for Economic Co-operation and Development
OPS	Overall Performance Study
PCB	Polychlorinated Biphenyls
PFOS	Perfluorooctane Sulfonic Acid
PIF	Project Identification Form
PIR	Project Implementation Report
POPs	Persistent Organic Pollutants
PPG	Project Preparation Grant
RDF	Refuse-Derived Fuel
RECP	Resource Efficient and Cleaner Production
SAICM	Strategic Approach to International Chemicals Management / Global Framework on Chemicals
SDG	Sustainable Development Goal
SIDS	Small Island Developing States
SPREP	Secretariat of the Pacific Regional Environment Programme
STAP	Scientific and Technical Advisory Panel
TEQ	Toxic Equivalent
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization
UNITAR	United Nations Institute for Training and Research
UPOP	Unintentional Persistent Organic Pollutant
USD	United States Dollar
WEEE	Waste Electrical and Electronic Equipment
WHO	World Health Organization

QUICK SCAN

1. **Chemicals have played a pivotal role in enhancing the quality of life for people worldwide**. From fertilizers to pharmaceuticals, and in 95 percent of manufactured goods, chemicals are fundamental (World Economic Forum & O. Wyman, 2023). However, the widespread use of chemicals presents significant challenges, particularly in managing their waste and disposal, which can have detrimental effects on the environment. This has led to air, water, and soil pollution, with severe consequences for human health and biodiversity. Harmful chemicals, including Persistent Organic Pollutants (POPs), like Polychlorinated biphenyls (PCBs) and Dichlorodiphenyltrichloroethane (DDT), and mercury, continue to be detected despite ongoing phase-out efforts managed by the Stockholm and Minamata Conventions, for which the GEF serves as the financial mechanism.

2. **This evaluation assesses the relevance, effectiveness, and sustainability of GEF interventions in the chemicals and waste sector**. Building on prior IEO assessments of the chemicals and waste focal area, it examines the alignment of these interventions with international conventions and the needs of participating countries, as well as their consistency with GEF strategies and programming directions. The evaluation provides an in-depth analysis of GEF's efforts to reduce pollution from persistent organic pollutants (POPs) and mercury. It also evaluates the design and relevance of recent projects that reflect a strategic shift toward sector-based approaches. The portfolio under review includes 487 projects, representing USD 1.8 billion in grant funding and USD 12.7 billion in co-financing, covering the period from GEF-5 to GEF-8. To ground-truth findings, the IEO team conducted case studies in Indonesia, North Macedonia, Senegal, Trinidad and Tobago, Uruguay, and Vietnam.

Findings and Conclusions

3. **The GEF chemicals and waste focal area plays a critical role in helping countries fulfill their obligations under the Stockholm and Minamata Conventions, as well as the Montreal Protocol and the Global Framework on Chemicals**. While countries value the GEF's support, challenges persist in accessing finance and obtaining assistance for submitting national implementation plans (NIPs) and Minamata initial assessments (MIAs) from implementing agencies. Streamlining access to funding and providing stronger support for countries in navigating these key processes is necessary to maximize impact.

4. **The GEF has moved from focusing on individual chemicals, such as PCBs, pesticides, and mercury, toward a broader, sector-wide approach**. The GEF chemicals and waste portfolio demonstrates a clear shift toward integrated programming, as seen by the increasing allocation of funding to programs and child projects from GEF-5 to GEF-8 (2010–2024). An integrated approach to programming is essential for effective chemicals and waste management, particularly in sectors like garment and food packaging, where chemicals are used extensively throughout the supply chain. The GEF's focus on addressing chemicals at every stage is appropriate and crucial to prevent the proliferation of harmful substances and ensuring sustainable practices across industries. Without a coordinated effort among the GEF, countries

and the Conventions, resources risk being spread too thin, diminishing the impact on overall sustainability goals.

5. **While this shift presents substantial advantages, it has also led to a reduced focus on legacy chemicals in recent projects, potentially reflecting the changing priorities of national agendas**. Despite the decrease in single-chemical initiatives, many countries still urgently need assistance to safely manage and dispose of PCBs to meet the 2028 Stockholm Convention deadline, as well as help with other legacy chemicals to combat pollution and enhance public health. The shift to a sector-wide approach risks creating a critical gap in targeted chemical management support at a time when it is most essential.

6. **The GEF chemicals and waste focal area plays a critical role in helping countries fulfill their obligations under the Stockholm and Minamata Conventions, as well as the Montreal Protocol and the Global Framework on Chemicals**. While countries value the GEF's support, challenges persist in accessing finance and obtaining assistance for submitting national implementation plans (NIPs) and Minamata initial assessments (MIAs) from implementing agencies. Streamlining access to funding and providing stronger support for countries in navigating these key processes is necessary to maximize impact.

7. **Private sector involvement has been vital for the sustainability of GEF chemicals and waste projects, yet persistent challenges remain to be addressed for broader success**. Engaging the private sector remains essential for ensuring long-term impact. GEF's market-oriented strategies, combined with local business participation and technology transfer, have driven transformational change—especially when supported by enabling legislation that facilitates scaling. In some instances, sustainability was ensured through a combination of GEF financing, government legislation or subsidies, certification schemes, or partnerships with international firms. However, resistance from industries facing intense competition—such as textiles and plating—and the absence of formal collaboration frameworks for knowledge sharing have hindered progress. Addressing these barriers, being more inclusive of small and medium enterprises, and fostering stronger, more structured private sector engagement will be key to enhancing the effectiveness and outcomes of future programs and projects.

8. **Smaller firms and chemical suppliers are often overlooked in broader interventions**. In developing countries, the textile and apparel industry is predominantly composed of small and micro enterprises, who face significant challenges in adopting sustainable practices due to limited financial resources and technical expertise. Smaller chemical suppliers, which play a critical role in ensuring sustainability across the supply chain, are often overlooked in broader GEF interventions. For industry-wide transitions to eco-friendly practices, targeted support for these smaller players is essential. Addressing high-cost barriers and involving suppliers more actively will enable smaller firms to better manage chemicals and adopt sustainable practices across the supply chain. Additionally, there are gaps in certification and labelling of chemicals produced by suppliers which need to be addressed.

9. **GEF projects demonstrate that successful technological innovation in chemicals and waste management involves more than installing new equipment**. While advancements in

green chemistry—substituting harmful chemicals with safer alternatives—have been effectively implemented, investments in imported machinery designed to reduce or eliminate harmful chemicals have faced significant challenges. These challenges include underutilization of equipment due to insufficient training, lack of technical knowledge, inadequate budgets for maintenance, and supply chain constraints. Ensuring the effectiveness and sustainability of such investments will require that projects prioritize capacity building, training and provide adequate financial resources for ongoing and operations and future sustainability.

10. **For instance, in Senegal, the UNIDO-implemented project, Environmentally Sound Management of Municipal and Hazardous Solid Waste to Reduce Emission of Unintentional POPs (GEF ID: 4888), financed the construction of various facilities in Tivaouane**. These included an electronic equipment collection and dismantling center, an environmentally sound landfill, and a medical waste autoclave. However, none of the machinery are being used as originally intended. Garbage has piled up, and informal workers are left to manually sort the waste, pointing to a lack of formalization. This outcome highlights the critical need to engage local stakeholders during project design, cultivate a sense of ownership, and develop long-term capacities to ensure that newly installed machinery is effectively utilized and maintained.

11. **The GEF's focus on the food and beverage supply chain, particularly at the end-of-life stage, highlights the effectiveness and sustainability of prevention over remediation**. Allowing plastics and packaging waste to accumulate in landfills leads to CO2 and methane emissions, costly geo-engineering, and the risk of toxic leakage. This is due to a combination of factors, including limited public awareness, insufficient government involvement in waste management and recycling systems, inadequate legislation, and a lack of education on recycling practices. GEF's preventative approach, including recycling, composting, and waste reduction, has proven to be sustainable when imported or local technologies are supported by adequate technical capacity and financing. Additionally, integrating informal waste pickers into formal waste management systems enhances both environmental outcomes and social equity, creating a more comprehensive and inclusive strategy for waste management. The GEF's progression toward upstream prevention represents a significant evolution from GEF-5 to GEF-8.

12. **The GEF's efforts to tackle mercury pollution through recent interventions in sectors such as dental amalgam and skin-lightening products emphasize the need for focusing on supply as well as behavior change**. Dental amalgam, a significant source of mercury pollution, particularly through improper waste disposal, requires both technical solutions, such as safe disposal facilities, and education for dentists on proper disposal techniques. The GEF is collaborating with customs authorities to prevent illegal imports of mercury, funds educational campaigns, and is supporting assessments of amalgam use in dentistry. Similarly, skin-lightening products remain a persistent source of mercury contamination, despite bans imposed by the Minamata Convention. In this area, the GEF is working on building awareness and with smaller family- owned enterprises producing such products. However, success in reducing mercury use in dental amalgams and skin lightening products will ultimately depend on both--driving behavior change through awareness raising and supply chain interventions such as better labeling, supporting import bans.

13. **Strong legislative frameworks are crucial for the success of chemicals and waste management projects, but enforcement and outcomes varied widely across countries**. Laws such as extended producer responsibility (EPR) play a key role in securing private sector engagement, while setting adequate tariffs for waste collection companies helps maintain consistent service delivery. Legislation has played a crucial role in scaling up pollution prevention. Additionally, formalizing the role of informal waste pickers or banning their involvement in e-waste collection is vital for reducing health risks and environmental harm. However, inconsistent enforcement of these legal measures in some countries has posed significant challenges, ultimately affecting the effectiveness and sustainability of project outcomes.

14. **The GEF can play a pivotal role in fostering policy coherence by promoting interministerial collaboration and enhancing enforcement and coordination among government agencies, where there is country appetite and capacity, and project designs which encourage coherence**. Through GEF financing, ministries with diverse, sometimes conflicting mandates are incentivized to collaborate, overcoming barriers to cooperation. This alignment enables ministries to address complex environmental challenges in a coordinated manner, rather than working at cross purposes. The GEF has helped promote policy coherence by fostering collaboration across ministries through innovative project designs including facilitating national dialogues, supporting legislative development, organizing study tours for staff from various ministries to learn from other countries, and engaging in awareness-raising and knowledge transfer initiatives. However, in some smaller countries, the GEF has been less successful in driving policy coherence primarily due to government departments feeling overstretched to take on co-ordination.

15. **Efforts to achieve socioeconomic outcomes and health co-benefits in GEF projects have grown, but quantifying health co-benefits remains challenging due to the absence of indicators and the long-term nature of health impacts**. The GEF's current approach to tracking socioeconomic co-benefits is limited, revealing the need for a stronger results framework. The assessment highlights that the GEF lacks standardized indicators for measuring socioeconomic co-benefits, which are inconsistently integrated into project design and monitoring processes. A key challenge is that the GEF lacks a mandate to measure health benefits, which are long-term outcomes that often extend beyond the typical project timeline. Co-ordination between Agencies that collect information on chemical prevalence and the GEF could be utilized to report on environmental outcomes such as chemical pollution that have implications for health outcomes.

16. **GEF projects show progress in gender awareness but need stronger support for women's health and safety**. The evaluation shows a rise in gender-aware GEF projects that recognize distinct roles and address gender inequalities, but progress in fully gender-mainstreamed projects remains limited. Gender-disaggregated data highlight the heightened vulnerability of women, especially pregnant women, to chemical pollution. While women's participation in workshops and training is noted, there is a need for stronger measures,

including health check-ups, safety equipment, and stricter regulatory enforcement, particularly for informal female workers.

Recommendations

(a) **Strengthen the focus on policy and regulatory reforms, awareness, and communication within Chemicals and Waste projects and programs.** The GEF should strengthen its focus on comprehensive policy and regulatory reforms, alongside heightened public awareness and communication efforts. Effective reforms require robust regulatory frameworks, supported by widespread public education campaigns to drive behavioral change, and enhanced enforcement mechanisms to ensure compliance.

(b) **Strengthen regulatory frameworks and further engagement with the broader private sector, including SMEs, to enhance project sustainability in chemicals and waste-related projects and programs.** Regulatory reforms and compliance with international standards play a crucial role in encouraging private sector participation in chemicals projects. The GEF should assist with reforms including formalizing the informal sector, enforcing anti-pollution laws, and legislating extended producer responsibility. In addition to strengthening regulatory frameworks, the GEF should continue to ensure the financial viability and technical capacity of small and medium enterprises through investments in advanced technologies and other forms of capacity building support.

(c) **The GEF needs to ensure that investments in autoclaves, laboratory equipment, and other machinery for chemicals and waste management, associated with indigenous or imported technologies, are fully utilized.** Local capacity must be addressed to ensure that technical skills of personnel are locally available thereby minimizing the risk of underutilization. To ensure sustainability, it is essential to ensure personnel receive adequate training, spare parts are readily accessible, and sufficient budgets are allocated for ongoing operation and maintenance.

(d) **Integrate health co-benefit indicators into project designs and the design and monitoring frameworks**. The GEF should, where relevant, incorporate health co-benefit indicators into project design and monitoring frameworks to better capture the impacts of its interventions. By adopting quantifiable indicators, these co-benefits can be effectively measured and tracked across projects. Greater emphasis on these indicators during project design will ensure that they are clearly defined within the project description, results framework, and theory of change, thereby enhancing the GEF's ability to demonstrate both environmental and health-related outcomes.

1. INTRODUCTION

1.1. Background

1. **Chemicals have played a pivotal role in enhancing the quality of life for people worldwide**. From fertilizers to pharmaceuticals, and in 95 percent of manufactured goods, chemicals are fundamental.[1] For instance, chemicals such as fertilizers and pesticides significantly boost crop yields, contributing to food security and economic growth in the agricultural sector.[2] In healthcare, chemicals are essential for the development of medicines, vaccines, and medical devices, which improve health outcomes and increase life expectancy.[3] Additionally, chemicals are crucial in various industrial processes, from plastics to electronics, thereby enhancing manufacturing efficiency and product quality.[4]

2. **The global chemicals market has seen substantial growth over the past two decades**. In 2022, global chemical sales reached approximately USD 5.9 trillion (EUR 5.4 trillion), a significant rise from USD 1.6 trillion (EUR 1.5 trillion) in 2002—an increase of 260 percent over 20 years.[5] China led the global chemicals market in 2022, followed by Europe and the United States.[6] In Europe, petrochemicals account for 27 percent of the chemicals industry, a figure expected to grow in the coming years.[7]

3. **However, the widespread use of chemicals presents significant challenges, particularly in managing their waste and disposal**, which can have detrimental effects on the environment. This has led to air, water, and soil pollution, with severe consequences for human health and biodiversity. Additionally, the chemicals sector is the largest industrial energy consumer and the third-largest emitter of carbon dioxide, further exacerbating environmental concerns.[8] Harmful chemicals, including persistent organic pollutants (POPs) like polychlorinated biphenyls (PCBs), perfluorooctane sulfonate (PFOS), dichlorodiphenyltrichloroethane (DDT), and mercury, continue to be detected despite ongoing phaseout efforts managed by the Stockholm and Minamata Conventions, akin to the management of the phaseout of ozone-depleting substances (ODS) under the Montreal Protocol.

[1] The World Economic Forum in Collaboration with Oliver Wyman. 2023. Nature Positive: Role of the Chemical Sector Insight Report, September 2023.
[2] Tilman, D., et al. (2002). "Agricultural sustainability and intensive production practices." Nature.
[3] Li, J. J., & Corey, E. J. (2013). "Drug Discovery: Practices, Processes, and Perspectives." Wiley.
[4] Carraher, C. E. (2013). "Introduction to Polymer Chemistry." CRC Press.
[5] https://cefic.org/app/uploads/2023/12/2023_Facts_and_Figures_The_Leaflet.pdf.
[6] Hermann, Iris. The Chemical Industry's Key Role In A Nature-Positive Future. https://www.oliverwyman.com/our-expertise/insights/2024/may/chemicals-industry-role-nature-positive-future.html.
[7] OECD/IEA. 2018. The Future of Petrochemicals Towards more sustainable plastics and fertilizers. “Today, more than 500 million tonnes of oil-equivalent (Mtoe) of feedstock is consumed per year to make nearly 1 billion tonnes of chemical products. […] Petrochemicals are rapidly becoming the largest driver of global oil consumption. They are set to account for more than a third of the growth in oil demand to 2030, and nearly half to 2050, ahead of trucks, aviation and shipping.”
[8] The World Economic Forum in Collaboration with Oliver Wyman. 2023. Nature Positive: Role of the Chemical Sector Insight Report, September 2023.

4. **Chemicals contribute to various forms of waste and pollution**. For instance, according to the United Nations Environment Programme (UNEP),[9] approximately 400 million metric tons of plastic are produced globally each year, with 11 million metric tons ending up in the oceans.[10] Despite these vast quantities, only about 9 percent of plastic is recycled, while 50 percent is disposed of in landfills.[11] This evaluation will not cover plastics in detail but will reference them in the context of waste management.

5. **E-waste is a growing environmental hazard**. E-waste is another growing source of pollution, releasing toxic chemicals when not properly recycled. In 2022 alone, around 62 billion kilograms of e-waste were generated globally.[12] In developing countries, e-waste is often handled by informal workers who extract valuable metals while discarding the remaining parts in landfills or through open burning, which poses serious risks to both their health and the environment.

6. **For the Global Environment Facility (GEF), chemicals and waste are defined by specific international conventions and agreements**. For the GEF, "chemicals" refer to chemicals controlled under the Stockholm Convention, Minamata Convention, and Montreal Protocol as well as those covered by the Global Framework on Chemicals (formerly SAICM).[13] "Waste" refers to waste generated from the production, use, and consumption of the chemicals covered by the multilateral environmental agreements (MEAs) for which the GEF is the financial mechanism, and other harmful wastes under control of the Montreal Protocol and the Global Framework on Chemicals.

7. **The GEF serves as the financial mechanism for the Stockholm Convention on Persistent Organic Pollutants[14] and the Minamata Convention[15] on mercury**. The GEF has long focused on eliminating hazardous chemicals and waste globally. Since its inception, the GEF has focused on helping countries eliminate hazardous chemicals and waste, including POPs listed under the Stockholm Convention, such as pesticides as well as PCBs and other unwanted byproducts of industrial processes. The GEF has also supported the Minamata Convention and the Global Framework on Chemicals (formerly SAICM) by funding initiatives to reduce mercury emissions, address highly hazardous pesticides, and eliminate lead in paint.

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9 Retrieved on August 13, 2024 from: https://www.unep.org/interactives/beat-plastic-pollution/.

10 Xia Zhu, Chelsea M. Rochman, Britta Denise Hardesty, Chris Wilcox. 2024. "Plastics in the deep sea – A global estimate of the ocean floor reservoir." Deep Sea Research Part I: Oceanographic Research Papers, Volume 206, April 2024, 104266; https://doi.org/10.1016/j.dsr.2024.104266.

11 Organisation for Economic Co-operation and Development. (2022). Global Plastics Outlook: Economic Drivers, Environmental Impacts and Policy Options, OECD Publishing, Paris, https://doi.org/10.1787/de747aef-en.

12 Cornelis P. Baldé, Ruediger Kuehr, Tales Yamamoto, Rosie McDonald, Elena D'Angelo, Shahana Althaf, Garam Bel, Otmar Deubzer, Elena Fernandez-Cubillo, Vanessa Forti, Vanessa Gray, Sunil Herat, Shunichi Honda, Giulia Iattoni, Deepali S. Khetriwal, Vittoria Luda di Cortemiglia, Yuliya Lobuntsova, Innocent Nnorom, Noémie Pralat, Michelle Wagner (2024). International Telecommunication Union (ITU) and United Nations Institute for Training and Research (UNITAR). 2024. Global E-waste Monitor 2024. Geneva/Bonn.

13 Since the International Conference on Chemicals Management (ICCM) 5 in 2023, the Strategic Approach to International Chemicals Management (SAICM) has been superseded by the Global Framework on Chemicals.

14 Articles 13 and 14 of the Stockholm Convention on Persistent Organic Pollutants.

15 Article 13 of the Minamata Convention on Mercury.

8. **Additionally, the GEF provides funding to support the implementation of the Montreal Protocol** on substances that deplete the ozone layer and aligns with strategic objectives under the Global Framework on Chemicals that require coordinated global action. By doing so, the GEF plays a catalytic role in mobilizing budgetary resources from national governments and encouraging greater private sector involvement in efforts to eliminate and reduce harmful chemicals and waste. The GEF also contributes to the achievement of Sustainable Development Goal (SDG) 12, which focuses on ensuring sustainable consumption and production patterns by promoting a systematic approach to managing chemicals throughout their life cycle.

9. **The GEF's support for chemicals and waste has evolved from single-chemical initiatives to a broader, integrated, sectoral approach**. The GEF's support in chemicals and waste began in 1995 when it financed ODS activities. In 2001, the GEF became the financial mechanism for the Stockholm Convention. During GEF-6, the GEF, acting as part of the Financial Mechanism of the Minamata Convention and responding to requests from the International Conference on Chemicals Management to support the objectives of the Global Framework on Chemicals (formerly SAICM), merged the ODS and POPs focal areas. This consolidation, along with the inclusion of the Minamata Convention and the Global Framework on Chemicals, formed the GEF's new Chemicals and Waste focal area. With the programmatic strategies of GEF-7 and GEF-8, the GEF shifted from a single-chemical focus, such as POPs or mercury, to an integrated, sectoral approach that addresses chemicals throughout their entire life cycle and supply chains. This transition represented a pivotal shift in the design of programs and projects, beginning with GEF-7.

10. **The GEF has invested significantly in addressing chemicals and waste through a range of approaches**. With a portfolio of 487 chemicals and waste projects, amounting to USD 1.8 billion in grant funding and 12 billion in cofinancing from GEF-5 to GEF-8[16], the GEF has addressed chemicals and waste through various approaches. GEF-funded chemicals and waste projects focus on: (1) creating, strengthening, and supporting the enabling environment and promoting policy coherence to transform the manufacture, use, and sound management of chemicals while reducing waste and chemical pollution; (2) preventing the future accumulation of hazardous chemicals and waste in the environment; and (3) eliminating existing hazardous chemicals and waste.

11. **This evaluation examines the relevance, effectiveness, and sustainability of GEF interventions in chemicals and waste**. It builds on previous Independent Evaluation Office (IEO) assessments of the chemicals and waste focal area, examining the relevance of interventions to international conventions and participating countries, while also assessing their alignment with GEF strategies and programming directions. It provides an in-depth analysis of the GEF's support in reducing POPs and mercury. Since GEF-7, the chemicals and waste focal area has expanded its scope to address a wider range of chemicals and materials, including hazardous chemicals in the agricultural sector, lead in paints, and chemicals of concern across various industries such as fashion and textiles, construction, and hard-to-manage plastics.

[16] Focal area financing and co-financing amounts under GEF-8 are expected to increase, as this evaluation portfolio only includes projects up to June 2024.

1.2. Summary of findings from previous IEO evaluations on chemicals and waste

12. **Key findings from the GEF IEO chemicals and waste focal area study in 2018[17] emphasized the importance of financial and institutional mechanisms for scaling up efforts**. The evaluation assessed grant funding for activities targeting POPs, ODS, and mercury, as well as broader aspects of sound chemicals management. It focused on activities carried out since the chemicals focal area was formally established under GEF-5, with implicit coverage of PCB waste and obsolete pesticides.[18] The evaluation highlighted the ongoing need for diligence and innovation in this area. Although many projects successfully achieved short-term objectives, such as the collection and destruction of POPs, they often failed to establish sustainable strategies or financial mechanisms to scale up these results.

13. **The Sixth Comprehensive Evaluation of the GEF (OPS-6, 2017) noted the strong alignment between the GEF's chemicals and waste focal area and its associated conventions**. OPS-6[19] noted that the chemicals and waste focal area is well aligned with the conventions[20] for which it serves as the financial mechanism.[21] The evaluation found that chemicals and waste projects contributed to reducing environmental stress, and strong government ownership and active private-sector engagement were important elements of success.

