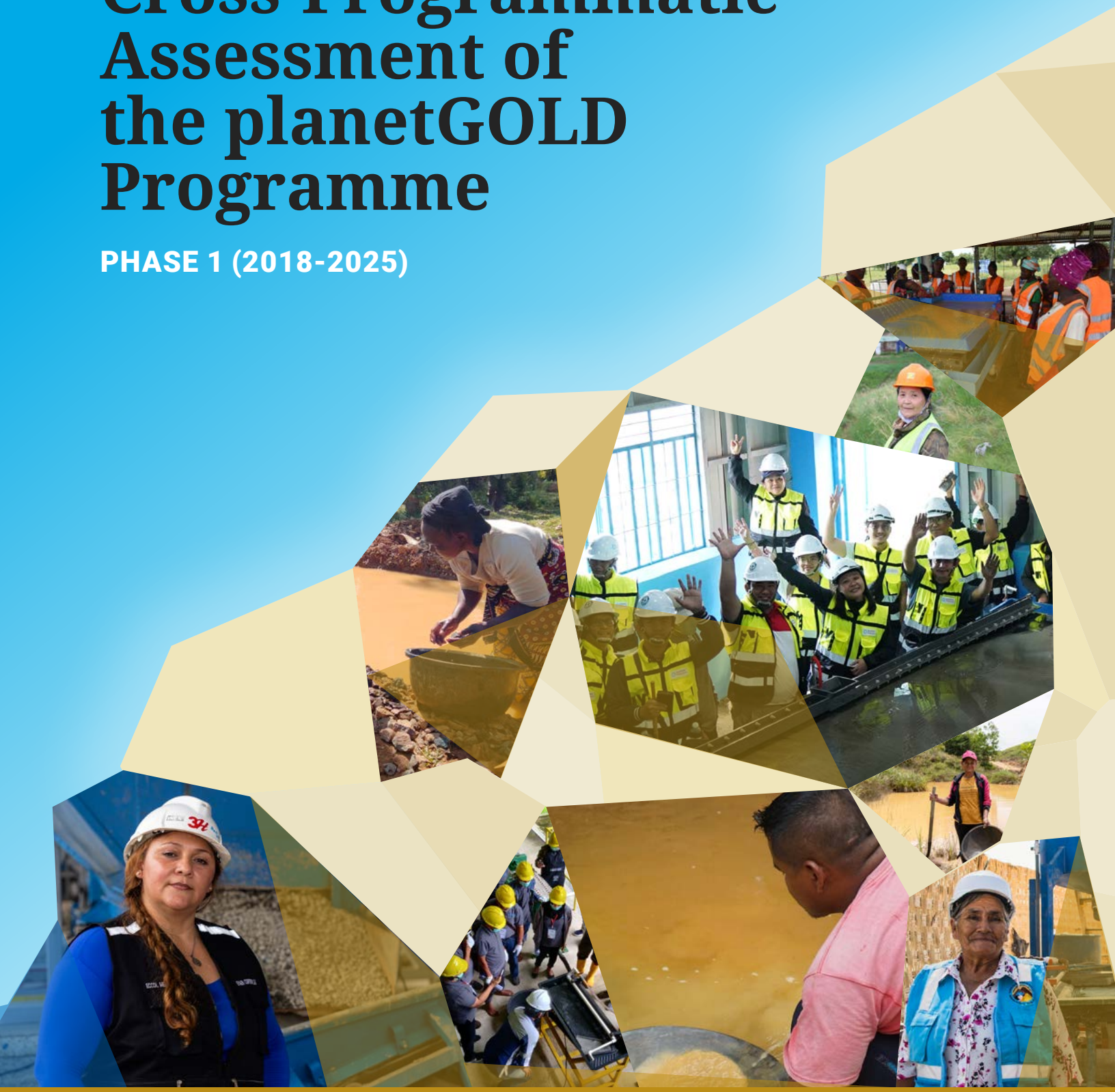
Cross-Programmatic Assessment of the planetGOLD Programme

PHASE 1 (2018-2025)



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Acknowledgments

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Executive Summary

The planetGOLD programme, supported by the Global Environment Facility (GEF), led by the United Nations Environment Programme (UNEP) and implemented by UNEP, the United Nations Development Programme (UNDP), the United Nations Industrial Development Organization (UNIDO), and Conservation International (CI), works in partnership with governments, the private sector, and artisanal and small-scale gold mining (ASGM) communities with the objective of eliminating mercury from the supply chain of gold produced by artisanal and small-scale miners.

