

Independent Terminal Evaluation

Implementing integrated measures for minimizing mercury releases from artisanal gold mining

UNIDO Project No.: GF/RLA/12/003 - 100271

GEF ID: 4799



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

UNIDO INDEPENDENT EVALUATION DIVISION

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Acknowledgements

This report includes the findings of the Terminal Evaluation (TE) of the Global Environment Facility (GEF) funded project “Implementing integrated measures for minimizing mercury releases from artisanal gold mining”

The TE report has been prepared by two independent consultants, Paul Cordy (TE Team Leader) and Rodrigo Eguiguren (TE National Consultant).

The Terminal Evaluation was carried out during the period of July and December, 2016. The initial TE mission was undertaken from July 27 to August 6 by Paul Cordy, during which meetings were held with project partners as well as beneficiaries and field visits were made to different project sites (see Annex A). During this meeting, the national and international consultants met to coordinate activities, and then after the initial mission, the national consultant continued the effort by interviewing the remaining stakeholders that were not included in the initial visit.

Abbreviations and acronyms

Acronym/Abbreviation	Description
ANA	Autoridad Nacional del Agua (The National Water Authority of Peru)
ARCOM	Agency for mining control and regulation in Ecuador
ASGM	Artisanal and Small-Scale Gold Mining
CDR	Communication, Dissemination and Replication
CIRDI	Canadian International Resources and Development Institute
DGAI	Director General Administrative Instruction
DGB	Director General Bulletin
ENAMI	Empresa Nacional de Minería
ESSPP	Environmental and Social Safeguards Policies and Procedures
GEF	Global Environment Facility
INIGEMM	Instituto Nacional de investigación Geológico, Minero, y Metalúrgico
INC	Inter-governmental Negotiating Committee
IW	International Waters
ITCAM	International Training Center for Artisanal Miners
LFA	Logical Framework Assessment
LFM	LogFrame Matrix
M&E	Monitoring and Evaluation
MINAM	Ministerio de Ambiente
MINEM	Ministerio de Energía y Minas
MoE	Ministry of Environment
NC	National Coordinator
NIP	National Implementation Plan
OFP	Operational Focal Point
PAD	Project Allotment Document
PCU	Project Coordination Unit
PIF	Project Identification Form
PIR	Project Implementation Report
PME	Peruvian Ministry of Environment
POPs	Persistent Organic Pollutants
RPC	Regional Project Coordinator
PTS	Persistent Toxic Substances
SENAGUA	The National Water Secretariat of Ecuador
TOR	Terms of Reference
UBC-NBK	University of British Columbia - Norman B. Keevil Institute of Mining
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization

Glossary of evaluation-related terms

Term	Definition
Baseline	The situation, prior to an intervention, against which progress can be assessed.
Effect	Intended or unintended change due directly or indirectly to an intervention.
Effectiveness	The extent to which the development intervention's objectives were achieved, or are expected to be achieved.
Efficiency	A measure of how economically resources/inputs (funds, expertise, time, etc.) are converted to results.
Impact	Positive and negative, intended and non-intended, directly and indirectly, long term effects produced by a development intervention.
Indicator	Quantitative or qualitative factors that provide a means to measure the changes caused by an intervention.
Lessons learned	Generalizations based on evaluation experiences that abstract from the specific circumstances to broader situations.
Logframe (logical framework approach)	Management tool used to facilitate the planning, implementation and evaluation of an intervention. It involves identifying strategic elements (activities, outputs, outcome, impact) and their causal relationships, indicators, and assumptions that may affect success or failure. Based on RBM (results based management) principles.
Outcome	The likely or achieved (short-term and/or medium-term) effects of an intervention's outputs.
Outputs	The products, capital goods and services which result from an intervention; may also include changes resulting from the intervention which are relevant to the achievement of outcomes.
Relevance	The extent to which the objectives of an intervention are consistent with beneficiaries' requirements, country needs, global priorities and partners' and donor's policies.
Risks	Factors, normally outside the scope of an intervention, which may affect the achievement of an intervention's objectives.
Sustainability	The continuation of benefits from an intervention, after the development assistance has been completed.
Target groups	The specific individuals or organizations for whose benefit an intervention is undertaken.

Executive summary

Background

Artisanal and small-scale gold mining is the world's top source of anthropogenic mercury emissions to the environment, among many other serious environmental issues. Most gold mining and processing in Ecuador takes place in Portovelo-Zaruma, where gold mining has been ongoing since Incan times. Today, the mining district of Portovelo-Zaruma processes an estimated 3,000 tonnes of ore per day, producing 9 tonnes of gold per year and releasing at least 22 tonnes of mercury into the environment. Large volumes of gold and mercury are traded illegally, so the actual production and mercury releases are likely to be much higher than these estimates.

The vast majority of gold produced in Ecuador is extracted in 87 processing centres; 80 per cent of which centres also provide cyanidation facilities. Locally referred to as "*plantas de beneficio*", these plants provide mining operations of various sizes with paid access to processing equipment that would be unaffordable by independent operations⁹. Between 1993 and 1996, the Government of Ecuador began to formalize miners, cooperatives and owners of processing centres in Portovelo-Zaruma, however formalization remains patchy and especially difficult to attain for smaller scale operators and artisanal miners.

Approximately 1.6 million tonnes of tailings were produced annually by the processing centers, despite having no space to store the tailings and only about 20% of plants destroy the cyanide before discharge. Large and increasing amounts of tailings from other areas of Ecuador are also reprocessed in Portovelo, thus adding to the storage and contamination problem. These tailings are often discharged at night when the regulators are not watching, although the construction of a communal tailings storage impoundment has increased responsible tailings management in the area.

Effluents are carried to coastal areas by the Puyango-Tumbes transboundary river system, upon which many people in both nations depend for water and irrigation. Contamination of the large industrial aquaculture and agriculture activities in the coastal regions, as well as of the municipal water system of the city of Tumbes, is of particular concern. There is a great need for a basin scale assessment and long-term monitoring of environmental quality for the protection of human health and the food supply.

A large part of the technology transfer activities was focused in Ecuador, as this is the main source of mercury emissions to the Puyango-Tumbes river basin. Ecuador and Peru have a Binational Plan for cooperation in their border region, but the area was the subject of a brief territorial war at the end of the millennium. Although both countries have demonstrated a commitment to improving conditions at Artisanal and Small-Scale Gold Mining (ASGM) communities, the efforts have not been able to fully tackle the problems

and mitigate the negative health and environmental impacts this activity presents. In many cases, local and national governments find it difficult to control activities outside of the formal sector and far from the government offices. A concerted approach is therefore necessary in order to maximize existing efforts and have a true impact on both national and regional ASGM communities. This project intended to foster better understanding and cooperation between Ecuador and Peru by increasing knowledge of environmental problems and solutions in their transboundary waters, and to provide novel alternative technical and financial models for more environmentally sound gold extraction.

The project is funded through a GEF grant, amounting to USD 999,900, a UNIDO contribution of USD 50,000 (in kind); and the counterparts' co-financing of USD 2,626,764 (in kind), which amount to total project budget of USD 3,676,664.

Project goals

This project's main target was a >40% reduction of mercury releases to the Puyango-Tumbes basin. It also aimed to promote more cost-effective gold recovery and income enhancement through an integrated series of measures including capacity building, technology transfer and policy/legal reforms. The project took a basin scale approach to assessment of environmental pollution stemming from gold mining and processing in Portovelo-Zaruma, Ecuador. The project had intended to support the Ecuadorian government's plans to establish an International Training Center for Artisanal Miners (ITCAM) in Portovelo, in which miners from across the region would travel to be trained in best practices and alternative techniques that would be developed and promoted by the project.

Key findings and conclusions

- i. According to the project's final report, mercury use by the processing centers (62 out of 87 centers) was reduced approximately 60%, from 4.64 tonnes/Hg/a in 2013 to 1.79 tonnes/Hg/a in 2015. Reanalysis of the report's numbers suggests that as much as 40% of the Puyango-Tumbes mercury emissions were reduced, which meets the anticipated target. However, the report did not state its achievements in precisely the same terms as specified at the outset. This evaluation makes an effort to bring out the achievements of the project even though they are not always explicitly stated;
- ii. New and specific information produced by this project through events that convened important government stakeholders led to agreements and commitments to action that were then carried out cooperatively by regional representatives of the Ministerio de Energia y Minas (MINEM), the Ministerio de Ambiente (MINAM), and the Instituto Nacional de investigacion Geologico, Minero, y Metalurgico (INIGEMM) in the field. This expanded interaction among government, community, and miners, while extending miners' perception of the reach and accessibility of the state and its laws. This project also aimed to help shape new

legislation with respect to mercury and formalization. Toward the end of the project, the Ecuadorian government banned mercury in mining, and this has led to demonstrable reductions in use and emissions. In practical terms, the complete ban on mercury use has impacted the aforementioned multilateral cooperation and has further marginalized the lowest income miners that most use mercury. Many are now forced to buy mercury on the black market and hide their activities. The project did not provide any alternatives to these miners in Ecuador, and instead focused on small scale processing plants through collaboration with the association of processing plant owners, APROPLASMIN. This became a pivotal alliance when the training centre was not endorsed by key stakeholders and had to be abandoned. What followed instead was a valuable, interesting, and useful analysis of present mineralogy and mineral processing methods, which will serve as an important guide to future projects in the area with similar aims;

- iii. As an alternative to mercury use in Ecuador, the project promoted direct cyanidation, which is a service offered by most of the local processing plants. This completely eliminates mercury application and gold recovery is demonstrably far superior. Issues of waste disposal remain, though responsible users in the area decompose the cyanide before discharge to storage ponds. Many miners were unconcerned by mercury toxicity or lacked awareness of the greater efficiency of cyanidation, however many also cannot assemble sufficient ore to fill the minimum load for cyanidation or don't trust that the plant operators won't skim some of their gold. Mercury is immediate and transparent by comparison;
- iv. Therefore, the initial strategy of seminar based workshops and training was not the optimal strategy, as lack of awareness and access to alternatives seem not to have been problems. In the absence of a training centre, the project used existing modern and responsible plants as training facilities, but these are million-dollar scale facilities and its difficult for an artisanal miner to see what intermediate steps they could take to be more efficient and clean. Sometimes miners complained that the trainers were too theoretical and less practically experienced than they. A change in focus and staff toward the end of the project learned from this and began to study the effective local empirical methods in a way that will be of great assistance to future project;
- v. Artisanal miners in Peru received greater attention and assistance, particularly in terms of formalization. Many Peruvians eliminated mercury completely as a result of this project, and the project's assistance to mining and environmental regulation and enforcement organizations led to significant advances in their understanding and support or control of mining activities in the Piura department;
- vi. Sending expensive international consultants for periodic seminar delivery and environmental sampling was inefficient in terms of time, money, and personnel, and as a result the project suffered from slow and patchy implementation that was at times disconnected from the needs and context in the field. The project met or exceeded all of its co-financing goals and the in-kind contributions from most

partner organizations were clearly evident in the evaluation interviews if not in print. The monitoring and evaluation was not adequately funded or executed. No exit surveys were conducted at the end of any training or workshop sessions, and therefore it is impossible to assess the satisfaction or learning of any of the participants. Mercury reduction claims are based on voluntary disclosures soon after a mercury ban, which casts doubt as to the veracity of the mercury reduction claims;

- vii. Nevertheless, it is clear that mercury has been reduced significantly in the region, mostly due to the mercury ban, the expansion of the use of direct cyanidation or of selling ore instead of processing; all of which was facilitated or promoted by the project. The basin scale environmental assessment and mineral processing investigations are useful outputs despite the fact that they are not precisely what the project had anticipated. In detail, the project was poorly executed, with little regard for the original indicators or monitoring. Therefore, on balance this evaluation concludes that the project was moderately successful. In terms of sustainability, though the project left little in its wake to continue the advanced made without external support, by chance there are other international organizations engaging in new projects that will continue and expand the achievements of the UNIDO project.

Key Recommendations and lessons

- A. As an alternative to mercury use in Ecuador, the project promoted direct cyanidation, which is a service offered by most of the local processing plants. This completely eliminates mercury application and gold recovery is demonstrably far superior.
- B. The project could have benefited from greater focus on technical gold recovery rather than mercury health and safety, and less reliance on intermittent discontinuous deployment of international consultants. This practice was remedied toward the end of the project.
- C. This project successfully reduced mercury use in Ecuador and Peru through training campaigns that encouraged miners to eliminate mercury by selling ore directly or paying for cyanidation.
- D. The national mercury-ban in Ecuador, which was likely at least partially a result of the data and awareness brought about by UNIDO's project, ensures that mercury use will continue to decline. Unfortunately, it also pushes great numbers of miners into illegality, forces them to hide their mercury use and obtain it from organized crime.

I. Evaluation objectives, scope and methodology

Objective of the evaluation

This evaluation aims to assess project performance in terms of relevance, effectiveness, efficiency and determine outcomes and impacts, actual and potential, arising from the United Nations Industrial Development Organization (UNIDO) project GF/RLA/12/003 - 100271 entitled “Implementing integrated measures for minimizing mercury releases from artisanal gold mining.” The findings shall include analysis of the long-term sustainability of the project outcomes and impacts, as well as a set of recommendations for similar projects in the future.

This inception report defines the scope, design and associated technical instruments as well as a specific implementation plan. The purpose of the inception report is to interpret and clarify the terms of reference, and to come to a basic agreement with the commissioning programme unit on how the evaluation will be conducted, how the contribution to the achievement of outcomes will be ascertained, and what the final product will look like.

Scope of the evaluation

This terminal evaluation includes field visits and project document reviews to ascertain project accomplishments, as well as interviews with key stakeholders at the national and local levels. Through the examination and assessment of the perspectives of the Ecuadorian and Peruvian Governments, counterparts, the GEF, UNIDO and other stakeholders, the evaluation team will analyze the level of attainment of global environmental objectives and project objectives. This includes:

- Verification of prospects for development impact and sustainability of project outcomes based on indicator targets.
- Re-examination of the relevance of the objectives and other elements of project design according to GEF Project Review Criteria:
 - Implementation approach
 - Country ownership/drivenness
 - Stakeholder participation
 - Sustainability
 - Replication approach
 - Financial planning
 - Cost-effectiveness
 - Monitoring and evaluation
- Draw lessons of wider applicability from experience gained in this project for replication in other projects/countries.

The key question of the terminal evaluation is whether the project has achieved or is likely to achieve the main objective of protecting human health and the environment by implementing integrated measures aimed at minimizing mercury releases (>40%) from artisanal gold mining activities affecting the Puyango River basin in Ecuador and the Tumbes River basin in Peru.

Methodology

The terminal evaluation was conducted in accordance with the UNIDO Evaluation Policy, the UNIDO Guidelines for the Technical Cooperation Programme and Project Cycle, the GEF Guidelines for GEF Agencies in Conducting Terminal Evaluations⁴, the GEF Monitoring and Evaluation Policy and the GEF Minimum Fiduciary Standards for GEF Implementing and Executing Agencies. It was carried out as an independent in-depth evaluation using a participatory approach whereby all key parties associated with the project are kept informed and regularly consulted throughout the evaluation. The evaluation team liaised with the UNIDO Independent Evaluation Division (ODG/EVQ/IEV) on the conduct of the evaluation and methodological issues.

The evaluation team used different methods to gather, analyze, and deliver evidence-based qualitative and quantitative information based on diverse sources, including: desk studies and literature review, statistical analysis, individual interviews, focus group meetings, surveys and direct observation. This approach not only enabled the evaluation to assess causality through quantitative means but also to provide reasons for why certain results were achieved or not and to triangulate information for higher reliability of findings.

The methodology included:

1. A desk review of project documents, including, but not limited to:
 - (a) The original project document, monitoring reports (such as progress and financial reports to UNIDO and UNIDO-GEF annual Project Implementation Reports (PIRs)), mid-term review (MTR) report, output reports (case studies, action plans, sub-regional strategies, etc.), back-to-office mission report(s), end-of-contract report(s) and relevant correspondence.
 - (b) If applicable, notes from the meetings of committees involved in the project (e.g. approval and steering committees).
 - (c) Other project-related material produced by the project.
2. The evaluation team will use available models of (or reconstruct if necessary) theory of change for the different types of intervention (enabling, capacity, investment, demonstration). The validity of the theory of change will be examined through specific questions in interviews and possibly through a survey of stakeholders.
3. Counterfactual information: In those cases where baseline information for relevant indicators is not available, the evaluation team will aim at establishing a proxy-baseline through recall and secondary information.

4. Interviews with project management and technical support including staff and management at UNIDO HQ and in the field and – if necessary - staff associated with the project’s financial administration and procurement.
5. Interviews with project partners and stakeholders, including, among others, government counterparts, GEF OFP, project stakeholders, and co-financing partners as shown in the corresponding sections of the project documents.
6. On-site observation of results achieved by demonstration projects, including interviews of actual and potential beneficiaries of improved technologies.
7. Interviews and telephone interviews with intended users for the project outputs and other stakeholders involved in the project. The evaluation team shall determine whether to seek additional information and opinions from representatives of any donor agency(ies) or other organizations.
8. Interviews with the relevant UNIDO Field Office in Ecuador (which covers Ecuador and Peru), to the extent that it was involved in the project, and members of the project management team and the various national and sub-regional authorities dealing with project activities as necessary. If deemed necessary, the evaluation team shall also gain broader perspectives from discussions with relevant GEF Secretariat staff.
9. Other interviews, surveys or document reviews as deemed necessary by the evaluation team and/or UNIDO, ODG/EVQ/IEV for triangulation purposes.
10. The inception report will provide details on the methodology used by the evaluation team and include an evaluation matrix.

II. Country and project background

Artisanal and small-scale gold mining (ASGM) is the primary source of gold production in Ecuador, accounting for 85 per cent of total national production¹. In Latin America, Ecuador ranks in fourth place both for estimated gold production and total number of artisanal and small-scale gold miners². The majority of mining occurs in the south of the country, with the three top gold mining areas being Portovelo-Zaruma in the Province of El Oro, Ponce Enriquez in the Province of Azuay, and Nambija the Province of Zamora Chinchipe.

There are about 90,000 workers directly employed in artisanal and small-scale mining in Ecuador, 65% of which work in gold mining (60,000). Of the total ASGM work force, 7% are women and 5% are children. Estimates for total gold production vary across reports, with recent publications indicating an unofficial annual production between 10 and 20 tonnes.

Intensive mercury use and cyanidation in gold processing, including the cyanidation of mercury contaminated tailings, is one of the primary environmental concerns associated with the ASGM sector of southern Ecuador. River health and the overall health of the ecosystem is threatened. Sediments, cyanide, mercury and other metals present in [mined] ore, such as lead, manganese and arsenic that are released during gold processing may be having severely negative impacts on fish, crops and human health. Many of the processing plants have pipes that empty directly into the Puyango River and its tributaries, and there are tailings piles with high levels of toxic metals including mercury, cadmium, copper, manganese, lead, and arsenic situated on the river banks.

Mercury losses could be as much as tenfold the amount of gold produced for operations in Ecuador. Based on the official gold production figures of 2005, AGSM activities in Ecuador could be responsible for the release of as much as 22.5 tonnes of mercury annually. However, taking into account the fact that unofficial total production at the time was likely more than double the official count, and that ASGM activities in Latin America have expanded rapidly over the past decade, one would expect current actual mercury releases to be much higher. In most cases, the only attempt to recover mercury is done by squeezing the amalgam in a piece of cloth before it is burned in an open-air pan. Retorts are rarely used. In Portovelo-Zaruma alone, it is estimated that 1.5 tons of mercury is released annually through the various amalgamation processes (70% as air emissions and 30% leached from tailings)¹. The Government of Ecuador, through the Ministry of Nonrenewable Natural Resources and its National Research Institute for Geology, Mining and Metallurgy (INIGEMM) are mandated to train and reform the ASGM activities.

The Puyango-Tumbes River is an important source of water for both Ecuador and Peru;

¹ Velasquez-Lopez et. al. "Mercury balance in amalgamation in artisanal and small-scale gold mining: identifying strategies for reducing environmental pollution in Portovelo-Zaruma Ecuador." *Journal of Cleaner Production*, 2010

60% of the river are headwaters in Ecuador, and the rest borders the ocean in Peru. Populations living in the middle and lower basin rely almost exclusively on the Puyango-Tumbes River as their primary water source. The Puyango-Tumbes River is part of the oldest continuing border dispute in the Western Hemisphere. In 1999 hostilities were formally ended and a border settlement reached. Now, the two countries are actively engaged in a restoration campaign to decontaminate the Puyango-Tumbes River system. Annual binational ministerial meetings which began in 2007, and in February 2013, The National Water Secretariat of Ecuador (SENAGUA) and The National Water Authority of Peru (ANA) signed a UNDP (United Nations Development Programme) agreement with the stated purpose of: “Strengthening institutional, policy, legal and scientific-technical capacities to implement Integrated Transboundary Water Resources Management in Puyango-Tumbes, Catamayo-Chira and Zarumilla River Basins and Aquifers integrating climate variability concerns”. The partially GEF funded grant (in total nearly USD 25 M) signals a strong commitment to working together to solve trans-border concerns.