14. **OPS-6 emphasized the need for tailored strategies and sector-wide approaches in GEF's chemical and waste initiatives**. OPS-6 highlighted the need for the GEF to enhance its chemical and waste strategies by better tailoring them to the specific development status of countries, whether they are middle-income countries (MICs), least developed countries (LDCs), or small island developing states (SIDS). The evaluation also emphasized the need for sector-wide approaches and multichemical projects, and the need to better align incentives and scope

[17] GEF IEO. 2018. Chemicals and Waste Focal Area Study, Evaluation Report No. 115. Washington, DC: GEF IEO.
[18] The GEF's chemicals and waste focal area projects have performed similarly to other GEF focal areas projects. However, five overarching recommendations came out of the 2018 chemicals and waste focal area study: 1) there needs to be more focus on scaling-up strategies during the project design and implementation phase; 2) increase support for regulatory reforms and sector wide approaches; 3) continue ODS work as opportunities arise; 4) the need for better tracking tools for consistent monitoring practices; and 5) enhanced communication with the GEF partnership. Chemicals and waste projects are not adequately focused on approaches to replicate or scale up project successes. For example, many closed projects have demonstrated successful collection and destruction of POPs but have failed to find sustainable strategies and financial mechanisms to scale-up the projects. Since it is not possible for the GEF to finance the destruction of all POPs nor finance the conversion of every industrial facility (e.g., mining sites, industrial parks, waterways contaminated by industry, and other dump sites, etc.) to cleaner production processes, the GEF must find a strategy for legacy POPs. It is also noted that there may be opportunities with the passing of recent conventions for ODS project focus in multifocal area collaborations. Lastly, the GEF has struggled to find sector-wide approaches for the chemicals and waste focal area, given its mandate to cover POPs and mercury but no other heavy metals.
[19] GEF IEO. 2017. OPS6 Report: The GEF in the Changing Environmental Finance Landscape, Washington, DC: GEF IEO.
[20] Conventions: Stockholm Convention on Persistent Organic Pollutants (2004), the Minamata Convention on Mercury (2017), and the Montreal Protocol on Substances that Deplete the Ozone Layer (1989), for which the GEF is not an official financial mechanism but supports its implementation in countries with economies in transition.
[21] GEF IEO. 2018. OPS6: The GEF in the Changing Environmental Finance Landscapes. Evaluation Report No. 110. Washington, DC: GEF IEO.

to support these approaches. Additionally, balancing hard outcome targets (e.g., tons of POPs and mercury disposed of) with soft outcomes (e.g., policy reforms and institutional capacity building) was highlighted as a persistent challenge.

15. **OPS-7 noted limited integration of chemicals and waste objectives into broader GEF impact programs**. OPS-7 (2021) also noted the shift from a chemicals-specific approach to a broader sectoral strategy. However, the evaluation found that the integration of chemicals and waste objectives into the GEF's integrated approach pilots and impact programs was limited. Of the 43 impact program child projects submitted by the time of OPS-7, only one included a target aligned with the chemicals and waste focal area indicators. Additionally, no progress had yet been reported on the environmentally safe disposal of obsolete pesticides in relation to GEF-5 targets.

16. **The evaluation of interventions in the artisanal and small-scale gold mining sector (ASGM)[22] found that GEF ASGM interventions were successful in reducing mercury use in project areas and in catalyzing miner formalization**.[23] These reductions were most effective in areas with strong government enforcement of mercury restrictions and in larger gold processing plants that had the capacity to invest in mercury-free alternatives. However, the most common substitute for mercury was a process involving another contaminant—cyanide—which can also be harmful if not properly managed. While significant miner formalization was not achieved during project implementation, capacity-building and awareness-raising efforts led to increased formalization after project completion in countries like Peru and the Philippines.[24]

1.3. Objective, scope, methodology, and limitations

17. **This study aims to evaluate the relevance and effectiveness of GEF support in the chemicals and waste focal area between GEF-5 and GEF-8**. The main objective of this evaluation is to assess the relevance, performance, and effectiveness of GEF support in the chemicals and waste focal area through a deep dive into closed projects. It also provides an early look into the design and performance of ongoing interventions to assess the recent shift in programming from a chemical-by-chemical approach to an integrated, sectoral approach.

18. **The evaluation examines GEF interventions approved and implemented from GEF-5 to GEF-8, focusing on closed projects and ongoing ones with mid-term reviews**. As of June 2024, about half of the GEF-8 projects have been included in the IEO portfolio. The evaluation includes projects with chemicals and waste, POPs, or ODS listed in their focal area; (2) projects with core indicator targets that are relevant to chemicals and waste; and (3) projects that include relevant chemicals and waste activities outside the focal area. The evaluation focuses

[22] GEF IEO. 2022. GEF Interventions in the Artisanal and Small-Scale Gold Mining Sector, Evaluation Report No. 146, Washington, DC: GEF IEO.
[23] Miner formalization is the process of integrating artisanal and small-scale mining into the formal economy, society, and regulatory system.
[24] GEF IEO. 2022. GEF Interventions in the Artisanal and Small-Scale Gold Mining Sector, Evaluation Report No. 146, Washington, DC: GEF IEO.

primarily on 72[25] implemented and financially closed projects with terminal evaluation documents, evaluating their effectiveness and efficiency. Additionally, it examines the quality at entry of 219 ongoing GEF-5, GEF-6, GEF-7, and GEF-8 projects, with detailed document reviews for 80 ongoing projects (37 percent).

19. The concept note for this IEO evaluation of the chemicals and waste focal area, including evaluative questions is available in annex A, with key highlights elaborated below.

20. **The evaluation draws on existing GEF IEO evidence, reviews of terminal evaluations, and country case studies for comprehensive analysis**. The evaluation draws on existing evaluative evidence generated by the GEF IEO and GEF Agencies. It includes a review of terminal evaluations and mid-term reviews completed by GEF Agencies. Country case studies were done in Indonesia, North Macedonia, Senegal, and Trinidad and Tobago, Uruguay, and Viet Nam.

21. **The evaluation uses a mixed-methods approach**, incorporating both quantitative and qualitative analytical methods and tools. An evaluation matrix, which outlines the key questions, related indicators, sources of information, and methods, is presented in annex A, table A.1.

22. The study employed the following methods:

(a) **Documentation review**: A review of GEF policy, strategy, and guidance documents related to the chemicals and waste focal area.

(b) **Thematic synthesis:** A synthesis of chemicals and waste-related evaluations conducted by the GEF IEO provided a historical perspective and highlighted key findings, issues, themes, and lessons learned in the chemicals and waste focal area.

(c) **Guidance review and mapping**: An analysis of the conventions' documentation (particularly conference of the parties [COP] decisions) and other guidance sources helped identify the links between the conventions' guidance and the strategic objectives of the GEF chemicals and waste programmatic directions (annex E).

(d) **Portfolio analysis of closed projects**: This analysis systematically assessed GEF interventions using a review template specifically designed to address key evaluation questions and aggregate findings effectively based on the terminal evaluations. From GEF-5 onwards, 72 projects were implemented, financially closed, and had terminal evaluations available on the GEF portal, all of which were reviewed for this evaluation. A detailed list of these projects can be found in annex B, table B.1.

(e) **Quality-at-entry review**: An assessment was conducted to evaluate the relevance between the chemicals and waste focal area strategies and the projects and programs

[25] The chemicals and waste portfolio comprised 72 projects with terminal evaluations, 51 of which were included in the 2023 APR.

that have undergone mid-term reviews (MTRs) but are not yet completed, starting from GEF-6 onwards. The IEO reviewed 28 such ongoing projects with MTRs, which are listed in annex C, table C.1.

(f) **Case Studies**: Six case studies were developed to provide a deeper analysis and address gaps in the existing evidence. These case studies included detailed reviews and site visits of selected projects. The selection process was based on several criteria: the prevalence of chemicals and waste projects, project performance, representation of various focal areas and agencies, and a diverse range of project experiences related to key topics identified in earlier assessments.

(g) **Stakeholder interviews**: The evaluation included interviews with stakeholders throughout the process, with particular emphasis on the preparation of case studies and during in-country visits. A list of the main interview partners is available in the annex D.

23. **This evaluation assesses the relevance and effectiveness of the GEF in supporting countries to meet their international convention commitments, particularly considering the shift from focusing on specific chemicals to adopting a sectoral approach**. It also evaluates the effectiveness of chemical and waste management policies, the appropriateness of technologies tailored to national contexts, and progress in reducing or eliminating hazardous chemicals. Through a formative review of recent interventions, the evaluation explores project designs that integrate circular economy principles across supply chains in sectors such as plastics, textiles and food and beverages, and initiatives to reduce mercury use in skin-lightening products and dental amalgam.

1.4. Limitations of this evaluation

24. **The evaluation is limited by the insufficient availability of terminal evaluation documents**. There was information on 72 implemented and financially closed projects out of a total of 220 (23 percent) in the GEF Portal. This limitation was mitigated by conducting quality-at-entry reviews for the ongoing projects in the portfolio.

25. **A second limitation is the inconsistent availability of core indicators for measuring progress in meeting chemical reduction and disposal targets, impacting the ability to fully assess project outcomes based on the terminal evaluations**. Notably, core indicators 9 and 10, related to chemicals and waste pollution, were only introduced in 2019, which means that results cannot be expected from a portfolio largely consisting of closed GEF-5 and GEF-6 projects. These indicators track target values for expected chemicals to be reduced or disposed of in GEF-7 and GEF-8.

2. PORTFOLIO ANALYSIS

2.1. Overview

26. **The chemicals and waste evaluation portfolio spans 487 projects from GEF-5 to GEF-8.** The evaluation portfolio[26] comprises 487 projects from GEF-5 to GEF-8, accounting for USD 1.8 billion in GEF funding and USD 12.7 billion in cofinancing. Forty-five percent (219) are ongoing, equal to USD 1.2 billion or 65 percent of the total GEF funding (table 1). Funding for chemicals and waste has been increasing over the GEF replenishment periods.

Table 1: Distribution of GEF funding by GEF replenishment period and project status

GEF	CEO endorsement stage		Ongoing		Closed		Total	
	Number	Million $	Number	Million $	Number	Million $	Number	Million $
GEF - 5	1	0.2	37	174.0	129	208.4	167	382.5
GEF - 6	3	16.7	63	360.7	85	106.7	151	484.2
GEF - 7	0	0	114	603.4	6	3.7	120	607.1
GEF - 8	44	310.0	5	34.6	0	0	49	344.6
Total	**48**	**326.9**	**219**	**1,172.6**	**220**	**318.8**	**487**	**1,818.3**

Note: The CEO endorsement stage includes projects that have been approved by the Council and are currently in the process of obtaining CEO endorsement or approval. MSP projects only require CEO approval. Ongoing projects refer to those that have received CEO endorsement or approval and are under implementation. Since GEF-8 projects are still in the programming phase, the current figures remain relatively low. Closed projects are those that have been fully implemented and financially closed. Projects that have been dropped or suspended are excluded. Financing data include project financing, PPG (project preparation grant), and PPG fees.[27]
Source: GEF Portal.

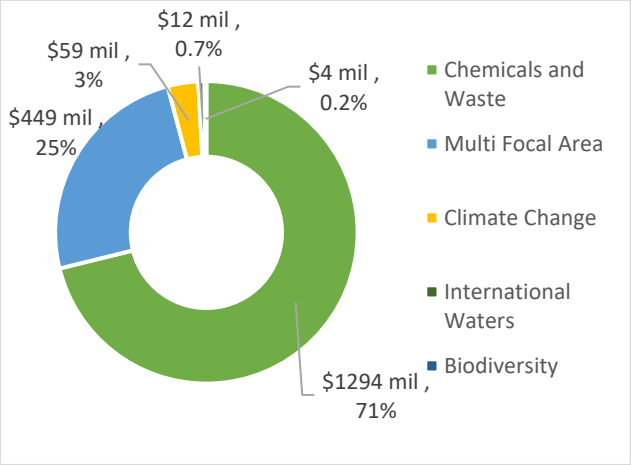
27. **Most of the evaluation portfolio funding came from the chemicals and waste focal area, with Asia receiving the largest share.** Seventy-one percent of the funding came from the chemicals and waste focal area (figure 1). Multifocal area projects accounted for 25 percent of total funding, with the most common combination being international waters and chemicals and waste. By region (figure 2), projects in Asia received the largest share of GEF funding (33 percent), followed by Africa (25 percent) and Latin America and the Caribbean (21 percent). By modality (figure 3), 91 percent of GEF funding in the evaluation portfolio went to full-size projects. In terms of the number of projects, full-size projects represented 47 percent of the total portfolio, followed by enabling activities (40 percent) and medium-size projects (13 percent).

28. **The evaluation portfolio highlights a growing number of integrated programs, with the share of funding for child projects steadily increasing across GEF cycles**. A total of 15

[26] The terms "chemicals and waste portfolio" and "evaluation portfolio" are used interchangeably in this report.
[27] Agency fees are not included.

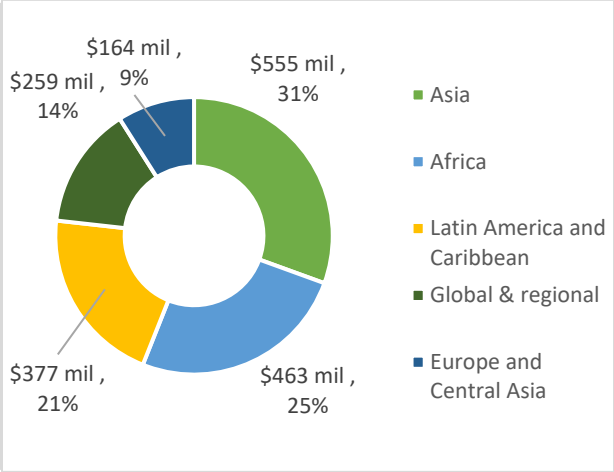
programs,[28] comprising 82 child projects, were included in the evaluation portfolio. The share of funding for child projects has steadily increased: it began at 29 percent in GEF-6 when first introduced, rose to 32 percent in GEF-7, and has already reached 53 percent in GEF-8 (figure 4).

Figure 1: Share of GEF funding by focal area



Source: GEF Portal.

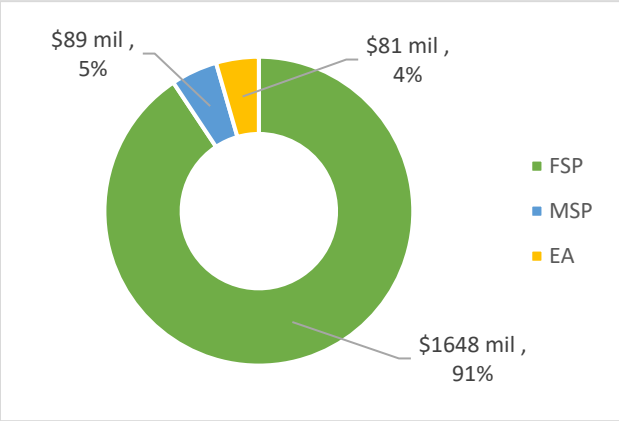
Figure 2: Share of GEF funding by region



Source: GEF Portal.

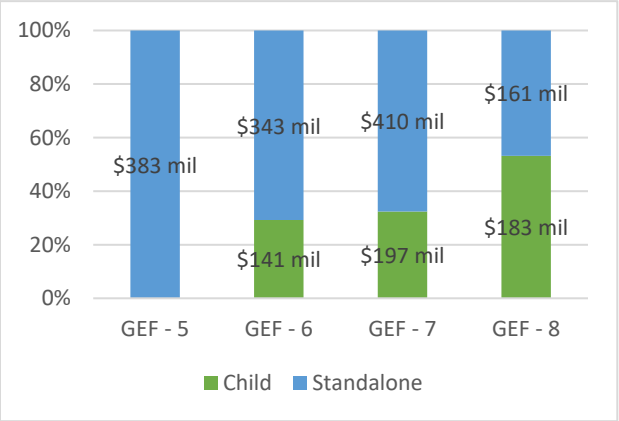
[28] (1) Cities-IAP: Sustainable Cities Initiative (GEF ID: 9077), (2) Africa Environmental Health and Pollution Management Project (GEF ID: 9444), (3) Integrated Sound Management of Mercury and Artisanal and Small-scale Gold Mining (ASGM; GEF ID: 9602), (4) Mediterranean Sea Basin Environment and Climate Regional Support Project (GEF ID: 9607), (5) Demonstration Investments in Eco-Waste Infrastructure Solutions (GEF ID: 9909), (6) ILANDS program (GEF ID: 10185), (7) Accelerating cleantech innovation and entrepreneurship in SMEs to support the transition towards circular economy and create green jobs (GEF ID: 10408), (8) Global Opportunities for Long-term Development of ASGM (GEF ID: 10569), (9) Financing Agrichemicals Removal and Management (FARM, GEF ID: 10872), (10) Global Programme to Support Countries to Upscale Integrated Electric Mobility Systems (GEF ID: 11074), (11) Eliminating hazardous chemicals from supply chains (GEF ID: 11169), (12) Circular Solutions to Plastic Pollution (GEF ID: 11181), (13) Trinidad and Tobago – Nature Based Solutions in Productive Landscapes (GEF ID: 11250), (14) Clean and Healthy Ocean Integrated Program (GEF ID: 11349), (15) Greening Transportation Infrastructure Development (GEF ID: 11467).

Figure 3: Share of GEF funding by project type



Source: GEF Portal.

Figure 4: Share of GEF funding by modality and GEF replenishment period



Source: GEF Portal.

29. **The United Nations Industrial Development Organization (UNIDO) leads in the number of projects in the evaluation portfolio, while UNDP manages the largest share of GEF funding**. Among GEF agencies, UNIDO has implemented the most projects, accounting for 35 percent of the evaluation portfolio. This is followed by UNEP with 30 percent and UNDP with 23 percent. The United Nations Development Programme (UNDP) received the largest share of GEF funding, representing 26 percent of the total financing (table 2).

Table 2: Distribution of chemicals and waste projects and GEF funding by lead agency

Lead Agency	Projects		GEF funding	
	No	%	Million $	%
United Nations Industrial Development Organization (UNIDO)	169	35%	$388 mil	21%
United Nations Environment Programme (UNEP)	145	30%	$455 mil	25%
United Nations Development Programme (UNDP)	112	23%	$477 mil	26%
World Bank	21	4%	$241 mil	13%
Food and Agriculture Organization of the United Nations (FAO)	13	3%	$63 mil	3%
Asian Development Bank (ADB)	6	1%	$44 mil	2%
Inter-American Development Bank (IDB)	4	1%	$37 mil	2%
African Development Bank (AfDB)	3	1%	$39 mil	2%
Conservation International (CI)	3	1%	$8 mil	0.4%
European Bank for Reconstruction and Development (EBRD)	3	1%	$29 mil	2%
GEF Secretariat (GEFSEC)	3	1%	$1 mil	0.03%
Development Bank of Southern Africa (DBSA)	2	0.4%	$9 mil	0.5%

World Wildlife Fund-US	2	0.4%	$13 mil	1%
West African Development Bank (BOAD)	1	0.2%	$16 mil	1%
Total	487	100%	$1,818 mil	100%

Source: GEF Portal.

30. **Nearly half of the chemicals and waste portfolio comprises private sector projects, which account for a substantial portion of GEF funding**. This includes 226 projects that involve the private sector, representing over 46 percent of the total portfolio projects. Collectively, these projects account for more than 78 percent of the GEF funding allocated within the portfolio. A project is considered to involve the private sector ("private sector projects") if it includes at least one private sector co-financier or executor, and/or carries a private sector flag, as indicated by the data on the GEF Portal.

2.2. Trends in the portfolio – multifocal area projects

31. **GEF interventions in the chemicals and waste focal area have moved from single to multifocal projects over time.** The share of funding allocated to multifocal area projects has increased from 7 percent in GEF-5 to 25 percent in GEF-6, 12 percent in GEF-7, and 65 percent in GEF-8. Of the 65 multifocal area projects, 41 (63 percent) received funding from the international waters focal area. These international waters projects primarily focused on ecosystem management in GEF-5 and GEF-6, but more recently have shifted towards circular solutions to reduce plastic pollution in GEF-7 and GEF-8. Additionally, 26 of the 65 projects received funding from the climate change focal area, focusing on technology transfer and low-carbon technologies.

32. **Two examples illustrate how the GEF connects chemicals and waste with the international waters focal area**. The GEF-6 Mediterranean Sea Program (GEF IDs: 9684, 9686, 9691, and 9717) implemented priority actions aimed at reducing significant transboundary environmental stresses on the Mediterranean Sea and its coastal areas. These actions also enhanced climate resilience, water security, and improved the health and livelihoods of coastal populations. Meanwhile, the GEF-7 standalone projects (GEF IDs: 10328, 10425, 10453, 10456, 10885, and 10886) focus on promoting the transition to a circular economy by introducing innovative clean technologies. These projects integrate renewable energy, energy efficiency, and waste management, with the core concept recognizing that the increasing waste generated by municipal and industrial sectors can be harnessed as a potential energy source, complementing the deployment of renewable energy and energy efficiency technologies.

33. **Integrated programming is a core feature of the GEF-8 chemicals and waste programs, which address key drivers of environmental degradation in recipient countries**. These programs aim to deliver global environmental benefits across multiple areas, such as chemicals and waste, climate change, biodiversity, and international waters, while also promoting gender equity and social and economic benefits. One example is the Circular Solutions to Plastic Pollution program (GEF ID: 11181, UNEP), which targets plastic pollution in the food and beverage sector through 15 child projects currently in development. Another program is the Eliminating Hazardous Chemicals from Supply Chains program (GEF ID 11169, UNEP), which

aims to drive transformational change in the fashion and construction sectors by replacing resource-intensive processes and materials with sustainable alternatives, while creating and strengthening circular and transparent supply chains.

2.3. Trends in the portfolio – enabling activities

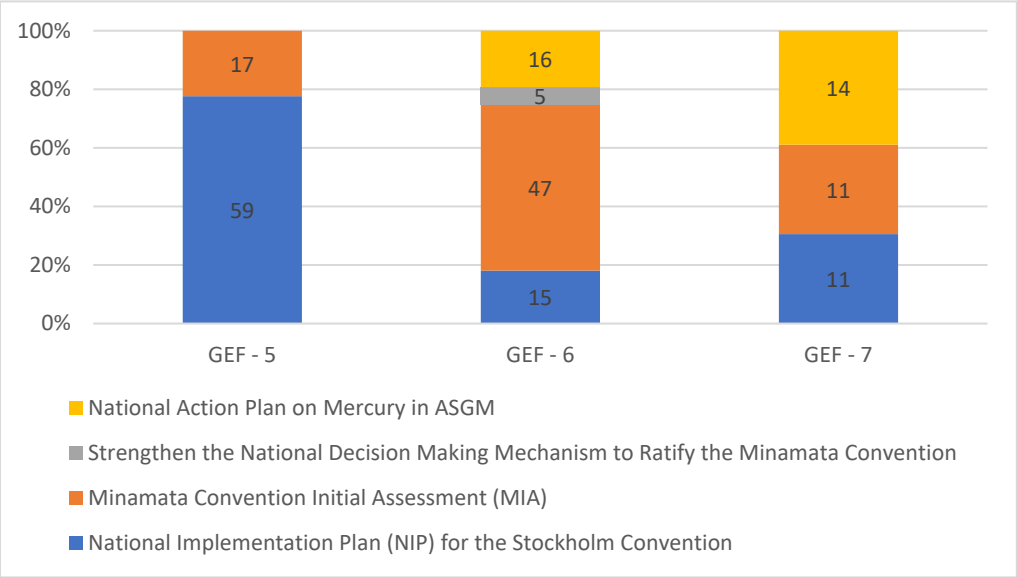
34. **Enabling activities help countries prepare national plans and assessments related to the Stockholm and Minamata Conventions**. The GEF defines an enabling activity as a "project for the preparation of a plan, strategy, or report to fulfill commitments under a Convention".[29] Enabling activities accounted for 40 percent of total projects in the evaluation portfolio, covering four main areas: (1) develop or update the national implementation plan (NIP) for the Stockholm Convention, (2) develop Minamata Convention initial assessment (MIA), (3) strengthen the national decision-making mechanism to ratify the Minamata Convention, and (4) develop the national action plan (NAP) on mercury for artisanal and small-scale gold mining (ASGM).