This report provides a cross-programmatic assessment of the first phase (2018-2025) of the programme, which comprised nine country-level projects as well as a global coordination project. The report examines planetGOLD's strategies for ASGM development in terms of formalization, technology transfer, financial and market access, and communications. Common challenges, divergent approaches, and successful methods are discussed against the background of gender and Indigenous people's issues.

All pillars of the planetGOLD programme work together to produce improvement in the ASGM sector. Formalization is the foundational element of ASGM development, upon which all other pillars hinge. Under the formalization component, projects successfully lobbied governments to enact major legislative and regulatory changes (including reversals of outright bans on ASGM) and to streamline formalization processes and services, and they conducted extensive governance training of ASGM organizations and relevant government authorities. Projects also helped with the formation of cooperatives and licensing processes for specific target miner groups. Projects' experiences demonstrate that formalization is not merely a legal exercise, but a transformative catalyst for improving financial inclusion, responsible market access, environmental sustainability, and social protections in the ASGM sector. While substantial progress was made across all participating countries, formalization remains complex, politically sensitive, and often misunderstood by miners and in some cases, by relevant government authorities themselves, requiring sustained trust-building and systemic reform. Formalization consistently proved more complex and slower than initially anticipated, yet it remains the key enabler for advancing environmental, financial, and social improvements in the ASGM sector.

Number of miners assisted in their formalization process

11,619

5,375 6,244

* As of June 2024.
Data reported from: Burkina Faso, Colombia, Ecuador, Mongolia, Peru, and the Philippines

Recommendations for future initiatives related to ASGM formalization include:

- Promoting simplified and decentralized formalization processes and services, such as streamlining licensing requirements
- Taking steps to ensure long-term, consistent government ownership and political will, including embedding formalization processes and systems in multiple government systems
- Strengthening gender-responsive formalization through targeted efforts to support women-only and mixed cooperatives, to build women's leadership and agency, and provide gender-relevant training to government officials
- Tailoring support to mining organizations' maturity and digital needs, including using targeted business support approaches that empower them to operate as formal economic actors

The planetGOLD programme's theory of change maintains that improving access to finance will drive adoption of mercury-free practices. Various private finance and microfinance sector partnerships were created to improve access to finance, leading to loan mechanisms that in some cases reflected special terms catering specifically to ASGM, and in two cases, included first-loss guarantees provided by planetGOLD projects. In one country, where commercial finance was deemed unavailable in the remote area where the partner ASGM operation is located, a miner-led savings and credit organization was established. In addition to supporting the development of these mechanisms, projects focused on increasing financial literacy and overall improved business conduct by the ASGM operators and increasing the trust of participating finance institutions in the bankability of the mine sites.

De-risking the sector was a common need identified among lenders and experts, but in practice it has proven difficult to get banks to provide finance to ASGM. Because miners cannot normally accommodate the bank's normal lending procedures (disclosing asset values, collateral, earnings history), bank managers do not know how to measure and monitor the risks to their portfolios. Instead, ASGM operators still largely seek informal finance, although this can mean getting a lower price for their gold in exchange for pre-financing and convenience of transactions.

Amount of money successfully accessed through financial products/ mechanisms

$1,784,161 USD

* As of June 2024.
Data reported from: Burkina Faso, Colombia, Ecuador, Indonesia, and Peru

Recommendations for future programming related to financial access include:

- Promoting behavior and mindset change among miners through targeted capacity building on financial literacy

Designing financial products specifically fit for the ASGM sector to encourage uptake by miners

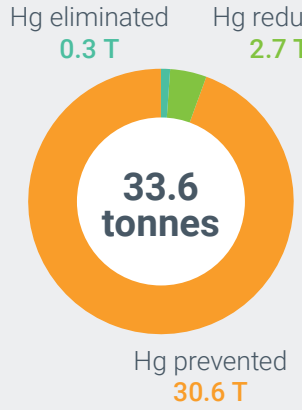
Prioritizing products and mechanisms that de-risk lending for financiers, such as models that leverage supplier agreements and sale receipts between ASGM operators and Central Banks instead of collateral