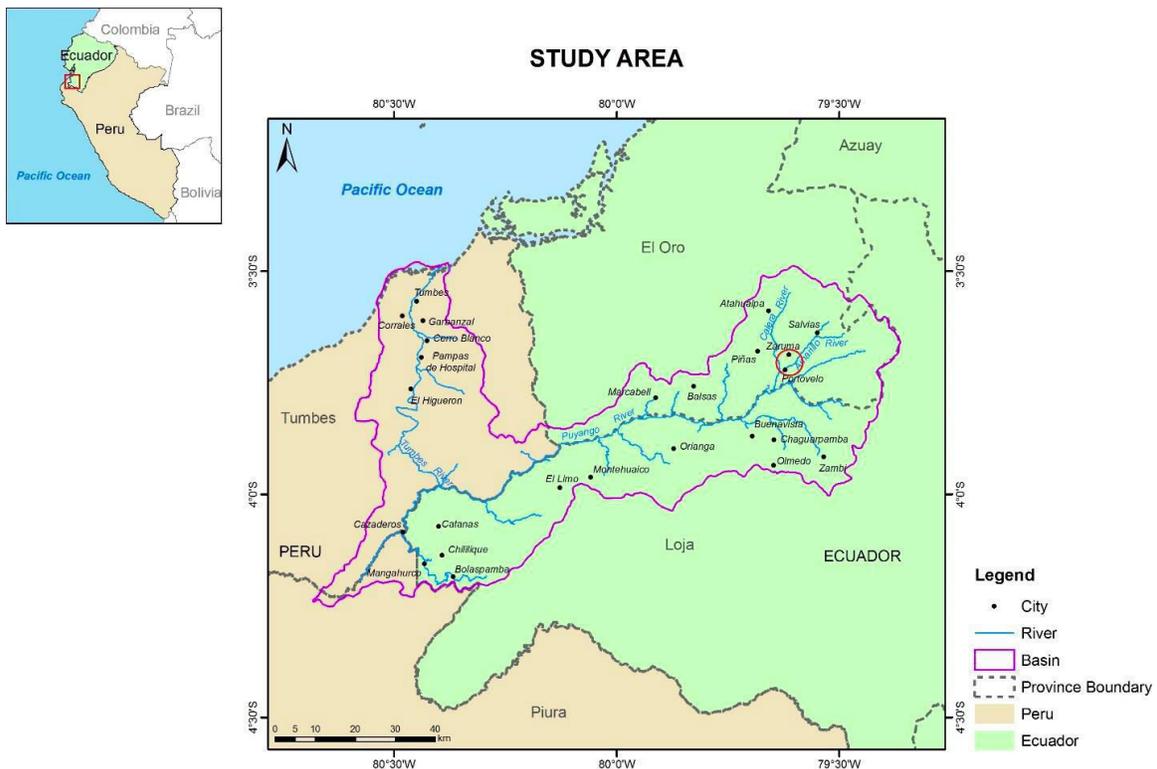


Figure 1. Location of processing centers in the mining region of Portovelo-Zaruma (red circle) within the Puyango-Tumbes River basin, which encompasses both Ecuador and Peru.

Peru is the largest producer of gold in Latin America. In 2002, the mining industry generated 23% of Peru’s total exports, 47% of which was from gold. In 2003 the gold production in Peru reached 171.5 tonnes. Exports were estimated at USD 2.05 billion, a 38% increase compared to 2002; informal miners contributed 17% of the production. In 2005 the gold production grew another 20%. The Department of Piura’s ASGM sector arose relatively recently, and mining operations are clustered near the Ecuador border. Formalization and mineral concession rights are the main challenges of these miners in

general. National Plan for the Formalization of Artisanal Mining (Supreme Decree No. 045-2010-PCM) is a recent effort from the Peruvian Government to support ASGM communities. The Plan has two main components, the formalization of the artisanal mining sector and the promotion of sustainable mining practices.

Project summary

Project goals

This project's main target was a >40% reduction of mercury releases to the Puyango-Tumbes basin. It also aimed to promote more cost-effective gold recovery and income enhancement through an integrated series of measures including capacity building, technology transfer and policy/legal reforms. The project was to investigate environmental pollution stemming from gold mining and processing in Portovelo-Zaruma, Ecuador.

The project had intended to establish an International Training Center for Artisanal Miners (ITCAM) in Portovelo, as per INIGEMM's plans at the time. Miners from across the region would travel to be trained in best practices and alternative techniques that would be developed and promoted by the project.

The main Ecuadorian counterpart of this project was INIGEMM, in cooperation with the main project contractor, University of British Colombia - Norman B. Keevil Institute of Mining Engineering (UBC-NBK), and with support from the Technical University of Machala, Ecuador.

Project factsheet

Project Title	Implementing integrated measures for minimizing mercury releases from artisanal gold mining
UNIDO project No.:	GF/RLA/12/003 - 100271
GEF project ID	4799
Region	Latin America
Country(ies)	Ecuador, Peru
GEF focal area(s) and operational programme	Multi focal area (Chemicals – POPs and International Waters)
GEF implementing agency(ies)	UNIDO
GEF executing partner(s)	National Geological, Mining and Metallurgy Research Institute (INIGEMM) – Ecuador Ministry of Environment - Peru
Project size (FSP, MSP, EA)	MSP
Project CEO endorsement / Approval date	19 March 2012

Project Title	Implementing integrated measures for minimizing mercury releases from artisanal gold mining
Project implementation start date (First PAD issuance date)	18 June 2012
Original expected implementation end date (indicated in CEO endorsement/Approval document)	18 March 2015
Revised expected implementation end date (if applicable)	31 December 2016
Actual implementation end date	31 December 2016
GEF project grant (excluding PPG, in USD)	999,900
GEF PPG (if applicable, in USD)	
UNIDO co-financing (in USD)	50,000 (in kind)
Total co-financing at CEO endorsement (in USD)	2,676,764 (cash-in-kind)
Materialized co-financing at project completion (in USD)	
Total project cost (excluding PPG and agency support cost, in USD; i.e., GEF project grant + total co- financing at CEO endorsement)	3,676,664
Mid-term review date	
Planned terminal evaluation date	July-October 2016

Some financial details are shown below:

Project outcomes	Donor (GEF/other) (USD)	Co-Financing (USD)	Total (USD)
1. Mercury minimization strategies and reduction targets endorsed by stakeholders in both countries	40,000	290,000	330,000.00
2. Reduction in mercury use and emissions in the targeted mining communities	769,000	2,100,000	2,869,000.00
3. Project objectives and results are communicated / disseminated to achieve replication at a national, regional and international level.	100,000	52,000	152,000.00
Project management	90,900	234,764	325,664.00
Total (USD)	999,900	2,676,764	3,676,664

Project implementation and execution arrangements

UNIDO: GEF implementation agency and responsible for overall monitoring and evaluation of the project, as well as reporting progress to the donor.

UNEP: Liaise with UNIDO through the Global Mercury Partnership on policies development, basin level action plans and national strategic action plans

INIGEMM: formalization and capacity building of miners in Ecuador (establishment of the International Training Center for Artisanal Mining – ITCAM), educating the local communities and strengthening the legal framework

Peruvian Ministry of Environment: implementing agency in Peru

Project Coordination Unit (PCU): was to be established in Ecuador, and to comprise:
Regional Project Coordinator (RPC): responsible for overall coordination of project activities, day-to-day implementation of the project in Ecuador and coordinate activities with the National Coordinator in Peru.

National Coordinator (NC): in Peru.

Other partner institutions that collaborated on research initiatives in this project include Mercer University, the University of Toronto, ANA (Autoridad Nacional del Agua). Specifically, a formal agreement between UBC and INIGEMM allowed for all collected and generated data to be shared equally and freely between these two institutions. Finally, the Canadian International Resources and Development Institute (CIRDI) was a collaborating partner that also contributed funding and support for the realization of this project.

This project is consistent with GEF focal area and international chemical and environmental treaties. The project is in line with the overall goal of the Chemicals Focal Area to "promote the sound management of chemicals to lead to the minimization of adverse effects on human health and the environment", and in particular with Objective 3 to "Pilot sound chemicals management and mercury reduction". The project aimed to strengthen the national capacity of both Ecuador and Peru to effectively manage mercury in the artisanal and small-scale gold mining sector. An emphasis on reductions in the releases of mercury in combination with increases in gold recovery, income enhancement and other socio-economic measures was to give sustainability to the interventions. The project was also consistent with the aim of the GEF-5 Chemicals focal area to support countries in preparation for the entry into force of the internationally legally binding Minamata treaty.

The International Waters (IW) focal area has traditionally had a pioneering role in support of action to combat releases of persistent toxic substances (PTS). Objective 1 of the IW focal area seeks to "catalyze multi-state cooperation to balance conflicting water uses in transboundary surfaces and groundwater basins while considering climatic

variability and change”, and encourages cooperation with the Chemicals area to demonstrate the effectiveness of policies, innovative instruments, and technologies for reducing releases of PTS. The project is also consistent with Outcome 1.3 as it promotes innovative solutions for reduced pollution and improved water use efficiency. This project brought together authorities and experts from both countries to prevent transboundary pollution arising from ASGM. On a political level, it may have helped relieve tensions that could, and have in the past, risen from competing uses for water resources.

III. Project assessment

Project identification and formulation

Project identification rating table: evaluation of the Logical Framework Assessment (LFA)

Evaluation issue	Evaluation comments	Evaluation rating
Needs identification	Thorough processes of stakeholder engagement. Pollution flows are a key topic in recent and ongoing bilateral talks regarding this formerly militarized and disputed border area. Portovelo is the epicenter of gold ore processing in Ecuador, better practices are badly needed.	S
Stakeholder analysis	Properly identified primary stakeholders in government and industry were well consulted before and involved in the project, though artisanal miners were not sufficiently involved (the project focused on small scale mining).	S
Monitoring and evaluation	Inadequate planning for M&E contributed to the lack of implementation thereof.	MU
LFA design process	Clear and focused outcomes were likely to result from the outputs proposed, however the indicators were often inappropriate or difficult to measure.	MS

Identification of the problem

The dire contamination problem was clearly identified, analyzed and documented with a great deal of firm evidence originating from various sources such as reports from previous projects, analysis of legislative changes in both countries, and extensive field research leading up to and during the preparatory phase of this project, among others.

Needs assessment

The project design was based on a sufficient needs assessment in both countries, through thorough processes of stakeholder engagement. There was considerable previous evidence that contamination exists in the Puyango Tumbes basin, including the fact that transboundary pollution flows are a key topic in recent and ongoing bilateral talks regarding this formerly militarized and disputed border area.

Furthermore, the presence of downstream activities such as subsistence agriculture and industrial aquaculture highlights the acute need for better assessment of pollutant transport and human consumption risks throughout the basin.

The choice of Portovelo and environs as the epicenter of this project is appropriate and strategic. A significant portion of the gold deposits in the country are found in southwestern Ecuador, and ore is brought from across the country and parts of Northern Peru to be processed in Portovelo. Therefore, it is an important point of dissemination of new practices as well as being a point of concentration most of the country's mineral processing and river discharges of contaminated mine tailings.

Stakeholder identification

Some stakeholders were well identified and included in the project, such as APROPLASMIN, whereas less research and intervention was directed towards the artisanal miners. This is reasonably justified given that the processing plants themselves are responsible for a much higher proportion of the contamination, and many artisanal miners process their ore by renting the processing facilities. This makes the plants a good place to focus interventions seeking change and also as a point at which to connect with artisanal miners and disseminate information to them. INIGEMM, ARCOM (the Agency for mining control and regulation in Ecuador), the ministries of mines and environment in both countries, among other stakeholders were properly identified and incorporated into the project according to their various mandates and potential contributions.

Conformity with national and local priorities and strategies

The project took into account and reflects national and local priorities and strategies. Both countries are signatories to the Minamata convention and have significant mercury use in mining, therefore they need to find ways to reform the industry in order to eliminate mercury.

Binational cooperation is also another important goal in both countries, as they were in conflict over the region as recently as 1999. The two countries are actively engaged in a restoration campaign to decontaminate the Puyango-Tumbes River system. Positive cooperation was reinforced by annual binational ministerial meetings which began in 2007.

This project synergized usefully with the UNDP (United Nations Development Program) initiative for "Strengthening institutional, policy, legal and scientific-technical capacities to implement Integrated Transboundary Water Resources Management in Puyango-Tumbes, Catamayo-Chira and Zarumilla River Basins and Aquifers integrating climate variability concerns". This was signed in February 2013 by the National Water Secretariat of Ecuador (SENAGUA) and The National Water Authority of Peru (ANA). The partially GEF funded grant (in total nearly USD 25 M) signals a strong commitment to working together to solve trans-border concerns.

Inclusiveness

Great efforts were made to be as inclusive as possible in the design of this project, despite the fact that the target economic activity is dominated by men. The monitoring and improvement of environmental quality aspects of this project equally benefit all people of the region. The inclusion of women was more effectively achieved in Peru, where more

diligent records of workshops show significant numbers of women had attended training workshops. Other disadvantaged people tend to be disproportionately found among miners than processing plant owners, and therefore the project's focus on the Ecuador processing plants inadvertently drew focus away from marginalized groups such as indigenous, afro-Ecuadorians, and the poor in general.

Choice of national proponents

MINAM Peru and INIGEMM were highly relevant government representatives which, at the time of inception, both upheld an organizational philosophy that was highly compatible with the project goals. This remained, and still remains, true for MINAM, however INIGEMM suffered several vacillations in guiding values as a result of serial leadership changes. This broke continuity of action and messaging from that institution. Mining ministries at national and regional levels were also deeply involved and consulted in Peru, and this led to some concrete advancement of formalization and regulation of mining activities in the field. Overall, these critical government agencies were appropriately involved in the identification of critical problem areas and the development of technical cooperation strategies. However, linkages with mining authorities, particularly ARCOM (the main regulatory body with respect to mining in Ecuador) became strained through the project, but not by direct fault of the project. Largely as a result of the mercury ban, miners have become highly antagonistic with mining governing bodies, and subsequent development agency workers have been instructed that they will receive no cooperation from miners if they bring ARCOM with them on site visits.

The main industry proponent in this project was APROPLASMIN, the association of processing plant owners of Portovelo. It is essential to involve this group in the project as they control most of the mineral processing in Portovelo, therefore in the country as a whole. Though they don't have the power to regulate the operations of member plant owners, they can set examples and recommendations, and some operators that also process material from their own mines have independently made reforms to their methods that have resulted in increased efficiency and mercury elimination. These should be studied and their stories of greater efficiency should be disseminated. Unfortunately, the dominant rental plant business model depends on providing inefficient processing facilities to miners and then extracting the majority of gold that is left in the tailings. These incentives are not aligned with the efficiency promoting goals of the project.

Project design

The project's design was adequate to address the problems at hand. All of the critical aspects of a mercury reduction intervention were present; attention to policy reform and strengthening of regulatory and enforcement activities, developing novel financial models for sustainable replication of project achievements beyond terminal date, comprehensive educational programming and awareness workshops focusing on better gold recovery and progressive elimination of mercury use, technology transfer.

The project had a clear thematically focused development objective. The theory of change was that training and awareness programs would encourage miners to invest in best practices with the help of novel financial mechanisms, facilitated formalization by the government, and effective basin scale environmental monitoring. Had novel financial mechanisms and effective training programs based on applicable alternative technologies actually been sufficiently developed, the project could have expected greater success.

Evaluation issue	Evaluation comments	Evaluation rating
Clarity and adequacy of outcomes	Outputs were generally clear, realistic, and could have adequately led to the achievement of the outcomes.	S
Clarity and adequacy of outputs	Outputs are practical, achievable and encompass the entire range of activities necessary to address the project goals.	S
LFM hierarchical clarity and consistency	Outputs clearly combine to affect the outcome desired.	MS
Quality of indicators	The headline indicator was ambitious but simple and highly relevant. Many other indicators did not adequately reflect the achievement they were meant to measure.	MU
Adequacy of Means of Verification and Assumptions	Project consulted and cross-referenced extensively with a wide variety of stakeholders to verify plans and assure the soundness of assumptions.	S
Overall LFM design quality.	Apart from the indicators, the logical framework of the project was sound.	S

Logical framework

Overall, the results hierarchy in the logical framework model, from activities to outputs, outcome and overall objective, is logical and consistent. The project outcome was fairly clear, somewhat realistic, highly relevant, and very adequately addressed the problem of heavy metal emissions in the Puyango-Tumbes watershed. The project justification provided a clear description of the benefit or improvement that would result from the successful project completion: namely, the improvement of environmental quality through elimination of mercury, better management of waste.

Outcomes

Outputs were generally clear, realistic, and could have adequately led to the achievement of the outcomes. The indicators were often less than ideal, and implementing problems precluded full attainment of many goals. The accompanying table lists all specific outputs and indicators, with specific commentary on each. The following discussion takes a broader critical view of each outcome.

Outcome 1: Stakeholders would endorse mercury reduction strategies and targets.

This is likely to result if one designs alternative methods and sets reasonable targets based on strong understanding of the local technical and social framework, as set out in the outputs.

Outcome 2: Alternative technologies, financing, and training would eliminate mercury use.

This depends mostly on outputs relating to health and mineral processing training. Bundling formalization, financial mechanisms, and public policy change in one outcome seems to minimize their importance. One might have added an output on organizing miners into larger groups that could pool capital and diversify labour roles. The detailed methodology for outcome 2 sufficiently explains the technical, capacity building, financial, policy, and monitoring programs that will support it.

Outcome 3 Communications lead to replication in country and internationally.

It is an ambitious goal to create a communications strategy will propagate self-replicating examples of mercury free processing technologies. This of course depends greatly on the quality of outputs in sections 1 and 2. In this case, the output is only a rephrasing of the outcome and does not indicate the manner in which this might be achieved.

Indicator and targets

Percentage reduction in Hg use

The percentage reduction in mercury use is an excellent SMART indicator as it is directly measurable and constitutes feedback on the immediate state of the system it measures. The target of 40% is reasonable given the achievements of past ASGM projects, though it is ambitious for such limited funds.

Percentage reduction in Hg in humans and the environment

The percentage reduction in mercury levels in rivers and in miner's bodies is a terrible indicator. These are difficult to measure, have long timescales for change, and do not necessarily correlate directly with the anticipated results that the indicator attempts to measure. No targets were set for these indicators.

Training indicators

Indicators of success of training exercises would have been adequate had they been sampled in the baseline, exit polls, or project closure, but there were no evaluations conducted after training sessions. Numbers of promotional materials distributed and workshops held are not sufficiently specific indicators with respect to whether the intended message was received by its audience nor that communities endorsed it.

Other indicators

The number of policies/guidance documents developed to promote formalization of sector is a good indicator for the outcome of promoting formalization, however no target was set, just as there was no target for the number of awareness training and

technical workshops/demonstrations conducted. The remaining indicators were fairly adequate, with some quite SMART indicators such as the participation of both countries in INC meetings for the Minamata convention.

Implementation Performance

Evaluation issue	Evaluation comments	Evaluation rating
Ownership and relevance	Both countries are grappling with ASGM and are committed to eliminating mercury. Portovelo is a national mining and contamination hotspot and the transboundary waters it affects were recently a subject of conflict.	HS
Effectiveness	Reported success on the top indicator of mercury reductions is laudable but performance was poor in terms of lower level indicators and outputs. ASGM was more positively affected in Peru than in Ecuador.	S
Efficiency	Slow and intermittent implementation under an operating model too heavy on international experts eroded efficiency.	MU
Impact	Indirect factors (mercury ban) led to greater mercury reductions than direct factors, and no new models or alternatives were introduced or adopted.	MS
Likelihood of/risks to Sustainability	Strained relations among miners and government agencies, plus changes to government budgets and staff, may preclude the continuation of project gains.	MU
Project management	Closer supervision of consultant could have improved efficiency and accounting.	MS
M&E	Indicators went unassessed, or were assessed differently than in the baseline, and final reports make no systematized self-assessment based on indicators. The M&E plan seems to have been ignored, and the baseline completed very late.	U

Relevance and ownership

Both countries are signatory to the Minamata convention and therefore are committed to reduce mercury voluntarily and soon by legal obligation. In particular, mining provides a significant portion of the GDP and development potential for both countries, especially in rural areas. Large potential tax and royalty revenues are lost because miners are not formalized, and mercury use is a critical impediment to this formalization. Furthermore, at the community and regional level, mercury use and release affects a broad spectrum of

people, mostly through vapour emissions locally and contamination of food production regionally. Water resources are shared among communities in both countries, and contamination lowers water quality standards to a degree that could impact human health as well as ecosystem integrity. In addition to mercury contamination, other heavy metals and fine sediments from tailings discharged directly into the rivers has become a transboundary issue, and could possibly affect industrial agri- and aquaculture in the downstream coastal lowlands.

The miner training, mercury reduction, and formalization goals of the project are directly aligned with the national mining/treaty implementation plans, mercury inventories, and SIACM/UNITAR activities in both countries. Specifically:

- *Ministry of Non-Renewable Natural Resources of Ecuador released the National Plan for Mining Sector Development for 2011-2015.*

Among its goals, the plan takes into account the formalization and management of the mining sector, strengthening the capacity of the miners to operate in an environmental sustainable manner and increase benefits from mining resources.

- *"Pilot Project to Strengthen the Development of an Inventory and Risk Management plan in the decision making regarding mercury: a contribution towards a global alliance on mercury"; a 2007 Ministry of Environment of Ecuador and UNITAR joint project.*

The objective of the project was the preparation of a National Inventory on Mercury Emissions; the development of a national strategy to institutionalize the reporting of mercury emissions; and the preparation of a National Risk Management plan for Mercury. Since 2011 Ecuador has also been participating in the Intergovernmental Negotiating Committee (INC) to prepare a globally legally binding instrument on mercury.