35. **The majority of enabling activities in GEF-5 (59 projects, 78 percent) supported countries in developing or updating their NIPs for the Stockholm Convention (figure 5).** As the Stockholm Convention was amended between COP 4 and COP 9 (2009–2019) to include additional persistent organic pollutants (POPs) in its annexes, all Parties that ratified these amendments were required to update their NIPs accordingly. This shift in the GEF's response is evident in GEF-5, where 56 of 59 enabling activities were dedicated to reviewing and updating previously prepared NIPs, and 3 focused on preparing new NIPs. A similar trend continued in GEF-6, where 13 of 15 Stockholm Convention-related enabling activities supported the review and updating of NIPs.

36. Enabling activities approved in GEF-6 and GEF-7 demonstrated an increased emphasis on activities related to the Minamata Convention. About 70 percent of enabling activities were funded to develop either the MIA or the national action plans (NAP) on mercury for ASGM initiatives.

[29] GEF IEO. 2023. Guidelines for Reporting on Completed Enabling Activities, Washington, DC: GEF IEO. ISBN: 978-1-64233-053-3.

Figure 5: Focus of enabling activities in the evaluation portfolio, by GEF replenishment period

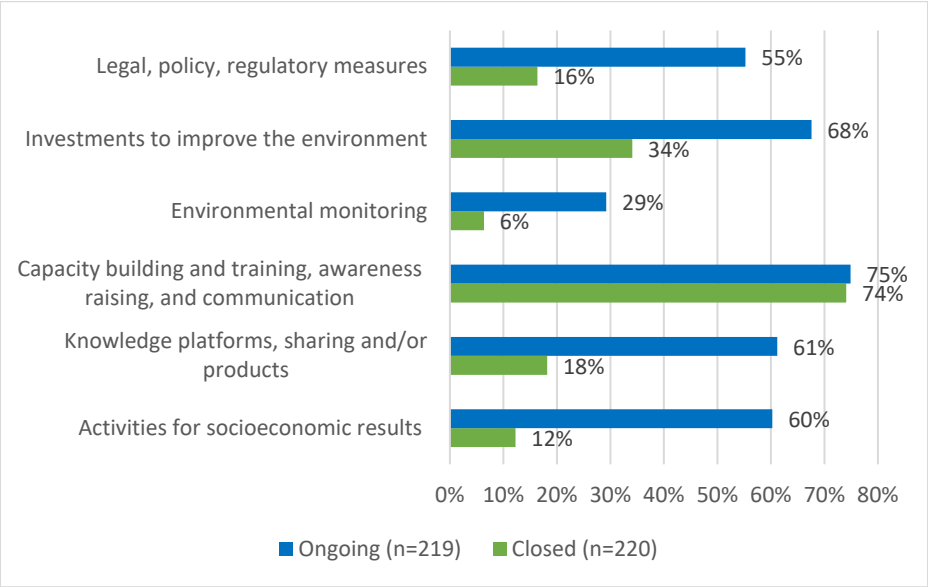


Source: IEO analysis, based on information from the GEF Portal.

37. **Capacity building and environment improvement investments were the main areas of intervention in closed and ongoing projects** (figure 6). In closed projects, the most frequently reported interventions are capacity building, environmental improvement investments in machinery or removal of contaminated soil, and knowledge management. In contrast, the portfolio of ongoing projects shows considerable increases in interventions aimed at: (1) achieving socioeconomic results; (2) implementing legal, policy, and regulatory measures; and (3) conducting environmental monitoring. A 2018 IEO evaluation[30] had recommended greater focus on regulatory reform, and as indicated in figure 6, the GEF has since significantly increased its attention in this area.

[30] GEF-IEO. 2018. Chemicals and Waste Focal Area Study, Evaluation Report No. 115, Washington, DC: GEF IEO.

Figure 6: Main type of interventions in portfolio projects, by project status (n=439)



Source: IEO analysis, based on project component data from GEF Portal and CEO endorsement documents for a sample of 439 projects.

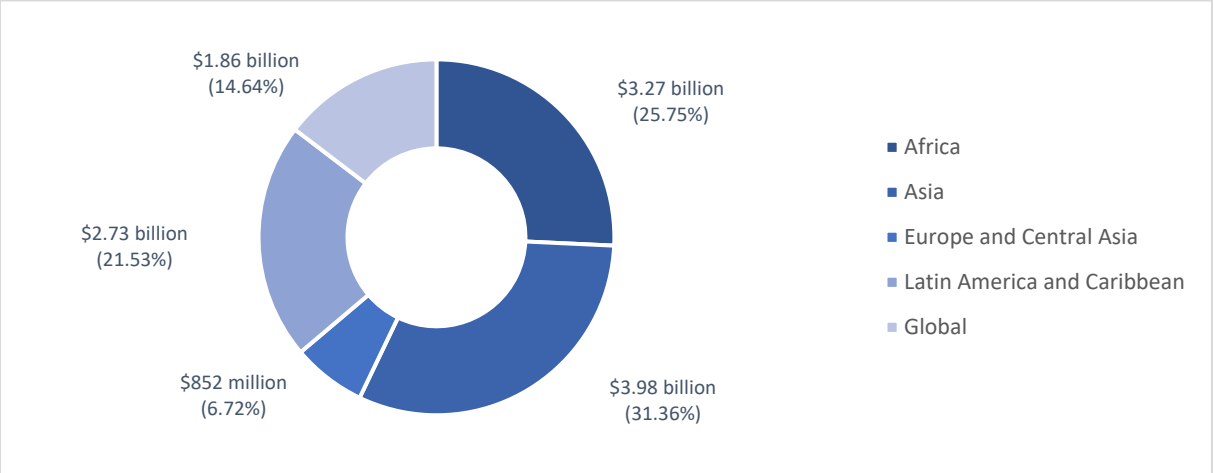
2.4. Trends in the portfolio – cofinancing

38. **The chemicals and waste portfolio aligns with the GEF Co-Financing Policy's ambition to reach a cofinancing ratio of at least 7:1. Of the 487 projects reviewed**, 401 (approximately 82 percent) reported cofinancing contributions from various sources. A total of 125 projects, representing nearly 26 percent of the portfolio, received some level of cofinancing from private sector entities. The private sector was the second largest source of cofinancing in the portfolio, contributing one quarter of the total cofinancing amount. Together, these projects raised nearly USD 12.7 billion in cofinancing, achieving an overall cofinancing ratio of 6.98, which is slightly above the cofinancing ratio for the overall portfolio of 6.95. This means that for every USD 1 of GEF grant funding, an additional USD 6.98 was mobilized from cofinancing partners. Notably, the project Natural Capital Fund (NCF): Investing in Nature-Positive Agri-Food Enterprises in Asia and the Pacific (GEF ID: 11062, ADB) from GEF-8 stands out for generating the highest cofinancing amount—USD 632 million—almost 46 times the GEF grant. Meanwhile, the Mediterranean Pollution Hot Spots Investment Project (GEF ID: 9717, UNEP) from GEF-6 boasts the highest cofinancing ratio, mobilizing USD 546 million, which is 104 times the size of its GEF grant.

39. **Cofinancing amounts vary across regions, with projects in Asia having raised the highest levels of cofinancing**. Projects in Asia, which also receive the largest GEF grant allocation in total (nearly USD 570 million), have together raised the most cofinancing, amounting to USD 3.98 billion. However, global projects together demonstrate the highest cofinancing ratio of 7.78, despite receiving a smaller amount of GEF funding. Projects in both Africa and Latin America and the Caribbean have successfully mobilized cofinancing at a rate of

seven times the GEF grant received by each region. Meanwhile, projects in Europe and Central Asia have the lowest overall cofinancing ratio at 5.2. (figure 7).

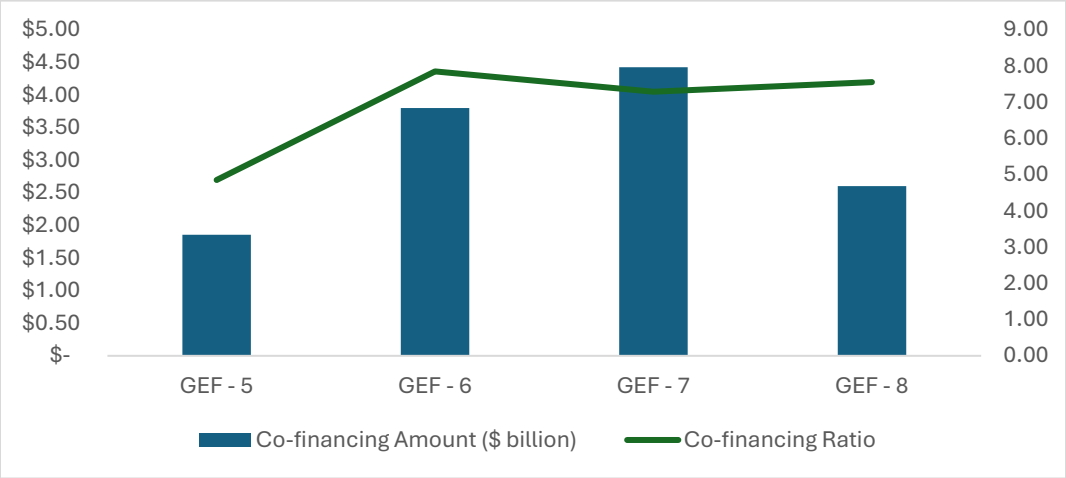
Figure 7: Distribution of total cofinancing amount (approx. $12.7 billion) for projects in the chemicals and waste portfolio, by region (data from 401 projects)



Source: GEF Portal.

40. **The amounts of cofinancing mobilized has increased over GEF replenishment periods, but the cofinancing ratio has fluctuated.** From GEF-5 to GEF-7, the total cofinancing amount rose from just under USD 1.9 billion to USD 4.4 billion. While the cofinancing ratio peaked at 7.85 in GEF-6, it decreased slightly to 7.29 in GEF-7. Preliminary data for GEF-8 show promising trends, with projects raising USD 2.6 billion in cofinancing and achieving a ratio of 7.56, although this is based on a limited number of projects that have reached the CEO endorsement stage (figure 8).

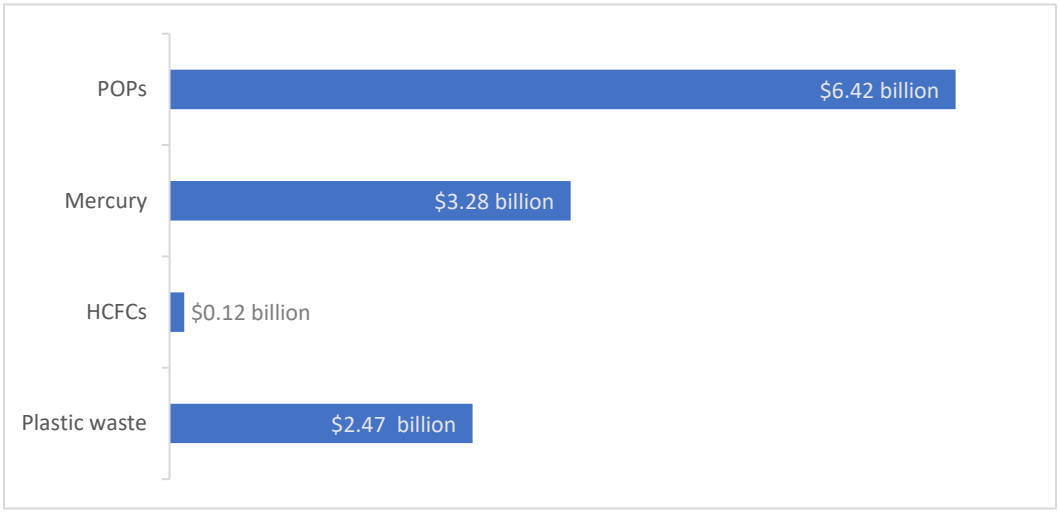
Figure 8: Cofinancing amount and ratio for projects in the chemicals and waste portfolio, by GEF replenishment period



Source: GEF Portal.

41. Projects addressing plastics waste attract higher cofinancing. Cofinancing amounts vary across projects working on different chemicals and waste issues. Projects targeting POPs have mobilized USD 6.4 billion in cofinancing, with a ratio of 7.30. Notably, projects addressing plastic waste have attracted the highest cofinancing per dollar of GEF funding, with USD 10.56 raised for every USD 1 of GEF financing (figure 9).

Figure 9: Cofinancing amount for closed projects in the chemicals and waste portfolio, by selected issue



Source: IEO analysis, based on information from the GEF Portal.
Note: One project may work on multiple issues.

2.5. Strategic relevance to conventions and countries

42. **Over the past decade, GEF programming in chemicals and waste has evolved and expanded**. In GEF-5, the chemicals and waste programming directions developed a unifying chemicals and waste strategy framework for the POPs and ODS focal areas. For GEF-6, a single chemicals and waste focal area approach was created—replacing the POPs and ODS focal areas. Under GEF-7, the focal area strategy shifted from a chemical-by-chemical-based approach to a sector-based approach. GEF-7 sought to promote integration with other focal areas, such as international waters (marine litter), sustainable cities, food systems, environmental restoration, sustainable forest management, and climate change mitigation. GEF-8 has further increased the shift towards a sector-based approach, seeking to align chemicals and waste activities with countries' sectoral priorities. The strategy includes a pivotal role for the private sector. The sections below will cover the different GEF replenishment periods in more detail.

43. **The GEF-5 and GEF-6 chemicals strategies effectively addressed most convention funding priorities**. Overall, the third review of the Stockholm Convention's financial mechanism[31] concluded that the GEF-5 chemicals strategy effectively addressed the convention's guidance by explicitly covering nearly all the funding priorities listed by the conference of the parties (COP), except for support for activities of Stockholm Convention regional centers and the establishment of clearinghouse mechanisms. Furthermore, the GEF-5 chemicals and waste strategy addressed pilot initiatives for mercury management and reduction in response to the negotiations that led to the establishment of the Minamata Convention.

44. **In GEF-5, the strategy for addressing unintentional POPs[32] prioritizes the management of key waste streams, including municipal solid waste, healthcare waste, e-waste, and industrial emissions**. This approach also emphasizes strengthening of global and regional efforts, with regional projects supporting the implementation of the global monitoring plan on POPs and assisting countries in updating their NIPs, particularly to include newly added POPs in the monitoring framework. A core aspect of this strategy involves the safe disposal of obsolete pesticide stockpiles, especially DDT (dichlorodiphenyltrichloroethane), and ensuring lifecycle management of other hazardous pesticides. Furthermore, the strategy focuses on developing sustainable systems for managing PCBs still in use, through enhanced inventory systems and maintenance protocols. Most mercury-related projects focused on artisanal and small-scale gold mining, while a few addressed mercury use in the healthcare sector.

45. **In GEF-6, the strategy focused on fostering synergies across related initiatives to enhance integration and coordination within its programs**. This approach includes the development of a chemicals and waste portfolio with five key programs. Three of these programs adopt a multifocal strategy: the Sustainable Cities Integrated Approach Pilot, the

[31] Stockholm Convention. 2013. Third review of the financial mechanism, UNEP/POPS/COP.6/23, p. 18.
[32] Unintentional POPs are POPs that are not voluntarily produced or released into the environment. They are emitted during incomplete combustion processes or are created as byproducts of manufacturing other chemicals. (https://www.unep.org/topics/chemicals-and-pollution-action/pollution-and-health/persistent-organic-pollutants-pops/upops). For more background information on UPOPs, see section 3.4.

Mediterranean Sea Program (MedProgram), and the Sustainable Management of the Bay of Bengal Large Marine Ecosystem Program, each incorporating several child projects to enhance regional and sectoral alignment. The strategy also includes two targeted programs solely focused on the chemicals and waste focal area: the Environmental Health and Pollution Management Program (EHPMP) in Africa and the Global Opportunities for Long-term Development of the ASGM Sector (GOLD). These programs were designed to address specific regional and sectoral challenges related to chemicals and waste management through several child projects. Additionally, GEF-6 aimed to balance its portfolio between multifocal and standalone projects. A significant portion of the approved projects—30 percent—are child projects under these five major programs, while the remaining projects operate independently.

46. **The strategy in GEF-6 for reducing unintentional POPs (UPOPs) emissions focuses on improving waste management systems at the national level, specifically targeting sectors such as municipal waste, healthcare waste, and e-waste**. This approach aims to mitigate emissions from open burning while promoting sustainable waste management practices. Additionally, the strategy includes reducing UPOPs emissions from industrial sectors, such as secondary copper processing and scrap metal recycling, by demonstrating best available techniques and best environmental practices (BAT/BEP), while also delivering socioeconomic benefits to the communities involved. GEF-6 also incorporates UPOPs reduction within multifocal projects. Two child projects under the Sustainable Cities Integrated Approach Pilot are designed to address UPOPs emissions through cross-cutting initiatives that include climate change, land degradation, and international waters focal areas. This strategy ensures that UPOPs reduction efforts are aligned with broader environmental and socioeconomic goals.[33]

47. **The third review of the Stockholm Convention's financial mechanism found** that the GEF-6 chemicals and waste strategy was responsive to the convention's guidance, addressing long-standing funding priorities, such as NIPs, and newly adopted time-bound priorities, including PCBs, newly listed POPs, DDT, and best available techniques (BAT) for new POPs sources. Although the strategy effectively covered all technical issues mentioned in the guidance, the request to increase the overall funding allocated to the chemicals focal area for the GEF-6 replenishment was not fully met.[34]

48. **The GEF-7 chemicals and waste projects sought to address both the Minamata and Stockholm Conventions**, to enhance synergies and global environmental benefits. In line with the guidance from the Minamata Convention COP and the Stockholm Convention COP, the GEF-7 chemicals and waste strategy was developed along sectoral lines, to enable integrated programming across the chemicals and waste focal area. A total of 14 projects funded during the GEF-7 period addressed issues related to both conventions.

49. **The GEF-7 chemicals and waste programming strategy incorporated all seven priorities established by the COP-8 guidance within its four programs**. Program 1 focused on the elimination of industrial chemicals and waste at the end of their life cycle, aiming to minimize and ultimately eliminate the release of POPs-containing products and waste from entering

[33] Stockholm Convention. 2021. Fifth review of the financial mechanism, UNEP/POPS/COP.10/INF/32. p. 52.
[34] Decision SC-6/20, §e.

material recovery supply chains. Program 2 targeted the introduction of alternatives to agricultural chemicals listed as POPs, with the objective of reducing the use of hazardous pesticides, ensuring the safe disposal of agricultural plastics contaminated with POPs, and restricting the production and use of DDT in cases where safe, effective, and affordable alternatives are unavailable. The Industrial Program addresses the development and strengthening of national legislation and regulations, including removing market access barriers, introducing alternatives, and promoting sustainable or green chemistry approaches that drive the shift toward a circular economy. The programming directions under GEF-7 are aligned with the guidance from the Minamata Convention COP.

50. **Multichemical and multiconvention projects and programs received the largest share of GEF-7 programming**. They accounted for approximately 44 percent of the total investment, or USD 139.84 million. These initiatives were designed to address chemicals and waste management through a sectoral approach rather than focusing on individual chemicals. They were designed to build and strengthen the capacity of recipient governments for more comprehensive and integrated management of chemicals and waste. Other key themes addressed by GEF-7 projects included integrated POPs management, agricultural POPs (including new POPs), industrial POPs (excluding PCBs), e-waste, healthcare waste, PCB management and disposal, and circular economy initiatives.[35]

51. The GEF-8 chemicals and waste project portfolio, reflects a clear shift toward integrated programming as a strategy to address the root causes of environmental degradation while also considering socioeconomic factors. This approach is evident in interventions targeting urban development, rural livelihoods, and commodity value chains.

52. **The GEF-8 chemicals and waste programming strategy, acknowledges that many of the chemicals listed under the Stockholm and Minamata Conventions** are used in, or emitted from, multiple supply chains, including fashion (particularly textiles), electronics, certain classes of plastics, and building materials. These chemicals are also prevalent in major economic sectors such as tourism, healthcare, industrial production and manufacturing, mining, and agriculture. In response, the chemicals and waste focal area aims to achieve Global Environmental Benefits (GEBs) through both focal area investments and integrated programs.

53. **Standalone projects are being designed to complement the GEF-8 integrated programs by addressing POPs in plastics and replacing hazardous chemicals in key sectors like automobiles, electronics, and textiles**. Several of the 19 standalone projects complement the two integrated programs by taking a multisectoral approach to addressing POPs and UPOPs in plastics within priority manufacturing sectors, such as the automobile and electronics industries. Additionally, these projects aim to replace hazardous chemicals in specific commodity supply chains, including textiles, garments, and footwear. For example, a project

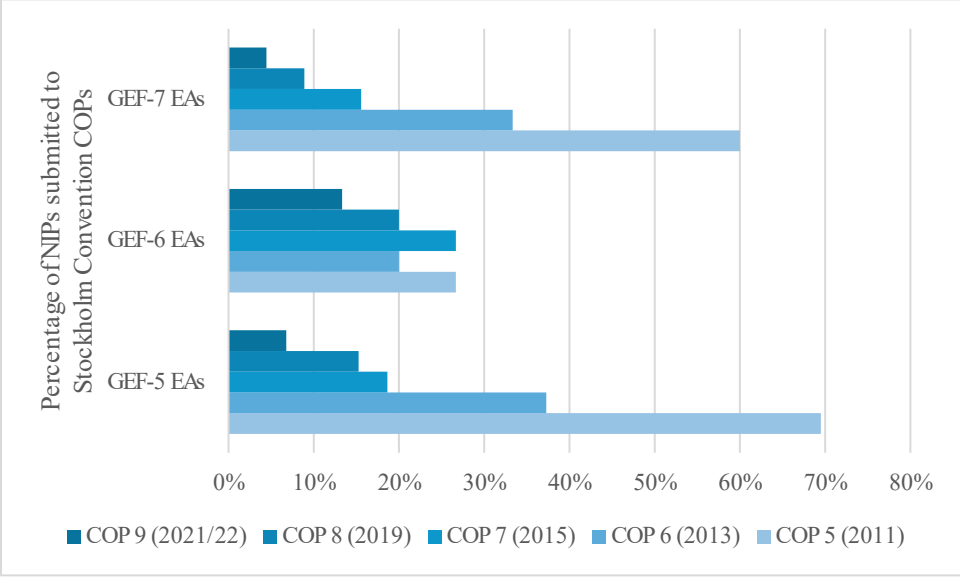
[35] The projects in the GEF-7 chemicals and waste portfolio track global environmental benefits related to POPs through two core indicators. Core indicator 9 measures and tracks the elimination, reduction, and avoidance of POPs, mercury, and ODS, quantified in metric tons. Core indicator 10 measures and tracks the elimination, reduction, and avoidance of emissions of UPOPs) to air, measured in grams of toxic equivalent (gTEQ).

from the international waters focal area has addressed marine plastic litter during GEF-8 (GEFID: 11166, FAO).

54. **The GEF plays a crucial role in supporting the implementation of the Stockholm and Minamata Conventions, with recipient countries generally acknowledging its efforts to align with the convention's guidance**.[36] However, the relevance of GEF programming to the Stockholm Convention has been regarded as mixed, as highlighted in a recent survey.[37] While many countries have had positive experiences, challenges remain, particularly in low-income economies where promoting alternatives to hazardous substances is a persistent issue due to higher costs. Countries have also faced difficulties such as limited access to resources, funding delays, and narrow project scopes. Despite these concerns, the GEF's overall responsiveness to the Stockholm Convention COP guidance was rated 4.3 out of 5 by 24 recipient countries.