Educating existing financial service providers on the sector to help them recognize investment in more responsible ASGM as a potentially profitable business endeavor

Using finance to promote responsible, mercury-free mining by making conformance with the planetGOLD Criteria or other responsible sourcing frameworks a lending requirement for financial institutions

Successfully piloting mercury-free technologies requires projects to carefully select appropriate target sites and groups to work with; to secure cooperation of key stakeholders; and to perform analysis to help select technologies suitable for the local social, geological and technical contexts. To ensure acceptance and sustainability of the technical interventions, projects needed to gain the trust and cooperation of miners, governments, and local communities. To this end, some planetGOLD countries worked explicitly with mining associations and government-affiliated vocational agencies and training bodies to institutionalize training on technologies. These institutions will continue to train miners long after planetGOLD has ended.

Amount of mercury abated



* As of June 2024.
Data reported from: Burkina Faso, Colombia, Ecuador, Guyana, Indonesia, Mongolia, and Peru.

Seven of nine of the planetGOLD projects introduced enhanced gravity-based methods for gold recovery. In addition, two projects introduced methods that rely on chemical-based gold extraction. In some countries, planetGOLD projects undertook efforts to build all-new mercury-free processing capacity, and in others, country teams opted to expand existing facilities' ability to process ore without mercury. This was done through capacity building and provision of mercury-free equipment, strengthened existing processing capacity, partnership with other mining associations to process ore, and/or encouraging miners to sell their ore to existing processing businesses, thereby removing the need for miners to use mercury. Project teams consulted with miners and relevant government officials in the selection of these technologies to ensure they were appropriate for the local setting and would be accepted by miners. Free, Prior and Informed Consent (FPIC) is required in all areas involving Indigenous Peoples. Once the appropriate interventions were identified, the teams engaged in appropriate licensing, procurement and commissioning of new/updated equipment. Miners and ore processors were trained to operate and maintain the new technologies. Each demonstration proved that mercury-free recovery was more efficient than traditional methods. Project sites were often used as training facilities to widely spread knowledge

about mercury-free mining processes. Despite the progress made by the projects, challenges persist in scalability, and some technologies introduced remain challenging to replicate, due to technical and/or financial constraints.

Recommendations for future interventions related to technology transfer include:

- Procuring equipment manufactured or supplied locally where possible, to increase the chances of miners being able to replicate technical solutions piloted by projects
- Favoring cheaper equipment installations that can be implemented in a greater number of sites, including developing modular designs that can be adapted to local conditions
- Prioritizing modification of existing mercury-free capacity rather than establishing new sites (thereby saving tremendous costs and possible licensing issues)
- Finding miners who co-invest in technology transfer intervention sites, to help guarantee long term ownership and sustainability of outcomes.
- Further encouraging direct ore sales, where feasible, to completely relieve miners of the burden of processing their ore while providing the ancillary benefit of aggregating ASGM gold at formal sites, which greatly advances goals of due diligence and increasing access to formal markets

Improving market access is crucial if miners are to do business with legal buyers and get the best price for their gold. Projects in planetGOLD mapped existing supply chains in their respective countries and facilitated engagement with local, regional, and global market actors. One country piloted a new mine-to-market supply chain, with full due diligence and transparency. Regulatory, geographic, and due diligence issues are all important barriers to formal market access, in addition to informality.

Recommendations for future projects related to formal market access include:

- Mapping the country's ASM gold supply chains and broader market system before designing interventions
- Identifying and engaging local market actors and local downstream buyers
- Actively pursuing early collaboration with Central Bank domestic ASGM gold buying programs
- Moving beyond using mining cooperatives solely for licensing purposes, strengthening them as platforms for broader market access

Amount of responsible gold produced in conformance with the planetGOLD Criteria

672.12 kg

* As of June 2024.
Data reported from: Burkina Faso, Colombia, Ecuador, Mongolia, and the Philippines

Building local capacity on responsible supply chain mechanisms by training ASGM operation staff as due diligence officers

Facilitating women's access to formal spaces for trading and ensuring equitable opportunities within formal markets

Communications in planetGOLD goes beyond simply disseminating project results. Each country project followed a focused communication strategy, developed at the programme level, that sought to change wholly negative opinions of ASGM among civil society, governments and financial entities, and widely promoted mercury-free techniques and training. Outreach targeted local and international media, miners and local communities, and often featured education initiatives with children and youth. Projects also conducted broad-based awareness raising and advocacy.