- In 2009 Ecuador strengthened the legal framework regarding mining, including the Mining Law and its General Regulations; the Environmental Regulations for Mining Activities; and the Regulation for Special Oversight of Small-Scale Mining and Artisanal Mining.
- Peru has developed a National Implementation Plan (NIP), within the Framework of the Stockholm Convention.
- Through the Ministry of Environment (MoE), Peru coordinates the national side of the Bi-national Peru-Ecuador Technical Group on Environmental Risk Management.
- Under SAICM's Quick Start Program, Peru is carrying out the Safe Chemicals Project, which is being executed by the Ministry of Health. One of the objectives is the participation of stakeholders from various sectors.
- MoE has been representing Peru in the sessions of the INC to prepare a treaty on mercury, as well as presiding the National Technical Group on Chemicals responsible for preparing the national position for each Regional Consultation and Negotiating Sessions.
- *April 2010, Supreme Decree No.045-2010-PCM, the National Plan to Formalize Artisanal Mining;* The objective of the plan is to formalize artisanal mining through the implementation of legal, technical, organizational and environmental

management tools.

- Peru and Bolivia are jointly working to develop a strategy for the minimization of the use of mercury in artisanal and small-scale gold mining with the aim of minimizing or eliminating the negative impacts on human health and the environment with the support of SAICM's Quick Start Program.

The health training and mercury reduction in this project is highly relevant to many target groups, in particular miners and non-miners living in mining affected regions. The project could also greatly reduce heavy metal contamination risks to the agricultural industry, and help maintain peace in a region with very recent history of military conflict.

Relevance in a changing environment

In a changing environment, the goals and results of this project will long remain highly relevant given the poor performance of other national industries (mainly hydrocarbon) and the persistent nature of mercury and other mining pollutants, particularly as international economic instability is a persistent fact that maintains a high gold price. Climate change will only exacerbate the water access and quality issues that are important factors in ASGM.

Effectiveness

Outputs and outcomes achieved so far

The project's final report states that mercury use and release decreased 60% in the intervention area, largely as a result of miners choosing to process using cyanide instead. Another important motivation for mercury reduction has been the national ban on mercury. Though the ban was not precisely the action advocated by the project, the research, results, and outreach of the project were significant factors driving the change of government regulation and national level enthusiasm for enacting activities related to the Minamata convention.

This assessment comes with an important caveat: mercury reductions were determined only by interviewing miners about their mercury use, instead of by interviews corroborated by physical measurements as in the baseline and midterm monitoring. This hinders proper evaluation of the results, as it is highly likely that after a national mercury ban miners would lie about their mercury use. Without objective data such as mass balances in processing plants or specific numbers of mercury users who have verifiably eliminated mercury or switched to cyanide, it is impossible to validate the impressive claims of mercury reduction. Furthermore, the project baseline estimates for mercury releases (1.5 Tonnes per year in 2013) are the same as those conducted four years earlier (2008), and only after the mercury ban when the mercury estimates are based entirely on self-reported data is there a reported reduction in mercury use.

Anecdotal evidence, from plant operators and miners interviewed, suggests that indeed many miners are choosing to pay to directly use cyanide instead of mercury. This corroborates the claim that mercury releases have been significantly reduced, but it cannot speak to the accuracy of the actual reduction estimates. According to UBC's final report, the number of plants that use amalgamation has only gone down 13%, which

somewhat contradicts the optimistic claims made of 60% reduction of mercury use. Furthermore, the project indicates that cyanidation has increased only 22%, and the average plant reduced mercury use by 38%, which is still considerably lower than the headline claims of this project.

Large numbers of well received training programs were conducted in both countries (up to twenty training events reached about 1000 miners in each of Ecuador and Peru), and supported partner agencies to fulfill their mandates in places where it benefited project goals. For example, covering transportation costs for authorities to participate in meetings, visits to mining sites and patrol activities along the Tumbes river.

The project also produced excellent in depth social, economic, technical appraisals of mercury use and mining waste practices in the Puyango-Tumbes basin as well as a thorough basin scale investigation of water quality and sediment contamination. This project also helped to inform Ecuador – Peru binational transboundary management and recovery process for the Puyango Tumbes. Overall, the project could have been more satisfactory if the final mercury inventory was more reliable and if new alternatives to mercury processing were proposed.

Example outcomes/outputs

The following section provides detail on a few key outcomes/outputs, and the accompanying table provides a short explanation of the present or likely achievement of targets for each indicator.

Outcome 1: mercury minimization strategies and reduction targets endorsed by stakeholders in both countries.

The primary mercury minimization strategy being endorsed by miners is to choose to pay industrial cyanidation operations to process their ore instead of renting facilities and processing on their own with mercury. This is going to be limited by local cyanidation plant capacity, which is near zero everywhere in Ecuador apart from Portovelo. Furthermore, many ASGM cannot wait to accumulate the amount of ore that merits cyanidation, or combine their ore with those of different miners with different mineralogies and grades, and therefore they cannot benefit from cyanide as an alternative to mercury. Replication of this solution outside of places where cyanidation infrastructure exists already. Part of the problem is that alternative solutions for small batch ore processing are unavailable and costly to import (machinery is subject to 50% tariff). Training that was done based on other alternatives such as centrifugal or shaker table concentration may not have produced significant change in part due to lack of availability of better tools.

Reduction targets have been endorsed by the national governments of both countries, and this is likely to lead to further reductions. However, it will also lead more miners that have no alternative to mercury (i.e. most miners) to hide their activities and access mercury through the black market.

One example of an effective mercury reduction initiative is the “Acapamba” chancha mill rental facility. At this plant, miners no longer add mercury to the mill, and instead amalgamate the pan concentrate. This would reduce mercury releases from this operation by half, and reduce the volume of tailings that are contaminated by 95% or more.

Output 2.3: develop programs to promote the use of financial tools for miners, policy/ legislative reforms and the formalization of the ASGM sector.

The main financial tool investigated was premium gold market access through the Alliance for Responsible Mining’s Fairmined program. Though some operations could qualify, and several were analyzed for their potential for inclusion in the program, none have been certified and none have engaged in the certification process. Direct access to jewelers (e.g. Transparencia SA in Peru) was also explored; however, this did not lead to agreements between miners and companies. Formalization seems to have been the main stumbling block in both cases, and this may have been exacerbated by policy changes in INIGEMM that rendered some planned activities impossible.

Also, the project made no progress in terms of policy/ legislative reforms to promote the formalization of the ASGM sector in Ecuador. The project did, however assist several individual mining operations (particularly in Peru) to make important steps toward formalization such as completing their ‘IGAC’, or the corrective environmental action plan.

Outcome 3: Communications and dissemination

Some technical and academic documents (reports and reports) have been produced by UBC, INIGEMM and associated consultants, which undoubtedly contributed to national and international scientific community. However, most of these have not been well distributed or presented within the communities nor among miners. There remain complaints that the results are not shared, not even with the plants or miners whose cooperation enabled data gathering and activities during the project. This fact is particularly annoying for the people because the investigations are related with their health and quality of life.

Logframe results analysis

Project Objective	Objectively verifiable indicators	End of Project results	Rating
Protect human health and the environment by implementing integrated measures aimed at minimizing mercury releases from artisanal gold mining activities affecting the Puyango River basin in Ecuador and the Tumbes River basin in Peru.	- 40% reduction in levels of mercury released into the Puyango - Tumbes river basin	60% reduction in mercury releases into the Puyango-Tumbes.	HS
1. Mercury minimization strategies and reduction targets endorsed by stakeholders in both countries	Strategies and reduction targets endorsed	<ul style="list-style-type: none"> - In Ecuador, targets were endorsed by government (complete mercury ban), but not by miners, many of whom felt that they were not given suitable alternatives to mercury. Mercury activities in Ecuador are being driven underground where they are harder to monitor and eliminate. - Peru government and miners endorse reduction and many miners have voluntarily eliminated mercury completely. 	S
1. Mercury minimization strategies and reduction targets endorsed by stakeholders in both countries	Strategies and reduction targets endorsed	<ul style="list-style-type: none"> - In Ecuador, targets were endorsed by government (complete mercury ban), but not by miners, many of whom felt that they were not given suitable alternatives to mercury. Mercury activities in Ecuador are being driven underground where they are harder to monitor and eliminate. - Peru government and miners endorse reduction and many miners have voluntarily eliminated mercury completely. 	S

Project Outcomes, and Outputs	Objectively verifiable indicators	End of Project results	Rating
1.1 Design strategies for minimization of mercury releases and enhancement of gold recovery	Strategies designed	<ul style="list-style-type: none"> - Baseline of mineral processing methods provides an excellent starting point for understanding, optimizing, and reforming current practices. - One strategy for minimization of mercury releases and enhancing gold recovery was proposed: cyanidation. It is highly successful, though it is unattainable for artisanal miners. - No new strategies were designed. 	MS
1.2 Develop a characterization and diagnostic analysis describing the baseline socio-economic, environmental and human health conditions, as well as the organizational and political structure of the ASGM communities	Diagnostic analysis produced.	<ul style="list-style-type: none"> - The project produced an excellent characterization and diagnostic analysis of the environmental and human health conditions. - The socio-economic baseline that was developed is minimal. - The organizational and political structure of ASGM communities are well understood for processing plant operators, but remains poorly researched at the artisanal scale. 	S
1.3 Establish targets for release reductions, with the development of accompanying indicators of success.	Indicators and targets established	<ul style="list-style-type: none"> - National target in Ecuador is total elimination of mercury use. - No specific target endorsed in Peru, but there is a strong national policy of mercury reduction. - No indicators or long monitoring program established. 	MS

Project Outcomes, and Outputs	Objectively verifiable indicators	End of Project results	Rating
<p>2. Reduction in mercury use and emissions in the targeted mining communities, through:</p> <p>i) local development and adaptation of mining alternative technologies/ techniques;</p> <p>ii) increased awareness of mining communities, national & local authorities and general public, particularly women and youth, of dangers of mercury use;</p> <p>iii) adoption of policies or programmes that support the formalization of miners and promote innovative financial mechanism.</p>	<ul style="list-style-type: none"> - % reduction in mercury levels in rivers - % reduction in mercury levels among targeted miners - % of stakeholder's report increased awareness of mercury danger after training - % of miners that adopt alternative techniques - No. of miners formalized - No. of miners that undertake new financial mechanisms 	<ul style="list-style-type: none"> - High quality laboratory analyses of the monitoring programme were produced and used in awareness and education campaigns. - Water/sediment quality monitoring was done over the life of the project without repeating sites at time intervals, therefore there is no way to assess change with present data and no program or responsible party to repeat the monitoring in Ecuador - In Peru, ANA has a clear mandate, system, and funding to continue monitoring beyond project end. - Exit surveys of stakeholders who attended training were not done or documented. - Evaluators found high awareness among miners and other stakeholders with respect to the hazards of mercury use and release. - Final evaluation did not provide any comparative information about relative levels of awareness before or after training, nor of the number of miners who changed their practices. Difficult to assess the total number of miners trained Ecuador. - Although limited different financial models were investigated, it appears that zero miners participated in new financial mechanisms. 	MS
<p>2.1 Training of miners on improved technologies and best practices to reduce mercury use and emissions, while enhancing gold recovery and incomes.</p>	<ul style="list-style-type: none"> - % reduction in mercury levels in miners and environment by end of project 	<ul style="list-style-type: none"> - Large numbers of miners trained in both countries during many different workshops. - Mercury levels in miners were not monitored, but it wasn't a good indicator anyway. 	S

Project Outcomes, and Outputs	Objectively verifiable indicators	End of Project results	Rating
2.2 Training of miners, national and local authorities, as well as the general public, particularly women and youth, on the dangers of mercury.	Results from evaluations conducted after training sessions	<ul style="list-style-type: none"> - Large numbers of miners, community members and local authorities trained on mercury dangers in both countries during many different workshops. - Post training evaluations were not done. 	MS
2.3 Develop programs to promote the use of financial tools for miners, policy/ legislative reforms and the formalization of the ASGM sector.	- Project results are shared with other mining communities in each country.	<ul style="list-style-type: none"> - The potential for applying an existing financial tool (Fair Mined premium program) was investigated at several mine operations. - National mercury ban is a policy that resulted in part from knowledge produced by this project and the USDOS co-finance project. - No programs were developed or delivered on the use of financial tools for miners, policy/ legislative reforms and the formalization of the ASGM sector. - There is no evidence that project results were shared with other mining communities. - No changes in formalization policy or strategy were promoted or produced, though in Peru several mining organizations received significant assistance with key elements of their formalization process such as environmental action plans (IGAC). 	MU

Project Outcomes, and Outputs	Objectively verifiable indicators	End of Project results	Rating
3. Project objectives and results are communicated / disseminated to achieve replication at a national, regional and international level.	<ul style="list-style-type: none"> - Project presents results at Intergovernmental Negotiating Committee (INC) - Project results are shared with other mining communities in each country. 	<ul style="list-style-type: none"> - Results presented at INC meeting. - Final reports say nothing of sharing results with other mining communities in each country. 	MS
3.1 The communication strategy will successfully disseminate the project achievements, which in turn will lead to a replication of best practices at a national, regional and international level	<ul style="list-style-type: none"> - Active participation of both countries in the INC meetings - Number of awareness raising events held or promotional material distributed. - Number of participatory workshops /demonstration events conducted 	<ul style="list-style-type: none"> - Both countries actively participate in INC meetings. - Many promotional materials produced in various media (pamphlets, videos, reports.) - Large number of awareness raising events held in both countries. - Many participatory workshop and demonstration events held. - No evidence of existing or likely replication of project results at any level because limited alternative methods were proposed or demonstrated. The main alternative promoted was selling ore to cyanidation processing plants or renting same. 	MS

Unplanned effects

The national mercury ban drives people to burn in their homes and hide their mercury processes, further driving them into the shadow economy. Miners in Portovelo area have become jaded regarding training programs, including those that came before this project. Some comment that they have had too many training events focused on the dangers of mercury and too few on the alternatives. Many complain that the results of these initiatives are not shared. The project did its best to adapt to feedback, but perhaps this could in the future be addressed in the baseline through a survey of previous knowledge and training experiences.

Rating outcomes against objectives

The project has fulfilled each of the outputs to some degree, most notably the projected reductions of mercury use were reported to be 20% higher than the target value within the intervention area. Some other outputs resulted in a manner that is likely to lead to the desired magnitude of change.

Part of outcome 1 was to design strategies for minimizing mercury releases and maximizing gold recovery, yet some miners, government stakeholders, and those executing the project, felt that the project did not offer a reasonable alternative approach. Better methods such as improved gravity concentration and better ore characterization may have not borne fruit for lack of access to affordable and optimal equipment or reliable local metallurgical analysis. An existing approach, in which miners sell all of their ore to cyanidation plants instead of processing it first with mercury, likely resulted in most of the direct reductions observed. For those that cannot amass sufficient material to rent the much higher capacity cyanidation circuits, there remains no local alternative to mercury use. This also contributed to some dissatisfaction with training programs for lacking in applied, hands-on training with best practice tools. The miner training centre could have prevented that shortfall had it not been derailed due to externalities.

The project excelled at training events and awareness workshops (outcome 2), and these have led to measurable changes in miners' views and behaviours. For example, in El Morocho, Peru, the head of the local miner's association removed all of the mills in her yard and stopped using mercury altogether to prevent her kids (with whom she lived in the house adjacent to her mills) to prevent them from having respiratory or neurological problems due to dust and mercury. She is recommending all of the members of the local association do the same. Now they all sell their ore to the cyanide processing plants.

Unforeseen achievements

Although it was not an activity that was originally foreseen in the plan, the project contributed to novel and interesting information on nutritional methods for reducing mercury burden and toxicity in vulnerable populations that is useful and innovative through its collaboration with UBC (UBC co-financing).

The prior assumption that there was no mining in the Tumbes area turned to be incorrect. This activity was then characterized, local government was enabled to monitor and enforce in protected areas.

Reformulation of the project design given changes in the operational context

The main change was elimination of the ITCAM miner training centre as a result of a change in priorities from the top management in INIGEMM, and this was reported in the midterm report. The project undertook a major study of the mineral processing practices of several plants, leading to very useful results that will help to guide future activities aimed at reducing mercury and improving gold recovery. This change, and the results thereof, was well documented. This approach was highly adaptive, as it recognized that previous training programs had not allowed for a two-way learning model that could capture and magnify the valuable experience based knowledge built up by the miners over decades of haphazard experimentation.

The project implemented appropriate outreach and public awareness campaigns, and these were largely responsible for the behaviour changes that were observed in both countries, but especially in Peru. Part of this success was due to the participatory and consultative manner of inclusion of vulnerable groups like women, powerful supporters such as APROPLASMIN, and opponents of the processes such as the many miners who perceive mercury elimination to be a scheme to eliminate artisanal miners.

Stakeholder perceptions and outreach

In large part the target beneficiaries were reached, but the product that reached them was not always commensurate with their needs. In particular, the miners in Ecuador and Peru became frustrated with training programs that extolled the evils of mercury but offered no solutions. Many also found that the workshops were too theoretical and offered no means of applying theory to specific changes in equipment or processes that they could enact. The list of target beneficiaries was also too narrow. In Ecuador, the project should have done more to engage a broader segment of society, perhaps through local advocacy organizations and the municipality.

Perspectives of key partners such as APROPLASMIN, various government agencies of both nations, as well as local miners' associations were effectively consulted and their desires were incorporated into the project plans, even though difficulties encountered during implementation limited the execution of these plans in their entirety.

Miners from Peru participated in a mineral processing training trip to Portovelo, which taught them the following:

1. Safe disposal of the mercury waste from decommissioned quimbaletes;
2. Abandoned mines wanted to help reclaim (fill);
3. How to comply with IGAC (environmental impact and remediation study) - They have started this process and the project sent consultants to help with it. The IGAC is still in the proposal phase;
4. That quimbaletes caught only 21% of gold and lost 40% of mercury.

Assessment of factors affecting achievement of project results

The project involved the relevant stakeholders through continuous information sharing and consultation, although with long breaks at times, that made some stakeholders unsure about whether the project was proceeding. Time was also lost in the beginning of the project as implementation got off to a slow start. Finally, instability in INIGEMM hindered the project and led to few activities and tangible results in all but the headline indicator of mercury reduction.

There were also other factors that limited the achievement of results. Tensions between miners and Government was significant. In Peru, some trainings or monitoring activities were delayed due to protests. And the tense climate in Ecuador meant that it took time to gain the trust of the miners in order to have a meaningful exchange on some of their innovative techniques and, based on that, develop and promote alternative techniques (like innovative concentration methods; direct smelting).

The executing modality could also have been a factor. The project relied a lot on one main contractor (UBC) and the limited success of that had an impact on overall results. Project managers would have preferred the main contractor had much more presence on the ground. Furthermore, project management and ASGM experience are hard to come by in rural areas, yet it is important to have someone in the field, close to the miners. This makes monitoring and adaptation more challenging. While yearly monitoring missions were done, given this delicate context, additional monitoring and a different local structure could have better supported achievement of results.

Stakeholder involvement

Not only did the project make excellent use of the skills and technical resources of INIGEMM and the University of Machala, but the experience and successful traditions of the local miners and gold refiners themselves were incorporated into the training methodologies and the search for alternative processes for gold extraction. In the latter part of the project the focus of interventions switched from a purely one-way mode of teaching to a two-way learning exchange in which researchers from INIGEMM began (in their own words) to value and gain new understanding of optimal local mineral processing methods as demonstrated by the miners themselves. This has created interesting and useful results that will greatly aid future initiatives in promoting the most efficient aspects of the local mining tradition while targeting more wasteful ones for change. An excellent example is the discovery of the special local ‘volcano’ method for gold smelting. This is a particular recipe for smelting the gold to extract it from concentrates, which is a key process in the elimination of mercury. Finding locally adapted method that functions well given the chemistry of local ore is an important step in promoting best practices.

The project also helped important government stakeholders to better serve their functions by supporting field expenses to visit remote mine sites. For example:

- Enabling DREM in Suyo to go interact with and ground truth mine sites that had applied for permits

- Supporting travel for central government officials to attend regional workshops or binational meetings
- Providing boat transport to enable SERNANP patrol mining activities along the Tumbes river.

A wide variety of additional stakeholders (Appendix A) were involved in the project, and their core competencies were incorporated well into the design and implementation of the project. For example:

- The Alliance for Responsible mining’s analysis of various mining operations for potential inclusion in fair mined premium markets.
- INIGEMM’s Field training of miners and sampling of basin wide contamination.
- MINAM Peru’s enforcement of environmental licenses
- SERNAMP’s enforcement of restrictions on mining in protected areas.

Longer-term impact

There are strong indications that several mining communities in Peru and mining cooperatives in Ecuador have abandoned mercury use permanently and this will significantly impact long term mercury use and release in their local areas. In particular, the national mercury ban in Ecuador will continue reducing the amount that is used, however it will be ever more difficult to measure and control as it passes entirely into the black market.

Comprehensive basin scale environmental sampling conducted in this project provide a highly relevant tool for understanding risks to human health and ecological integrity. It is already being used to inform policy and international cooperation in the area. ANA in Peru is committed and funded to persist in the water quality monitoring, and INIGEMM had a team dedicated to that end in Ecuador but it has not always been supported by subsequent administrations.

Catalytic or replication effects

Education of community and government stakeholders contributed to the adoption of a national mercury ban, which will definitively impact practices and reduce mercury releases in the area for many years. In the immediate-term, there is also an increased risk that mercury activities are being conducted clandestinely, often indoors. Therefore, there will be a period in which the human health impacts are going to be higher and the gold commerce further pushed into the shadow economy.

Efficiency

The project was quite inefficient with time, as implementation began slowly with some lapses and setbacks. For example, the approval date was 19 March 2012, yet there were almost no activities or billing until December 2013, almost two years later. Evaluating the financial efficiency of the project is rather more difficult. By far the largest budget line item in each year (overall 43% of the total project budget) was “contractual services”, which were rendered by UBC. The table below breaks down the UBC final budget into the project line

items used by UNIDO for project evaluation. The overall UNIDO budget shows that 27% of the project budget went to national consultants, which certainly seem like a very efficient way to spend almost a third of the budget. It also appears that only 12% was spent on international consultants and staff in the UNIDO project budget, however when the UBC contract budget is broken down into separate line items and added with the respective UNIDO line items, it appears that about 38% of the budget went to International consultants and staff, and 29% on national consultants and staff. Relatively little funds were spent on equipment given that it was a project related to mining. Altogether 67% is a very high proportion of the budget for consultants and staff, and 38% indicates a very top down, high paid international consultants-heavy approach.