55. **Submission rates of national assessments to the conventions have declined, impeding global monitoring efforts.** The GEF has been financing enabling activities to assist countries in preparing or updating their NIPs for submission to the Stockholm Convention Conference of the Parties. These submissions are essential, as they serve as a prerequisite for securing GEF funding for chemicals and waste projects, as well as global monitoring activities. Despite this, follow-through and submission rates have declined in recent years. The IEO review highlighted gaps in the submission process and the need for improvement (figure 10).

Figure 10: NIP submission rates to Stockholm Convention COP 5 to COP 9 for countries with GEF-financed enabling activities (n=119 enabling activities over GEF-5 to GEF-7)



[36] At COP-5 in 2023, the Minamata Convention Conference of the Parties (COP) conducted the second review of the financial mechanism, confirming its alignment with the convention's guidance outlined in decision MC-4/7: Second Review of the Financial Mechanism.

[37] UNEP/POPS/COP.12/INF/XX. 2024. "Draft report on the 6th review of the Financial Mechanism of the Stockholm Convention."

Source: IEO review, based on information from the GEF Portal and Stockholm Convention information on NIP submission.

56. **During GEF-5, 18 of 58 enabling activities (31 percent) were not submitted to the Conference of the Parties (COP) of the Stockholm Convention**. In GEF-6, this issue worsened, with 11 out of 15 enabling activities (73 percent) remaining unsubmitted. Although some progress was made under GEF-7, 18 of 45 enabling activities (40 percent) were still not submitted. This persistent trend, as illustrated in figure 10, highlights ongoing difficulties with the submission of NIPs and points to a critical gap in the support provided by GEF Agencies in assisting countries to finalize and submit their NIPs. The submission is a national responsibility and may be affected by country endorsement processes, changing government priorities, staff turnover, and external influences like industry lobbying. This could potentially lead to delays or reprioritization in the development of National Implementation Plans (NIPs).

57. **The GEF has made progress in addressing chemical pollution in countries with large stockpiles of PCBs, pesticides, and UPOPs.** According to the UNEP Global Chemicals Outlook II report,[38] of the 21 countries identified as having the highest PCB stockpiles, only one—Antigua and Barbuda in the Caribbean—was part of GEF-5 and GEF-6 interventions targeting PCBs. Similarly, for pesticides like DDT, among the 11 countries with the largest DDT stockpiles, only three—China, Côte d'Ivoire, and India—received GEF financing to address these chemicals. This does not suggest that other countries did not require further assistance in managing PCBs or DDT.[39]

58. While the GEF is addressing many of the most relevant chemicals and waste related issues, some gaps have been observed. A mapping exercise, presented in section 5.3. of this report, confirms that the GEF is addressing many of the most relevant chemicals and waste-related issues in each country. For example, countries with significant industries in textiles, dental amalgam, and skin lightening products have been selected for GEF support in these sectors. However, while key industries are covered, gaps remain in other areas. This could, in part be explained by countries not submitting requests for multiple GEF projects in a GEF cycle. For instance, although e-waste recycling is important in Uruguay, the country has not submitted a project for GEF consideration that is focused on safe e-waste dismantling.[40]

59. **Table 3 provides a schematic overview of GEF-financed interventions across chemical-related industries and services in the case study countries**. It highlights that five of the six countries are addressing the mining sector, focusing on emissions reduction and the safe

[38] UNEP. 2019. Global Chemicals Outlook II. From Legacies to Innovative Solutions: Implementing the 2030 Agenda for Sustainable Development. Geneva, Switzerland.
[39] The 2019 UNEP report lists Côte d'Ivoire, Ethiopia, China, Uganda, Mali, Mauritius, Haiti, India, Solomon Islands, Sudan, and Tajikistan as 11 countries with the highest legacy pesticides. The following countries received GEF financing for pesticides and DDT during GEF-5 and GEF-6: China, India, Cameroon, Armenia, Morocco, Benin, Malawi, Uruguay, Cote d'Ivoire, Guatemala, and Bangladesh.
[40] The GEF's country-driven model balances several key elements: countries setting their priorities, conventions offering guidance, the GEF outlining programming directions, and implementing agencies proposing projects. Consequently, declines in certain areas may result from a complex interplay of factors that are challenging to disentangle.

disposal of PCB oils. Viet Nam and Indonesia also tackle industrial production through metal plating, and manufacturing via supply chain approaches in the automotive and textile industries. The other four countries do not address textiles, despite the sector's significance. Packaging, while relevant to all six countries, is being addressed by three.

Table 3: Relevant sectors and selected supply chains in case study countries

SECTORS	Mining, oil and gas	Industrial production, construction material	Manufacturing	Agriculture	Electronics	Tourism	Healthcare
SELECTED SUPPLY CHAINS	Emissions reduction through resource sharing and PCB disposal, waste to energy	Metal plating, cement, green chemistry, automotive	Textile industry	Packaging in the food and beverage industry	E-waste and battery recycling	Plastics and waste management, recycling	Medical waste, laboratory equipment, dental amalgam, skin-lightening products
Viet Nam	✓	✓	✓			✓	✓
Indonesia	✓	✓	✓		✓	✓	✓
Senegal	✓				✓	✓	✓
Trinidad and Tobago	✓			✓		✓	
North Macedonia	✓			✓			
Uruguay				✓	✓		✓

Note: ✓ = GEF-financing; green = industry or service prevalence.

60. **On country visits, countries in Eastern Europe and Central Asia, with significant stockpiles, indicated that they value GEF support but emphasize the need for further assistance in waste management and environmental risk mitigation**. A focus group discussion during a regional expanded constituency workshop (ECW) held in North Macedonia highlighted the appreciation for ongoing GEF projects addressing chemicals and waste. For instance, North Macedonia (GEF ID: 4919) established a viable business for cleaning PCB liquids with GEF funding for PCB removal machinery, while Türkiye (GEF ID: 4601) received support for the

longer-term phaseout of PCBs. Several countries in the region expressed interest in additional assistance. For example, Tajikistan, which previously received GEF support for its Stockholm Convention NIP (GEF ID: 5223) and projects focused on phasing out ODS and promoting sustainable cooling systems (GEF IDs: 9712 and 11430), is seeking to enhance its waste management efforts and has established regional waste management centers. Similarly, Kyrgyzstan, which has benefited from GEF support for managing mercury, POPs, and DDT (GEF IDs: 4985, 5068, 9421, and 9644), is keen to advance waste management and PCB removal. The country's significant PCB stockpiles in upper mountain ranges pose a contamination risk to the entire watershed, including Uzbekistan and Kazakhstan, particularly in the event of a natural disaster, such as the 2023 floods in Pakistan.

61. **In Viet Nam, the GEF was relevant to key sectors through projects focused on eco-industrial parks (GEF ID: 4766, UNIDO), green chemistry (GEF ID: 9379, UNDP), and contaminated soil cleanup and recycling (GEF ID: 5062, UNDP)**, some of which have driven transformational change and highlighted the GEF's added value. Viet Nam has not sought GEF assistance for the food and beverage industry, despite its significance as a major sector in the country. A critical issue is that food waste is often mixed with plastic waste and ends up in landfills. To tackle this, prioritizing waste separation before it reaches landfills and institutionalizing composting are essential steps for the country.

62. **In Trinidad and Tobago, the GEF has been relevant in addressing end-of-life plastics recycling and landfill improvements**. Trinidad and Tobago has not sought GEF support for its major chemical industries, which include oil and gas production, as well as ammonia, methanol, and cement manufacturing. Although major international companies operate in these sectors and comply with global regulations, robust environmental legislation remains crucial for the country. Gaps still exist, particularly in areas such as mercury management.

63. **While the GEF is effectively aligning its programming with convention commitments, some recipient countries face challenges in accessing support**. Recipient countries are generally satisfied with the GEF's financial support in helping them meet these obligations. However, according to a Stockholm Convention survey,[41] some countries, particularly those in the lower-income bracket, find the processes burdensome. These nations also express a desire for increased financial support to address persistent organic pollutants like PCBs and to update and submit their NIPs to the conventions' conferences of the parties. Considering the limited presence of GEF projects within key chemical industries and sectors that contribute significantly to chemical waste, it is essential for Conventions and the GEF to extend support and guidance to countries in developing projects. This assistance will enable them to formulate and implement impactful projects addressing chemical waste management.

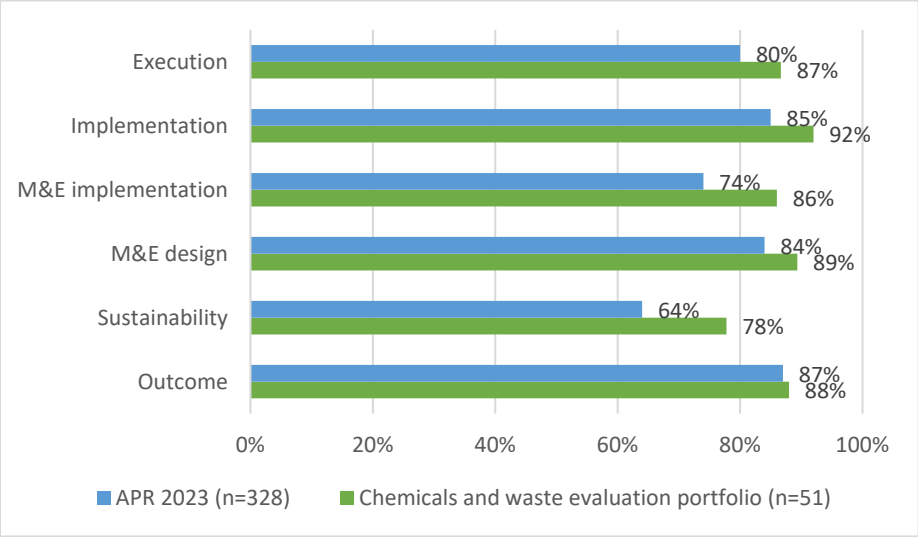
[41] UNEP/POPS/COP.12/INF/XX. 2024. "Draft report on the 6th review of Financial Mechanism of the Stockholm Convention."

3. RESULTS AND PERFORMANCE

3.1. Key trends in performance

64. **Chemicals and waste projects have demonstrated strong performance, with slightly higher outcome and sustainability ratings compared to the overall GEF portfolio**. For a cohort of 51 closed GEF-5 and GEF-6 chemicals and waste projects that received performance ratings in the IEO's Annual Performance Report (APR) 2023, 88 percent were rated within the satisfactory range (moderately satisfactory, satisfactory, or highly satisfactory) for outcomes, mirroring the outcome ratings from the overall APR 2023 cohort (figure 11). The ratings for the likelihood of sustainability of outcomes at project closure, however, were significantly higher for the chemicals and waste cohort than for the overall APR 2023 cohort, with 78 percent and 64 percent rated as sustainable, respectively. Ratings for overall implementation and execution as well as for M&E design and M&E implementation were also higher in the chemicals and waste cohort compared with the overall APR cohort.

Figure 11: Performance ratings of chemicals and wastes projects in APR 2023, compared with overall APR cohort



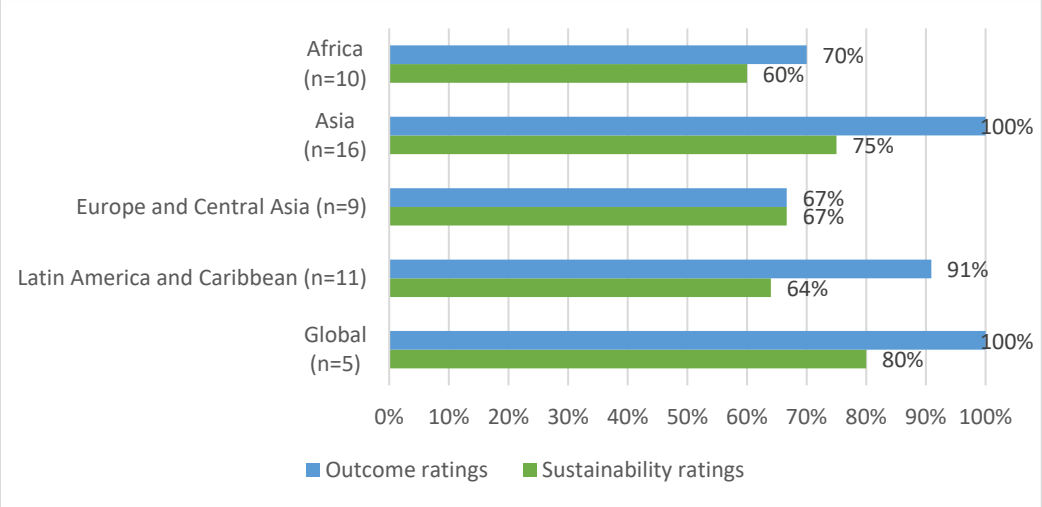
Note: Of the 72 closed medium and full–size projects in the evaluation portfolio, 51 have APR ratings.

Source: GEF IEO APR 2023 dataset.

65. **Global projects and those in Asia have performed particularly well.** One hundred percent of completed projects in Asia and global projects are rated in the satisfactory range for outcomes. In contrast, projects in Europe and Central Asia had the lowest percentage of satisfactory outcomes, with only 67 percent (n=9) rated in this range. Global projects and projects in Asia also had higher sustainability ratings at completion, with 80 percent and 75 percent, respectively, rated in the likely range for sustainability. The Africa region had the

lowest sustainability ratings, with only 60 percent of projects (n=10) rated as likely to be sustainable (figure 12).

Figure 12: Outcome and sustainability ratings of chemicals and waste projects in the APR 2023 in the satisfactory range, by region



Source: IEO analysis, based on information from the GEF Portal.

66. **Monitoring and evaluation were notably affected by the COVID-19 pandemic, which disrupted standard procedures and hindered in-person field visits**. Six projects were rated in the unsatisfactory range at completion for M&E design and M&E implementation. However, their midterm reviews (MTRs) did not indicate significant challenges, and all six projects received moderately satisfactory or satisfactory ratings for implementation progress, with no substantial risks identified at the MTR stage. A consistent pattern emerged across these projects, characterized by insufficient M&E frameworks and poor stakeholder engagement—factors that persisted until project completion, ultimately contributing to unsatisfactory outcomes. Evidence from the project review suggests that earlier interventions—such as formalizing M&E systems, improving stakeholder coordination, and securing dedicated resources for evaluation—could have mitigated these issues.

67. **Based on MTRs and terminal evaluations, lockdowns during the COVID-19 pandemic affected data collection and project outcomes, often rendering interventions less relevant**. COVID-19–related lockdowns created atypical situations, and the observed changes were not always due to project activities, or within the project's control. For example, the Achieving Low Carbon Growth in Cities through Sustainable Urban Systems Management in Thailand project (GEF ID 5086, UNDP) supported composting in 28 hotels on Samui and equipment to process coconut and milk waste into animal feed and fertilizer. The reduction in tourists and in the overall amount of commercial waste generated meant that these interventions were irrelevant, at least during the lockdown period.[42]

[42] GEF-IEO. 2022. Evaluation of the Effects of the Covid-19 Pandemic on GEF Activities. Washington, DC: GEF IEO, 2022.

3.2. Reporting on core indicators

68. **The IEO reviewed the planned and actual reduction and elimination of chemicals using data reported in the GEF Portal, including core indicators 9 and 10**.[43] Core indicator 9 measures the reduction, disposal/destruction, phaseout, elimination, and avoidance of chemicals of global concern and their waste in the environment and in processes, materials, and products in metric tons of toxic chemicals reduced. Core indicator 10 tracks the reduction, avoidance of emissions of POPs to air from point and non-point sources.

69. Given that core indicators[44] were only introduced in 2019 and only some GEF-6 projects tracked core indicators that were introduced ex-post, 158 projects in the evaluation portfolio set targets for either core indicator 9 or 10 at design and 23 completed projects in the portfolio reported results in their terminal evaluations (table 4).

Table 4: Core indicator 10 targets and results by GEF replenishment period (measured in grams of toxic equivalent [gTEQ])

GEF replenishment period	Number of projects reported targets and/or results	Target (gTEQ)	Results (gTEQ)	% Achieved
GEF-5	3	35,246.8	41,195.5	117%
GEF-6	7	354.2	170.6	48%
GEF-7	33	3,781.4	-	-
GEF-8	32	4,322.3	-	-

[43] GEF. 2019. Guidelines on Core Indicators and Sub-Indicators. Guidelines: ME/GN/02 refer to core indicator no. 9: Reduction, disposal/destruction, phaseout, elimination and avoidance of chemicals of global concern and their waste in the environment and in processes, materials, and products (metric tons of toxic chemicals reduced). Sub-indicators are 9.1.: Solid and liquid persistent organic pollutants (POPs) removed or disposed (POPs type); 9.2.: Quantity of mercury reduced; and 9.3.: Hydrochlorofluorocarbons reduced/phased out. In addition, the GEF defined the following Contextual Sub-Indicators: 9.4.: Number of countries with legislation and policy implemented to control chemicals and waste; 9.5.: Number of low-chemical/non-chemical systems implemented, particularly in food production, manufacturing, and cities; and 9.6.: Quantity of products/materials containing POPs/Mercury directly avoided. Furthermore, core indicator 10 tracks the reduction, avoidance of emissions of POPS to air from point and nonpoint sources (grams of toxic equivalent [gTEQ]). In terms of Contextual Sub-Indicators 10, the guidelines include: 10.1.: Number of countries with legislation and policies implemented to control emissions of POPs to air; and 10.2.: Number of emission control technologies/practices implemented.

[44] GEF. 2019. Guidelines on Core Indicators and Sub-Indicators. Guidelines: ME/GN/02 refer to core indicator no. 9 and 10 (also see footnote 38).

Total	75	43,704.6	41,366.1	95%

Source: GEF Portal core indicator data report.
Note: Some projects may report actual results but have no target/expected results at CEO endorsement/approval stage (and vice versa). Toxic equivalent (TEQ) is a unit of measurement used to express the overall toxicity of a mixture of chemicals as a single number.

70. **Targets for indicator 10 were exceeded in GEF-5, while targets for indicator 9 were less frequently achieved.** Targets for indicator 10 were exceeded in GEF-5 (table 4). Three GEF-5 projects recorded targets for indicator 10 at the project design stage, all of which are completed, achieving 117 percent of the original targets. Of the six GEF-5 projects that documented targets for core indicator 9, five reported results in their terminal evaluations, achieving 45 percent of the original targets. Additionally, three GEF-5 projects, while not having set initial targets for core indicator 9, reported outcomes at project completion, leading to an average of 56 percent of achievement of the GEF-5 original targets (table 5).

Table 5: Core indicator 9 targets and results by GEF replenishment period (measured in metric tons)

GEF replenishment period	Number of projects reported targets and/or results	Target (metric tons)	Results (metric tons)	% Achieved
GEF-5	9	18,418.0	10,338.8	56%
GEF-6	34	75,892.1	5,245.7	7%
GEF-7	65	103,081.1	0.2	-
GEF-8	30	66,301.4	-	-
Total	138	263,692.6	15,584.6	6%

Source: GEF portal core indicator data report.
Note: Some projects may report actual results but have no target/expected results at CEO endorsement/approval stage (and vice versa).

71. **Target setting for the core indicators at the design stage has improved over GEF replenishment periods.** Twenty-six percent of GEF-6 projects and 60 percent of GEF-7 projects reported targets for core indicators 9 and 10 during project design. However, it is still too early

to assess the achievement of these targets as most projects are ongoing. Of the 49 GEF-8 projects in the evaluation portfolio, 45 (92 percent) set targets for core indicators 9 and 10.[45, 46]

3.3. Sustainability

72. **Sixty-eight percent of completed projects in the chemicals and waste portfolio are likely to sustain results.** This is higher than the GEF's cumulative average of 63 percent. Despite this favorable comparison, the findings underscore the ongoing challenges in ensuring long-term sustainability across the portfolio. Mercury-related projects faced the most sustainability challenges, while POPs, healthcare waste, and UPOPs projects were generally more successful. In Indonesia, for example, mercury-containing medical devices were collected; however, the lack of disposal options for the mercury presents a significant challenge for the future.

73. **Private sector involvement, supported by strong legislation, has proven to be a key factor in ensuring the sustainability of GEF projects across several countries**. In Viet Nam, the industrial parks project (GEF ID: 4766, UNIDO) stands as a successful example, where private sector engagement, backed by legislation, has led to long-term impact. Similarly, in North Macedonia, the PCB reduction project (GEF ID: 2875) achieved sustainable results through effective collaboration with the private sector under appropriate legal frameworks. Indonesia (GEF ID: 4446, UNIDO) also saw some success in this regard, though further legislative improvements are needed to fully secure sustainability. In these instances, sustainability was ensured through a combination of GEF financing, government legislation or subsidies, certification schemes, or through partnerships with international firms.

74. **Technological innovation plays a vital role in the chemicals and waste sector, but long-term sustainability depends on aligning these innovations with local capacities for operation and maintenance**. The IEO identified two main types of technological innovations. The first involves substituting harmful chemicals or pesticides with environmentally friendly alternatives, such as green chemistry or eco-friendly pesticides. The second type focuses on machinery or equipment designed either to detect harmful chemicals (e.g., laboratory equipment) or to remove and destroy them (e.g., autoclaves for managing healthcare waste).

75. **In the first model of a technological innovation, substituting harmful chemicals or pesticides with environmentally friendly alternatives proved sustainable**. It requires significant investment by countries to comply with international conventions and local regulations. For this substitution to be sustainable in the long term, governments must create incentives and provide financial support to help the private sector adapt to these innovations and manage the associated investment costs. Furthermore, the introduction of access to finance in GEF-6 was instrumental in fostering long-term sustainability. Box 1 highlights a

[45] The four GEF-8 projects that did not set chemicals and waste-related targets were: Greening Transportation Infrastructure Development Global Platform (GEF ID: 11473, WWF-US), Global Coordination Project-Clean and Healthy Ocean Integrated Program (GEF ID: 11353, FAO), Circular Solutions to Plastic Pollution: Global Platform (GEF ID 11197, UNEP), Supporting the shift to a low-emission, circular const ruction in Chile (GEF ID 11071, UNEP; climate change project).

[46] GEF ID: 11071 and 11191 did not receive funding from the chemicals and waste focal area and did not set targets for core indicator 9 or 10.

sustainable green chemistry project, though the long-term sustainability and replicability of such efforts remain uncertain.

Box 1: Private-sector green chemistry project in Viet Nam

The Viet Nam case study highlights the successful implementation of green chemistry technology by Plato Joint Stock Company, a plating factory in Thai Nguyen Province, to improve its environmental practices. The project, supported by a GEF grant of USD 2.1 million, leveraged substantial private sector cofinancing of USD 9.9 million, a nearly 5:1 ratio. As part of a pilot initiative under the Green Chemistry Project (GEF ID: 9379, UNDP), the factory focused on replacing harmful chemicals such as perfluorooctane sulfonic acid (PFOS) and POPs with sustainable, eco-friendly alternatives. Traditionally, PFOS was used as a mist suppressant in chrome plating, but its use was not in compliance with Stockholm Convention guidelines, as the plant lacked a closed-loop system. To address this, the project successfully substituted hexavalent chromium (Cr VI) with the safer trivalent chromium (Cr III) in decorative plating applications, eliminating the need for PFOS.

The factory underwent a complete overhaul, installing new zinc-alkaline electroplating lines to replace the old chrome-plating processes. This upgrade improved environmental management by introducing a recycling system for water used in the plating process, with toxic sludge now treated separately. Despite challenges posed by the COVID-19 pandemic, which reduced the factory's operating capacity by half, Plato continues to serve its international clients, particularly in the U.S. and Korea, but business remains slow. The factory's manager affirmed that the investment in green chemistry was the right decision, reflecting a commitment to sustainable practices while maintaining its competitive edge in the global market.