Recommendations for future initiatives on ASGM-related communication and awareness raising include:

Using digital and immersive technologies to enhance learning, accessibility and understanding of responsible, mercury-free mining

Intentionally engaging members of the media to transform them into allies, promoting narratives based in a solution journalism approach

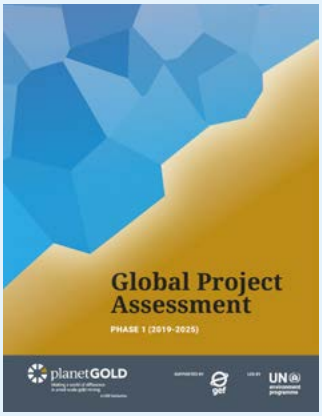
Tailoring content to local traditions and communication norms to increase uptake, especially in more rural regions

Developing partnerships with stakeholders (e.g., NGOs, training institutions, small-scale mining associations) to enhance reach and legitimacy

Blending communication channels to strengthen visibility and audience engagement

Strategically targeting audience groups and differentiating messaging for each

Fostering community champions to sustain awareness raising over the long term



Activities in the planetGOLD countries were supported by a programme-wide Global Project focused on knowledge management, communications and coordination. This programmatic approach enables more rapid learning and impact by enabling projects to share resources and learn from each other in ways that uniquely facilitate their progress. Being part of a global programme also lends legitimacy to initiatives individual country projects promote and more broadly to the issue of supporting more responsible ASGM. For a description of the supportive activities undertaken by this global component, read the **Global Project Assessment** report, which complements this cross-programmatic assessment.

The enabling factors for success in planetGOLD projects included greater prior social acceptance of mining, and a prior foundation of sector development work aimed establishing the legal and regulatory framework for ASGM and the broader mining industry, which resulted in comparatively clear and defined rules and processes. Technology transfer was enabled by well-established supply chains for mining equipment and services in country, as well as transportation infrastructure. Some countries also benefited from favorable conditions such as high ore grades, that facilitated transfer of low-cost gravity-based solutions. Issues with formality, from explicit ASM bans to mired tenure processes, created the highest barriers to success in planetGOLD, sapping the majority of project efforts and time in combating these problems.

Programme results will be sustained through dozens of project sites across the nine planetGOLD phase 1 countries that will continue to produce mercury-free gold and provide training sites and examples for replication across their respective regions and the world. In many planetGOLD countries, mercury-free ambassadors continue to advocate and educate.

Future programmes should explicitly connect activities under planetGOLD projects to the objectives and strategies of the National Action Plans (NAPs). Making this connection will allow countries to explicitly track the contribution of planetGOLD interventions to NAP progress. Future programmes should also initiate coordination and programmatic standard setting ahead of the inception of country projects, if feasible, and projects should focus initial project activities on fostering key enabling conditions such as formalization and developing local supply of equipment and services for mining. Where foundational elements like formalization are lagging, country projects should adapt the emphasis on project pillars to suit conditions within the national ASGM sector, for example shifting focus away from market access because it depends on the legality of the gold supply.

As important as it is to target more formal, better organized and serviced mining organizations to enable quick progress in developing pilot sites for training and replication, projects should also reflect on how to complement the approach of working only with legal/legitimate mining entities, given persistent widespread informality. Technical interventions need to be designed and implemented with ease of replication in mind, prioritizing modifications to miners' existing infrastructure wherever possible and promoting ore selling as an efficient mercury elimination strategy. In all cases, projects need to build on planetGOLD's efforts to create a better, solution-focused narrative around the benefits of responsibly managed ASGM. Programmes on ASGM must also embrace new technologies to stretch resources, ease data collection requirements, include broader audiences, and streamline project reporting. Whatever the nature of the ASGM initiative may be, any interventions must be designed with miners' perspectives as a central consideration, delivering benefits that are attractive to miners while accomplishing programmatic goals.