Table of project finances

Item	UNIDO (in USD)	UBC (in USD)	Total recalculated disbursement (in USD)	Percentage of total
Staff & International Consultant	101,148.60	202,183.43	303,332.03	37.8
Local travel	44,132.18	4,000.00	48,132.18	6.0
Staff Travel	323.35	25,243.26	25,566.61	3.2
Nat.Consult./Staff	232,363.07	0.00	232,363.07	29.0
Contractual Services	0.00	35,730.75	35,730.75	4.5
Train/Fellowship/Stu	13,976.75	0.00	13,976.75	1.7
International Meeting	49,247.63	19,972.27	69,219.90	8.6
Equipment	20,337.35	21,236.57	41,573.92	5.2
Other Direct Costs	31,512.41	0.00	31,512.41	3.9
Total (USD)	864,058.01	308,366.28	801,407.62	

Close review of the UBC final budget also indicated that there are many in-kind contributions from other organizations (for example, 0USD in the budget for Colon Velasquez' work as head of INIGEMM, among others). This explains in part for difficulties this evaluation has encountered in accounting for the in-kind contributions of project partners. Each stated their cash contributions, except for MINAM which submitted no final contribution letter due to a change of government, but none reported their staff time, equipment, or other in-kind. However, in MINAM's case, as well as many others, there is ample evidence of significant in-kind contributions made by all partners despite there being no direct measure of any of it.

Likelihood of sustainability of project outcomes

Continuity will be supported by UNDP and CIRD projects that are in preparation. ANA Peru will continue water quality monitoring in the Tumbes area and by SENAGUA in Ecuador.

Short-falls in state oil revenue prevent continued investment by the government. Given that a

limited number of financial models were provided by project, one of which was proven unattainable for the operations investigated (premium gold certification). There is little chance that financing for extending project goals into the future were it not that other agencies were gearing up for similar activities. Though the UNIDO project baseline and lessons learned will provide some help to incoming projects, there is little in the way of a working program, alternative techniques, or educational resources, to replicate in new projects.

Mercury reductions are durable as miners increasingly sell ore directly to cyanidation plants due to better economics and the national mercury ban. However, the ban also pushes artisanal miners further into informality and activities have become harder to regulate and more likely to negatively impact health.

Despite excellent capacity and will among INIGEMM staff, serial changes in directors have adversely affected the effectiveness and acceptance of that institution. Formalization remains an unattainable goal for many miners, and ARCOM, the mining regulator, is deeply mistrusted and disliked among miners.

Project coordination and management

UNIDO and the government adequately provided most of the inputs as planned and in a timely fashion. In particular, INIGEMM provided high quality and dedicated personnel for field sampling and miner training operations, and the local authorities in Peru offered considerable attention and person hours to activities on their side.

Coordination with other UNIDO and other donors' projects

The US state department project in Piura/Portovelo provided a firm foundation on which to launch this project, and UNIDO made significant gains in advancing the achievements of the former project, thereby increasing the sustainability of both. The UNDP international waters partner project was an important collaboration but there is little in the project documents to show which aspects were attributable to which project.

Assessment of monitoring and evaluation systems

The project steering committee, established at the inception workshop, was composed of a fair representation of the principle stakeholders in the region, and many of them reported ancillary benefits of convening the PSC. Among these were improved communication about transboundary water issues that positively contributed to the binational post conflict healing process.

The PCU was perhaps the most effective monitoring and evaluation mechanism created within the project. Government stakeholders championed their role in the project and gave strong evidence of having delivered on their co-financing commitments.

Unfortunately, the one-year project implementation report and final report don't make numerical estimates of important indicator targets. There is no mention of the percentage of stakeholders reporting an increase in awareness of dangers of mercury (target was 75% of

awareness raising participants), even though there was clearly significant success on this parameter. It seems that the monitoring and evaluation plan was not followed closely enough, and that these awareness campaigns had insufficient exit polls or feedback surveys.

There is no evidence that they approached the goal of 50% adoption of alternative techniques, except to the extent to which miners abandon their own processing activities in favour of selling their bulk product. The evaluation (such as we could find) makes no mention of any percentage, or absolute number of artisanal miners that adopted alternative techniques, nor was the project itself oriented towards effecting change among that group. It instead focused on processing plant owners. At least one mining association was to become formalized, yet there is no evidence of this, nor any mention of any monitoring of this target.

The project monitoring and evaluation plan did not employ direct mass balance measurements of mercury use. The estimates of mercury emissions mostly come from verbal interviews on mercury use of miners and plant operators, which may not be entirely unbiased. Overall the project scores very low for their monitoring and evaluation plan and execution. As a result, it must have been very difficult to assemble a final report that clearly shows how successful the project was in each component and for each indicator. In fact, the final reports read more like random walk research projects, without much forethought or structure, and even less resemblance to a project closing document. Finally, there was little dissemination of the results of the project to the communities involved.

Gender mainstreaming

Many stakeholders highlighted that women have benefited from greater awareness of the dangers of mercury. The project also promoted the idea that women can be miners, which many felt is a significant mind shift that is necessary and welcome, and could lead to further change in attitudes and the role of women in mining communities. Furthermore, the relatively high level of engagement of women in workshops was critical, as many feel that they are more apt to learn about health risks and better practices than men. Women were always well represented among project staff as well as in workshops.

Women have benefited from having less mercury and dust from processing plants in their yards and no amalgam burning in the kitchen. Follow up should be done by analyzing mercury in air in these homes to see if legacy mercury is evaporating from the walls and household items. Workshop and training attendance was disaggregated by gender.

Summary evaluation rating table

Criterion	Summary evaluation comments	Evaluator's rating
Attainment of project objectives and results	Many important results were achieved, and mercury reduction targets were exceeded. The miner training centre did not come to fruition and few alternative mineral processing designs were introduced.	MS
Project implementation	Implementation was patchy, intermittent, and often unfocused. Some quality professionals executed many of the research and training aspects in a highly effective manner.	MS
Effectiveness	Select stakeholder groups were effectively reached and strongly endorsed project aims, however coverage of beneficiaries was non-uniform and sometimes absent.	MS
Relevance	The aims were closely aligned with country and international objectives such as the need to reform mineral processing activities in the Puyango-Tumbes and both countries are signatories of the Minamata convention.	HS
Efficiency	Some funds were clearly spent to good effect, but poor tracking makes this difficult to assess.	MS
Sustainability of project outcomes	Continuity will be maintained by UNDP and CIRDI projects that are in preparation,	ML
Financial risks	Short-falls in state oil revenue prevent continued investment, and a limited number of financial models were provided by project.	MU
Sociopolitical risks	Mercury reductions are durable as miners increasingly sell ore directly to cyanidation plants due to better economics and national mercury ban. The ban also pushes artisanal miners further into informality and activities have become harder to regulate and more likely to negatively impact health.	ML
Institutional and governance risks	Despite excellent capacity and will among INIGEMM technical staff, serial changes in directors have adversely affected the effectiveness and acceptance of that institution. While the central Governments demonstrate the importance given to ASGM nationally, there are limited resources for local authorities to monitor and enforce ASGM rules, making governance a risk for the sector. Formalization remains an unattainable goal for many miners.	MU

Criterion	Summary evaluation comments	Evaluator's rating
Environmental risks	Water scarcity and contamination remain possible threats.	ML
Monitoring and evaluation	A fair M+E program was not closely followed and there was poor monitoring of indicator targets.	MU
Design	Fairly good design of indicators and methods for measuring them.	S
Implementation	Incomplete monitoring during project life.	U
Budgeting	Roughly adequate budgeting.	MS
Project Management		MS
Quality, preparation and readiness	The project began with strong national proponents and plans. Binational acceptance and coordination was excellent.	S
Implementation approach	The approach was likely to produce the desired results had there not been major disruptions.	MS
UNIDO Supervision and backstopping	Dynamic and tense local context combined with contractors' weak field presence strained monitoring and supervisory roles.	MS
Gender Mainstreaming	Significant participation among women in Peruvian communities, less so in Ecuador.	MS
Overall Rating	Significant results were achieved in some aspects of the project, but setbacks prevented full attainment of sustainable outcomes in other respects.	MS

IV. Conclusions, recommendations and lessons learned

Conclusions

This project successfully reduced mercury use in Ecuador and Peru through training campaigns that encouraged miners to eliminate mercury by selling ore directly or paying for cyanidation. The national mercury-ban in Ecuador, which was likely at least partially a result of the data and awareness brought about by UNIDO's project, ensures that mercury use will continue to decline. Unfortunately, no new alternative processing methods or long-term training programs were put forward by the project, and therefore mineral processing methods in general remain as they were before the project began (except with a higher proportion of cyanidation use in the traditional local manner). Although the project was adequately planned and funded, it was executed in fits and starts, with a heavy reliance on international consultants. Inadequate monitoring makes it very difficult to fully assess the efficiency and progress of the project, and final reports make little reference to the original logical framework or indicators. Changes in the administration of key project partners contributed to delays and ultimately prevented the completion of the International Training Centre for Miners. Instead, the project adjusted its focus toward better understanding existing mineral processing techniques and their inefficiencies, so that more precise interventions could be designed in the future. These are worthwhile outputs, even though they were not the primary ones as originally conceived. The basin scale environmental quality analysis that the project undertook is also of great value. Though no such program persists basin-wide, some monitoring will continue in Peru. Overall, this was a moderately satisfactory project, owing to the significant and durable mercury reductions and in spite of poor monitoring and execution.

Recommendations

A. Recommendations for INIGEMM, UNIDO, and future ASGM projects in Ecuador and beyond.

Recommendation 1: Similar or future projects should consider engaging miners (beneficiaries) in a practical and customized way.

The best way to engage miners in effecting positive change is to present concrete solutions that are adapted to their needs and employ locally available technologies. As important as it is to highlight the health and environmental risks of mercury, it is not an effective motivator for miners. They are more likely to respond to the possibility of increasing gold production. However, they are often reluctant to experiment with new techniques. Therefore, miners must be able to manipulate their own ore, or witness parallel experiments using their ore with traditional and alternative techniques. This may involve taking on the risk of gold losses by purchasing ore from the miners to use in alternative processes. Theoretical workshops do little good without showing how that theory can be applied in practice, ideally in the processing plant itself. Below are some sketches of possible pilot programs that might have had greater effect than the strategies followed by the UNIDO project, with approximate costs in USD given investigations into local equipment availability and costs that were conducted during this evaluation:

Pilot 1: Mobile training/ore analysis mini plant (USD75000)

- Can be loaded into 1-2 pickup trucks depending on the application (less for alluvial)
- Used to test and demonstrate scalable mercury free processes on different ores, without needing a large sample (large samples can be processed also, just slower.)
- Can be used for training at a dedicated site or can be moved to different communities/mine sites.
- Can be used at mine sites to demonstrate effectiveness of larger scale permanent changes upon which one could base a business model for financing. i.e. pilots 2 and 3.
- Training and protocols specific to each piece of equipment, various combinations thereof, as well as quality assurance and maintenance.
- From crushing to direct smelting, this system does it all chemical free.

Pilot 2: Janchera women's plant (USD100,000)

- Optimized/demonstrated with mobile plant.
- Finding a plant site and fast-tracking permitting will be critical, unless you find a long-term contract with a plant owner that is willing to permit a new plant on their property and their license can accommodate the extra tailings.
- Built to fit Janchera needs plus extra, so that they can run spare capacity as rental to other miners (spreading the Hg free awareness).
- The manufacturer in Pinas can make a small Chilean mill that is similar to but better than those currently in use.

Pilot 3: Existing plant upgrade (USD 0-100,000)

- Accept existing mills and improve feed and concentration elements.
- Can be done using mobile plant facilities, later in the project new equipment should be dedicated to this purpose, to be sold to plant if they are happy, and re-purchased for new intervention.
- Ore may have to be “bought” in order to process, but the gold can be sold back at ore purchase price to avoid showing profit.
- Can be as simple as installing two centrifuges to replace the sluices while optimizing the feed size, slurry density, and feed rate. Add labour for ore pre-screening and crusher recirculation by hand, among other things, and you can simulate a full scale automated belt fed system's performance to prove its value.
- Also, there is need to make an economic argument for better maintenance or refurbishing of Chilean mills themselves. They are inefficient, maybe keeping them properly maintained will pay dividends. It would be best to look for plants that are planning a refurbishing and test efficiency of new systems before and after with purchase ore and rented facilities.

Recommendation 2: Positive experiences from some miners/operators should be documented and shared

Some APROPLASMIN operators that also process material from their own mines have independently made reforms to their methods that have resulted in increased efficiency and mercury elimination. These should be studied and their stories of greater efficiency should be disseminated.

The Interminas equipment manufacturer in Pinas is an excellent project partner, as they have the local manufacturing rights for the GoldCacha centrifuge system. This means that they produce them in Ecuador, thereby cutting the cost in half. They also add rotational speed regulators and other modifications that enable better optimization for a wider array of ores and applications. This kind of equipment supply and support is critical to the continuation and replication of this kind of project in the long term, and Interminas itself could also serve other projects in neighbouring countries (they themselves are participating in a post-conflict mining project in Colombia, and have sold concentration systems to miners in Colombia and Peru).

One important aspect of this is reliable metallurgical analysis, and reducing the cost of these analyses. The lab scale plant mentioned above can be used to help the latter, whereas the former can be improved by purchasing and distributing analytical standards and encourage miners to insist that laboratories use them. This increases the reliability of analytical results, and is always done in the formal sector. It is required for certification of labs. While getting local labs certified is not within the scope of this project, distributing standards and teaching miners about their importance can help miners negotiate a better price when selling their tailings, ingots or ore to third parties. Projects should develop educational curriculum and resources to help understand lab analysis results and the justifications for undertaking regular targeted analyses.

In addition, miners also need to better understand the importance of proper ore sampling and extraction. Often, they take large chunks of barren host rock along with the high-grade quartz vein, thereby dropping the overall ore grade as measured in a lab or by the amount of gold obtained by processing and concentrating the ore. Miners often attribute conspiracy or theft to the resulting decline in ore richness or processing outcomes. This leads them to mistrust the analytical labs and anything but their own instinct and the amount of gold they obtain using familiar methods.

Recommendation 3: Alternative technical and sustainable business models should be developed and shared

Ultimately there must be an alternative to the business model of offering cheap and inefficient processes, usually using mercury, in order to accumulate the gold rich waste for cyanidation. It is highly profitable but also unfair and lacking in transparency, as miners usually donate 60% of the gold in their ore to the plant owner in the form of mercury contaminated waste. In an ideal world, processing plants would use highly efficient concentration and cyanidation to maximally extract coarse and fine gold without mercury, and charge 60% of the gold in their ore for that service. Competition would then drop that number to a level that is closer to the actual cost per unit gold extracted. In the real world, it is hard to guarantee to the miner that all of the gold extracted gets into their hands unless they are present when it is electroplated

and/or smelted. Plant owners are unlikely to welcome their presence and workplace safety would be a concern. If there are local mafias, they might not welcome potential change to the local business model.

Finally, the issue of cyanidation of mercury contaminated tailings must be addressed. Either an effective way of separating mercury before cyanidation must be developed and applied in all ASGM affected areas. Often the costs of recovery can be offset by the gold recovered, however there is considerable risk of remobilizing residual mercury during reprocessing.

B. Recommendations for government and/or counterpart organizations

Recommendation 4: Government should consider issuing temporary licenses to miners under conditions of demonstrated reducing mercury use

Though it has led to significant apparent reductions in mercury use and release, the national ban on mercury sales and use has pushed artisanal miners further into the shadow economy, and many now burn in kitchens and tunnels to hide their activity. In order to avoid these and other unintended negative consequences the government could issue temporary licenses to miners for mercury use on condition that they submit to training, self-monitoring and regulation. Licenses would be time limited with extensions available to those that show reductions in mercury use. Self-monitoring should be verified by statistically significant random sampling checks to evaluate the compliance rate and encourage honest mercury accounting. The educational program should also enable miners to improve mineral processing practices and increase gold recovery, as an added incentive to the program. At present, however, there is so much mistrust of ARCOM and the government that this solution may be impossible. The miners may fear that they are being lured into a trap and once they declare their activities the government may begin to harshly enforce the ban, or if not the present government, another future one may revoke temporary mercury licenses and then pursue the miners that registered.

It is therefore recommended that other countries not move to a full ban until they have a solid field based plan for promoting alternatives first.

Recommendation 5: The government should assess the possibility of setting-up or extending the service of a national institution to purchase metals (gold) to miners countrywide.

In other parts of Ecuador, ENAMI (empresa nacional de minería) purchases metals from artisanal miners at a stabilized price, whereby the profits made by the state in bypassing middlemen pay into a fund that allows the state to pay higher prices when commodity values are low. This provides miners with a reliable buyer and a trust based relationship that could be leveraged to deliver training and environmental/health information. The government should assess the possibility of extending this service to gold miners countrywide. It expands incomes in rural areas while keeping miners in the formal economy where they pay taxes and can benefit from state services. It would also facilitate the temporary mercury licensing proposed above. In order to alleviate some of the administrative burden of enforcing mining regulations, efforts must be made to convince miners to form corporations, cooperatives, or other associations that will enable them to afford the mineral title access costs and environmental planning and management expenses.

Recommendation 6: Governments should consider implementing financial mechanisms to facilitate access to loan programs, and/or tax exemption for mining equipment for small scale gold miners.

Future projects should also approach other major national and international banking chains to explore the possibility of loan programs. To facilitate this, one must make some rough economic models of ASGM gold extraction (profits, costs, equipment and installation costs for best practice equipment) so that they have a base upon which to evaluate loan payback periods, profit margins, stress tests, and various risks. Large gold buyers like Argor could be enlisted to guarantee purchase of gold at set percentage of London fix for OECD compliant gold flowing through transparent supply chain from miners that are converting to best practices.

It would also be worthwhile investigating the possibility of a trial freeze on high import taxes on mining equipment for small scale gold miners, or at least for those that participate in an ASGM project. Longer term negotiations for reduction of these import duties could create an enabling environment for change. Another avenue for investigation would be gold loans from the equipment distributors. This is commonly done elsewhere for heavy equipment (unfortunately often as a money laundering vehicle). Equipment distributors, such as those in Pinas near Portovelo, are often closer to the miners, and can more easily understand the economics and social networks locally. Gold loans are payable in gold, and the distributors might have longer term capital that could enable them to stockpile their gold for export or bulk sale to gold buyers farther up the supply chain. These loans could be managed by a community based organization at an arm's length from the distributor and the miners, and they could manage the funds in a revolving trust out of which repaid loans further propagate upgrades.

Finally, in order to avoid the difficulties this project encountered in demonstrating co-financing in-cash and in-kind, future projects should strive for better accounting of in-kind contributions, and try to get interim co-finance contribution letters if there is going to be a change of government. In this case there were serial changes in leaders of key government branches, which is more difficult to predict.

The permitting process for new mineral processing plants, and the enforcement of the rules place on them, is too lax. For example, many plants in Portovelo obtain licenses for up to 50 tonnes per day of capacity because that flies just under a regulatory limit that would otherwise require higher royalties and waste storage capacity. Then they build for and process 100 tonnes per day and dump the waste in the river at night. Worse, these are the wealthier stakeholders, and they take advantage of the informality and lack of technical knowledge of the miners and regulators.

The requirements of environmental assessment and management, as well as the paperwork to engage in and maintain all of the various permitting processes necessary for full formalization, are often beyond what small scale miners can afford. Sometimes countries have distinct traps that are laid by legislators that would prefer the sector fail and disappear. Identifying and alleviating these traps is an important step for enabling the sector to thrive.

Finally, there are potential problems arising from the national mercury ban in Ecuador, and in other countries that are soon to follow. Where mercury is banned, a government might be unable to later accept funds for a project aiming at mercury elimination, because they may not be able to admit that the ban has not been completely successful. In some cases, projects may insist that they aim to eliminate toxic substances (as process control, concentration, etc. are also important for reducing cyanide use as well as mercury use). In general, however, a complete ban may cause more trouble than good, as mercury trade and use gets pushed underground it becomes more difficult to monitor and reform.

Lessons learned

Implementation

Many lessons are doubtless similar to those learned in other projects, such as the need for rapid and sustained effort, without discontinuities or gaps in communication and activity. The practice of periodically parachuting in experts to do training that is divorced from the needs and knowledge of the audience is seldom successful. Also, insufficiently SMART indicators that are only loosely correlated to the outcomes being evaluated makes reporting and evaluation a much more difficult task. In this project, changing the evaluation method relative to the baseline (using self-reported survey data instead of mercury mass balances) makes it impossible to confidently assess the impact of the project on the headline target.

Perhaps the most important specific lesson of this project is that it is dangerous to propose grand elaborate plans that rely on too many national and international agencies along with large infrastructure goals. The International Training Centre for Artisanal Miners model was the central focus of the project in the first year or more, but this focus was too narrow and inflexible. Building a large brick and mortar school (especially with accommodation for international students) involves a lot of major expenses and complexities that threaten the overall success of the project. It might have been better to develop the curriculum and teaching resources of this school and piloting them out in rented facilities and using existing plants locally that use best or better practices. They used this strategy for some of the training exercises and some of those trained in this way spoke positively of the experience. Some of these training participants that come from Suyo area in Peru commented that it was hard to see how to apply the highly modern, organized, large capital investment plant to their situation because it represented too large a leap in terms of complexity and cost. Clearly there is need for training programs that include transitional levels of complexity and investment.