76. **The second model of technology innovation, investing in high-tech machinery for sustainable environmental solutions, was not sustainable in most cases**. Investments in machinery often faced challenges due to skill gaps, budget constraints, and supply issues. One of the primary challenges was the lack of technical skills among local workers. High-tech machinery often requires specialized training, and without adequate capacity building, the local workforce may be unable to operate or maintain the equipment effectively. This can lead to underutilization or even abandonment of the technology.

77. **For instance, in Senegal, the UNIDO-implemented project, Environmentally Sound Management of Municipal and Hazardous Solid Waste to Reduce Emission of Unintentional POPs (GEF ID: 4888), financed the construction of various facilities in the city of Tivaouane**. These included an electronic-equipment collection and dismantling center, an environmentally sound landfill, and a medical waste autoclave. However, none of the machinery is being used as originally intended. Garbage has piled up, and informal workers are left to manually sort the waste, pointing to a lack of formalization. This outcome highlights the critical need to engage

local stakeholders during project design, cultivate a sense of ownership, and develop long-term capacities to ensure that newly installed machinery is effectively used and maintained.

78. **In other countries, sustainability was at risk as well.** A lack of training and maintenance funding has left critical lab equipment unused. In Trinidad and Tobago, X-ray fluorescence spectroscopy equipment, intended for analyzing the elemental composition of materials, remains unused in its original packaging due to a lack of funding for the necessary training. Similarly, lab equipment in Indonesia was relocated from its original site and is no longer in use because staff were not trained to reinstall it, and no maintenance contract was in place to support its upkeep. However, successful cases—such as mercury measurement in Uruguay, autoclaves in Jordan and Trinidad and Tobago, and PCB elimination machinery in Indonesia and North Macedonia—shared a common success factor: the presence of a dedicated "champion" from the government or private sector. These champions played a pivotal role in ensuring equipment was properly installed, staff were trained, and resources were allocated.

79. **Waste management projects face sustainability challenges due to financial, workforce, and public awareness gaps**. Despite some progress, sustainability in waste management projects has yet to be fully achieved, as shown by country experiences. Key gaps include the need to address local municipalities' capacity to cover operation and maintenance costs (evident in GEF ID: 5052 in Indonesia, GEF ID: 5062 in Viet Nam, and GEF ID: 4888 in Senegal). For instance, an ongoing initiative in Senegal (GEF ID: 9854, World Bank) focuses on raising long-term community awareness about recycling. Volunteers conduct door-to-door outreach, educating residents on recycling practices as a sustainable alternative to open burning. Since the project is still in progress, its long-term sustainability remains to be determined.

80. Projects that remediated soil contaminated by lead and DDT proved sustainable even though their health benefits have not been recorded and the IEO had to rely on observation and interviews to assess the lasting change (box 2).

Box 2: Lead decontamination in Indonesia showcases recovery and sustainability

In Indonesia, a village once plagued by informal lead-acid battery recycling faced serious environmental and health challenges. Lead contamination not only harmed local biodiversity, killing birds and stunting vegetation, but also posed long-term risks to human health, increasing cardiovascular disease rates and impairing cognitive development.

With support from a GEF-funded lead remediation project (GEF ID: 5701, UNDP), the village has recovered. Polluting activities were halted, and soil was safely treated. Farms are now thriving again, and the community is seeing the return of a healthy environment. Residents credit the project for stopping harmful practices and sparking environmental recovery.

However, as this success in Indonesia shows, long-term safeguards are essential. Future generations need clear signage and records to ensure they do not unknowingly disturb contaminated land and equipment. A similar project in Viet Nam (GEF ID: 5067, UNDP) demonstrated how nature-based solutions, such as planting vegetation over contaminated areas, can create a natural barrier to protect communities and prevent exposure. These efforts

highlight how a blend of remediation, awareness, and future safeguards can lead to sustainable, lasting change.

81. **Learning and adapting during implementation helped turn around high-risk chemicals and waste projects**. Of the 51 completed projects with an APR rating, 21 (41 percent) had midterm reviews (MTRs), and three were flagged for substantial risks. Two of these faced moderately unsatisfactory progress. For instance, the Obsolete Pesticides Management Project in Côte d'Ivoire (GEF ID: 5362) initially faced substantial risks due to capacity and operational challenges. However, through early training, integration into an experienced project coordination unit, and oversight from an international expert and safeguards team, the project's risk rating dropped to Moderate by completion, thanks to adaptive management and World Bank support. This pattern held across all three projects (GEF IDs 5067, 5362, and 4617), which shared common risks related to institutional capacity, environmental concerns, and stakeholder engagement. Key milestones were underachieved at the MTR stage, but corrective actions and recommendations allowed them to mitigate risks and successfully meet their objectives by project closure.

82. **A strategic approach is crucial for replicating and scaling the destruction of legacy POPs**, as many chemicals and waste projects often serve as demonstration efforts but lack the frameworks for long-term sustainability. While these projects successfully collect and destroy POPs, they often fall short in establishing financial mechanisms or prioritizing the replication of their successes. Given that the GEF cannot fund the destruction of all POPs or the conversion of every industrial facility to cleaner production processes, scaling up these efforts requires strong legislation and enforcement. Without regulatory support, the countrywide adoption of successful practices remains limited, and long-term impacts are not fully realized.

3.4. Effectiveness

83. **This section evaluates the outcomes of GEF's single-chemical focus in GEF-5 and GEF-6**. During GEF-5 and GEF-6, the GEF effectively supported countries in managing chemicals to meet their convention commitments, with a primary focus on specific chemicals like PCBs, UPOPs, pesticides, and mercury. The analysis concentrates on closed projects related to three types of chemicals: PCBs, pesticides, and UPOPs. For each of these chemicals, it also provides an outlook on developments in GEF-7 and GEF-8, highlighting the growing emphasis on integrating sectoral approaches. Artisanal small-scale gold mining (ASGM) made up a significant part of the GEF-6 chemicals and waste portfolio, though this evaluation excludes ASGM projects, which have been addressed in a separate 2022 IEO review.[47] Non-ASGM mercury projects during this period mainly involved mercury initial assessments (MIAs) under the Minamata Convention.

84. **The GEF's approach has evolved from the "chemical-by-chemical" strategy of GEF-5 and GEF-6 to a more integrated, sector-wide focus**. Despite this shift, the lessons learned from

[47] GEF IEO. 2022. GEF Interventions in the Artisanal and Small-Scale Gold Mining Sector, Evaluation Report No. 146, Washington, DC: GEF IEO.

the single-chemical approach remain valuable, as many of the same chemicals are now being tackled across various industry supply chains, requiring more comprehensive solutions. This section presents evaluative evidence on specific single-chemical projects, assessing the effectiveness of past efforts and offering insights for the newer, programmatic and sector-based approaches.

Polychlorinated biphenyls (PCBs)

85. **The GEF has played a crucial role in assisting countries to manage and eliminate PCBs.** PCBs are one of the original 12 POPs listed under the Stockholm Convention. PCBs have dispersed globally and are linked to adverse human health impacts, such as cancer, reproductive issues, and immune system deficiencies. According to a 2023 Stockholm Convention assessment, approximately 330,000 tons of PCBs (or 22 percent of the total produced) have been destroyed within national boundaries.[48] During GEF-5 and GEF-6, the GEF has supported 12 countries in (1) identifying and validating PCB inventories, (2) developing national phaseout and elimination plans, (3) disposing of contaminated equipment and other PCB waste, and (4) building national and local capacities, including regulatory enforcement as well as treatment and disposal infrastructure.

86. **GEF-5 and GEF-6 projects successfully surpassed PCB elimination targets on average**. Together, the GEF-5 and GEF-6 projects exceeded their targets by eliminating approximately 112 percent, or 6,245 metric tons, of PCBs. Six projects received outcome ratings in the satisfactory range, while the regional Caribbean Disposal of Obsolete Pesticides Including POPs project (GEF ID: 5407, FAO) was rated moderately unsatisfactory. The main accomplishment of the project was the disposal of 319 metric tons of obsolete pesticides. However, the project has not been successful in ensuring capacity development and knowledge transfer in all project countries equally. The project failed due to a disconnect between strong regional stakeholder engagement and weaker national-level involvement. Furthermore, poor communication between the project and the Basel Convention Regional Centre for Training and Technology Transfer for the Caribbean (BCRC-Caribbean) and the UNIDO team hindered the creation of synergies, particularly in aligning model legislation on chemicals and pesticides. In some countries, interest waned after pesticide disposal activities ended, with limited involvement of policy makers and national-level decision makers, further undermining long-term impact.

87. **A successful example of the GEF's long-term engagement helped countries eliminate PCB stockpiles from North Macedonia**. Here, the GEF has successfully financed two projects to address PCB management. The first project (GEF ID: 1518) ran from 2002 to 2006, focusing on enabling activities. This was followed by a PCB phaseout project (GEF ID: 2875), which helped a private company, Rade Koncar, establish specialized PCB removal services. Initially targeting the decontamination of 20 percent of the country's PCBs, the project had treated nearly 90 percent by 2023. Rade Koncar now offers PCB removal services not only within North Macedonia but also to neighboring Montenegro and Kosovo, using a business model that combines

[48] Stockholm Convention on Persistent Organic Pollutants / UNEP. 2023. Report on progress towards the elimination of polychlorinated biphenyls. UNEP/POPS/COP.11/INF/11*.

transformer production with PCB cleaning and transformer maintenance, eliminating the need for costly shipments to Switzerland.

88. **The proposal to treat PCB waste from other countries has sometimes faced regulatory and political barriers**. For instance, in the case of Indonesia (GEF ID: 4446, UNIDO), there is a gap between the high capacity of the country's PCB treatment facility and the limited supply of PCB waste being sent to it. One proposal to bridge this gap is for the facility to treat PCB waste from other countries. However, this idea was met with regulatory and political obstacles. Current regulations prohibit the importation of PCB waste from abroad, reflecting a broader, multi-agency consensus that Indonesia should not become a waste disposal site for other countries.

89. **A thorough assessment of local needs and capacities before importing machinery is important for sustainability**. Investing in machinery imported from Europe, the US, or China requires a thorough, context-specific assessment of local needs and capacities to ensure sustainability. Inventory exercises have proven useful in assessing the scale of challenges related to chemicals and waste, but moving forward, these exercises should assess the local context to better contextualize skill levels, municipal budgets, and demand. For example, Indonesia's sole PCB treatment plant (GEF ID: 4446, UNIDO) was built based on an estimate that there was a total stock of 16,000 tons of PCB waste in the country.[49] However, the project overlooked the fact that much of this waste is sold and processed informally, leaving only a small portion from entities willing to pay for proper disposal. In addition, legislation set PCB limits too high. As a result, while the facility has the capacity to process over 3,000 tons annually, it has only handled 200 tons so far.

90. **Successful PCB projects focused on capacity building, stakeholder involvement, and regulatory enhancements**. Since PCBs were commonly used in transformers, electric utility companies play a crucial role in the environmentally sound management of these substances. Effective collaboration between technical experts and PCB owners is essential. Some projects achieved notable private sector engagement or aimed to establish public-private partnerships (PPPs) to better address PCB-related challenges. However, even some of the most successful PCB projects, such as the one in Montenegro (GEF ID: 9045, UNDP), were unable to establish public-private partnerships. The more successful projects focused on capacity building, stakeholder engagement, and regulatory improvements. The Integrated PCB Management project in Costa Rica (GEF ID: 4485) successfully developed technical capacities for operating new equipment and enhancing storage infrastructure for PCB elimination. Its outcomes are highly sustainable, strengthening governance, institutional capacity, and the technical and operational capabilities of participating companies. The project also aligned with international good practices by improving regulations, inventory systems, and monitoring and control

[49] According to a 2022 survey, Indonesia still needs to dispose of an estimated 15,135,364.5 kg or 16,683 tons of PCB liquids and equipment to meet the 2028 deadline on PCBs. Retrieved on August 30th from: https://ers.pops.int/ERS-Extended/FeedbackServer/fsadmin.aspx?fscontrol=respondentReport&surveyid=81&voterid=51302&readonly=1&nomenu=1.

measures, enabling companies to comply with national legal requirements for PCB management and removal.

91. **In GEF-7 and GEF-8, the single-chemical approach has evolved, shifting toward full integration with the power sector.** In GEF-7 and GEF-8, only four projects targeted PCBs. Two GEF-7 projects are underway, in Brazil and Peru. The Environmentally Sound Destruction of PCBs project in Brazil (GEF ID: 10368, UNDP) focuses solely on PCB disposal, benefiting from large-scale targets and private-sector funding, without integration with other chemicals and waste projects. In contrast, Peru's Environmentally Sound Management of PCBs, Mercury, and Other Toxic Chemicals project (GEF ID: 10419, UNDP) addressed several chemicals in one project. Two newly approved GEF-8 projects in Côte d'Ivoire (GEF ID: 11420 UNIDO) and Indonesia (GEF ID: 11425 UNIDO) aim to eliminate PCBs from water and soil, aligning with the power sector through a sectoral approach. Additionally, the GEF's Global Elimination Program for PCBs (GEF ID: 11749, World Bank), a regional initiative that engages utilities to integrate PCB management into transmission and distribution in the power sector, is too recent to be included in the evaluation portfolio.[50]

92. **Despite these recent initiatives, the overall number of GEF-funded PCB projects has significantly declined, highlighting the need for increased support moving forward**. Efforts are still underway to help countries meet the Stockholm Convention's 2028 deadline for ensuring environmentally sound waste management of PCBs, but critical PCB stockpiles continue to pose risks in various regions. As referred to earlier, in Kyrgyzstan's upper mountain ranges, large PCB stockpiles threaten the entire watershed, including neighboring Uzbekistan and Kazakhstan, in the event of a natural disaster, such as the 2023 floods in Pakistan. This reduction in GEF-funded PCB projects presents a substantial challenge, emphasizing the urgent need for funding, which may be partly attributed to limited country interest.[51]

Pesticides

93. **Pesticides not only harm the environment but also pose serious risks to human health**. They are major contributors to biodiversity loss and have been associated with severe health issues, including terminal illnesses such as cancer.[52] According to the World Health Organization's Mortality Database, approximately "385 million cases of unintentional acute pesticide poisoning occur annually worldwide, resulting in around 11,000 fatalities."[53] Although most of the POPs pesticides listed in the Stockholm Convention have been banned in countries

[50] GEF ID: 11749. The program will use the approaches and decision tools that are being developed under a companion World Bank analytical and advisory project (P507106).
[51] PCB management is prioritized in the GEF-8 Chemicals and Waste programming, but few projects exist due to limited country requests.
[52] Bassil KL, Vakil C, Sanborn M, Cole DC, Kaur JS, Kerr KJ. 2007. Cancer health effects of pesticides: systematic review. Can Fam Physician 53(10):1704-11. PMID: 17934034; PMCID: PMC2231435.
[53] Boedeker, W., M. Watts, P. Clausing, & E. Marquez. 2020. "The Global Distribution of Acute Unintentional Pesticide Poisoning: Estimations Based on a Systematic Review." BMC Public Health 20, 1875. https://doi.org/10.1186/s12889-020-09939-0.

that have ratified the convention, many of these countries still face challenges in fully eliminating the use of these hazardous chemicals in agriculture.

94. **Several GEF projects successfully disposed of significant quantities of obsolete pesticides and DDT, with some even exceeding their project targets**. In the chemicals and waste portfolio, there were nine projects from GEF-5 and one from GEF-6 with terminal evaluations that include components addressing harmful pesticides. On average, these nine projects achieved 87 percent of their disposal targets, that is, 5,513 tons of waste disposed of a total of 6,311 tons targeted, with 75 percent of the projects being rated in the satisfactory range.

95. **Successful inventories and disposals of pesticides highlight the GEF's effectiveness in building national capacity**. For instance, the POPs Legacy Elimination and POPs Release Reduction Project in Turkey (GEF ID: 4601, UNDP), rated as highly satisfactory, strengthened institutional, regulatory, and technical capacities within a comprehensive chemicals management framework. It eliminated at least 350 tons of PCB stockpiles and equipment and monitored contaminated sites. Through targeted capacity building, it addressed the urgent need for better management and disposal of hazardous chemicals, ensuring long-term environmental and public health protection. The Viet Nam POPs and Sound Harmful Chemicals Management Project (GEF ID: 5067) provided training and capacity building to local community members and indigenous populations on the safe management and disposal of DDT (box 3).

Box 3: Inclusion of indigenous peoples in a GEF-financed DDT removal project

As part of the Viet Nam POPs and Sound Harmful Chemicals Management Project (GEF ID: 5067 UNDP), a site cleanup was conducted in a remote ethnic minority community in Viet Nam's central highlands. A cave in this community, once used by the North Viet-Namese Army during the Viet Nam War to store large quantities of DDT, was the focus of the cleanup effort.

The project team undertook excavation and removal activities, treating contaminated soil using a nature-based solution—phytoremediation. This involved planting specific plants to absorb contaminants and using local vegetation to discourage people from approaching contaminated areas. This approach was chosen for its cost-effectiveness and suitability for the remote community's context.

Engaging the local community was a priority, with an emphasis on training and raising awareness. Community members were taught how to manage pesticide pollution safely and protect themselves from its harmful effects.

96. **Effective engagement of the private sector in projects addressing obsolete pesticides was driven by market-oriented strategies, local private-sector involvement, and involvement of extension services for technology transfer**. Eight of the 10 completed projects[54] focused on obsolete pesticides successfully engaged private sector entities, with the most successful example being in Pakistan. These projects involved a range of private sector participants,

[54] GEF IDs: 4756, 5362, 5407, 4756, 4477, 4477, 4601, and 5179.

including importers, manufacturers, distributors of pesticides and biopesticides, and traders of agricultural products. The projects that effectively engaged the private sector in pesticide and container management typically (1) adopted a market-oriented approach, (2) actively involved the local private sector, and (3) utilized extension services to help farmers adopt new technologies. In Pakistan, for example, the Comprehensive Reduction and Elimination of Persistent Organic Pollutants project (GEF ID: 4477, UNDP) effectively engaged the private sector in managing the collection and disposal of obsolete pesticides. Instead of relying on agricultural extension departments, private companies were tasked with safely collecting pesticides and containers and delivering them to designated disposal sites. This approach not only leveraged private sector capabilities but also fostered long-term environmental responsibility and infrastructure improvements within the industry.

97. **Challenges in private sector engagement arose due to low farmer demand, industry resistance, and limited formal frameworks for collaboration**. Projects faced challenges in engaging the private sector when (1) there was insufficient farmer demand for alternative pesticides and resistance from the industry, (2) a formal framework for private sector involvement was lacking, and (3) individual countries struggled to reach agreements with the regional pesticides control board. For instance, regional private sector engagement in the Caribbean (GEF ID: 5407 FAO) was hindered by conflicts between regional integration and national sovereignty, posing risks to project sustainability. Private sector engagement was achieved at the regional level through the Coordinating Group of Pesticides Control Boards, but it did not extend to the ground level as intended. Despite private sector advocacy for a regional pesticide registration mechanism for over 20 years, individual countries were unable to reach an agreement. The tension between regional integration and national sovereignty was identified as the primary obstacle, posing a significant sociopolitical risk to the sustainability of the initiative.

98. **There has been a decline in the number of pesticide projects with a shift towards integration with other chemicals in the agricultural supply chain under GEF-7**. The chemicals and waste portfolio shows a consistent decrease in the number of GEF projects with pesticide components. In GEF-5, 15 percent of projects had pesticide components, which decreased to 7 percent in GEF-6, 9 percent in GEF-7, and only 2 percent thus far in GEF-8. There are just eight projects with pesticide components across GEF-7 and GEF-8.

99. **For instance, the GEF-7 FARM program takes a sectoral approach to chemicals management along the supply chain**. The Financing Agrochemical Reduction and Management (FARM) program (GEF ID: 10872, UNEP) includes five full-sized child projects and addresses the agricultural supply chain by providing farmers with access to finance to help them transition to non-toxic pesticides, while also establishing a system for the safe removal of toxic containers and improving the regulatory framework. Targeting major food-producing countries—India, Viet Nam, Ecuador, Kenya, Lao PDR, the Philippines, and Uruguay—the program aims to mitigate the use of harmful pesticides. Additionally, it seeks to help governments establish minimum product standards and implement mandatory requirements for extended producer

responsibility (EPR)[55] schemes for unwanted pesticides, empty containers, and agricultural plastics.

Unintentional persistent organic pollutants (UPOPs)

100. **Unintentional Persistent Organic Pollutants (UPOPs) are a group of toxic, man-made chemicals that have harmful effects on the environment and human health**. Unlike other Persistent Organic Pollutants (POPs) that are intentionally produced for various purposes, UPOPs are not intentionally manufactured or released. Instead, they are formed as byproducts of industrial processes, combustion, and other human activities. Notably, they are among the most toxic carcinogens known. Short-term exposure to high levels of UPOPs can cause skin lesions like chloracne, patchy skin darkening, and liver function alterations. Long-term exposure is associated with immune system impairment, developmental issues in the nervous system, endocrine disruptions, and reproductive problems.[56]

101. **The GEF has financed several projects worldwide aimed at addressing various types of UPOPs**. These projects encompass a wide range of waste management issues, including healthcare waste, solid waste generated from open burning, electronic waste, agriculture waste, secondary copper production sector, plastic manufacturing, disposal and recycling, and waste from the pulp and paper sector. By targeting these diverse sources of UPOPs, GEF initiatives work to mitigate their environmental and health impacts, promoting safer waste management practices and reducing harmful emissions on a global scale. Participating countries include China, Viet Nam, Kazakhstan, Kyrgyzstan and Indonesia in Asia; Belize in the Caribbean; Kenya, Egypt, and Senegal in Africa; and Armenia in Southern Europe.

102. **Most UPOPs projects achieved satisfactory outcome and sustainability ratings**. Of the 12 projects addressing UPOPs, 10 received outcome ratings, all of which were rated as satisfactory.[57] Regarding sustainability, eight were rated as likely to be sustainable. All five healthcare waste projects received satisfactory outcome ratings, although one was rated as unlikely to be sustainable. The project with the unlikely sustainability rating focused on UPOPs from solid waste and healthcare waste in Kenya (GEF ID: 5689 UNDP). Additionally, there was one e-waste project (GEF ID: 4392 UNDP), which received both a satisfactory outcome rating and a likely sustainability rating.

[55] Extended producer responsibility (EPR) is a policy that holds producers responsible for the management of their products throughout their life cycle, including after they are used. EPR aims to support environmental goals like recycling and materials management, and can also encourage product design innovations.

[56] Abbas Idowu Innocent, Sakwe Quinta Eta, and Iguisi Edwin Osawe. 2016. Dioxin emission and industrial solid waste in Kano metropolis, Nigeria. In: E3 Journal of Environmental Research and Management Vol. 7(2). pp. 0029-0037, December, 2016 Available online http://www.e3journals.org ISSN 2141-7466 © E3 Journals 2016 DOI : http://dx.doi.org/10.18685/EJERM(7)2_EJERM-16-017.

[57] The project with the unlikely sustainability rating focused on UPOPs from solid waste and healthcare waste in Kenya (GEF ID: 5689, UNDP). All five healthcare waste projects received satisfactory outcome ratings, although one was rated as unlikely to be sustainable. Additionally, there was one e-waste project (GEF ID: 4392, UNDP), which received both a satisfactory outcome rating and a likely sustainability rating.

103. **Most GEF-5 and GEF-6 UPOPs projects met or exceeded their reduction targets**. Most GEF-5 and GEF-6 projects with available indicators met their targets for UPOPs reduction, measured in grams of toxic equivalent per year. Both of China's projects—one focused on the pulp and paper sector and the other on secondary copper production—performed exceptionally well. Viet Nam's project on solid waste (GEF ID: 5082, UNIDO) exceeded its target by 20 percent. Indonesia (GEF ID: 5052, UNDP) and Senegal (GEF ID: 4888, UNIDO) successfully met their targets in the plastic and solid waste management sectors, respectively. However, Egypt's e-waste project (GEF ID: 4392, UNDP) achieved only 71 percent of its target, and Kenya's project in the solid waste sector (GEF ID: 5689, UNDP) reached just 66 percent of its target.