Abbreviations

ASGM	Artisanal and small-scale gold mining
ASM	Artisanal and small-scale mining
CFA	Corporacion Financiera de Antioquia
CRAFT	Code of Risk-mitigation for ASM engaging in Formal Trade
GEF	Global Environment Facility
MoU	Memorandum of Understanding
NAP	National Action Plan
NGO	Non-governmental organization
OECD	Organization for Economic Cooperation and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization

Introduction

Between 10 and 20 million artisanal and small-scale gold miners (ASGM) use mercury to extract gold in less developed nations worldwide, sometimes illegally and often producing severe impacts on landscapes and living systems. The ASGM sector is the largest contributor to global atmospheric mercury emissions annually (37%), most of which is emitted in Central and South America, Sub-Saharan Africa and Southeast Asia.[1] Mercury is the oldest, cheapest and fastest means of extracting gold, and therefore amalgamation is the method of choice for artisanal and small-scale miners globally. Miners are most inclined to adopt new technologies that increase production, rather than those that increase efficiency or reduce environmental impact. These tools, including powerful excavators, diesel generators and pumps, electric rock drills and mine ventilation systems, can greatly accelerate the rate of landscape disturbance and generation of toxic waste and residues, including mercury.

Miners often operate informally, if not illegally, as they lack the organization and technical ability to apply for legal instruments such as mining title and environmental licenses, thus preventing them from accessing formal finance to invest in cleaner technologies. In larger operations with higher operating expenses, mercury costs are dwarfed by fuel, labor and equipment costs, so there is little incentive to minimize mercury use; thus, larger operations tend to be relatively worse polluters as excess mercury is applied in the hope of maximizing gold recovery. This produces significant mercury losses from steady attrition of the material into the waste effluent, likely taking some of the gold with it.

Recognizing the significant contribution of ASGM to global mercury pollution, the Minamata Convention on Mercury includes an article that requires parties with “more than insignificant” ASGM to reduce, and where feasible eliminate, mercury use in the sector. However, ASGM is also an important driver of development, especially in rural areas of developing nations, and an important source of livelihood for millions of people who have few income-generating alternatives. Acknowledging the potential contribution of ASGM to economic development, the Minamata Convention does not treat ASGM as a problem to be stamped out but encourages parties to adopt strategies focused on bringing miners into the formal economy, promoting mercury-free practices and minimizing other negative environmental and social impacts.

1 United Nations Environment Programme, UNEP 2018

Design of the Programme

The planetGOLD programme was established to address mercury pollution from ASGM, to assist countries in upholding their obligations under the Minamata Convention on Mercury. Funded by the Global Environment Facility (GEF) and led by the United Nations Environment Programme (UNEP), the projects that comprise the programme are implemented by UNEP, the United Nations Development Programme (UNDP), United Nations Industrial Development Organization (UNIDO), and Conservation International (CI), in partnership with governments, miners, the private sector and other stakeholders. The first phase of the planetGOLD programme began in 2018, with projects in Burkina Faso, Colombia, Guyana, Indonesia, Kenya, Mongolia, Peru, and the Philippines. The programme also collaborated with an existing GEF project in Ecuador[2] that had similar objectives as planetGOLD and included that project in programme activities.

The planetGOLD programme works to significantly improve the production practices and work environment of artisanal and small-scale gold miners, as a means to reduce mercury use. By working to close the financing gap, supporting formalization, raising awareness, and connecting mining communities with mercury-free technology and formal markets, the programme aims to demonstrate a pathway to cleaner and more efficient small-scale gold mining practices that benefit everyone, from mine to market.