Baseline inventory

A survey of previous knowledge and training experiences among miners could have helped to better tailor the project's educational efforts so that they were more relevant and actionable by the recipients. It is also critical to use the same methods and criterion in the baseline as in the evaluation inventory, in order to facilitate evaluation.

Regulation

The experience in Ecuador has shown that separately regulating mines and processing plants leads to value chain discontinuities that can be exploited by those with access to capital. Miners are often people that are seeking an alternative to poor, unstable work in agriculture or other hard labour. They don't have the education or organization to obtain legal licenses to their mines, let alone to obtain land for a processing plant and tailings storage, plus the consultants for design and permitting. Intrepid people with capital recognize the immense obstacles in obtaining concessions and instead focus on the plant, which they then rent to the miners. Clever dodging of regulations and enforcement makes the plant operator's profits even greater, without having to do the hard and dangerous work of mining. Worse, plant operators have the aforementioned perverse incentive against efficiency, which is further exasperated by lack of enforcement of tailings disposal. Divorcing the mine labour from the more technical discipline of ore processing exacerbates social divides in a way that impedes development; miners remain poor, uneducated, and unable to access knowledge, technology, and financing that could turn their fortunes. Local mafias form around the rich processing industry and further impede development and spread of more efficient and profitable, and more equitable, practices.

Enforcement of mineral processing plants must include verifiable and periodically audited self-reported accounting of the masses of materials flowing through plants and their waste production, with stiff penalties for those that process more than their waste management plan allows. This is the least that must be done, as it will help address the clandestine disposal of tailings. The construction of the El Tablon tailings storage facility will help this issue by resolving the tailings storage issue for a time. However, they have already had to revise the anticipated life of the facility from 20 to 10 years. Ecuador and other countries should evaluate the wisdom of allowing processing as a separate service, as it often leads to exploitative systems that may actively resist change. Requiring new plants to be aligned contractually with existing mines, or to be opened only by those producing ore, may be a possible solution, as long as reliable mercury free alternatives are provided to suit local needs.

Process control from mine to market

This is the principal missing element in all ASGM sites, and it underlies every inefficiency and technical challenge they face. Despite knowing they are inefficient, miners often have no understanding of how improperly controlling their processes at each step introduces inefficiencies that cascade and multiply throughout their plants, resulting in significant losses. For instance, miners in Ecuador and many other places often don't control the slurry density during milling, even though it is an incredibly important parameter that greatly affects efficiency. Simply measuring, regulating, and keeping good records of the basic inputs and outputs of their systems can give them traceability, a window into their performance, and tools for optimizing their systems. Process control is a key activity that must be performed in order to establish and manage best practice systems, prove the superiority of best practices in parallel processing tests, and establish a clear chain of custody from ore extraction to ingot export.

Grade control

Grade control is an element of process control; it relates to the choice of ore extracted for processing and host rock that is barren. Often miners are not sufficiently selective in their choice of ore. Sometimes they discard small bits of rich quartz (thereby leading to the Janchera phenomenon), and other times they feed too much barren host rock (gangue) into the mill. Improper sampling of the ore to be analyzed in laboratories can also lead to mistrust, for instance when different results are produced by different laboratories or processing plants that may actually be attributed to poor sampling or homogenization. They may attribute conspiracy or foul play to outcomes that are more likely artifacts of ore selection or natural variability.

Exploration

Traditionally exploration is thought of as a precursor to mine opening, however it is just as important during exploitation. Grade control is one element of this, but also it includes searching for nearby veins that could extend the life of the mine, or quantifying the nature and quantity of the reserve being exploited. These all help when it comes to obtaining financing. In Ecuador, as in many countries, lack of exploration leads to underutilization of resources, inefficiency, and inability of miners to secure finance that can help them develop better practices. Future projects must address the exploration gap with training programs and demonstrative business modeling.

Training

INIGEMM and the project implementers have learned the valuable lesson that the technical capacity of miners in a given area is inhomogeneous. Some have developed innovative methods that can be adapted and promoted as part of a complete and locally relevant set of solutions. Through identifying and formally studying these methods they have gained better understanding of and acceptance by the miners they set out to train.

This was late in coming. One of the most common criticisms of the project is the way in which they would periodically swoop in with rigid classroom based theory lessons that offered no application to their processes. In the last year of the project, according to INEGEMM, they gave another such teacher-student lecture style event and the miners told them to stop, and instead give them something practical, or better yet visit their mines with new technology or methods. Also, Quito INIGEMM lab and staff are too far away to effectively assist miners in the south. Travel costs are prohibitive and during the project it could take 4-5 months for miners to get the results of their ore analyses. There needs to be people on site with equipment to demonstrate best practices and verified labs nearby.

Miners don't respond well to hierarchical master-student relationships. It is important to be evidence based and practical when engaging them in training, and to study the effective methods they sometimes come upon through experience. There are lots of cases of miners building their own systems for better recovery and process optimization, but many are reluctant to show them because they don't want the miners that rent the processing facilities to know that there are more effective methods that are being withheld from them in order to leave more profit in the tailings that the plant owner processes. Somehow these plant operators need to see and endorse a more fair and transparent business model.

Lessons for donor organizations

Donors need to recognize that the central issue of formalization is the main barrier to all development in this sector. At the core of this issue is land tenure, because in many places mineral concessions are not available, or those that hold them choose to extract such punitive rents or evictions, with the result that miners remain an underclass that participates in all of the hard, dangerous labour and receives the smallest share of the profits. Part of the reason for this is that countries don't always enforce the obligations that the concession holders have in order to keep their licenses (meeting minimum exploration, investment or development quotas or paying concession fees), choosing instead to let large holders keep their concessions even if they are not actively working them because it is easier to administer large persistent concessions rather than lapsing them and receiving new applications. However, another important obstacle is the lack of government staff to administer the great many small concessions that would suit the artisanal and small-scale miners. Mining codes are often designed with the large industrial mining sector in mind, and countries without ASGM only have to manage tens to hundreds of concessions and mining operations. By contrast, formalization of all ASGM in many countries means that the regulators have to enforce rules for many thousands of mineral concessions and processing plants. This would stress any government, and developing nations often find the burden unmanageable.

Annex A: 1. List of stakeholders interviewed; and 2. List of documents reviewed

1. The following is a list of stakeholders that were interviewed as part of this evaluation.

Institución	Contacto
INIGEMM	Ing. Byron Granda Ing. Carlos Aguila Colon Velasquez
APROPLASMIN	Danilo Castillo,
Ministerio de Ambiente (Ecuador)	Berenice Quiroz
ARCOM	Ing. Elister Cabrera, Coordinador Regional de Minas Machala
MINAM Peru	Wilma morales

N°	INSTITUCIÓN PÚBLICA	REGIÓN
1	Autoridad Local del Agua Tumbes-ALA tumbes	Tumbes
2	Dirección Regional de Minería Tumbes-DREM Tumbes	Tumbes
3	Organismo de Evaluación y Fiscalización Ambiental-OEFA Tumbes	Tumbes
4	Gerencia de Recursos Naturales del Gobierno Regional de Tumbes-RRNN	Tumbes
5	Instituto del Mar del Perú-Estación Costera IMARPE Tumbes	Tumbes
6	Dirección Regional de Salud-DIRESA Tumbes	Tumbes
7	Fiscalía de Provincial de prevención del delito de Tumbes	Tumbes
8	Jefatura del Parque Nacional Cerros de Amotape y Reserva de Tumbes-SERNANP	Tumbes
9	Autoridad Local del Agua Tambogrande-ALA Tambogrande	Piura
10	Dirección Regional de Minería Piura-DREM Piura	Piura
11	Gerencia de Recursos Naturales del Gobierno Regional de Piura-RRNN	Piura
12	Oficina de la Dirección General de Formalización Minera-ODGFM Suyo	Piura

N°	ASOCIACIONES MINERAS ARTESANALES	REGIÓN
1	Asociación de Mineros Artesanales y Procesos de minerales de Morocho	Piura
2	Asociación de mineros de Pampa Larga	Piura
3	Asociación de mineros de Servilleta-SERVIMINAS	Piura
4	Asociación de mineros de Cuchicorral	Piura
5	Asociación de mineros de San Sebastián MARSS S.A.	Piura
6	Asociación de mineros de Jambur	Piura
7	Asociación de mineros de San Pedro de Las Lomas	Piura
8	Asociación de mineros de Cacaturo de Las Lomas	Piura

2. List of documents reviewed

No.	Documento	Comentario
1	Línea Base	Trabajo de equipo liderado por Colon
2	2 Informes final – UBC and Colon	Sobre monitoreo ambiental en la cuenca y caracterización de las plantas; Marcello Veiga, Colon Velasquez y su equipo
3	Informe Perú	Informe preparado por Jose Antonio Mendoza Oliva, coordinador nacional de Perú, sobre actividades realizadas durante el proyecto
4	Informe – Comunicación	Informe final preparado por Fabricio Velasquez, especialista en comunicación, sobre trabajo realizado en el área de comunicación
5	Project Identification Form (PIF)	Documento de proyecto GEF
6	Project Implementation Report (PIR) & tracking tool 2015	Último informe anual enviado al GEF
7	Informe ARM	Informe de intervención de la Alianza de Minería Responsable (Output 2.3)
8	INIGEMM (3)	- Informe de visita de campo a Suyo, Perú en Julio 2015 - Informe de misión reciente a Portovelo - Carta de cofinanciamiento
9	Medidas para mitigar el uso de mercurio	Ejemplo de material informativo generado
10	Informe Colon	Informe sobre las últimas actividades realizadas en Portovelo
11	Informes varios de Leonor (3)	Indicación de las actividades realizadas en el transcurso del proyecto

Annex B: Project milestones

Milestone	Expected date	Actual date
Project CEO endorsement/approval date	March 2012	19 March 2012
Project implementation start date (PAD issuance date)	May 2012	18 June 2012
Original expected implementation end date (indicated in CEO endorsement/ approval document)	18 March 2015	31 December 2016
Revised expected implementation end date (if any)	31 December 2016	31 December 2016
Terminal evaluation completion	July-October 2016	31 December 2016
Planned tracking tool date	n/a	n/a

Annex C: Evaluation matrix

Criteria/Sub-criteria	Questions to be addressed	What to look for	Data sources	Data collection methods
Relevance	Is the initiative aligned with national strategies?	How does the project align with national strategies for reduction of heavy metal contamination impacts from mining?	UNIDO project documents UNIDO project, Annual Work Plans, Project evaluation reports, Government's national planning documents, MDG progress reports, Government partners progress reports Interviews with beneficiaries	Desk reviews of project reports and secondary data, Interviews with government partners Interviews with NGOs partners/ service providers Interviews with funding agencies Interview with civil societies in mining, agriculture, and other activities. Field visits to selected project implementation sites
	Is it consistent with human development needs and the specific development challenges in Peru and Ecuador?	How does the project address the human development needs of intended beneficiaries (poor, women, disadvantaged groups)?		
	Are UNIDO approaches, resources, models, conceptual framework relevant to achieve the planned outcome?	What analysis was done in designing the project?	Project identification and planning documents UNIDO staff Development partners (GAC, etc.) Government partners involved in specific results/thematic areas	
		To what extent have indigenous peoples, women, conflict displaced peoples, and other stakeholders been involved in project design?		
	Are they sufficiently sensitive post-conflict environment in the country?		Concerned civil society partners Concerned associations and federations	
	To what extent has UNIDO adopted participatory approaches in planning and delivery of the initiative?	Are the resources allocated sufficient to achieve the objectives of the project?		

Criteria/Sub-criteria	Questions to be addressed	What to look for	Data sources	Data collection methods
Effectiveness	<p>Did the project implementation contribute towards the stated outcome?</p> <p>Did it set dynamic changes and processes that move towards the long-term outcomes?</p> <p>How does UNIDO measure its progress towards expected results/ outcomes in a context of flux?</p>	<p>What outcomes does the project intend to achieve? What outputs has the project achieved?</p> <p>What percentage of the project results at the output level has been achieved?</p> <p>What changes can be observed as a result of these outputs?</p> <p>In addition to UNIDO initiatives, what other factors may have affected the results?</p> <p>What were the unintended results (+ or -) of UNIDO initiatives?</p>	<p>Project evaluation reports</p> <p>Progress reports on projects</p> <p>UNIDO staff</p> <p>Development partners</p> <p>Government partners, Beneficiaries</p>	<p>Desk reviews of secondary data</p> <p>Interviews with government partners, development partners, UNIDO staff, civil society partners, associations, and federations</p> <p>Field visits to selected projects</p>
	<p>How broad are the outcomes (e.g., local community, district, regional, national)?</p> <p>Are UNIDO's efforts concentrated in regions/districts of greatest need?</p>	<p>Are the results of the project intended to reach local community, district, regional or national level?</p>	<p>Evaluation reports</p> <p>Progress reports on projects</p>	<p>Desk reviews of secondary data</p>

Criteria/Sub-criteria	Questions to be addressed	What to look for	Data sources	Data collection methods
	<p>Who are the main beneficiaries?</p> <p>To what extent do the poor, indigenous groups, women, and other disadvantaged and marginalized groups benefit?</p>	<p>Who are the target beneficiaries and to what extent have they been reached by the project?</p> <p>How have the particular needs of disadvantaged groups been taken into account in the design and implementation, benefit sharing, monitoring and evaluation of the project?</p> <p>How far has social inclusion been taken into account in the project?</p> <p>How far has the regional context (least developed region) been taken into consideration while selecting the project?</p>	<p>Programme documents</p> <p>Annual Work Plans</p> <p>Evaluation reports</p> <p>MDG progress reports</p>	<p>Desk reviews of secondary data</p>

Criteria/Sub criteria	Questions to be addressed	What to look for	Data sources	Data collection methods
Efficiency	<p>Has the project or programme been implemented within deadline and cost estimates?</p> <p>Have UNIDO and its partners taken prompt actions to solve implementation issues?</p> <p>What impact has political instability had on delivery timelines?</p>	<p>Have there been time extensions on the project? What were the circumstances giving rise to the need for time extension?</p> <p>Has there been over-expenditure or under-expenditure on the project?</p> <p>What mechanisms does UNIDO have in place to monitor implementation? Are these effective?</p>	<p>Programme documents Annual Work Plans Evaluation reports □ Government partners Development partners UNIDO staff</p>	<p>Desk reviews of secondary data Interviews with government partners and development partners</p>
	<p>Were UNIDO resources focused on the set of activities that were expected to produce significant results?</p> <p>Was there any identified synergy between UNIDO initiatives that contributed to reducing costs while supporting results?</p>	<p>Are resources concentrated on the most important initiatives or are they scattered/spread thinly across initiatives?</p>	<p>Programme documents Annual Work Plans Evaluation reports Government partners Development partners UNIDO staff</p>	<p>Desk reviews of secondary data Interviews with government partners and development partners</p>

Criteria/Sub-criteria	Questions to be addressed	What to look for	Data sources	Data collection methods
Sustainability	<p>Were initiatives designed to have sustainable results given the identifiable risks?</p> <p>Did they include an exit/continuation strategy?</p>	<p>- Did the project have an exit strategy?</p> <p>- To what extent does the exit strategy take into account the following:</p> <ul style="list-style-type: none"> – Political factors (support from national authorities) – Financial factors (available budgets) – Technical factors (skills and expertise needed) – Environmental factors (environmental appraisal) 	<p>Programme documents</p> <p>Annual Work Plans</p> <p>Evaluation reports</p>	<p>Desk reviews of secondary data</p>
	<p>What issues emerged during implementation as a threat to sustainability? What corrective measures were adopted?</p> <p>How has UNIDO addressed the challenge of building national capacity in the face of high turnover of government officials?</p>	<p>What unanticipated sustainability threats emerged during implementation?</p> <p>What corrective measures did UNIDO take?</p>	<p>Evaluation reports</p> <p>Progress reports</p> <p>□ UNIDO staff</p>	<p>Desk reviews of secondary data</p> <p>Interview UNIDO staff</p>
	<p>How has UNIDO approached the scaling up of successful pilot initiatives and catalytic projects?</p> <p>Has the government taken on these initiatives? Have donors stepped in to scale up initiatives?</p>	<p>What actions have been taken to scale up the project if it is a pilot initiative?</p>	<p>Evaluation reports</p> <p>Progress reports</p> <p>UNIDO staff</p>	<p>Desk reviews of secondary data</p> <p>Interview UNIDO- staff</p>

Criteria/Sub-criteria	Questions to be addressed	What to look for	Data sources	Data collection methods
Supporting policy dialogue on human development issues	To what extent did the initiative support the government in monitoring achievement of MDGs?	<input type="checkbox"/> What assistance has the initiative provided supported the government in promoting human development approach and monitoring MDGs? Comment on how effective this support has been.	Project documents Evaluation reports HDR reports MDG reports National Planning Commission Ministry of Finance	Desk review of secondary data Interviews with government partners
Contribution to gender equality	<p>To what extent was the UNIDO initiative designed to appropriately incorporate in each outcome area contributions to attainment of gender equality?</p> <p>To what extent did UNIDO support positive changes in terms of gender equality and were there any unintended effects?</p>	<p>Provide example(s) of how the initiative contributes to gender equality.</p> <p>Can results of the programme be disaggregated by sex?</p>	Project documents Evaluation reports UNIDO staff Government partners Beneficiaries	Desk review of secondary data Interviews with UNIDO staff and government partners Observations from field visits
Addressing equity issues (social inclusion)	How did the UNIDO initiative take into account the plight and needs of vulnerable and disadvantaged to promote social equity, for example, women, youth, disabled persons?	Provide example(s) of how the initiative takes into account the needs of vulnerable and disadvantaged groups, for example, women, youth, disabled persons. How has UNIDO programmed social inclusion into the initiative?	Project documents Evaluation reports UNIDO staff Government partners Beneficiaries	Desk review of secondary data Interviews with UNIDO staff and government partners Observations from field visits

Annex D: Evaluation Terms of Reference

Independent terminal evaluation of the UNIDO project:

Implementing integrated measures for minimizing mercury releases from artisanal gold mining

UNIDO Project number: GF/RLA/12/003 - 100271

GEF ID: 4799

MAY 2016

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I. Project background and overview

1. Project factsheet

Project Title	Implementing integrated measures for minimizing mercury releases from artisanal gold mini
UNIDO project No.:	GF/RLA/12/003 - 100271
GEF project ID	4799
Region	Latin America
Country(ies)	Ecuador, Peru
GEF focal area(s) and operational programme	Multi focal area (Chemicals – POPs and International Waters)
GEF implementing agency(ies)	UNIDO
GEF executing partner(s)	National Geologic, Mining and metallurgy Research Institute (INIGEMM) – Ecuador Ministry of Environment - Peru
Project size (FSP, MSP, EA)	MSP
Project CEO endorsement / Approval date	19 March 2012
Project implementation start date (First PAD issuance date)	18 June 2012
Original expected implementation end date (indicated in CEO endorsement/Approval document)	18 March 2015
Revised expected implementation end date (if applicable)	31 August 2016
Actual implementation end date	31 August 2016
GEF project grant (excluding PPG, in USD)	999,900
GEF PPG (if applicable, in USD)	
UNIDO co-financing (in USD)	50,000 (in kind)
Total co-financing at CEO endorsement (in USD)	2,676,764 (cash+in-kind)
Materialized co-financing at project completion (in USD)	
Total project cost (excluding PPG and agency support cost, in USD; i.e., GEF project grant + total co-financing at CEO endorsement)	3,726,664
Mid-term review date	
Planned terminal evaluation date	July - August 2016

(Source: Project document)²

² Project information data throughout this TOR are to be verified during the inception phase.

2. Project background and context

The project started in 2012. It is being implemented in the Puyango-Tumbes river basin located in the south of Ecuador and north of Peru. Ecuador and Peru have a long withstanding cooperation in their border region through the Binational Plan, which was signed in 1998. Given its past success, the cooperation has recently been extended till 2014. The plan has several programs currently underway, including in the areas of environmental management. The plan demonstrates the countries willingness and ability to cooperate in the areas of mutual interest in order to strengthen the development of this region. The project aimed to strengthen the national capacity of both Ecuador and Peru to effectively manage mercury in the artisanal and small-scale gold mining sector.

In Peru, the Tumbes river basin was targeted as it is the direct receptor of any contaminating activities upstream; however, the primary technology transfer, training and awareness raising activities were to be conducted in the department of Piura, also in the north of Peru, as artisanal and small-scale gold mining (ASGM) is practiced in this area, whereas the Tumbes area does not mine gold.

Small-scale artisanal gold mining is a major cause of mercury (extraction chemical) releases and environmental pollution. The propensity for water transport of mercury, its chemical transformation and bioaccumulation, and its easy transport in often transboundary rivers and aquifers, makes it a threat not only to the health of miners and of ecosystems at the local level, but to the environmental health of the global community. Currently, ASGM is one of the largest anthropogenic sources of mercury emission to the environment. UNIDO estimates that nearly 100% of all mercury used in ASGM is released into the environment. Total releases are estimated at 1,000 tonnes of mercury per year, which is equivalent to about 30% of total anthropogenic mercury emissions.

This project aimed to reduce substantial (>40%) mercury releases, more cost-effective gold recovery and income enhancement, by applying an integrated series of measures including capacity building, technology transfer and policy/legal reforms. By achieving a reduction in the releases of mercury and strengthening capacities for the implementation of vigilance and monitoring programs, the project would have a beneficial impact on easing tension in the region; and the benefits from increased gold recovery and income enhancement will give sustainability to the initiative. Both countries have a strong tradition in gold mining and have demonstrated a strong commitment to action, including legislative, to respond to the environmental issues raised by ASGM.