104. **High-performing projects included a comprehensive approach to UPOPs reduction emphasizing technology, regulatory frameworks, and institutional capacity building**. UPOPs healthcare projects in Africa, the Middle East, and Central Asia aimed to reduce mercury and improve waste handling. These projects employed best available techniques (BAT) and best environmental practices (BEP) to phase out mercury-containing devices, manage mercury waste to prevent environmental contamination, introduce non-incineration technologies such as autoclaves, and strengthen national regulations and capacities. A common focus across these projects was building regulatory frameworks, enhancing institutional capacities (e.g., healthcare facilities), and promoting the adoption of BAT/BEP. These shared strategies reflect a comprehensive approach to improving healthcare waste management and reducing the risks of UPOPs generation. All five healthcare projects were successful, with an average outcome rating of moderately satisfactory. However, sustainability remained a challenge.

105. **The successful introduction of new technologies depended on local resources and maintenance support.** As highlighted earlier, replacing incinerators with autoclaves or mercury elimination machines was successful in countries like Jordan (GEF ID: 9189, UNDP), Trinidad and Tobago (GEF ID: 5558, UNIDO), and Uruguay (GEF ID: 4998, UNDP), where skilled operators were available, project-based training was provided, and sufficient budgets were allocated for electricity costs and staff time. However, in Senegal (GEF ID: 4888, UNIDO), the introduction of the new machinery faced challenges. Once the maintenance contract expired and a crucial spare part was unavailable, the autoclave stopped functioning, leading to the accumulation of toxic medical waste in and around the facility just two years after the project's completion. Mercury replacement efforts also succeeded with capacity building and innovation (GEF ID: UNIDO, 10353), but when tools needed for proper disposal were not available, the process of eliminating mercury-containing medical devices was partially completed, for instance, in Indonesia. To address these challenges, starting with GEF-7, the GEF has supported indigenous technologies while actively involving women and youth through initiatives such as the FARM program (GEF ID 10872, led by UNDP), the Integrated Program on Eliminating Hazardous Chemicals from Supply Chains (GEF ID 11169, led by UNEP), and the upcoming iCOAST and FARM+ programs.

106. **Efforts to manage e-waste collection have had mixed success**. In Jordan, the Reduction and Elimination of POPs project (GEF ID: 9189, UNDP) aimed to formalize informal e-waste collectors but fell short of its targets due to the dominance of the informal sector and

challenges in formalization. However, in Egypt, the Protect Human Health and the Environment from Unintentional Releases of POPs project (GEF ID: 4392, UNDP) successfully met its e-waste collection goals. This was achieved through an initiative led by multinational mobile phone companies, which created an online platform for household e-waste collection, laying a strong foundation for expanding national waste electrical and electronic equipment (WEEE) facilities.

107. **Effective regulation, including extended producer responsibility and landfill bans, is key to successful private sector involvement in e-waste management**. In e-waste management, regulation plays a crucial role in encouraging private sector participation. When legislation ensures coverage of collection costs, the private sector has a clear incentive to get involved. However, for this model to be effective, the disposal of e-waste in landfills must be prohibited. Additionally, implementing extended producer responsibility (EPR) is another proven approach to successfully engage the private sector in e-waste recycling efforts.

108. **Of the five projects focused on the Global Framework on Chemicals (formerly SAICM)—four addressing waste electrical and electronic equipment (WEEE) and one targeting lead pollution—three reported private sector involvement**. In China (GEF ID: 4862, UNDP), substantial cofinancing was provided by domestic WEEE facility operators. In Egypt (GEF ID: 4392, UNDP) and Jordan (GEF ID: 9189, UNDP), the projects facilitated the formalization and licensing of private sector companies for WEEE processing, enabling two operators in Egypt and eight companies in Jordan to handle materials from e-waste generators. In contrast, the Investment Promotion on Environmentally Sound Management of Electrical and Electronic Waste: Sound Management of Electrical and Electronic Waste project in Ethiopia (GEF ID: 5040, UNIDO) saw limited private sector engagement but offered a key insight: the primary driver for e-waste recycling is regulatory pressure.

109. **More recently, GEF-7 and GEF-8 projects work closely with the private sector to manage e-waste and other waste streams, albeit with limited engagement with upstream producers**. For instance, the Improved Management of E-waste and Healthcare Waste project in Egypt (GEF ID: 10879, World Bank) plans to jointly manage e-waste and healthcare waste in collaboration with the private sector, including shopping malls. Similarly, a GEF-8 project in Eswatini (GEF ID: 11272, UNDP) aims to tackle healthcare waste, single-use plastics, e-waste, and household organic waste. A more recent program to finance e-waste management is the Global Electronics Management (GEM) program (GEFID 11553 UNIDO) approved in June 2024. While a sectoral approach to chemicals management may be efficient, especially with the increasing number of chemicals listed under the Stockholm Convention, there is a risk of resources being spread too thin across numerous targets at the end of a product's life cycle, potentially neglecting collaboration with upstream producers.

110. **Private sector involvement in healthcare waste management projects was limited, but where applicable was useful in maintaining healthcare equipment**. The five completed projects on healthcare waste management (HCWM), with terminal evaluations (GEF IDs: 4442, 4611, 4888, 5068, and 5689), reported minimal or no involvement of the private sector. This was primarily because most of the beneficiary healthcare facilities selected were public (government) hospitals. However, in Egypt, a key breakthrough for private sector participation

was the adoption of a new waste management law, which reclassified sterilized healthcare waste (HCW) as nonhazardous, enabling its use in the production of refuse-derived fuel (RDF). Furthermore, the project revised the HCW treatment tariff, raising the rate and creating new opportunities for private sector investment in HCW treatment facilities.

111. **Additionally, engaging the private sector in cofinancing and maintaining healthcare waste equipment proved highly beneficial for several projects**. In Kazakhstan and Ghana, private sector involvement in healthcare waste management was successfully achieved through cofinancing and technology adoption agreements (GEF IDs: 4442 and 4611). In Jordan, a healthcare waste management project improved equipment reliability by establishing a long-term maintenance agreement with an international autoclave supplier (GEF ID: 9189, UNDP). This innovative approach streamlined the identification and repair of malfunctioning equipment, ensuring more reliable preventive and corrective maintenance.

3.5. Socioeconomic impacts

Gender

112. **Gender-aware and gender-sensitive projects are increasing in GEF projects, but gender-mainstreamed efforts remain limited**. The review of the gender dimension in terminal evaluations revealed a notable increase in the number and proportion of projects classified as gender-aware (acknowledging the different roles and responsibilities of men and women) and gender-sensitive (using methodologies to address gender inequalities). However, progress in gender-mainstreamed projects—those that assess the implications of actions for both women and men—remained modest. Among a portfolio of 51 projects, 27 were gender-aware and 29 gender-sensitive, but only 1 project was classified as gender-mainstreamed.

113. **Gender-disaggregated data emphasize the heightened vulnerability of women and** their role in raising awareness about chemical dangers. A total of 12 terminal evaluations provided gender-disaggregated data, primarily focusing on workshop participants. These evaluations typically address gender dimensions in relation to vulnerability to harmful chemicals, noting that certain groups—such as pregnant women, children, and impoverished communities—are at greater risk of harm. Women are frequently highlighted for their role in raising awareness about the dangers of chemicals. For example, the Environmentally Sound Management and Final Disposal of PCBs project in Serbia (GEF ID: 4877, UNIDO) developed a brochure specifically addressing the effects of PCBs on pregnant women.

114. **Discussions about women's involvement in closed projects often focus on their participation in workshops or emphasize the need for increased representation of women among technical managers and decision makers in the rural sector**. For instance, in the Disposal of POPs and Obsolete Pesticides and Strengthening Life-cycle Management of Pesticides project in Benin (GEF ID: 4752, UNDP), efforts were made to educate women on pesticide management and the safe handling of empty containers (box 4). However, in addition to raising awareness about the dangers of pesticides, it is essential to provide women with regular health check-ups and occupational safety equipment and ensure the enforcement of

health regulations. Moreover, formalizing informal workers is critical to safeguarding their well-being.[58]

Box 4: Women and waste management

The central role of women in addressing plastic pollution is evident in the GEF-5 project on plastics in Indonesia (GEF ID: 5052, UNDP), yet the project also reveals critical gaps in addressing gender-specific risks. This project conducted an assessment to understand the needs and roles of both women and men in recycling activities. The findings showed that while women play an active role in the recycling process, they are predominantly tasked with sorting materials. This work involves identifying different types of plastics by relying on methods like smelling the odor from burning plastic or rubbing pieces with gasoline. These practices expose women to significant health hazards, increasing their long-term health risks and financial burdens. To mitigate these differentiated risks, the project conducted gender-sensitive health and safety training. This highlights the importance of both a gender analysis and a concrete action plan addressing the specific needs and vulnerabilities of women. Ensuring that gender considerations translate into meaningful measures is key to promoting equitable participation in pollution control efforts. This is in line with the GEF Policy on Gender Equality, which requires a project's gender analysis to feed into a gender action plan (or equivalent).

Socioeconomic co-benefits

115. **Activities to achieve socioeconomic outcomes have increased in recent years (figure 6).** Of 219 ongoing projects, 132 have incorporated socioeconomic outcomes, compared to just 27 closed projects (18 percent of all closed projects). Socioeconomic outcomes play a critical role in these 132 ongoing projects, particularly in communities affected by hazardous chemicals. The designs of ongoing projects tend to integrate environmental protection with expected socioeconomic improvements, particularly in communities reliant on natural resources or engaged in informal economic activities. For instance, the Yield Lab Opportunity Fund I project (GEF ID: 11066, IDB) is expected to demonstrate how advancements in waste management can improve working conditions and create new economic opportunities for informal waste sector workers. Similarly, the global project Global Best Practices on Emerging Chemical Policy Issues of Concern (GEF ID: 10119, UNEP) aims to promote sustainable agricultural practices, reducing chemical use while enhancing both the economic prospects and health outcomes of farmers.

116. **Quantifying health co-benefits in GEF projects is infrequent, due to a lack of indicators and the long-term nature of health impacts**. The removal of legacy fertilizers and the transition to environmentally friendly technologies, as previously discussed, have a substantial positive impact on health. Similarly, the proper storage and treatment of healthcare waste using incinerators or autoclaves reduces harm to community health. However, recycling of electronic waste, lead-containing batteries, and other waste management practices can have detrimental health effects. Quantifying health benefits from initiatives such as sanitary landfills or e-waste

[58] The IEO background paper on vulnerable groups, including informal waste pickers, is available upon request.

recycling labs is difficult. Although two projects—one in Kenya (GEF ID: 5689, UNDP) and one in Viet Nam (GEF ID: 9379, UNDP)—mention health benefits from improved e-waste management, they do not include indicators to measure these benefits. In Indonesia, the Lead Decontamination Project (GEF ID: 5701, UNDP) successfully cleaned up a contaminated site where the local community had been dismantling electronic waste and batteries, unaware of the detrimental health effects. It was not until agricultural outputs declined and health issues became apparent that the dangers were recognized. The project financed the closure of the site, buried the hazardous equipment under a soccer field, and removed contaminated soil, allowing nature to rebound. However, no health impacts were measured or reported as part of the project.

117. **Among the 72 closed projects with terminal evaluations, only the Obsolete Pesticides Management Project in Côte d'Ivoire (GEF ID: 5362, World Bank) included a health-related indicator, which was measured through number of workshop participants**. The direct beneficiaries were those whose health and environmental risks had been reduced through protection from or elimination of obsolete pesticides and associated wastes, or whose income increased (or expenses decreased) due to improved pesticide use. The project reached a total of 153,279 direct beneficiaries, surpassing the target value by 153 percent. As presented in Section 4.3, GEF's recent projects addressing mercury in dental amalgam and skin-lightening creams are expected to yield health benefits and positive socioeconomic impacts.

118. **The GEF's current approach to tracking socioeconomic co-benefits is limited, highlighting the need for a stronger results framework**. The evaluation also found that socioeconomic co-benefits are not consistently emphasized during the project design stage, where they are often insufficiently articulated in project descriptions, results frameworks, and theories of change. Currently, the proxy indicator used to track socioeconomic results is the number of beneficiaries, as reflected in core indicator 11, introduced during the GEF-7 period, which only provides a quick estimate of the scale of the impact on the target population. A challenge is that the GEF lacks a mandate to measure health benefits, which are long-term outcomes that often extend beyond the typical project timeline. While UNEP conducts regular assessments of chemical prevalence for Stockholm Convention countries and chemicals, these studies and their findings are not systematically integrated into GEF projects and do not inform outcomes. Enhanced coordination between UNEP and the GEF on measuring health impacts could greatly improve the alignment and impact of these initiatives.

119. **A 2019 IEO evaluation[59] on health co-benefits found that there is encouraging and clear potential for attaining substantial improvements in health and well-being from GEF interventions in chemicals and waste**. The primary limiting factors in maximizing these benefits are the lagged and indirect nature of their manifestation, limited baseline data and counterfactuals, insufficient quantitative reporting of global environmental benefits realized in interventions, the limited capacity within the GEF and executing agencies to measure and track these co-benefits, and most importantly, low engagement with the health care sector, public health community, and intervention beneficiaries. These limiting factors have translated into

[59] Nicholas Hadjimichael and Geeta Batra. 2019. A study on the health co-benefits of GEF chemicals and waste focal area. GEF IEO, Washington, D.C.

the systematic lack of attention to health dimensions of the abatement of chemicals and waste pollution. However, an institutional push to leverage these co-benefits may not only lead to more sustained impact for beneficiaries of GEF interventions, but also would help establish the additionality of GEF involvement.

3.6. Impact on policy reform and policy coherence

120. **Ongoing projects feature an increased focus on legal, policy and regulatory reform activities.** Of the 219 ongoing projects, 121 (or 55 percent) include legal, policy, and regulatory activities, compared to just 36 closed projects (16 percent) that mention similar activities. A clear pattern emerges among these 121 ongoing projects, which focus on building robust legal frameworks as a foundation for long-term environmental sustainability. For example, the regional project Accelerate Minamata Convention Compliance (GEF ID: 11047, UNEP) in Latin America aims to improve mercury regulations in artisanal and small-scale gold mining, a sector where regulatory oversight is often weak. Similarly, the global project Global Replication to Eliminate Hazardous Chemicals from Supply Chains (GEF ID: 11177, UNEP) seeks to develop comprehensive guidelines for the environmentally sound management of hazardous chemicals, helping countries adopt international standards. These initiatives are designed to align with international conventions, such as the Stockholm and Minamata Conventions, by strengthening national frameworks for chemical management and environmental protection.

121. **The GEF's ability to drive transformational, market-oriented change is grounded in its approach to engaging the private sector and supporting legislative frameworks**. This strategy has enabled large-scale, sustainable environmental solutions in several countries. For instance, in Viet Nam, the introduction of eco-industrial park legislation (GEF ID 4766, UNIDO) facilitated the nationwide adoption of a resource-sharing model. This model encourages interconnected industries to optimize resource efficiency by sharing resources, implementing recycling systems, and collectively reducing CO2 emissions. By fostering collaboration among neighboring companies, it not only minimizes waste but also promotes sustainable practices. Additionally, the integration of cutting-edge technological innovations enhances operational sustainability, further showcasing the success of the GEF's approach to fostering impactful change across the country.

122. **Similarly, Indonesia and Mexico implemented extended producer responsibility laws, while several other countries**, including Cameroon, Côte d'Ivoire, Ethiopia, Indonesia, the Philippines, Tanzania, and Viet Nam, made significant progress in drafting and passing lead regulations, further demonstrating the importance of regulatory frameworks in achieving large-scale environmental impact.[60] In China and Egypt (GEF IDs: 4862 and 5689), methodical efforts to formalize workers, supported by incentives and strong regulatory frameworks, have helped enhance project results and reduce pollution. In China, where e-waste is a growing concern, a project (GEF ID: 4862, UNDP) used financial incentives to formalize informal recyclers, reducing harmful emissions and promoting sustainable practices. In the case of waste management in Egypt (GEF ID: 4392, UNDP), informal collectors initially resisted formalization due to

[60] Cameroon, Cote d'Ivoire, Ethiopia, Tanzania (GEF ID: 5633), Indonesia and the Philippines (GEF ID: 5701), and Viet Nam (GEF ID: 9379).

insufficient incentives, which delayed progress and cooperation. This resistance persisted until legislation was enacted, banning the informal collection and dismantling of electronic waste. This shift in approach was essential for reducing pollution risks, particularly unintentional POP (UPOP) emissions from e-waste processing. With the law in place, the project team moved towards formalizing the sector by licensing select waste managers, thereby creating a more structured and regulated system.

123. **Successful legislative efforts in GEF projects are often hindered by short time frames and challenges in enforcement. Formalization can also be complex**. While the preparation of new legislation or amendments to existing laws has generally been successful, limited project time frames are not always conducive to effectively introducing policies and legislation. Moreover, enforcement remains a significant obstacle in many countries, requiring more training and awareness-raising efforts to ensure proper implementation and compliance. Formalization efforts can also be complex and may require broader macroeconomic changes, including enhanced social protections for informal workers.[61] Successfully formalizing large groups of workers, demands a step-by-step approach that addresses structural barriers,[62] often requiring significant reforms that can be challenging to implement.

124. **Based on field visits, the GEF plays a key role in fostering interministerial collaboration and enhancing policy coherence**. Though policy coherence is interpreted differently across countries, officials in Viet Nam and Indonesia agree that the GEF plays a pivotal role in fostering interministerial collaboration on projects. Institutionalized dialogues between ministries and regular meetings at the national level are essential for improving policy coherence. In Indonesia, a GEF-financed textile project (GEF ID: 10523, UNEP) enabled the first formal collaboration between the Ministry of Environment and Forestry and the Ministry of Industry. This collaboration was particularly significant because both ministries had previously struggled to coordinate on issues such as the business permitting process and agreeing on a list of chemicals of concern for the industry.

125. **In Viet Nam, the country has a mechanism for interministerial cooperation through a steering committee**. The GEF, alongside the Viet-Namese government, used this mechanism to coordinate efforts among 17 officials from various ministries for the Implementation of Eco-Industrial Park Initiative for Sustainable Industrial Zones in Viet Nam project (GEF ID 4766, UNIDO). Eco-industrial parks require input from multiple ministries, each responsible for different aspects of industrial development—such as waste and wate management by the Ministry of Natural Resources and Environment, and cleaner production by the Ministry of Industry and Trade. Their cooperation is essential for the success of industrial symbiosis, where byproducts from one factory are used by another, as demonstrated in Ninh Binh, where a gas company captures and repurposes byproducts from a fertilizer factory. The new legislation on

[61]Yashodhan Ghorpade, Camila Franco Restrepo, and Luis Eduardo Castellanos, Social Protection and Labor Market Policies for the Informally Employed: A Review of Evidence from Low- and Middle-Income Countries, March 1, 2024.

[62] Ulrike Lehr (Senior Economist, Jobs Group, World Bank Group) in discussion with the author, June 20, 2024.

eco-industrial parks enabled the nationwide scaling-up of project results, expanding the impact across the country.

126. **Other GEF-supported projects have facilitated synergies between ministries**. For instance, a mercury project in Uruguay (GEF ID: 4998, UNDP) promotes collaboration between the Ministry of Environment and the Ministry of Health, while a PCB project in Indonesia (GEF ID: 4446, UNIDO) involved close cooperation between the Ministry of Environment and Forest and the Ministry of Energy and Mineral Resources.

4. REVIEW OF RECENT PROJECTS (GEF-7 THROUGH GEF-8)

127. **The increasing proliferation of chemicals demands a holistic response**. Unlike the chemicals originally listed in the Stockholm Convention, many chemicals today cannot simply be banned from import, disposed of, or exported for destruction. Instead, they must be addressed throughout the entire supply chain—from sourcing and processing to distribution, and ultimately, end-of-life recycling or elimination.

128. This section provides a quality-at-entry assessment of ongoing projects in GEF-7 and GEF-8, which focus on key supply chains related to chemicals and waste in the textiles and food and beverages sectors, dental amalgams, or which adopt a program approach such as in the small island developing states (SIDS; box 5), or through the Artisanal Gold Mining Program.

Box 5: Implementing sustainable low and nonchemical development in SIDS (ISLANDS)

The ISLANDS program (GEF ID 10185, UNEP), launched under GEF-7, guides Small Island Developing States (SIDS) toward sustainable chemical management. The program strengthens SIDS' capacity to control chemical and material inflows while providing resources for long-term waste management. The program comprises six child projects: one global project focused on communication and knowledge management (GEF ID 10266, UNEP) and five regional projects across the Caribbean (GEF ID 10279, UNEP/FAO; GEF ID 10258, IDB), Pacific (GEF ID 10267, UNEP), Atlantic (GEF ID 10848, UNEP), and Indian Ocean (GEF ID 10261, UNEP).

The ISLANDS Pacific Child Project established three objectives: implement effective mechanisms to control imports of chemicals and products generating hazardous waste; ensure environmentally sound disposal of harmful chemicals and materials; and prevent harmful material accumulation through circular and life-cycle management systems with private sector engagement.

GEF IEO's Evaluation of GEF Programs in Pacific SIDS revealed significant implementation challenges. While the project was designed collaboratively with SPREP (Secretariat of the Pacific Regional Environment Programme) and stakeholders to align with GEF's strategic aims, its ambitious components—including harmonized regional policies and centralized waste treatment facilities—encountered substantial implementation barriers. Notable successes included the Mercury Free Pacific Campaign and the Tide Turners youth initiative, which engaged 700 youth across Samoa and Tonga. In Samoa, Brown Girl Woke's partnership with

Rugby Plus Samoa expanded the Training of Trainers program to ten additional schools, while Tonga's No Pelesitiki Campaign mobilized 400 youth in environmental activities.

Key challenges emerged in project governance, particularly in the stakeholder regional project coordination group's effectiveness. Stakeholders emphasized how individual country allocations impeded regional cooperation. Interviews consistently highlighted that the program's complexity and management challenges in Pacific SIDS demonstrate the need for streamlined objectives and realistic timelines, considering SIDS ministries' limited capacity.

The implementation experience identified three critical success factors for future initiatives in the Pacific: more adaptable frameworks, simplified governance structures, and implementation timelines aligned with SIDS' operational capabilities. These findings accentuate the importance of balancing ambitious environmental goals with practical implementation considerations in regional development programs.

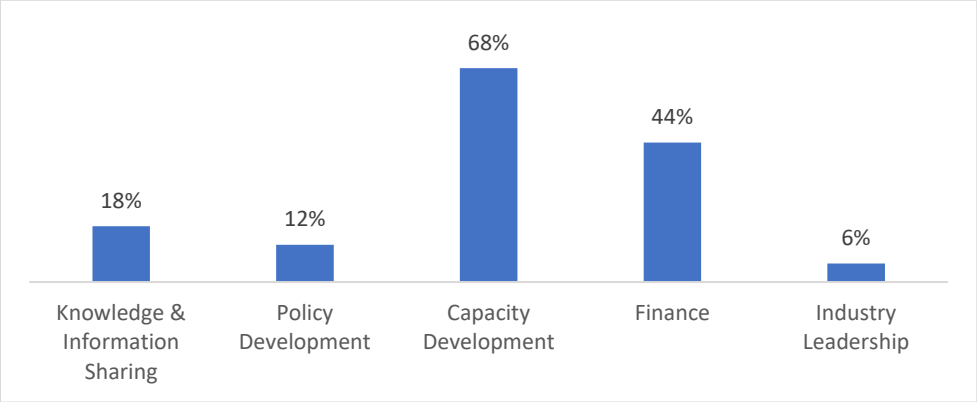
Source: Evaluation of GEF Programs in Pacific Small Island Developing States.