A large part of the technology transfer activities was to be focused in Ecuador, as this is where the mercury emissions affecting the transboundary water system originate. Special attention was to be given to working with the communities in the Puyango River water basin in order to promote the adoption of clean techniques and technologies which reduce mercury use and emissions. However, lessons learned from the techniques and technologies that are developed and transferred were also to be shared with the mining communities in Peru. Both countries were to receive extensive training and awareness-raising.

The project is funded through a GEF grant, amounting to USD 999,900, a UNIDO contribution of USD 50,000 (in kind); and the counterparts' co-financing of USD 2,626,764 (in kind), which amount to total project budget of USD 3,726,664.

The project implementation started in June 2012 and the initial project end date was in March 2015. The same was revised and the new expected implementation end date is 31 August 2016.

3. Project objective and structure

The main objective of the project is to protect human health and the environment by implementing integrated measures aimed at minimizing mercury releases (>40%) from artisanal gold mining activities affecting the Puyango River basin in Ecuador and the Tumbes River basin in Peru.

The project's technical components, in addition to project management, are as follows:

PC-1: Design of strategies for minimization of mercury releases and enhancement of gold recovery and income (Mercury minimization strategies and reduction targets endorsed by stakeholders in both countries)

PC-2: Implementation of Mercury Releases Minimization Strategies in the Puyango-Tumbes River basins. (Reduction in mercury use and emissions in the targeted mining communities, through a) local development and adoption of alternative mining technologies, b) increased awareness of mining communities, national & local authorities on dangers on mercury, c) adoption of policies or programmes supporting the formalization of miners and promoting innovative financial mechanism)

PC-3: Implementation of Communication, Dissemination and Replication (CDR) Strategies (Project objectives and results are communicated / disseminated to achieve replication at a national, regional and international level)

The following are, in brief, some of the expected results of the project:

- Design strategies for minimization of mercury releases and enhancement of gold recovery
- Develop a characterization and diagnostic analysis, describing the baseline socio-economic, environmental and human health conditions, as well as the organization and political structure of the ASGM communities
- Establish targets for release reductions, with the development of accompanying indicators of success
- Training of miners on improved technologies and best practices to reduce mercury use and emissions, while enhancing gold recovery and incomes
- Training of miners, national and local authorities, as well as the general public, particularly women and youth, on the dangers of mercury.
- Conduct a mercury monitoring programme in the Puyango-Tumbes river basin
- Develop programs to prompt the use of financial tools for miners, policy/legislative reforms and the formalization of the ASGM sector
- The communication strategy will successfully disseminate the project achievements, which in turn will lead to a replication of the best practices at a national, regional and international level.

4. Project implementation and execution arrangements

UNIDO: GEF implementation agency and responsible for overall monitoring and evaluation of the project, as well as reporting progress to the donor.

UNEP: Liaise with UNIDO through the Global Mercury Partnership on policies development, basin level action plans and national strategic action plans

INIGEMM: formalization and capacity building of miners in Ecuador (establishment of the International Training Center for Artisanal Mining – ITCAM), educating the local communities and strengthening the legal framework

Peruvian Ministry of Environment: implementing agency in Peru

Project Coordination Unit (PCU): was to be established in Ecuador, and to comprise:

Regional Project Coordinator (RPC): responsible for overall coordination of project activities, day-to-day implementation of the project in Ecuador and coordinate activities with the National Coordinator in Peru.

National Coordinator (NC): in Peru.

5. Budget information

The project is funded through a GEF grant, amounting to USD 999,900, a UNIDO contribution of USD 50,000 (in kind); and the counterparts' co-financing of USD 2,626,764 (in kind), which amount to total project budget of USD 3,726,664.

Some financial details are shown below:

Project outcomes	Donor (GEF/other) (USD)	Co-Financing (USD)	Total (USD)
1. Mercury minimization strategies and reduction targets endorsed by stakeholders in both countries	40,000	290,000	330,000.00
2. Reduction in mercury use and emissions in the targeted mining communities	769,000	2,100,000	2,869,000.00
3. Project objectives and results are communicated / disseminated to achieve replication at a national, regional and international level.	100,000	52,000	152,000.00
Project management	90,900	234,764	325,664.00
Total (USD)	999,900	2,676,764	3,676,664

Source: CEO endorsement document

Co-financing Source Breakdown is as follows:

Co-financing Source		Type	Total Co-financing
INIGEMM	National Government	Grant	540,000
INIGEMM	National Government	In-kind	1,419,600
University of Machala, Ecuador	Other	In-kind	150,000
US State Department	National Government	Grant	242,000
Ministry of Environment, Peru	National Government	In-kind	275,164
UNIDO	IA	In-kind	50,000
Total Co-financing			2,676,764

Source: CEO Endorsement document

UNIDO GEF-grant disbursement breakdown:

Item	Disbursement (expenditure, incl. commitment) in 2012	Disbursement in 2013	Disbursement in 2014	Disbursement in 2015	Disbursement in 2016	Total disbursement (in USD) (2012-present) (12 May 2016)
Staff & Intern Consult.	6,423.60	16,671.00	1,132.00	64,322.00	12,600.00	101,148.60
Local travel	7,816.41	5,530.47	4,912.19	17,528.14	8,344.97	44,132.18
Staff Travel		254.73		68.62		323.35
Nat.Consult./Staff		47,234.11	80,105.91	63,784.77	41,238.28	232,363.07
Contractual Services		102,083.33	191,000.00	77,933.34		371,016.67
Train/Fellowship/Stu		14,461.78	174.73	-659.76		13,976.75
International Meetings	15,583.06	7,799.16	25,900.49	-133.35	98.27	49,247.63
Equipment		2,581.93	590.65	-691.23	17,856.00	20,337.35
Other Direct Costs	1,439.87	6,255.60	5,721.14	5,542.66	12,553.14	31,512.41
Total (in USD)	31,262.94	202,872.11	309,537.11	227,695.19	92,690.66	864,058.01

Source: UNIDO database, 12 May 2016

II. Scope and purpose of the evaluation

The terminal evaluation (TE) will cover the whole duration of the project from its starting date in June 2012 to the estimated completion date in December 2016. It will assess project performance against the evaluation criteria: relevance, effectiveness, efficiency, sustainability and impact.

The TE has an additional purpose of drawing lessons and developing recommendations for UNIDO and the GEF that may help improving the selection, enhancing the design and implementation of similar future projects and activities in the country and on a global scale upon project completion. The terminal evaluation report should include examples of good practices for other projects in the focal area, country, or region.

The terminal evaluation should provide an analysis of the attainment of the project objective(s) and the corresponding technical components or outputs. Through its assessments, the terminal evaluation should enable the Government, the national GEF Operational Focal Point (OFP), counterparts, the GEF, UNIDO and other stakeholders and donors to verify prospects for development impact and promoting sustainability, providing an analysis of the attainment of global environmental objectives, project objectives, delivery and completion of project outputs/activities, and outcomes/impacts based on indicators, and management of risks. The assessment includes re-examination of the relevance of the objectives and other elements of project design according to the project evaluation parameters defined in chapter VI.

The key question of the terminal evaluation is whether the project has achieved or is likely to achieve the main objective of the project which is to protect human health and the environment by implementing integrated measures aimed at minimizing mercury releases (>40%) from artisanal gold mining activities affecting the Puyango River basin in Ecuador and the Tumbes River basin in Peru.

III. Evaluation approach and methodology

The terminal evaluation will be conducted in accordance with the UNIDO Evaluation Policy³, the UNIDO Guidelines for the Technical Cooperation Programme and Project Cycle⁴, the GEF Guidelines for GEF Agencies in Conducting Terminal Evaluations⁵, the GEF Monitoring and Evaluation Policy⁶ and the GEF Minimum Fiduciary Standards for GEF Implementing and Executing Agencies⁷.

It will be carried out by an independent evaluation team, as an independent in-depth evaluation using a participatory approach whereby all key parties associated with the project are kept informed and regularly consulted throughout the evaluation. The evaluation team will liaise with the UNIDO Independent Evaluation Division (ODG/EVQ/IEV) on the conduct of the evaluation and methodological issues.

The evaluation team will be required to use different methods to ensure that data gathering and analysis deliver evidence-based qualitative and quantitative information, based on diverse sources, as necessary: desk studies and literature review, statistical analysis, individual interviews, focus group meetings, surveys and direct observation. This approach will not only enable the evaluation

³ UNIDO. (2015). Director General's Bulletin: Evaluation Policy (UNIDO/DGB/(M).98/Rev.1)

⁴ UNIDO. (2006). Director-General's Administrative Instruction No. 17/Rev.1: Guidelines for the Technical Cooperation Programme and Project Cycle (DGAL.17/Rev.1, 24 August 2006)

⁵ GEF. (2008). Guidelines for GEF Agencies in Conducting Terminal Evaluations (Evaluation Office, Evaluation Document No. 3, 2008)

⁶ GEF. (2010) The GEF Monitoring and Evaluation Policy (Evaluation Office, November 2010)

⁷ GEF. (2011). GEF Minimum Fiduciary Standards: Separation of Implementation and Execution Functions in GEF Partner Agencies (GEF/C.41/06/Rev.01, 3 November 2011, prepared by the Trustee)

to assess causality through quantitative means but also to provide reasons for why certain results were achieved or not and to triangulate information for higher reliability of findings. The specific mixed methodological approach will be described in the inception report.

The evaluation team will develop interview guidelines. Field interviews can take place either in the form of focus-group discussions or one-to-one consultations.

The methodology will be based on the following:

1. A desk review of project documents, including, but not limited to:
 - (a) The original project document, monitoring reports (such as progress and financial reports to UNIDO and UNIDO-GEF annual Project Implementation Reports (PIRs)), mid-term review (MTR) report, output reports (case studies, action plans, sub-regional strategies, etc.), back-to-office mission report(s), end-of-contract report(s) and relevant correspondence.
 - (b) If applicable, notes from the meetings of committees involved in the project (e.g. approval and steering committees).
 - (c) Other project-related material produced by the project.
2. The evaluation team will use available models of (or reconstruct if necessary) theory of change for the different types of intervention (enabling, capacity, investment, demonstration). The validity of the theory of change will be examined through specific questions in interviews and possibly through a survey of stakeholders.
3. Counterfactual information: In those cases where baseline information for relevant indicators is not available, the evaluation team will aim at establishing a proxy-baseline through recall and secondary information.
4. Interviews with project management and technical support including staff and management at UNIDO HQ and in the field and – if necessary - staff associated with the project's financial administration and procurement.
5. Interviews with project partners and stakeholders, including, among others, government counterparts, GEF OFP, project stakeholders, and co-financing partners as shown in the corresponding sections of the project documents.
6. On-site observation of results achieved by demonstration projects, including interviews of actual and potential beneficiaries of improved technologies.
7. Interviews and telephone interviews with intended users for the project outputs and other stakeholders involved in the project. The evaluation team shall determine whether to seek additional information and opinions from representatives of any donor agency(ies) or other organizations.
8. Interviews with the relevant UNIDO Field Office in Colombia (which covers Ecuador and Peru), to the extent that it was involved in the project, and members of the project management team and the various national and sub-regional authorities dealing with project activities as necessary. If deemed necessary, the evaluation team shall also gain broader perspectives from discussions with relevant GEF Secretariat staff.
9. Other interviews, surveys or document reviews as deemed necessary by the evaluation team and/or UNIDO, ODG/EVQ/IEV for triangulation purposes.
10. The inception report will provide details on the methodology used by the evaluation team and include an evaluation matrix.

IV. Evaluation team composition

The evaluation team will be composed of one international evaluation consultant acting as the team leader and one national consultant(s). The consultants will be contracted by UNIDO. The tasks of each team member are specified in the job descriptions annexed to these terms of reference.

The evaluation team might be required to provide information relevant for follow-up studies, including terminal evaluation verification on request to the GEF partnership up to three years after completion of the terminal evaluation.

Members of the evaluation team must not have been directly involved in the design and/or implementation of the projects/programme under evaluation.

The UNIDO project manager and the project teams in the participating countries will support the evaluation team. The UNIDO GEF Coordinator and the GEF OFP will be briefed on the evaluation and provide support to its conduct. GEF OFP will, where applicable and feasible, also be briefed and debriefed at the start and end of the evaluation mission.

V. Time schedule and deliverables

The evaluation is scheduled to take place from June-August 2016. The evaluation mission is planned for July 2016. At the end of the field mission, there will be a presentation of the preliminary findings for all stakeholders involved in this project/programme in the participating country.

At the end of the evaluation field mission, a debriefing should also be conducted inviting local stakeholders (incl. government and parties involved in the evaluation). After the evaluation mission, the international evaluation consultant will come to UNIDO HQ for debriefing and presentation of the preliminary findings of the terminal evaluation.

The draft TE report will be submitted 4 to 6 weeks after the end of the mission. The draft TE report is to be shared with the UNIDO PM, ODG/EVQ/IEV, the UNIDO GEF Coordinator and the GEF OFP and other relevant stakeholders for receipt of comments. The ET is expected to revise the draft TE report based on the comments received, edit the language and form and submit the final version of the TE report in accordance with UNIDO ODG/EVQ/IEV standards.

VI. Project evaluation parameters

The evaluation team will assess the project performance guided by the parameters and evaluations questions provided in this section. In addition to the qualitative assessment based on the evidence gathered in the evaluation, the evaluation team will rate the project on the basis of the **rating criteria for the parameters described in the following sub-chapters, A to I.**

Ratings will be presented in the form of tables with each of the criteria / aspects rated separately and with **brief justifications for the rating** based on the findings and the main analyses (see Table 1 to Table 3) in Annex 2. Table 4 in Annex 2 presents the template for summarizing the overall ratings.

For GEF projects: As per the GEF's requirements, the evaluation report should also provide information on project identification, time frame, actual expenditures, and co-financing in the format in Annex 6, which is modelled after the GEF's project identification form (PIF).

A. Project identification and design

Project identification assessment criteria derived from the logical framework approach (LFA) methodology, establishing the process and set up of steps and analyses required to design a project in a systematic and structured way, e.g. situation, stakeholder, problem and objective analyses.

The aspects to be addressed by the evaluation include inter alia the extent to which:

- a) The situation, problem, need / gap was clearly identified, analysed and documented (evidence, references). The project design was based on a needs assessment
- b) Stakeholder analysis was adequate (e.g. clear identification of end-users, beneficiaries, sponsors, partners, and clearly defined roles and responsibilities in the project(s)).
- c) The project took into account and reflects national and local priorities and strategies
- d) ISID-related issues and priorities were considered when designing the project

- e) Relevant country representatives (from government, industries, gender groups, custom officers and civil society - including the GEF OFP for GEF projects), were appropriately involved and participated in the identification of critical problem areas and the development of technical cooperation strategies.

Project design quality assessment criteria derive from the logical framework approach (LFA) methodology, leading to the establishment of LogFrame Matrix (LFM) and the main elements of the project, i.e. overall objective, outcomes, outputs, to defining their causal relationship, as well as indicators, their means of verification and the assumptions. The evaluation will examine the extent to which:

- f) The project's design was adequate to address the problems at hand;
- g) The project had a clear thematically focused development objective;
- h) The project outcome was clear, realistic, relevant, addressed the problem identified and provided a clear description of the benefit or improvement that will be achieved after project completion;
- i) Outputs were clear, realistic, adequately leading to the achievement of the outcome;
- j) The attainment of overall development objective, outcome and outputs can be determined by a set of SMART verifiable indicators;
- k) The results hierarchy in the LFM, from activities to outputs, outcome and overall objective, is logical and consistent.
- l) Verification and Assumptions were adequate, identifying important external factors and risks;
- m) All GEF-4 and GEF-5 projects have incorporated relevant environmental and social considerations into the project design / GEF-6 projects have followed the provisions specified in UNIDO/DGAI.23: UNIDO Environmental and Social Safeguards Policies and Procedures (ESSPP).

B. Implementation Performance

Implementation assessment criteria to be applied are shown below and correspond to DAC criteria, as well as to good programme/project management practices.

a) Relevance and ownership

The evaluation will examine the extent to which the project is relevant to the:

- i. National development and environmental priorities and strategies of the Government and the population, and regional and international agreements. See possible evaluation questions under "Country ownership/drivenness" below.
- ii. Target groups: relevance of the project's objectives, outcomes and outputs to the different target groups of the interventions (e.g. companies, civil society, beneficiaries of capacity building and training, etc.).
- iii. GEF's focal areas/operational programme strategies: In retrospect, were the project's outcomes consistent with the GEF focal area(s)/operational program strategies? Ascertain the likely nature and significance of the contribution of the project outcomes to the wider portfolio of POPs.
- iv. Does the project remain relevant taking into account the changing environment?

b) Effectiveness

- i. Achievement of expected outcomes:
 - o What outputs and outcomes has the project achieved so far (both qualitative and quantitative results)?
 - o To what extent have the expected outcomes, outputs and long-term objectives been achieved or are likely to be achieved?
 - o Has the project generated any results that could lead to changes of the assisted institutions?

- Have there been any unplanned effects?
- Are the project outcomes commensurate with the original or modified project objectives?
- If the original or modified expected results were described as merely outputs/inputs, were there any real outcomes of the project and, if so, were these commensurate with realistic expectations from the project?
- If there was a need to reformulate the project design and the project results framework given changes in the country and operational context, were such modifications properly documented?
- ii. How do the stakeholders perceive the quality of outputs? Were the targeted beneficiary groups actually reached?
- iii. Longer-term impact: Identify actual and/or potential longer-term impacts or at least indicate the steps taken to assess these (see also below “monitoring of long term changes”). Wherever possible, evaluators should indicate how findings on impacts will be reported in future.
- iv. Catalytic or replication effects: Describe any catalytic or replication effects: the evaluation will describe any catalytic or replication effect both within and outside the project. If no effects are identified, the evaluation will describe the catalytic or replication actions that the project carried out. No ratings are requested for the project’s catalytic role.

c) Efficiency

The extent to which:

- i. The project cost was effective? Was the project using the most cost-efficient options?
- ii. Has the project produced results (outputs and outcomes) within the expected time frame? Was project implementation delayed, and, if it was, did that affect cost effectiveness or results? Wherever possible, the evaluator should also compare the costs incurred and the time taken to achieve outcomes with that for similar projects. Are the project’s activities in line with the schedule of activities as defined by the project team and annual work plans? Are the disbursements and project expenditures in line with budgets?
- iii. Have the inputs from the donor, UNIDO and Government/counterpart been provided as planned, and were they adequate to meet the requirements? Was the quality of UNIDO inputs and services as planned and timely?
- iv. Was there coordination with other UNIDO and other donors’ projects, and did possible synergy effects happen?
- v. Were there delays in project implementation and if so, what were their causes?

d) Assessment of risks to sustainability of project outcomes

Sustainability is understood as the likelihood of continued benefits after the GEF project ends. Assessment of sustainability of outcomes will be given special attention but also technical, financial and organization sustainability will be reviewed. This assessment should explain how the risks to project outcomes will affect continuation of benefits after the GEF project ends. It will include both exogenous and endogenous risks. The following four dimensions or aspects of risks to sustainability will be addressed:

- i. **Financial risks.** Are there any financial risks that may jeopardize sustainability of project outcomes? What is the likelihood of financial and economic resources not being available once GEF assistance ends? (Such resources can be from multiple sources, such as the public and private sectors or income-generating activities; these can also include trends that indicate the likelihood that, in future, there will be adequate financial resources for sustaining project outcomes.) Was the project successful in identifying and leveraging co-financing?
- ii. **Sociopolitical risks.** Are there any social or political risks that may jeopardize sustainability of project outcomes? What is the risk that the level of stakeholder ownership (including ownership by governments and other key stakeholders) will be insufficient to allow for the project outcomes/benefits to be sustained? Do the various key stakeholders

see that it is in their interest that project benefits continue to flow? Is there sufficient public/stakeholder awareness in support of the project's long-term objectives?

- iii. **Institutional framework and governance risks.** Do the legal frameworks, policies, and governance structures and processes within which the project operates pose risks that may jeopardize sustainability of project benefits? Are requisite systems for accountability and transparency and required technical know-how in place?
- iv. **Environmental risks.** Are there any environmental risks that may jeopardize sustainability of project outcomes? Are there any environmental factors, positive or negative, that can influence the future flow of project benefits? Are there any project outputs or higher-level results that are likely to have adverse environmental impacts, which, in turn, might affect sustainability of project benefits? The evaluation should assess whether certain activities will pose a threat to the sustainability of the project outcomes.

e) Assessment of monitoring and evaluation (M&E) systems

- i. **M&E design.** Did the project have an M&E plan to monitor results and track progress towards achieving project objectives? The evaluation will assess whether the project met the minimum requirements for the application of the Project M&E plan (see Annex 3).
- ii. **M&E plan implementation.** The evaluation should verify that an M&E system was in place and facilitated timely tracking of progress toward project objectives by collecting information on chosen indicators continually throughout the project implementation period; annual project reports were complete and accurate, with well-justified ratings; the information provided by the M&E system was used during the project to improve performance and to adapt to changing needs; and the project had an M&E system in place with proper training for parties responsible for M&E activities to ensure that data will continue to be collected and used after project closure. Was monitoring and self-evaluation carried out effectively, based on indicators for outputs, outcomes and impacts? Are there any annual work plans? Was any steering or advisory mechanism put in place? Did reporting and performance reviews take place regularly?
- iii. **Budgeting and Funding for M&E activities.** In addition to incorporating information on funding for M&E while assessing M&E design, the evaluators will determine whether M&E was sufficiently budgeted for at the project planning stage and whether M&E was adequately funded and in a timely manner during implementation.

f) Monitoring of long-term changes

The M&E of long-term changes is often incorporated in GEF-supported projects as a separate component and may include determination of environmental baselines; specification of indicators; and provisioning of equipment and capacity building for data gathering, analysis, and use. This section of the evaluation report will describe project actions and accomplishments towards establishing a long-term monitoring system. The evaluation will address the following questions:

- i. Did the project contribute to the establishment of a long-term monitoring system? If it did not, should the project have included such a component?
- ii. What were the accomplishments and shortcomings in establishment of this system?
- iii. Is the system sustainable — that is, is it embedded in a proper institutional structure and does it have financing? How likely is it that this system continues operating upon project completion?
- iv. Is the information generated by this system being used as originally intended?

g) Assessment of processes affecting achievement of project results

Among other factors, when relevant, the evaluation will consider a number of issues affecting project implementation and attainment of project results. The assessment of these issues can be integrated into the analyses of project design, relevance, effectiveness, efficiency, sustainability and management as the evaluators deem them appropriate (it is not necessary, however it is possible to have a separate chapter on these aspects in the evaluation report). The evaluation will

consider, but need not be limited to, the following issues that may have affected project implementation and achievement of project results:

- i. **Preparation and readiness / Quality at entry.** Were the project's objectives and components clear, practicable, and feasible within its time frame? Were counterpart resources (funding, staff, and facilities), and adequate project management arrangements in place at project entry? Were the capacities of executing institution and counterparts properly considered when the project was designed? Were lessons from other relevant projects properly incorporated in the project design? Were the partnership arrangements properly identified and the roles and responsibilities negotiated prior to project approval?
- ii. **Country ownership/drivenness.** Was the project concept in line with the sectoral and development priorities and plans of the country—or of participating countries, in the case of multi-country projects? Are project outcomes contributing to national development priorities and plans? Were relevant country representatives from government and civil society involved in the project? Was the GEF OFP involved in the project design and implementation? Did the recipient government maintain its financial commitment to the project? Has the government—or governments in the case of multi-country projects—approved policies or regulatory frameworks in line with the project's objectives?
- iii. **Stakeholder involvement and consultation.** Did the project involve the relevant stakeholders through continuous information sharing and consultation? Did the project implement appropriate outreach and public awareness campaigns? Were the relevant vulnerable groups and powerful supporters and opponents of the processes involved in a participatory and consultative manner? Which stakeholders were involved in the project (e.g., NGOs, private sector, other UN Agencies) and what were their immediate tasks? Did the project consult with and make use of the skills, experience, and knowledge of the appropriate government entities, nongovernmental organizations, community groups, private sector entities, local governments, and academic institutions in the design, implementation, and evaluation of project activities? Were perspectives of those who would be affected by project decisions, those who could affect the outcomes, and those who could contribute information or other resources to the process taken into account while taking decisions?
- iv. **Financial planning.** Did the project have appropriate financial controls, including reporting and planning, that allowed management to make informed decisions regarding the budget and allowed for timely flow of funds? Was there due diligence in the management of funds and financial audits? Did promised co-financing materialize? Specifically, the evaluation should also include a breakdown of final actual project costs by activities compared to budget (variances), financial management (including disbursement issues), and co-financing.
- v. **UNIDO's supervision and backstopping.** Did UNIDO staff identify problems in a timely fashion and accurately estimate their seriousness? Did UNIDO staff provide quality support and advice to the project, approve modifications in time, and restructure the project when needed? Did UNIDO provide the right staffing levels, continuity, skill mix, and frequency of field visits for the project?
- vi. **Co-financing and project outcomes and sustainability.** Did the project manage to mobilize the co-financing amount expected at the time of CEO Endorsement? If there was a difference in the level of expected co-financing and the co-financing actually mobilized, what were the reasons for the variance? Did the extent of materialization of co-financing affect project outcomes and/or sustainability, and, if so, in what ways and through what causal linkages?
- vii. **Delays and project outcomes and sustainability.** If there were delays in project implementation and completion, what were the reasons? Did the delays affect project outcomes and/or sustainability, and, if so, in what ways and through what causal linkages?
- viii. **Implementation and execution approach.** Is the implementation and execution approach chosen different from other implementation approaches applied by UNIDO and other agencies? Does the approach comply with the principles of the Paris Declaration? Is the

implementation and execution approach in line with the GEF Minimum Fiduciary Standards: Separation of Implementation and Execution Functions in GEF Partner Agencies (GEF/C.41/06/Rev.01) and the relevant UNIDO regulations (DGAI.20 and Procurement Manual)? Does the approach promote local ownership and capacity building? Does the approach involve significant risks? In cases where Execution was done by third parties, i.e. Executing Partners, based on a contractual arrangement with UNIDO was this done in accordance with the contractual arrangement concluded with UNIDO in an effective and efficient manner?

- ix. **Environmental and Social Safeguards.** If a GEF-5 project, has the project incorporated relevant environmental and social risk considerations into the project design? What impact did these risks have on the achievement of project results?

h) Project coordination and management

The extent to which:

- i. The national management and overall coordination mechanisms have been efficient and effective? Did each partner have assigned roles and responsibilities from the beginning? Did each partner fulfil its role and responsibilities (e.g. providing strategic support, monitoring and reviewing performance, allocating funds, providing technical support, following up agreed/corrective actions)?
- ii. The UNIDO HQ-based management, coordination, monitoring, quality control and technical inputs have been efficient, timely and effective (e.g. problems identified timely and accurately; quality support provided timely and effectively; right staffing levels, continuity, skill mix and frequency of field visits)?

i) Assessment of gender mainstreaming

Gender mainstreaming assessment criteria are provided in the table below. Guidance on integrating gender is included in Annex 4.

The evaluation will consider, but need not be limited to, the following issues that may have affected gender mainstreaming in the project:

- Did the project/programme design adequately consider the gender dimensions in its interventions? If so, how (at the level of project outcome, output or activity)?
- Was a gender analysis included in a baseline study or needs assessment (if any)?
- How gender-balanced was the composition of the project management team, the Steering Committee, experts and consultants and the beneficiaries?
- Have women and men benefited equally from the project's interventions? Do the results affect women and men differently? If so, why and how? How are the results likely to affect gender relations (e.g., division of labour, decision-making authority)?
- Are women/gender-focused groups, associations or gender units in partner organizations consulted/included in the project?
- To what extent were socioeconomic benefits delivered by the project at the national and local levels, including consideration of gender dimensions?

VII. Deliverables and Reporting

Inception report

These terms of reference (TOR) provide some information on the evaluation methodology, but this should not be regarded as exhaustive. After reviewing the project documentation and initial interviews with the project manager, the evaluation team will prepare a short inception report that will operationalize the TOR relating to the evaluation questions and provide information on what

type of and how the evidence will be collected (methodology). It will be discussed with and approved by the responsible in the UNIDO Independent Evaluation Division.

The inception report will focus on the following elements: preliminary project theory model(s); elaboration of evaluation methodology including quantitative and qualitative approaches through an evaluation framework (“evaluation matrix”); division of work between the international evaluation consultants; mission plan, including places to be visited, people to be interviewed and possible surveys to be conducted and a debriefing and reporting timetable⁸.

Evaluation report format and review procedures

The draft report will be delivered to UNIDO Independent Evaluation Division (the suggested report outline is in Annex 1) and circulated to UNIDO staff, the GEF OFP, and national stakeholders associated with the project for factual validation and comments. Any comments or responses, or feedback on any errors of fact to the draft report provided by the stakeholders will be sent to UNIDO ODG/EVQ/IEV for collation and onward transmission to the project evaluation team who will be advised of any necessary revisions. On the basis of this feedback, and taking into consideration the comments received, the evaluation team will prepare the final version of the terminal evaluation report.

The evaluation team will present its preliminary findings to the national stakeholders at the end of the field visit and take into account their feed-back in preparing the evaluation report. A presentation of preliminary findings will take place at UNIDO HQ after the field mission.

The terminal evaluation report should be brief, to the point and easy to understand. It must explain the purpose of the evaluation, exactly what was evaluated, and the methods used. The report must highlight any methodological limitations, identify key concerns and present evidence-based findings, consequent conclusions, recommendations and lessons. The report should provide information on when the evaluation took place, the places visited, who was involved and be presented in a way that makes the information accessible and comprehensible. The report should include an executive summary that encapsulates the essence of the information contained in the report to facilitate dissemination and distillation of lessons.

Findings, conclusions and recommendations should be presented in a complete, logical and balanced manner. The evaluation report shall be written in English and follow the outline given in Annex 1.

Evaluation work plan and deliverables

The “Evaluation Work Plan” includes the following main products/deliverables:

INCEPTION PHASE:

1. Desk review, briefing by project manager and development of methodology: Following the receipt of all relevant documents, and consultation with the Project Manager about the documentation, including reaching an agreement on the methodology, the desk review could be completed.
2. Inception report: At the time of departure to the field mission, all the received material has been reviewed and consolidated into the Inception report.

FIELD MISSION:

3. Field mission: The principal responsibility for managing this evaluation lies with UNIDO. It will be responsible for liaising with the project team to set up the stakeholder interviews, arrange the field missions, coordinate with the Government. At the end of the field mission, there will be a presentation of preliminary findings to the key stakeholders in the country where the project was implemented.

⁸ The evaluator will be provided with a Guide on how to prepare an evaluation inception report prepared by the UNIDO Independent Evaluation Division.

4. Preliminary findings from the field mission: Following the field mission, the main findings, conclusions and recommendations would be prepared and presented in the field and at UNIDO Headquarters.

REPORTING:

5. Data analysis/collation of the data/information collected
6. A draft terminal evaluation report will be forwarded electronically to the UNIDO Independent Evaluation Division and circulated to main stakeholders.
7. Final terminal evaluation report will incorporate comments received.

VIII. Quality assurance

All UNIDO terminal evaluations are subject to quality assessments by the UNIDO Independent Evaluation Division. Quality assurance and control is exercised in different ways throughout the evaluation process (briefing of consultants on methodology and process by the UNIDO, ODG/EVQ/IEV, providing inputs regarding findings, lessons learned and recommendations from other UNIDO evaluations, review of inception report and evaluation report by UNIDO, ODG/EVQ/IEV). The quality of the evaluation report will be assessed and rated against the criteria set forth in the Checklist on evaluation report quality, attached as Annex 5. The applied evaluation quality assessment criteria are used as a tool to provide structured feedback. UNIDO, ODG/EVQ/IEV should ensure that the evaluation report is useful for UNIDO in terms of organizational learning (recommendations and lessons learned) and is compliant with UNIDO's evaluation policy and these terms of reference. The draft and final terminal evaluation report are reviewed by the UNIDO Independent Evaluation Division, which will submit the final report to the GEF Evaluation Office and circulate it within UNIDO together with a management response sheet.

Annex 1 - Outline of an in-depth project evaluation report

Executive summary

- Must provide a synopsis of the storyline which includes the main evaluation findings and recommendations
- Must present strengths and weaknesses of the project
- Must be self-explanatory and should be maximum 3-4 pages in length

I. Evaluation objectives, methodology and process

- Information on the evaluation: why, when, by whom, etc.
- Scope and objectives of the evaluation, main questions to be addressed
- Information sources and availability of information
- Methodological remarks, limitations encountered and validity of the findings

II. Country and project background

- Brief country context: an overview of the economy, the environment, institutional development, demographic and other data of relevance to the project
- Sector-specific issues of concern to the project⁹ and important developments during the project implementation period
- Project summary:
 - Fact sheet of the project: including project objectives and structure, donors and counterparts, project timing and duration, project costs and co-financing
 - Brief description including history and previous cooperation
 - Project implementation arrangements and implementation modalities, institutions involved, major changes to project implementation
 - Positioning of the UNIDO project (other initiatives of Government, other donors, private sector, etc.)
 - Counterpart organization(s)

III. Project assessment

This is the key chapter of the report and should address all evaluation criteria and questions outlined in the TOR (see section VI - Project evaluation parameters). Assessment must be based on factual evidence collected and analyzed from different sources. The evaluators' assessment can be broken into the following sections:

- A. Project identification and formulation
- B. Project design
- C. Implementation performance
 - a) Relevance and ownership (report on the relevance of project towards countries and beneficiaries, country ownership, stakeholder involvement)
 - b) Effectiveness (the extent to which the development intervention's objectives and deliverables were achieved, or are expected to be achieved, taking into account their relative importance)
 - c) Efficiency (report on the overall cost-benefit of the project and partner countries' contribution to the achievement of project objectives)
 - d) Likelihood of sustainability of project outcomes (report on the risks and vulnerability of the project, considering the likely effects of sociopolitical and institutional changes in partner countries, and its impact on continuation of benefits after the GEF project ends, specifically the financial, sociopolitical, institutional framework and governance, and environmental risks)
 - e) Project coordination and management (Report on the project management conditions and achievements, and partner countries' commitment)

⁹ Explicit and implicit assumptions in the logical framework of the project can provide insights into key-issues of concern (e.g., relevant legislation, enforcement capacities, government initiatives)

- f) Assessment of monitoring and evaluation systems (report on M&E design, M&E plan implementation, and budgeting and funding for M&E activities)
 - g) Monitoring of long-term changes
 - h) Assessment of processes affecting achievement of project results (report on preparation and readiness / quality at entry, country ownership, stakeholder involvement, financial planning, UNIDO support, co-financing and project outcomes and sustainability, delays of project outcomes and sustainability, and implementation approach)
- D. Gender mainstreaming

At the end of this chapter, an overall project achievement rating should be developed as required in Annex 2. The overall rating table required by the GEF should be presented here.

IV. Conclusions, recommendations and lessons learned

This chapter can be divided into three sections:

A. Conclusions

This section should include a storyline of the main evaluation conclusions related to the project's achievements and shortfalls. It is important to avoid providing a summary based on each and every evaluation criterion. The main conclusions should be cross-referenced to relevant sections of the evaluation report.

B. Recommendations

This section should be succinct and contain few key recommendations. They should be:

- Based on evaluation findings
- Realistic and feasible within a project context
- Indicating institution(s) responsible for implementation (addressed to a specific officer, group or entity who can act on it) and have a proposed timeline for implementation if possible
- Commensurate with the available capacities of project team and partners
- Taking resource requirements into account.

Recommendations should be structured by addressees:

- UNIDO
- Government and/or counterpart organizations
- Donor

C. Lessons learned

- Lessons learned must be of wider applicability beyond the evaluated project but must be based on findings and conclusions of the evaluation
- For each lesson, the context from which they are derived should be briefly stated

Annexes should include the evaluation TOR, list of interviewees, documents reviewed, a summary of project identification and financial data, including an updated table of expenditures to date, and other detailed quantitative information. Dissident views or management responses to the evaluation findings may later be appended in an annex.

Annex 2 - Rating tables

Ratings will be presented in the form of tables with each of the criteria / aspects rated separately and with brief justifications for the rating based on the findings and the main analyses (see Table 1 to Table 3) below. Table 4 presents the template for summarizing the overall ratings.

Table 1. Rating criteria for Quality of project identification and formulation process (LFA Process)

Evaluation issue	Evaluator's comments	Ratings
1. Extent to which the situation, problem, need / gap is clearly identified, analysed and documented (evidence, references).		
2. Adequacy and clarity of the stakeholder analysis (clear identification of end-users, beneficiaries, sponsors, partners, and clearly defined roles and responsibilities in the project(s)).		
3. Adequacy of project monitoring and evaluation (M&E) design.		
4. Overall LFA design process.		

Table 2. Quality of project design (LFM)

Evaluation issue	Evaluator's comments	Rating
1. Clarity and adequacy of outcome (clear, realistic, relevant, addressing the problem identified). Does it provide a clear description of the benefit or improvement that will be achieved after project completion?		
2. Clarity and adequacy of outputs (realistic, measurable, adequate for leading to the achievement of the outcome).		
3. Clarity, consistency and logic of the objective tree , and its reflexion in the LFM results hierarchy from activities to outputs, to outcome and to overall objective .		
4. Indicators are SMART for Outcome and Output levels.		
5. Adequacy of Means of Verification and Assumptions (including important external factors and risks).		
6. Overall LFM design quality.		

Table 3. Quality of project implementation performance

Evaluation criteria	Rating	
7. Ownership and relevance		
8. Effectiveness		
9. Efficiency		
10. Impact		
11. Likelihood of/ risks to sustainability		
12. Project management		
13. M&E		

Table 4. Template for summarizing overall ratings

Criterion	Evaluator's summary comments	Evaluator's rating
Attainment of project objectives and results (overall rating) , sub criteria (below)		
Project implementation		
Effectiveness		
Relevance		
Efficiency		
Sustainability of project outcomes (overall rating) , sub criteria (below)		
Financial risks		
Sociopolitical risks		
Institutional framework and governance risks		
Environmental risks		
Monitoring and evaluation (overall rating) , sub criteria (below)		
M&E Design		
M&E Plan implementation (use for adaptive management)		
Budgeting and Funding for M&E activities		
Project management - UNIDO specific ratings		
Quality at entry / Preparation and readiness		
Implementation approach		
UNIDO Supervision and backstopping		
Gender Mainstreaming		
Overall rating		

RATING OF PROJECT OBJECTIVES AND RESULTS

- Highly satisfactory (HS): The project had no shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.
- Satisfactory (S): The project had minor shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.
- Moderately satisfactory (MS): The project had moderate shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.
- Moderately unsatisfactory (MU): The project had significant shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.
- Unsatisfactory (U) The project had major shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.
- Highly unsatisfactory (HU): The project had severe shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.

Please note: Relevance and effectiveness will be considered as critical criteria. The overall rating of the project for achievement of objectives and results **may not be higher** than the lowest rating on either of these two criteria. Thus, to have an overall satisfactory rating for outcomes a project must have at least satisfactory ratings on both relevance and effectiveness.

RATINGS ON SUSTAINABILITY

Sustainability will be understood as the probability of continued long-term outcomes and impacts after the GEF project funding ends. The evaluation will identify and assess the key conditions or factors that are likely to contribute or undermine the persistence of benefits beyond project completion. Some of these factors might be outcomes of the project, i.e. stronger institutional capacities, legal frameworks, socio-economic incentives /or public awareness. Other factors will include contextual circumstances or developments that are not outcomes of the project but that are relevant to the sustainability of outcomes.

Rating system for sustainability sub-criteria

On each of the dimensions of sustainability of the project outcomes will be rated as follows.

- Likely (L): There are no risks affecting this dimension of sustainability.
- Moderately likely (ML). There are moderate risks that affect this dimension of sustainability.
- Moderately unlikely (MU): There are significant risks that affect this dimension of sustainability.
- Unlikely (U): There are severe risks that affect this dimension of sustainability.

All the risk dimensions of sustainability are critical. Therefore, overall rating for sustainability will not be higher than the rating of the dimension with lowest ratings. For example, if a project has an Unlikely rating in either of the dimensions then its overall rating cannot be higher than Unlikely, regardless of whether higher ratings in other dimensions of sustainability produce a higher average.

RATINGS OF PROJECT M&E

Monitoring is a continuing function that uses systematic collection of data on specified indicators to provide management and the main stakeholders of an ongoing project with indications of the extent of progress and achievement of objectives and progress in the use of allocated funds. Evaluation is the systematic and objective assessment of an on-going or completed project, its design, implementation and results. Project evaluation may involve the definition of appropriate standards, the examination of performance against those standards, and an assessment of actual and expected results.

The Project M&E system will be rated on M&E design, M&E plan implementation and budgeting and funding for M&E activities as follows:

- Highly satisfactory (HS): There were no shortcomings in the project M&E system.
- Satisfactory(S): There were minor shortcomings in the project M&E system.
- Moderately satisfactory (MS): There were moderate shortcomings in the project M&E system.
- Moderately unsatisfactory (MU): There were significant shortcomings in the project M&E system.
- Unsatisfactory (U): There were major shortcomings in the project M&E system.
- Highly unsatisfactory (HU): The Project had no M&E system.

M&E plan implementation will be considered a critical parameter for the overall assessment of the M&E system. The overall rating for the M&E systems will not be higher than the rating on M&E plan implementation.

All other ratings will be on the GEF six-point scale:

HS	= Highly satisfactory	Excellent
S	= Satisfactory	Well above average
MS	= Moderately satisfactory	Average
MU	= Moderately unsatisfactory	Below average
U	= Unsatisfactory	Poor
HU	= Highly unsatisfactory	Very poor (appalling)

Annex 3 - GEF Minimum requirements for M&E¹⁰

Minimum requirement 1: Project design of M&E

All projects will include a concrete and fully budgeted M&E plan by the time of work program entry for full-sized projects (FSP) and CEO approval for medium-sized projects (MSP). This M&E plan will contain as a minimum:

- SMART indicators for project implementation, or, if no indicators are identified, an alternative plan for monitoring that will deliver reliable and valid information to management;
- SMART indicators for results (outcomes and, if applicable, impacts), and, where appropriate, indicators identified at the corporate level;
- Baseline for the project, with a description of the problem to be addressed, with indicator data, or, if major baseline indicators are not identified, an alternative plan for addressing this within one year of implementation;
- Identification of reviews and evaluations that will be undertaken, such as mid-term reviews or evaluations of activities; and
- Organizational set-up and budgets for monitoring and evaluation.

Minimum requirement 2: Application of project M&E

Project monitoring and supervision will include implementation of the M&E plan, comprising:

- SMART indicators for implementation are actively used, or if not, a reasonable explanation is provided;
- SMART indicators for results are actively used, or if not, a reasonable explanation is provided;
- The baseline for the project is fully established and data compiled to review progress reviews, and evaluations are undertaken as planned; and
- The organizational set-up for M&E is operational and budgets are spent as planned.