129. **The portfolio for GEF-7 and GEF-8 includes 10 parent programs[63] with 61 child projects and 108 standalone projects.** With only two mid-term reviews (MTRs) available for GEF-7 projects, the quality-at-entry analysis was primarily based on CEO approval documents, where available. Figure 6 above illustrates how the activities in the overall portfolio have evolved. The analysis indicates a significant growth in interventions focusing on socioeconomic outcomes; legal, policy, and regulatory measures; and environmental monitoring. GEF-7 and GEF-8 project designs incorporated legal, policy, and regulatory measures in 55 percent of ongoing projects. These projects focused on developing extended producer responsibility (EPR) frameworks for waste management, particularly in the electronics sector, and aimed to strengthen institutional capacity for regulatory enforcement. Additionally, the designs emphasized circular economy policies, including the development of action plans and standards, especially in sectors like waste management and sustainable urban planning. A strong focus is also placed on ensuring compliance with international environmental standards and agreements. Even though the percentage of projects focused on legal, policy, and regulatory measures has increased in ongoing projects compared with closed ones, the nature of activities is not different from those encountered in closed projects.

[63] GEF-7: ISLANDS program (GEF ID: 10185), Accelerating cleantech innovation and entrepreneurship in SMEs to support the transition towards circular economy and create green jobs (GEF ID: 10408), Global Opportunities for Long-term Development of ASGM (GEF ID: 10569), Financing Agrichemicals Removal and Management (FARM, GEF ID: 10872), and
GEF-8: Global Programme to Support Countries to Upscale Integrated Electric Mobility Systems (GEF ID: 11074), Eliminating hazardous chemicals from supply chains (GEF ID: 11169), Circular Solutions to Plastic Pollution (GEF ID: 11181), Trinidad and Tobago – Nature Based Solutions in Productive Landscapes (GEF ID: 11250), Clean and Healthy Ocean Integrated Program (GEF ID: 11349), and Greening Transportation Infrastructure Development (GEF ID: 11467).

130. **Compared to closed projects, ongoing projects show a much greater focus on expected socioeconomic outcomes.** In 60 percent of ongoing projects, activities were designed to achieve socioeconomic outcomes. These initiatives included job creation through waste management, recycling, and the promotion of green technologies. A strong emphasis was placed on creating opportunities for women, youth, and vulnerable groups, as well as supporting gender-responsive entrepreneurship. The projects also aimed to improve health and safety conditions for workers in sectors such as manufacturing and agriculture, while capacity-building efforts focused on training and skill development to empower communities and improve livelihoods.

Figure 13: Form of private sector engagement across GEF-7 and GEF-8 chemicals and waste projects that leverage a sectoral or integrated approach (n=34)



Source: IEO analysis, based on information in project documents.
Note: One project may involve multiple forms of private sector engagement.

131. **More than two-thirds of the reviewed projects engage the private sector primarily through capacity development, typically in the form of technical assistance, and 44 percent use financing schemes**. The evaluation portfolio includes 20 GEF-7 and 14 GEF-8 private-sector projects, all of which are part of integrated or sectoral approaches. In some cases, projects are classified based on more than one primary engagement method (figure 13). This engagement aims to transform core business operations to align with environmental goals, often by offering workshops, demonstrations, or facilitating access to financing for businesses. For example, a project in Morocco's construction sector (GEF ID: 11428, UNIDO) is set to provide capacity building for the growth of green businesses, including support through incubators and innovations in alternative materials. Similarly, a regional child project under the FARM program in Asia (GEF ID: 10910, UNIDO) focuses on training farmers and farmer associations to adopt greener and eco-friendly alternatives to conventional pesticides.

132. **Financing schemes for instance include facilities secured by a first loss guarantees (Global Programme to Support Countries to Upscale Integrated Electric Mobility Systems**; GEF ID: 11075, UNEP) and the mobilization of private sector investments through fiscal incentives and solar energy feed-in schemes (Eliminating Hazardous Chemicals from Supply Chains in Cambodia; GEF ID: 11170, UNEP). A project focusing on the plastics sector in Ghana (GEF ID:

10401, UNIDO) and another project on the healthcare and agricultural sectors in Sri Lanka (GEF ID: 10868, UNDP) both include specific plans to develop public-private partnerships (PPPs) to mobilize sustainable financing for pollution and waste management. Furthermore, multiple projects, including child projects of the Supply Chain Integrated Program in Mongolia (GEF ID: 11171, UNDP) and Trinidad and Tobago (GEF ID: 11176, UNEP), focus on working closely with financial institutions to create funding facilities or financial products that support businesses addressing chemical and waste issues.

4.1. Integrated program in the garment sector

133. **The textile industry, faced with multiple environmental demands, is a good candidate for an integrated approach to sustainabilit**y. The need to decarbonize, reduce POPs, lower water consumption and pollution, and increase the use of recycled materials must be balanced with the sector's global competitiveness. An integrated approach, if designed and implemented well, not only helps align these goals under a unified strategy but also enhances efficiency in achieving them, particularly in meeting commitments under international conventions on POPs.

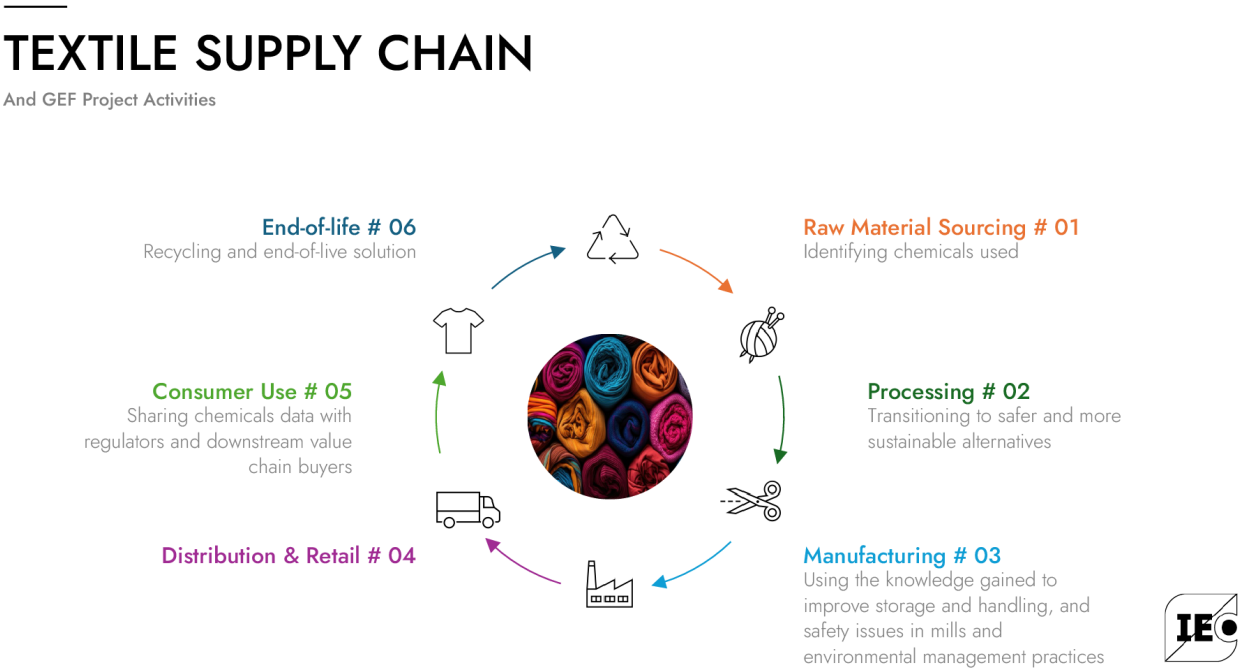
134. **The 2023 UNEP report, "Sustainability and Circularity in the Textile Value Chain," notes that the sustainability challenges of the textile value chain are expected to intensify**. Global demand is projected to reach USD 2 trillion by 2027, with 63 percent of this growth coming from emerging markets.[64] As demand increases, so does the urgency to address the environmental impacts of the textile industry. Transforming the textile value chain to adopt circular practices presents a crucial opportunity to tackle the interconnected crises of climate change, biodiversity loss, and pollution.

135. **For effective transformation, goals must be tailored to the specific production and consumption regions that are central to the textile industry**. Localized strategies are key to addressing region-specific challenges while fostering sustainability across the entire value chain. Circular business models, which focus on reducing waste, reusing materials, and investing in sustainable practices, are becoming essential.

136. **GEF-7 and GEF-8 programming directions have focused on the important aspects of the textile supply chain for addressing POPs and other harmful chemicals, albeit with significant gaps**. Figure 14 demonstrates that GEF programming and activities target critical steps along the supply chain. They help companies identify chemicals used, transition to alternative chemicals, and improve health and safety conditions, regulations, and recycling. A key gap in the supply chain not currently addressed by the GEF is packaging and transportation. Project designs, in general, take a systemic approach, from the raw material sourcing, design, production, consumption, waste management, including recycling, to the end-of-life solutions, while also addressing regulation, knowledge management, and scaling up.

[64] UNEP. 2023. Sustainability and Circularity in the Textile Value Chain. A Global Roadmap. Paris.

Figure 14: Textile supply chain with environmental impact and GEF programming and activities



Source: IEO analysis.

137. **The GEF's textile projects were designed to target key textile-producing countries across Asia, Africa, and Latin America, guided by technical criteria**. In Asia, the program engaged with major textile and garment producers, including China, India, Bangladesh, Viet Nam, Pakistan, Indonesia, Cambodia, and Mongolia. In Africa, the focus was on Ethiopia, South Africa, Lesotho, and Madagascar, while in Latin America, the program included Costa Rica, Ecuador, Peru, and Trinidad and Tobago. Some garment-producing countries, such as Turkey, Egypt, Morocco, and Tunisia, were not part of the program, either due to their non-participation in the competition or, in Turkey's case[65], not meeting the selection criteria. This approach demonstrates a regionally balanced effort to address major textile-producing countries across various regions, based on the program's technical requirements.

138. In general, the design of the textile programs is comprehensive, addressing key intervention points throughout the supply chain related to POPs. Review of CEO approval documents indicates that early implementation experience has revealed advantages and opportunities, as well as challenges.

139. **Textile projects have been designed to offer a range of solutions for participating countries**. These include: (1) certification and voluntary compliance measures, (2) promoting sustainable chemistry and textile recycling, (3) reducing chemical use among suppliers, and (4)

[65] It is important to highlight that the Integrated Program (IP) on supply chains, including fashion, employed a competitive selection process with limited funding. As a result, Turkey, the only Middle Eastern country to submit an application focused on fashion, was not included. Its expression of interest was evaluated as not sufficiently transformative to meet the IP's criteria.

addressing market failures and supply chain fragmentation. For instance, textile projects in Asia focus on introducing certification and voluntary compliance measures to encourage companies to reduce the use and release of priority chemicals of concern, including POPs, within their facilities (GEF ID: 10523; involving Bangladesh, Indonesia, Pakistan, Viet Nam). In Africa, other projects (GEF ID: 10543 and 10683) address both upstream factors, such as resource efficiency and sustainable chemistry, and downstream aspects, like the reuse, recycling, and transformation of textile and garment waste into economically viable and socially beneficial products and services (GEF ID: 10543, UNIDO; involving Lesotho, Madagascar, South Africa). Additionally, a global project approved under GEF-8 (GEF ID: 11326, World Bank; currently at the project identification form [PIF] stage) aims to identify opportunities for reducing chemical use in textile production among participating suppliers. A recently approved integrated program (GEF ID: 11169, UNEP; involving Cambodia, Mongolia, Pakistan, Costa Rica, Ecuador, Trinidad and Tobago, India, and Peru) promotes South-South and triangular cooperation in the fashion and apparel industry to tackle systemic issues, such as market inefficiencies and supply chain fragmentation, and the lack of formal collaboration frameworks for knowledge sharing involving the private sector.

140. **Limited implementation experience reveals three key design factors in recent textile sector projects**. Since most chemical and waste projects in the textile sector were only recently approved, there is limited implementation experience so far. However, an analysis of project design quality reveals three common factors across these projects:

(a) Increased focus on the upstream sections of the textile and apparel value chain, specifically through direct technical assistance to suppliers;

(b) Support for technology transfer by identifying and assessing BAT/BEP investments to promote resource-efficient and cleaner production; and

(c) Active engagement with the private sector to drive sustainable practices.

141. **The projects primarily target large textile enterprises, while smaller companies may struggle to adopt eco-friendly practices due to financial constraints**. The projects primarily target and rely on global supply chains and major players in the textile and apparel sector at both global and national levels. Experience from the GEF-5 project in China shows that large textile enterprises have already implemented strict manufacturing standards and are financially robust enough to allocate appropriate budgets for procuring eco-friendly dyes and chemicals from selected suppliers to ensure high-quality products. In contrast, smaller textile enterprises, which may not be as financially strong, might opt for non-eco-friendly dyes to increase profitability, as the selection of chemicals directly impacts their bottom line.

142. **GEF projects in the textile and apparel sector do not currently prioritize the inclusion and support of small and micro enterprises, which dominate the industry in many countries, particularly in East and Southeast Asia**. Successful sector-wide interventions depend on providing these smaller enterprises with targeted technical assistance to transition to eco-friendly practices. Additionally, large chemical enterprises have dominated data and information sharing, while smaller companies are less cooperative. The information and data

shared through the communication platform primarily came from large, leading chemical enterprises in the industry. Small-sized enterprises were less cooperative and rarely contributed data and information. Without a focus on small enterprises, the overall impact and sustainability of environmental improvements in the sector will be limited.

143. **GEF projects have had limited collaboration with chemical suppliers, with recent improvements**. One key lesson learned from GEF projects (GEF IDs: 11326 and 10523) is the importance of involving chemical suppliers in addressing POPs challenges. Since many textile companies rely on imported chemicals that often lack proper labeling or safe handling instructions, working with suppliers across the supply chain becomes critical. Stakeholders have highlighted the need for better collaboration at this level to ensure the safe and sustainable use of chemicals within the textile industry. A recent improvement in this area was observed in Viet Nam (GEF ID: 10523) which conducted a comprehensive inventory of the industry before selecting companies for pilot programs to test eco-innovations in chemicals management.

144. **There is significant potential to expand South-South cooperation by fostering expert exchanges that go beyond simple information exchange and routine check-ins**. The regional textiles project (GEF ID: 10523, UNEP) in Bangladesh, Indonesia, Pakistan, and Viet Nam is exploring opportunities for expert exchanges and institutionalized knowledge-sharing through formal associations. For instance, stakeholders in Viet Nam have expressed interest in learning from an Indonesian expert currently conducting policy mapping for the project in Indonesia, highlighting the value of cross-country collaboration to enhance project outcomes.

4.2. Circular approaches along the supply chain in the food and beverage industry

145. **In less than a century, plastic pollution has become one of the most urgent environmental challenges, driven by the rapid increase in disposable plastic product production, which has outpaced the world's capacity to manage it**. There is a strong connection between POPs and plastics, which the GEF is addressing through initiatives in the food, beverage, and construction industries. Certain POPs, such as short-chain chlorinated paraffins (SCCPs), PCBs, and polybrominated diphenyl ethers (PBDEs), have been widely used as chemical additives in plastics, especially in electronics, automotive, furniture, and toy manufacturing, despite being banned under the Stockholm Convention. The burning of plastics containing chlorinated and brominated additives can unintentionally release harmful POPs, like dioxins. As a result, the GEF's chemicals and waste focal area prioritizes the production, legacy management, and disposal of these plastics to mitigate environmental and health risks. A 2024 report by Oxford Economics[66] on the plastics value chain identifies key players in the plastics value chain as primary plastic polymer producers, plastic product manufacturers (or converters), end-use industries, and both mechanical and chemical recyclers.

146. **The GEF's approach to plastic management in the food and beverage sector has evolved across its focal areas**. Traditionally, the chemicals and waste focal area addressed plastics from various sources. During GEF-7, a collaborative initiative between the international

[66] Oxford Economics. 2024. Mapping the Plastics Value Chain: A Framework to Understand the Socioeconomic Impacts of a Production Cap on Virgin Plastics.

waters and chemicals and waste focal areas introduced a circular economy approach to plastics. In GEF-8, the food and beverage sector, continues to benefit from targeted support through this Integrated Program, while the chemicals and waste focal area focuses on managing specific types of plastics, particularly those that are challenging to handle. This strategy reflects the GEF's effort to address plastic pollution through a holistic approach across various sectors and focal areas.

147. The GEF has primarily addressed plastic pollution at the end-of-life stage and in waste management (GEF IDs: 5052, 10401, 10546, 10547, 10628, 10711, 11197). However, it is now shifting towards tackling the issue earlier in the supply chain, with a focus on the food and beverage industry as one key entry point.

148. **Projects specifically targeting plastic pollution were absent in GEF-5 and scarce in GEF-6**. The three GEF-6 projects (GEF IDs 9246, 9263, and 9371) primarily focused on capacity building and general support for managing plastic waste, including efforts in collection, recycling, and clean-up.[67] Of these, only one project (GEF ID: 9246, UNDP) set a concrete goal for plastic waste reduction, aiming for a 20 percent decrease, equivalent to 21,900 metric tons. Planned activities include integrating proper management of chemicals and wastes, such as UPOPs and plastics, into the watershed management plans and monitoring systems of key institutions in the Río Motagua watershed in Guatemala. The project aims to eliminate at least 6 percent of illegal dumpsites and reduce plastic waste in dumpsites by 8 percent. Three pilot projects will focus on reducing solid waste, improving waste disposal practices, and eliminating open-air burning. According to the latest project implementation report (PIR), the project was rated high risk, with moderately unsatisfactory ratings for development outcome and implementation progress.

149. **The GEF-7 chemicals and waste portfolio saw a significant increase in projects addressing plastic pollution**, with seven approved initiatives (GEF IDs: 10401, 10546, 10547, 10628, 10117, 10711, and 11015). However, only four of the GEF-7 projects set specific targets for reducing plastic pollution through a circular economy approach, while the remaining three focused on providing general support for plastic pollution management. Together, the GEF-7 projects committed to reducing 443,721 metric tons of plastic.

150. **GEF-8 takes a more structured approach to tackling the root causes of plastic pollution**, aiming for a system-wide transformation through the Circular Solutions to Plastic Pollution Integrated Program.[68] The program emphasizes early interventions in the plastic value chain, focusing on upstream and midstream actions to reduce plastic production and

[67] The GEF-6 international waters focal area project (GEF ID 9681), "Addressing Marine Plastics – A Systemic Approach," serves as an early and notable example of GEF funding dedicated to reducing plastic pollution.
[68] Under GEF-8, the integrated program Circular Solutions to Plastic Pollution (GEF ID 11181) will be delivered through a global platform project (GEF ID 11197) and a cohort of 15 national projects (GEF IDs 11182, 11183, 11184, 11185, 11186, 11187, 11188, 11189, 11190, 11191, 11192, 11193, 11194, 111195, 11196). It tackles plastic pollution by working with governments on circular policies, with businesses to adopt circular practices, with financiers to invest in circular solutions, and with the public to raise awareness and shift consumer behavior. In addition to the above integrated program, there are three standalone projects with circular approaches to plastic pollution (GEF IDs 11049, 11272, 11434) – the last two at approved concept stage.

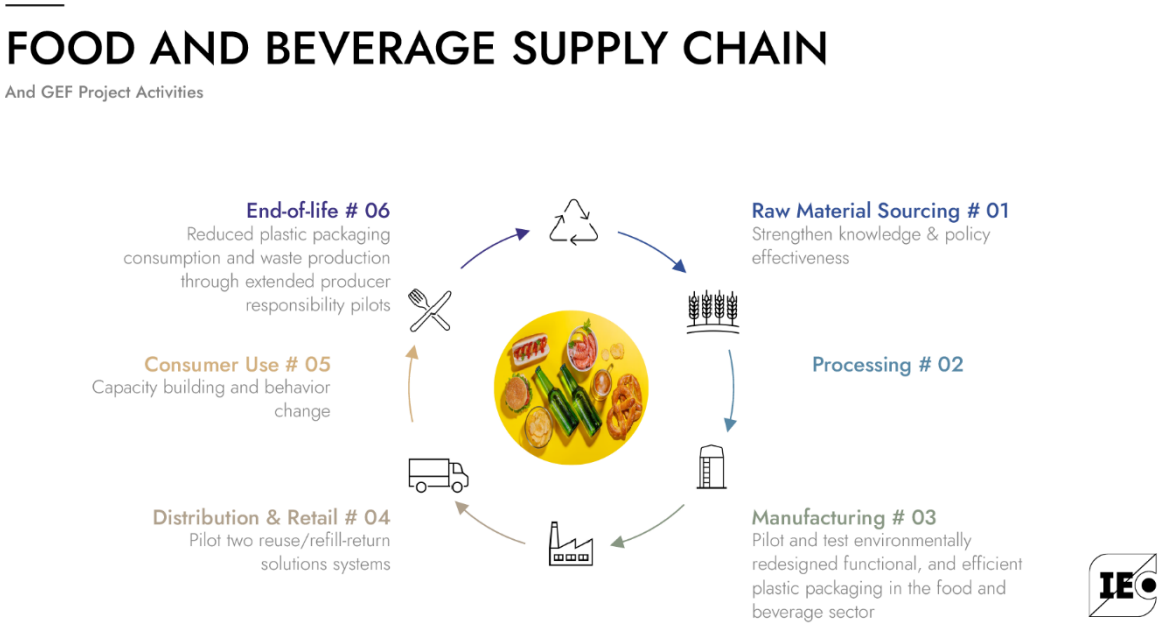
consumption. The proposed circular solutions focus on eliminating single-use plastic products and packaging, reducing reliance on crude oil as the primary feedstock; promoting circular design in materials, products, and business models; and ensuring active circulation of materials and products through reuse and refill systems.

151. **The program, consisting of a global platform project and 15 national projects, tackles plastic pollution** through collaboration with governments to develop circular policies, businesses to adopt circular practices, financiers to invest in circular solutions, and the public to raise awareness and shift consumer behavior. Collectively, the projects under the integrated program are expected to deliver significant global environmental benefits, including improved governance of one shared water ecosystem, mitigation of 16 million metric tons of CO_2 equivalent (Mt CO_2e), and the elimination of 10 million metric tons of hazardous chemicals. In addition to the integrated program, three standalone projects also use circular approaches to address plastic pollution, collectively aiming to reduce an additional 101,000 metric tons of plastic waste.

152. **Projects under the global standalone Shifting to Zero Waste Against Pollution (SWAP) Initiative (GEF ID: 11211, UNDP) address plastic pollution and are expected to generate socioeconomic benefits alongside environmental gains**. These include diversified livelihoods and economic growth, improved labor conditions for informal workers, and better human health. Furthermore, job creation is expected to rise from new business opportunities linked to zero-waste solutions. The GEF's approach to plastic management adopts a two-pronged strategy. The GEF-8 Integrated Program (GEF ID: 11181) aims to promote a circular economy for plastics within the sector, while projects under the chemicals and waste focal area target hard-to-manage plastic types.

153. **The GEF's approach to addressing plastic pollution in the food and beverage industry addresses key supply chain issues but requires further upstream engagement**. While GEF-8 projects on packaging are still pending approval, past efforts have focused on the end of the supply chain, including refill stations, recycling, and waste management. These are critical areas, but there is a growing need to address packaging upstream, particularly through extended producer responsibility legislation. Previous GEF-financed projects did not engage with packaging companies to promote design for recyclability, highlighting a critical area for improvement. In contrast, the GEF-8 Plastics Integrated Program (GEF ID 11181, UNEP) has reached out to industry leaders like Coca-Cola and Nestlé—two of the largest companies in the sector (Figure 15).

Figure 15: Food and beverage supply chain and GEF programming and activities



Source: IEO analysis.