¹⁰ http://www.thegef.org/gef/sites/thegef.org/files/documents/ME_Policy_2010.pdf

Annex 4 - Guidance on integrating gender in evaluations of UNIDO projects and programmes

A. Introduction

Gender equality is internationally recognized as a goal of development and is fundamental to sustainable growth and poverty reduction. The UNIDO Policy on gender equality and the empowerment of women and its addendum, issued respectively in April 2009 and May 2010 (UNIDO/DGB(M).110 and UNIDO/DGB(M).110/Add.1), provides the overall guidelines for establishing a gender mainstreaming strategy and action plans to guide the process of addressing gender issues in the Organization's industrial development interventions.

According to the UNIDO Policy on gender equality and the empowerment of women:

Gender equality refers to the equal rights, responsibilities and opportunities of women and men and girls and boys. Equality does not suggest that women and men become 'the same' but that women's and men's rights, responsibilities and opportunities do not depend on whether they are born male or female. Gender equality implies that the interests, needs and priorities of both women and men are taken into consideration, recognizing the diversity of different groups of women and men. It is therefore not a 'women's issues'. On the contrary, it concerns and should fully engage both men and women and is a precondition for, and an indicator of sustainable people-centered development.

Empowerment of women signifies women gaining power and control over their own lives. It involves awareness-raising, building of self-confidence, expansion of choices, increased access to and control over resources and actions to transform the structures and institutions which reinforce and perpetuate gender discriminations and inequality.

Gender parity signifies equal numbers of men and women at all levels of an institution or organization, particularly at senior and decision-making levels.

The UNIDO projects/programmes can be divided into two categories: 1) those where promotion of gender equality is one of the key aspects of the project/programme; and 2) those where there is limited or no attempted integration of gender. Evaluation managers/evaluators should select relevant questions depending on the type of interventions.

B. Gender responsive evaluation questions

The questions below will help evaluation managers/evaluators to mainstream gender issues in their evaluations.

B.1 Design

- Is the project/programme in line with the UNIDO and national policies on gender equality and the empowerment of women?
- Were gender issues identified at the design stage?
- Did the project/programme design adequately consider the gender dimensions in its interventions? If so, how?
- Were adequate resources (e.g., funds, staff time, methodology, experts) allocated to address gender concerns?
- To what extent were the needs and priorities of women, girls, boys and men reflected in the design?
- Was a gender analysis included in a baseline study or needs assessment (if any)?
- If the project/programme is people-centered, were target beneficiaries clearly identified and disaggregated by sex, age, race, ethnicity and socio-economic group?
- If the project/programme promotes gender equality and/or women's empowerment, was gender equality reflected in its objective/s? To what extent are output/outcome indicators gender disaggregated?

B.2 Implementation management

- Did project monitoring and self-evaluation collect and analyze gender disaggregated data?
- Were decisions and recommendations based on the analyses? If so, how?
- Were gender concerns reflected in the criteria to select beneficiaries? If so, how?
- How gender-balanced was the composition of the project management team, the Steering Committee, experts and consultants and the beneficiaries?
- If the project/programme promotes gender equality and/or women's empowerment, did the project/programme monitor, assess and report on its gender related objective/s?

B.3 Results

- Have women and men benefited equally from the project's interventions? Do the results affect women and men differently? If so, why and how? How are the results likely to affect gender relations (e.g., division of labour, decision making authority)?
- In the case of a project/programme with gender related objective/s, to what extent has the project/programme achieved the objective/s? To what extent has the project/programme reduced gender disparities and enhanced women's empowerment?

Annex 5. Checklist on terminal evaluation report quality

Independent terminal evaluation of UNIDO-GEF project:

Project Title:

UNIDO Project No.:

GEF ID:

Evaluation team leader:

Quality review done by:

Date:

Checklist on evaluation report quality

Report quality criteria	UNIDO ODG/EVQ/IEV assessment notes	Rating
A. Was the report well-structured and properly written? (Clear language, correct grammar, clear and logical structure)		
B. Was the evaluation objective clearly stated and the methodology appropriately defined?		
C. Did the report present an assessment of relevant outcomes and achievement of project objectives?		
D. Was the report consistent with the ToR and was the evidence complete and convincing?		
E. Did the report present a sound assessment of sustainability of outcomes or did it explain why this is not (yet) possible? (Including assessment of assumptions, risks and impact drivers)		
F. Did the evidence presented support the lessons and recommendations? Are these directly based on findings?		
G. Did the report include the actual project costs (total, per activity, per source)?		
H. Did the report include an assessment of the quality of both the M&E plan at entry and the system used during the implementation? Was the M&E sufficiently budgeted for during preparation and properly funded during implementation?		
I. Quality of the lessons: were lessons readily applicable in other contexts? Did they suggest prescriptive action?		
J. Quality of the recommendations: did recommendations specify the actions necessary to correct existing conditions or improve operations ('who?' 'what?' 'where?' 'when?'). Can these be immediately implemented with current resources?		

Report quality criteria	UNIDO ODG/EVQ/IEV assessment notes	Rating
K. Are the main cross-cutting issues, such as gender, human rights and environment, appropriately covered?		
L. Was the report delivered in a timely manner? (Observance of deadlines)		

Rating system for quality of evaluation reports

A number rating 1-6 is used for each criterion: Highly satisfactory = 6, Satisfactory = 5, Moderately satisfactory = 4, Moderately unsatisfactory = 3, Unsatisfactory = 2, Highly unsatisfactory = 1, and unable to assess = 0.

Annex 6 – Required project identification and financial data

The evaluation report should provide information on project identification, time frame, actual expenditures, and co-financing in the following format, which is modeled after the project identification form (PIF).

I. Dates

Milestone	Expected date	Actual date
Project CEO endorsement/approval date		
Project implementation start date (PAD issuance date)		
Original expected implementation end date (indicated in CEO endorsement/approval document)		
Revised expected implementation end date (if any)		
Terminal evaluation completion		
Planned tracking tool date		

II. Project framework

Project component	Activity type	GEF financing (in USD)		Co-financing (in USD)	
		Approved	Actual	Promised	Actual
1.					
2.					
3.					
4.					
5.					
6. Project management					
Total (in USD)					

Activity types are:

- a) Experts, researches hired
- b) technical assistance, Workshop, Meetings or experts consultation scientific and technical analysis, experts researches hired
- c) Promised co-financing refers to the amount indicated on endorsement/approval.

III. Co-financing

Source of co-financing (name of specific co-financiers)	Type of co-financier (e.g. government, GEF agency(ies), Bilateral and aid agency (ies), multilateral agency(ies), private sector, NGO/CSOs, other)	Type of co-financing	Project preparation – CEO endorsement/ approval stage (in USD)		Project implementation stage (in USD)		Total (in USD)	
			Expected	Actual	Expected	Actual	Expected	Actual
Total co-financing (in USD)								

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

Annex 7 – Job descriptions



UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Terms of Reference for Personnel under Individual Service Agreement (ISA)

Title:	International evaluation consultant, team leader
Main Duty Station and Location:	Home-based
Missions:	Missions to Vienna, Austria; Portovelo-Zaruma, Ecuador and Suyo, Peru
Start of Contract (EOD):	20 June 2016
End of Contract (COB):	20 August 2016
Number of Working Days:	30 working days spread over 2 months

1. ORGANIZATIONAL CONTEXT

The UNIDO Independent Evaluation Division (ODG/EVQ/IEV) is responsible for the independent evaluation function of UNIDO. It supports learning, continuous improvement and accountability, and provides factual information about result and practices that feed into the programmatic and strategic decision-making processes. Evaluation is an assessment, as systematic and impartial as possible, of a programme, a project or a theme. Independent evaluations provide evidence-based information that is credible, reliable and useful, enabling the timely incorporation of findings, recommendations and lessons learned into the decision-making processes at organization-wide, programme and project level. ODG/EVQ/IEV is guided by the UNIDO Evaluation Policy, which is aligned to the norms and standards for evaluation in the UN system.

2. PROJECT CONTEXT

Small-scale artisanal gold mining is a major cause of mercury (extraction chemical) releases and environmental pollution. The propensity for water transport of mercury, its chemical transformation and bioaccumulation, and its easy transport in often transboundary rivers and aquifers, makes it a threat not only to the health of miners and of ecosystems at the local level, but to the environmental health of the global community. Currently, artisanal and small-scale gold mining (ASGM) is one of the largest anthropogenic sources of mercury emission to the environment. UNIDO estimates that nearly 100% of all mercury used in ASGM is released into the environment. Total releases are estimated at 1,000 tonnes of mercury per year, which is equivalent to about 30% of total anthropogenic mercury emissions.

This project aimed to reduce substantial (>40%) mercury releases, more cost-effective gold recovery and income enhancement by applying an integrated series of measures including capacity building, technology transfer and policy/legal reforms. By achieving a reduction in the releases of mercury and strengthening capacities for the implementation of vigilance and monitoring programs, the project would have a beneficial impact on easing tension in the region; and the benefits from increased gold recovery and income enhancement will give sustainability to the initiative. Both countries, Ecuador and Peru, have a strong tradition in gold mining and have demonstrated a strong commitment to action, including legislative, to respond to the environmental issues raised by ASGM.

The main objective of the project is to protect human health and the environment by implementing integrated measures aimed at minimizing mercury releases (>40%) from artisanal gold mining activities affecting the Puyango River basin in Ecuador and the Tumbes River basin in Peru.

Detailed background information of the project can be found the Terms of Reference (TORs) for the terminal evaluation.

3. DUTIES AND RESPONSIBILITIES

MAIN DUTIES	Concrete/ Measurable Outputs to be achieved	Working Days	Location
<p>1. Review project documentation and relevant country background information (national policies and strategies, UN strategies and general economic data); determine key data to collect in the field and adjust the key data collection instrument of 3A accordingly (if needed);</p> <p>Assess the adequacy of legislative and regulatory framework relevant to the project's activities and analyze other background info.</p>	<ul style="list-style-type: none"> • Adjust table of evaluation questions, depending on country specific context; • Draft list of stakeholders to interview during the field missions; • Brief assessment of the adequacy of the country's legislative and regulatory framework. 	6 days	Home-based
<p>2. Briefing with the UNIDO Independent Evaluation Division, project managers and other key stakeholders at UNIDO HQ.</p> <p>Preparation of the Inception Report</p>	<ul style="list-style-type: none"> • Detailed evaluation schedule with tentative mission agenda (incl. list of stakeholders to interview and site visits); mission planning; • Division of evaluation tasks with the National Consultant. • Inception Report 	1 day	Vienna, Austria
<p>3. Conduct field mission to Ecuador and Peru in July 2016¹¹.</p>	<ul style="list-style-type: none"> • Conduct meetings with relevant project stakeholders, beneficiaries, the GEF Operational Focal Point (OFP), etc. for the collection of data and clarifications; • Agreement with the National Consultant on the structure and content of the evaluation report and the distribution of writing tasks; • Evaluation presentation of the evaluation's initial findings prepared, draft conclusions and recommendations to stakeholders in the country, including the GEF OFP, at the end of the mission. 	12 days	Ecuador and Peru
<p>4. Present overall findings and recommendations to the stakeholders at UNIDO HQ</p>	<ul style="list-style-type: none"> • After field mission(s): Presentation slides, feedback from stakeholders obtained and discussed 	2 days	Vienna, Austria

¹¹ The exact mission dates will be decided in agreement with the Consultant, UNIDO HQ, and the country counterparts.

MAIN DUTIES	Concrete/ Measurable Outputs to be achieved	Working Days	Location
5. Prepare the evaluation report, with inputs from the National Consultant, according to the TOR; Coordinate the inputs from the National Consultant and combine with her/his own inputs into the draft evaluation report. Share the evaluation report with UNIDO HQ and national stakeholders for feedback and comments.	• Draft evaluation report.	6 days	Home-based
6. Revise the draft project evaluation report based on comments from UNIDO Independent Evaluation Division and stakeholders and edit the language and form of the final version according to UNIDO standards.	• Final evaluation report.	3 days	Home-based
	TOTAL	305 days	

MINIMUM ORGANIZATIONAL REQUIREMENTS

Education:

Advanced degree in environment, energy, engineering, development studies or related areas

Technical and functional experience:

- Minimum of 7 years' experience in environmental project management and/or evaluation (of development projects)
- Strong experience in environment and/or earth sciences (geology, mineralogy, etc.), as well as knowledge about GEF operational programs and strategies and about relevant GEF policies such as those on project life cycle, M&E, incremental costs, and fiduciary standards
- Experience in the evaluation of GEF projects and knowledge of UNIDO activities an asset
- Knowledge about multilateral technical cooperation and the UN, international development priorities and frameworks
- Working experience in developing countries

Languages:

Fluency in written and spoken English is required. Working knowledge in Spanish is required.

Reporting and deliverables

- 1) At the beginning of the assignment the Consultant will submit a concise Inception Report that will outline the general methodology and presents a concept Table of Contents;
- 2) The country assignment will have the following deliverables:
 - Presentation of initial findings of the mission to key national stakeholders;
 - Draft report;
 - Final report, comprising of executive summary, findings regarding design, implementation and results, conclusions and recommendations.

3) Debriefing at UNIDO HQ:

- Presentation and discussion of findings;
- Concise summary and comparative analysis of the main results of the evaluation report.

All reports and related documents must be in English and presented in electronic format.

Absence of conflict of interest:

According to UNIDO rules, the consultant must not have been involved in the design and/or implementation, supervision and coordination of and/or have benefited from the programme/project (or theme) under evaluation. The consultant will be requested to sign a declaration that none of the above situations exists and that the consultants will not seek assignments with the manager/s in charge of the project before the completion of her/his contract with the UNIDO Independent Evaluation Division.



UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Terms of reference for personnel under Individual Service Agreement (ISA)

Title:	National evaluation consultant
Main Duty Station and Location:	Home-based
Mission/s to:	Travel to potential sites within Ecuador and Peru
Start of Contract:	20 June 2016
End of Contract:	20 August 2016
Number of Working Days:	25 days spread over 2 months

ORGANIZATIONAL CONTEXT

The UNIDO Independent Evaluation Division is responsible for the independent evaluation function of UNIDO. It supports learning, continuous improvement and accountability, and provides factual information about result and practices that feed into the programmatic and strategic decision-making processes. Evaluation is an assessment, as systematic and impartial as possible, of a programme, a project or a theme. Independent evaluations provide evidence-based information that is credible, reliable and useful, enabling the timely incorporation of findings, recommendations and lessons learned into the decision-making processes at organization-wide, programme and project level. The UNIDO Independent Evaluation Division is guided by the UNIDO Evaluation Policy, which is aligned to the norms and standards for evaluation in the UN system.

PROJECT CONTEXT

The national evaluation consultant will evaluate the projects according to the terms of reference (TOR) under the leadership of the team leader (international evaluation consultant). S/he will perform the following tasks:

MAIN DUTIES	Concrete/measurable outputs to be achieved	Expected duration	Location
Review and analyze project documentation and relevant country background information (national policies and strategies, UN strategies and general economic data); in cooperation with the Team Leader: determine key data to collect in the field and prepare key instruments in both English and local language (questionnaires, logic models) to collect these data through interviews and/or surveys during and prior to the field missions; Coordinate and lead interviews/surveys in local language and assist the team leader with translation where necessary;	<ul style="list-style-type: none"> List of detailed evaluation questions to be clarified; questionnaires/interview guide; logic models; list of key data to collect, draft list of stakeholders to interview during the field missions Drafting and presentation of brief assessment of the adequacy of the country's legislative and regulatory framework in the context of the project. 	7 days	Home-based

MAIN DUTIES	Concrete/measurable outputs to be achieved	Expected duration	Location
Analyze and assess the adequacy of legislative and regulatory framework, specifically in the context of the project's objectives and targets; provide analysis and advice to the team leader on existing and appropriate policies for input to the team leader.			
Review all project outputs/ publications/feedback; Briefing with the evaluation team leader, UNIDO project managers and other key stakeholders. Coordinate the evaluation mission agenda, ensuring and setting up the required meetings with project partners and government counterparts, and organize and lead site visits, in close cooperation with the Project Management Unit. Assist and provide detailed analysis and inputs to the team leader in the preparation of the inception report.	<ul style="list-style-type: none"> • Interview notes, detailed evaluation schedule and list of stakeholders to interview during the field missions. • Division of evaluation tasks with the Team Leader. • Inception Report. 	3 days	Home-based (telephone interviews)
Coordinate and conduct the field mission with the team leader in cooperation with the Project Management Unit, where required; Consult with the team leader on the structure and content of the evaluation report and the distribution of writing tasks.	<ul style="list-style-type: none"> • Presentations of the evaluation's initial findings, draft conclusions and recommendations to stakeholders in the country at the end of the mission. • Agreement with the Team Leader on the structure and content of the evaluation report and the distribution of writing tasks. 	10 days (including travel days)	Ecuador/ Peru
Prepare inputs and analysis to the evaluation report according to TOR and as agreed with the Team Leader.	Draft evaluation report prepared.	3 days	Home-based
Revise the draft project evaluation report based on comments from UNIDO Independent Evaluation Division and stakeholders and edit the language and form of the final version according to UNIDO standards.	Final evaluation report prepared.	2 days	Home-based
TOTAL		25 days	

REQUIRED COMPETENCIES

Core values:

1. Integrity
2. Professionalism
3. Respect for diversity

Core competencies:

1. Results orientation and accountability
2. Planning and organizing
3. Communication and trust
4. Team orientation
5. Client orientation
6. Organizational development and innovation

Managerial competencies (as applicable):

1. Strategy and direction
2. Managing people and performance
3. Judgement and decision making
4. Conflict resolution

MINIMUM ORGANIZATIONAL REQUIREMENTS

Education: Advanced university degree in science, engineering or and/or other relevant discipline like developmental studies.

Technical and functional experience:

- Exposure to the needs, conditions and problems in developing countries.
- Familiarity with the institutional context of the project is desirable.
- Experience in the field of environment and energy, including evaluation of development cooperation in developing countries is an asset

Languages: Fluency in written and spoken English and Spanish is required.

Absence of conflict of interest:

According to UNIDO rules, the consultant must not have been involved in the design and/or implementation, supervision and coordination of and/or have benefited from the programme/project (or theme) under evaluation. The consultant will be requested to sign a declaration that none of the above situations exists and that the consultants will not seek assignments with the manager/s in charge of the project before the completion of her/his contract with the UNIDO Independent Evaluation Division.

Annex 8 – Project results framework

	Intervention logic	Objectively verifiable indicators	Sources of verification	Assumptions
Development goal/impact <i>What the target group achieves (benefit)</i>	Protect human health and the environment by implementing integrated measures aimed at minimizing mercury releases from artisanal gold mining activities affecting the Puyango River basin in Ecuador and the Tumbes River basin in Peru.	- 40% reduction in levels of mercury released into the Puyango -Tumbes river basin		
Outcome(s)/ immediate objective(s)/ <i>What the target group does differently (change in behaviour)</i>	1. Mercury minimization strategies and reduction targets endorsed by stakeholders in both countries 2. Reduction in mercury use and emissions in the targeted mining communities, through: i) local development and adoption of mining alternative technologies/ techniques; ii) increased awareness of mining communities, national & local authorities and general public, particularly women and youth, of dangers of mercury use; iii) adoption of policies or programmes that support the formalization of miners and promote innovative financial mechanism. 3. Project objectives and results are communicated / disseminated to achieve replication at a national, regional and international level.	Strategies and reduction targets endorsed - % reduction in mercury levels in rivers - % reduction in mercury levels among targeted miners - % of stakeholders report increased awareness of mercury danger after training - % of miners that adopt alternative techniques - No. of miners formalized - No. of miners that undertake new financial mechanisms - Project presents results at Intergovernmental Negotiating Committee (INC) - Project results are shared with other mining communities in each country.	Project progress report - Laboratory results of the monitoring programme - Survey of stakeholders - Training assessment - Final evaluation - Project progress report - Minutes of the INC meeting(s)	- Continued Government commitment - The ASGM community is open to adopting new technologies/ techniques - Other mining communities are receptive to results from demonstration ASGM communities.

Outputs (results) <i>What the project achieves (create a potential)</i>	1.1 Design strategies for minimization of mercury releases and enhancement of gold recovery 1.2 Develop a characterization and diagnostic analysis describing the baseline socio-economic, environmental and human health conditions, as well as the organizational and political structure of the ASGM communities 1.3 Establish targets for release reductions, with the development of accompanying indicators of success.	<ul style="list-style-type: none"> - Preparation of strategies and targets for mercury reductions - Preparation of baseline analysis 	<ul style="list-style-type: none"> - Project progress report 	<ul style="list-style-type: none"> - Sufficient information is available for baseline and relevant stakeholders share the information.
	2.1 Training of miners on improved technologies and best practices to reduce mercury use and emissions, while enhancing gold recovery and incomes. 2.2 Training of miners, national and local authorities, as well as the general public, particularly women and youth, on the dangers of mercury 2.3 Develop programs to promote the use of financial tools for miners, policy/ legislative reforms and the formalization of the ASGM sector.	<ul style="list-style-type: none"> - % reduction in mercury levels in miners and environment by end of project - Results from evaluations conducted after training sessions - Number of policies / guidance documents developed to promote formalization of sector - Number of miners that adopt new financial mechanisms by end of project 	<ul style="list-style-type: none"> - Results of the monitoring programme - Final report - Final evaluation 	<ul style="list-style-type: none"> - Miners are receptive to new technologies and practices - Miners have the capacity to adopt new financial tools - Continued Gov. support to formalize ASGM sector.
	3.1 The communication strategy will successfully disseminate the project achievements, which in turn will lead to a replication of best practices at a national, regional and international level	<ul style="list-style-type: none"> - Active participation of both countries in the INC meetings - Number of awareness raising events held or promotional material distributed. - Number of participatory workshops /demonstration events conducted 	<ul style="list-style-type: none"> - Minutes of the INC (reflecting presentation of project, stand or number of interventions) - Promotional material - Final report 	<ul style="list-style-type: none"> - Government support of INC and dissemination of results