154. **The main challenge for GEF interventions in the food supply chain under the chemicals and waste focal area is that the primary environmental impacts of food production occur in other focal areas**. As highlighted in a 2022 Organization for Economic Co-operation and Development (OECD) report,[69] the agri-food life cycle involves multiple stages, each with distinct environmental effects. These impacts include greenhouse gas emissions from energy use, land-use changes like deforestation due to increased demand, and various forms of waste, including food loss and packaging materials. Addressing these broader environmental issues typically falls under the GEF's land degradation, biodiversity, and climate change focal areas. Additionally, the focal area has financed projects to replace harmful chemicals in pesticides and fertilizers, such as in the GEF-7 Financing Agro-chemical Reduction and Management (FARM, GEFID: 10872 ADB) program.

155. **The chemicals and waste focal area, however, has a more limited scope**; although most waste generated by the food industry is organic, chemicals and waste interventions are focused primarily on chemical waste, such as food packaging. The GEF currently supports key steps in the food supply chain, such as raw material sourcing, manufacturing, and end-of-life processes, with some efforts aimed at reducing plastic waste during distribution and retail.

156. **Although the GEF does not target the upstream stages of food production directly, there is potential for intervention through resource-efficient and cleaner production (RECP) in**

[69] OECD. 2022. Environmental Impacts along Food Supply Chains, Paper No. 185, OECD Food, Agriculture and Fisheries, September 2022.

the agri-food industry. This approach offers a comprehensive framework for managing materials and processes; promoting waste elimination, water management, and energy efficiency; and ensuring quality and safety in food production. Additionally, RECP could influence consumer behavior by encouraging the adoption of sustainable practices in food product development. However, the most effective modalities for such interventions have yet to be determined.

157. **Sustained impact will require complementary local solutions in addition to addressing broader supply chain issues.** While the GEF focuses on the right entry points, no single program or project can provide all the solutions for one country or sector, especially when addressing multiple chemicals. The impact of these efforts is localized and influenced by factors such as public awareness of the need to recycle plastics and reduce open burning, consumer preferences, and the ability to engage with the private sector, particularly the food and beverage industry, to effectively address air quality and ensure the sustainability of project outcomes (box 6).

Box 6: Challenges with sustainability and low demand for recycled products in a recycling project in Viet Nam

As part of the Viet Nam POPs and Sound Harmful Chemicals Management Project (GEF ID: 5067, UNDP), two brick production lines were established in the villages of Phan Boi and Minh Khai, where recycled plastics were transformed into construction bricks. Despite the successful construction of two durable buildings, there was little demand for these bricks in the Viet-Namese market, resulting in the closure of the production lines after the project ended.

The project also missed an opportunity to create a more sustainable solution by collaborating with the private sector. For example, the Minh Khai recycling facility was located near a PepsiCo production plant, presenting a potential partnership for corporate responsibility in managing plastic waste, according to representatives from the Viet Nam Cleaner Production Centre Co. Ltd. (VNCPC) and Vina Color, who were involved in setting up the production line.

4.3. GEF approach to addressing mercury

158. **The GEF has been tackling mercury release into the environment through a multipronged strategy**, including interventions in gold mining, battery dismantling, dental amalgam, and skin-lightening products. The highlights of the IEO evaluation on Artisanal Gold Mining[70] are presented in box 7.

[70] GEF-IEO. 2022. GEF Interventions in the Artisanal and Small-Scale Gold Mining Sector, Evaluation Report No. 146, Washington, DC: GEF IEO.

159. **Recent GEF initiatives with the World Health Organization target the harmful effects of mercury in dental amalgam and skin-lightening products**. This evaluation assessed two ongoing projects: one addressing mercury in dental amalgam (GEF ID: 10936, UNEP) and the other focused on skin-lightening products (GEF ID: 10810, UNEP). While mercury use in these products is relatively small compared to other sectors, such as gold mining, their harmful effects on human health and the environment are just as significant.

Box 7: Enhancing formalization of and mercury reduction in artisanal and small-scale gold mining, GOLD+

GEF interventions in artisanal gold mining are highly relevant to the Minamata Convention and national government priorities related to mercury reduction. According to a 2022 IEO evaluation,[71] mercury use reductions were reported at project completion in some project areas in three completed case-study projects, including Ecuador, the Philippines, and Senegal. In addition, some projects in Peru and the Philippines made progress toward reaching formalization for artisanal gold miners.

The GEF-7 GOLD+ program (GEF ID: 10569, Conservation International) is being implemented in Bolivia, Nigeria, Madagascar, Honduras, Suriname, Ghana, Uganda, and Congo. Formalization of artisanal gold mining has been tried many times by governments with support from international organizations, but such efforts have failed to lead to a large portion of artisanal gold miners becoming formalized, except in Guyana, where artisanal gold mining has been widely legal for many years.[72] Governments have largely designed mining policy around large-scale mining, which brings in more revenue and, with fewer actors, is easier to regulate, while often ignoring artisanal gold mining in what is known as the "large-scale bias."[73]

In many cases, governments see little reason to invest further resources in artisanal gold mining when its potential to create revenue is small compared to the resources that would be required to adequately engage a rural and dispersed sector. Instead, they often focus on enforcement, which creates animosity. On the flip side, miners see little reason to formalize if the only result will be paying taxes. Given these inherent challenges to formalization, experts note that the issue is difficult to address. While the GEF-6 GOLD program (GEF ID: 9602, UNEP) targeted countries where formalization is already in an advanced state, the GOLD+ program (GEF ID: 10569, Conservation International) features formalization more prominently in its activities.

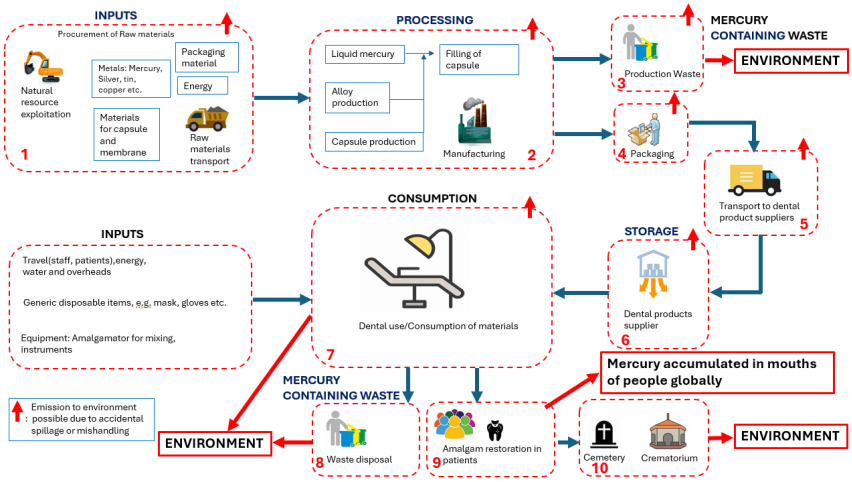
160. Dental amalgam is a major contributor to mercury pollution, particularly through waste disposal into wastewater systems.

161. **Figure 16 illustrates the various stages in the life cycle of dental amalgam, highlighting its potential to release mercury into the environment at any phase**. It underscores that dental amalgam can contribute to the environmental mercury pool at any stage of its life cycle, from production and use to disposal. This highlights the ongoing environmental risks associated with

[71] GEF-IEO. 2022. GEF Interventions in the Artisanal and Small-Scale Gold Mining Sector, Evaluation Report No. 146, Washington, DC: GEF IEO.
[72] Marshall, B.G., and M.M. Veiga. 2017. "Formalization of Artisanal Miners: Stop the Train, We Need to Get Off!" The Extractive Industries and Society 4 (2): 300–03.
[73] Hirons, M. 2020. "How the Sustainable Development Goals Risk Undermining Efforts to Address Environmental and Social Issues in the Small-Scale Mining Sector." *Environmental Science and Policy* 114: 321–28.

mercury use in dental amalgam, necessitating careful management at all points in the supply chain.

Figure 16: Cradle-to-grave life cycle of mercury used in dental amalgam



Source: IEO.

162. According to the World Health Organization (WHO), the global amount of mercury stored in dental fillings ranges between 3,000 and 5,000 tons. UNEP estimates that dental amalgam accounts for approximately 21 percent of total mercury consumption.[74]

163. **The GEF began addressing dental amalgam as a source of mercury pollution in GEF-5, identifying key gaps in national waste management strategies for mercury-containing products. (GEF IDs: 5222 and 5494).** Various projects during this replenishment period identified critical gaps, including the lack of national plans or strategies for managing waste from mercury-containing products. Additionally, healthcare waste management systems often did not account for mercury waste streams, highlighting the need for more comprehensive approaches to address mercury pollution effectively. The ongoing GEF-7 project on dental amalgam aims to phase down its use in Senegal, Uruguay, and Thailand, with each country at different stages of progress.

164. **In Senegal, the prevalence of dental amalgam use is currently being assessed under the GEF-financed project with early encouraging findings (GEF ID: 10936, UNEP).** Preliminary findings suggest that a considerable number of the 500 to 550 dentists in the country have ceased using amalgam. However, according to estimates from a specialist at the anti-poisoning institute, approximately 50 percent of dentists in Senegal still rely on dental amalgam for their practices, indicating that its use remains widespread despite growing efforts to phase it out. The project aims not only to understand the use of dental amalgam and promote a phasedown in mercury use, but also to ensure the safe disposal of mercury-containing dental amalgam. With no current legislation regulating amalgam and mercury use in Senegal, development of

[74] UNEP. 2016. Lessons from countries phasing down dental amalgam use. UNEP Chemicals and Waste Branch, Geneva, Switzerland.

safe disposal guidelines is needed. Since the country currently lacks facilities for the safe disposal of mercury, it is anticipated that amalgam waste will need to be shipped to Europe for proper processing. Educating dentists on correct disposal techniques is crucial, though the GEF project is awaiting the completion of a national survey before fully advancing these efforts.

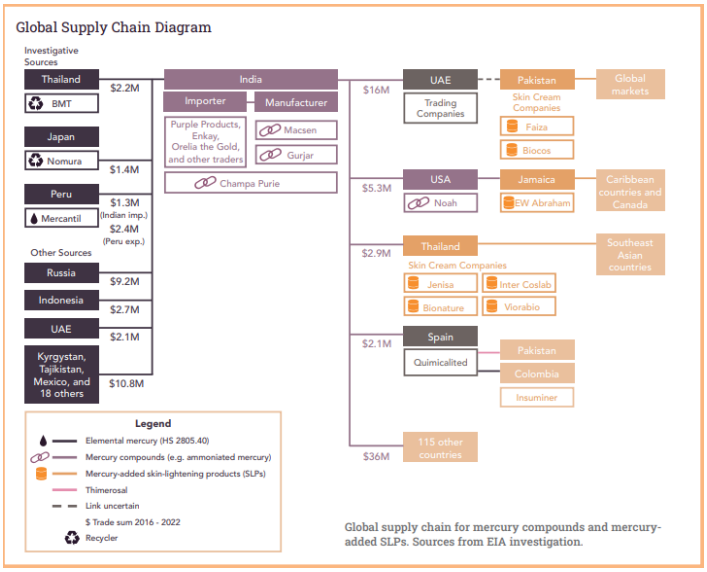
165. **Uruguay's experience with project implementation was notably successful.** The GEF-7 global project on dental amalgam (GEF ID: 10936, UNEP) provided increased visibility to the issue and validated Uruguay's efforts, which helped to accelerate the phaseout process. In 2018, the country removed dental amalgam from its oral health services catalog and classified it as an obsolete material. The project also played a key role in the development and passage of a national decree regulating mercury life-cycle management, with a particular focus on lamps and dental amalgam. The project financed a direct mercury analyzer (DMA) device, which reduced the analysis time for mercury samples from 48 hours to just 1 hour. Despite its efficiency, demand for the device's use was occasionally lagging at times. Key stakeholders from the health sector noted that without the GEF's involvement, dental amalgam and oral health might have been overlooked, as these issues had not been high on the political agenda.

Skin-lightening products

166. **The GEF's intervention in addressing mercury-containing skin lightening products represents an initial step toward testing approaches and strategies that support the Minamata Convention.** These products pose immediate health risks, primarily to women, yet awareness of their harmful effects, particularly on pregnant women, remains limited. Skin-lightening products continue to contribute significantly to mercury-related public health and environmental issues, despite the ban imposed by the Minamata Convention. Studies indicate that a significant percentage of skin-lightening creams used worldwide contain dangerous levels of mercury. According to a 2017–2018 study by the Zero Mercury Working Group, among 338 skin-lightening creams collected from 22 countries, 34 creams (10 percent of the samples) had mercury concentrations ranging from 93 to 16,353 parts per million (ppm), much more than the 1 mg/kg (1ppm) recommended by the Minamata Convention.[75]

[75] "About Us" | Minamata Convention on Mercury' <https://minamataconvention.org/en/about> [accessed 25 April 2024].

Figure 17: Global supply chain for mercury compounds and mercury-added skin-lightening products



Source: Environmental Investigation Agency, Mercury in Retrograde - EIA.org[76]

167. **Projects address critical points along the supply chain, but achieving sustained behavior change will be a challenge.** An ongoing GEF-7-funded project, Eliminating Mercury in Skin Lightening Products (GEF ID: 10810, UNEP), with a budget of USD 14 million, focuses on eliminating mercury-containing skin-lightening products. The project is being implemented in Jamaica, Sri Lanka, and Gabon, with a reduction goal of approximately 50–55 percent in each country. Project activities are supporting these countries in strengthening legislation, improving policy coherence, enhancing labeling standards, curbing black market sales, and enforcing laws. According to insights from the project team in Jamaica, sustained behavior change is anticipated to be a key focus moving forward, though it remains a significant challenge. The project has faced significant delays in Jamaica due to the COVID-19 pandemic, the impact of Hurricane Grace in 2021, and a smallpox outbreak in 2023, which stretched the Ministry of Health's capacity to prioritize these efforts. In 2025, UNEP will publish studies focused on legislation related to the online sales of skin-lightening products and an assessment of the root causes driving their use, whether for medical or beauty-related reasons.

168. **A key finding is that there is a need for clearer identification and prioritization of the most effective mercury mitigation measures**. Currently, it is crucial for the GEF, in partnership with the Minamata Convention and UNEP, to enhance the quantification of mercury sources that pose risks to human health and the environment. In the short term, phasing down the use of dental amalgam and mercury-containing skin lightening creams can be achieved through awareness-raising campaigns, promoting affordable alternatives, and encouraging behavior change. In the long term, a complete ban on mercury-containing products may become feasible without forcing skin lightening cream producers into illegality.

[76] Environmental Investigation Agency. 2023. Mercury in Retrograde – The Dark World of Skin-Lightening Products. Washington, D.C.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions

169. **The GEF has moved from focusing on individual chemicals, such as PCBs, pesticides, and mercury, toward a broader, sector-wide approach**. The GEF chemicals and waste portfolio demonstrates a clear shift toward integrated programming, as seen by the increasing allocation of funding to programs and child projects from GEF-5 to GEF-8 (2010–2024). An integrated approach to programming is essential for effective chemicals and waste management, particularly in sectors like garment and food packaging, where chemicals are used extensively throughout the supply chain. The GEF's focus on addressing chemicals at every stage is appropriate and crucial to prevent the proliferation of harmful substances and ensuring sustainable practices across industries. Without a coordinated effort among the GEF, countries and the Conventions, resources risk being spread too thin, diminishing the impact on overall sustainability goals.

170. **While this shift presents substantial advantages, it has also led to a reduced focus on legacy chemicals in recent projects, potentially reflecting the changing priorities of national agendas**. Despite the decrease in single-chemical initiatives, many countries still urgently need assistance to safely manage and dispose of PCBs to meet the 2028 Stockholm Convention deadline, as well as help with other legacy chemicals to combat pollution and enhance public health. The shift to a sector-wide approach risks creating a critical gap in targeted chemical management support at a time when it is most essential.

171. **The GEF chemicals and waste focal area plays a critical role in helping countries fulfill their obligations under the Stockholm and Minamata Conventions, as well as the Montreal Protocol and the Global Framework on Chemicals**. While countries value the GEF's support, challenges persist in accessing finance and obtaining assistance for submitting national implementation plans (NIPs) and Minamata initial assessments (MIAs) from implementing agencies. Streamlining access to funding and providing stronger support for countries in navigating these key processes is necessary to maximize impact.

172. **Private sector involvement has been vital for the sustainability of GEF chemicals and waste projects, yet persistent challenges remain to be addressed for broader success.** Engaging the private sector remains essential for ensuring long-term impact. GEF's market-oriented strategies, combined with local business participation and technology transfer, have driven transformational change—especially when supported by enabling legislation that facilitates scaling. In some instances, sustainability was ensured through a combination of GEF financing, government legislation or subsidies, certification schemes, or partnerships with international firms. However, resistance from industries facing intense competition—such as textiles and plating—and the absence of formal collaboration frameworks for knowledge sharing have hindered progress. Addressing these barriers, being more inclusive of small and medium enterprises, and fostering stronger, more structured private sector engagement will be key to enhancing the effectiveness and outcomes of future programs and projects.

173. **Smaller firms and chemical suppliers are often overlooked in broader interventions**. In developing countries, the textile and apparel industry is predominantly composed of small and micro enterprises, who face significant challenges in adopting sustainable practices due to limited financial resources and technical expertise. Smaller chemical suppliers, which play a critical role in ensuring sustainability across the supply chain, are often overlooked in broader GEF interventions. For industry-wide transitions to eco-friendly practices, targeted support for these smaller players is essential. Addressing high-cost barriers and involving suppliers more actively will enable smaller firms to better manage chemicals and adopt sustainable practices across the supply chain. Additionally, there are gaps in certification and labelling of chemicals produced by suppliers which need to be addressed.

174. **GEF projects demonstrate that successful technological innovation in chemicals and waste management involves more than installing new equipment**. While advancements in green chemistry—substituting harmful chemicals with safer alternatives—have been effectively implemented, investments in imported machinery designed to reduce or eliminate harmful chemicals have faced significant challenges. These challenges include underutilization of equipment due to insufficient training, lack of technical knowledge, inadequate budgets for maintenance, and supply chain constraints. Ensuring the effectiveness and sustainability of such investments will require that projects prioritize capacity building, training and provide adequate financial resources for ongoing and operations and future sustainability.

175. **Strong legislative frameworks are crucial for the success of chemicals and waste management projects, but enforcement and outcomes varied widely across countries**. Laws such as extended producer responsibility (EPR) play a key role in securing private sector engagement, while setting adequate tariffs for waste collection companies helps maintain consistent service delivery. Legislation has played a crucial role in scaling up pollution prevention. Additionally, formalizing the role of informal waste pickers or banning their involvement in e-waste collection is vital for reducing health risks and environmental harm. However, inconsistent enforcement of these legal measures in some countries has posed significant challenges, ultimately affecting the effectiveness and sustainability of project outcomes.

176. **The GEF can play a pivotal role in fostering policy coherence by promoting interministerial collaboration and enhancing enforcement and coordination among government agencies**, where there is country appetite and capacity, and project designs which encourage coherence. Through GEF financing, ministries with diverse, sometimes conflicting mandates are incentivized to collaborate, overcoming barriers to cooperation. This alignment enables ministries to address complex environmental challenges in a coordinated manner, rather than working at cross purposes. The GEF has helped promote policy coherence by fostering collaboration across ministries through innovative project designs including facilitating national dialogues, supporting legislative development, organizing study tours for staff from various ministries to learn from other countries, and engaging in awareness-raising and knowledge transfer initiatives. However, in some smaller countries, the GEF has been less successful in driving policy coherence primarily due to government departments feeling overstretched to take on co-ordination.

177. **Efforts to achieve socioeconomic outcomes and health co-benefits in GEF projects have grown**, but quantifying health co-benefits remains challenging due to the absence of indicators and the long-term nature of health impacts. The GEF's current approach to tracking socioeconomic co-benefits is limited, revealing the need for a stronger results framework. The assessment highlights that the GEF lacks standardized indicators for measuring socioeconomic co-benefits, which are inconsistently integrated into project design and monitoring processes. A key challenge is that the GEF lacks a mandate to measure health benefits, which are long-term outcomes that often extend beyond the typical project timeline. Co-ordination between Agencies that collect information on chemical prevalence and the GEF could be utilized to report on environmental outcomes such as chemical pollution that have implications for health outcomes. Additionally, GEF projects often fall short in addressing gender-specific impacts, despite the heightened vulnerability of women and newborns to harmful chemicals. It would be useful to incorporate standardized socioeconomic and health indicators, integrate these co-benefits into project design and monitoring, and take a more proactive approach in addressing gender-related risks and impacts.

178. **The GEF's focus on the food and beverage supply chain, particularly at the end-of-life stage, highlights the effectiveness and sustainability of prevention over remediation**. Allowing plastics and packaging waste to accumulate in landfills leads to CO2 and methane emissions, costly geo-engineering, and the risk of toxic leakage. This is due to a combination of factors, including limited public awareness, insufficient government involvement in waste management and recycling systems, inadequate legislation, and a lack of education on recycling practices. GEF's preventative approach, including recycling, composting, and waste reduction, has proven to be sustainable when imported or local technologies are supported by adequate technical capacity and financing. Additionally, integrating informal waste pickers into formal waste management systems enhances both environmental outcomes and social equity, creating a more comprehensive and inclusive strategy for waste management. The GEF's progression toward upstream prevention represents a significant evolution from GEF-5 to GEF-8.

179. **The GEF's efforts to tackle mercury pollution through recent interventions in sectors such as dental amalgam and skin-lightening products emphasize the need for focusing on supply as well as behavior change**. Dental amalgam, a significant source of mercury pollution, particularly through improper waste disposal, requires both technical solutions, such as safe disposal facilities, and education for dentists on proper disposal techniques. The GEF is collaborating with customs authorities to prevent illegal imports of mercury, funds educational campaigns, and is supporting assessments of amalgam use in dentistry. Similarly, skin-lightening products remain a persistent source of mercury contamination, despite bans imposed by the Minamata Convention. In this area, the GEF is working on building awareness and with smaller family- owned enterprises producing such products. However, success in reducing mercury use in dental amalgams and skin lightening products will ultimately depend on both--driving behavior change through awareness raising and supply chain interventions such as better labeling, supporting import bans.

5.2. Recommendations

(a) **Strengthen the focus on policy and regulatory reforms, awareness, and communication within Chemicals and Waste projects and programs.** The GEF should strengthen its focus on comprehensive policy and regulatory reforms, alongside heightened public awareness and communication efforts. Effective reforms require robust regulatory frameworks, supported by widespread public education campaigns to drive behavioral change, and enhanced enforcement mechanisms to ensure compliance.

(b) **Strengthen regulatory frameworks and further engagement with the broader private sector, including SMEs, to enhance project sustainability in chemicals and waste-related projects and programs.** Regulatory reforms and compliance with international standards play a crucial role in encouraging private sector participation in chemicals projects. The GEF should assist with reforms including formalizing the informal sector, enforcing anti-pollution laws, and legislating extended producer responsibility. In addition to strengthening regulatory frameworks, the GEF should continue to ensure the financial viability and technical capacity of small and medium enterprises through investments in advanced technologies and other forms of capacity building support.

(c) **The GEF needs to ensure that investments in autoclaves, laboratory equipment, and other machinery for chemicals and waste management, associated with indigenous or imported technologies, are fully utilized.** Local capacity must be addressed to ensure that technical skills of personnel are locally available thereby minimizing the risk of underutilization. To ensure sustainability, it is essential to ensure personnel receive adequate training, spare parts are readily accessible, and sufficient budgets are allocated for ongoing operation and maintenance.

(d) **Integrate health co-benefit indicators into project designs and the design and monitoring frameworks**. The GEF should, where relevant, incorporate health co-benefit indicators into project design and monitoring frameworks to better capture the impacts of its interventions. By adopting quantifiable indicators, these co-benefits can be effectively measured and tracked across projects. Greater emphasis on these indicators during project design will ensure that they are clearly defined within the project description, results framework, and theory of change, thereby enhancing the GEF's ability to demonstrate both environmental and health-related outcomes.

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