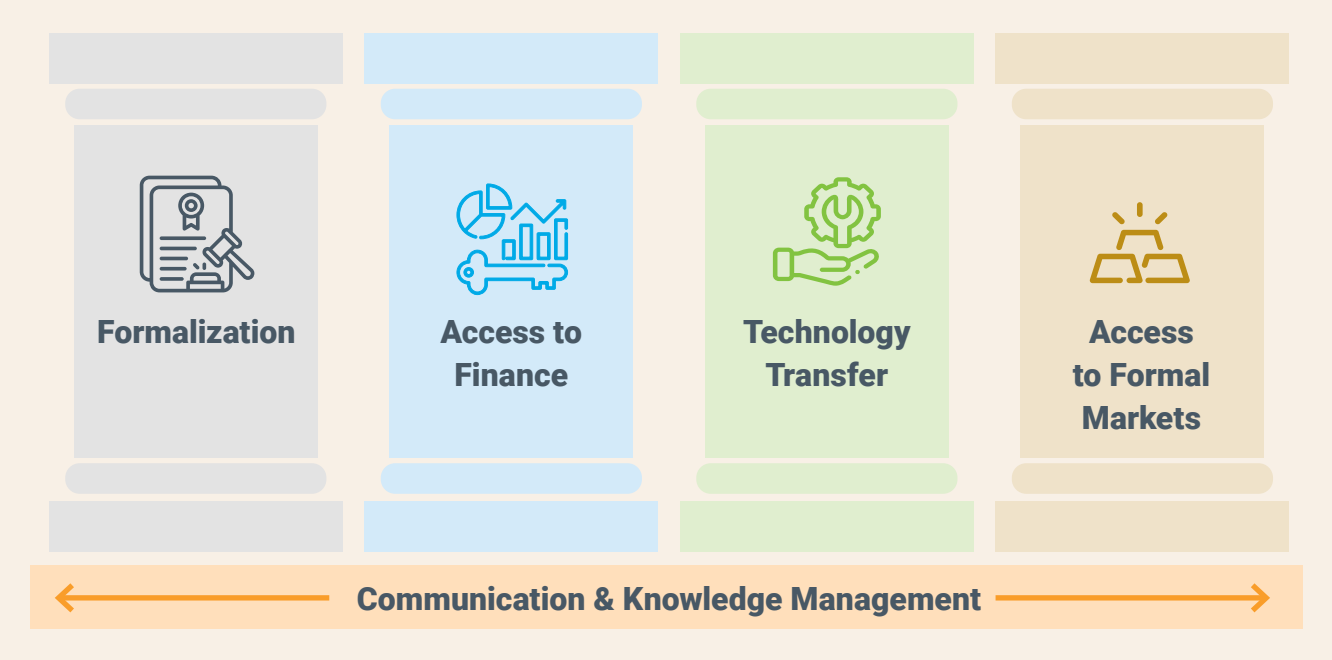


Figure 1: planetGOLD Programme Pillar Areas

2 *National Program for the Environmental Sound Management and Lifecycle of Chemical Substances* GEF Project # 9203

As seen above in Figure 1, country projects participating in the planetGOLD programme each included four technical pillars with the following associated overall outcomes:

PROGRAMME PILLAR	OUTCOME
Formalization	Integration of the ASGM sector into the formal economy, society, and regulatory system
Access to Finance	Successful models for access to investment and finance for small-scale miners and their communities
Technology Transfer	Access to and implementation of mercury-free technologies and best practices in ASGM
Access to Formal Markets	Access to formal gold supply chains for miners in partnership with gold buyers and industrial users

The inclusion of these pillars was based on a theory of change that recognizes that mercury reduction entails adoption of technical and operational improvements. Such improvements require investment in purchasing new equipment, as well as supporting training and other measures to promote more responsible production. The ability to demonstrate responsible production in turn may improve access to formal gold markets, creating more stability and potentially higher gold prices for miners. However, access to new technology and training, finance and formal markets all fundamentally depend on miners operating formally, with necessary legal recognition, land and mining rights and permits.

All planetGOLD projects included activities to address each aspect of this theory of change, with special attention to gender aspects. All projects also included communications and knowledge management to improve understanding and perception of ASGM's potential while sharing knowledge to maximize impact.

Role of the Global Project

Given the commonality in design among country projects, a global coordination project was included as part of the planetGOLD design, to foster co-learning and collaboration across the programme. The Global Project, executed by the co-leads of the ASGM Area of UNEP's Global Mercury Partnership (i.e. the Natural Resources Defense Council, UNEP and UNIDO) also supported outreach to financiers and investors, knowledge management,

and communication with a wide range of international stakeholders. The Global Project conducted outreach with the international investment community to highlight ASGM's potential as an investable sector, while also supporting country projects in designing and implementing financial mechanisms. To help responsible ASGM operations attract financing and sell to formal markets, the Global Project also created the **planetGOLD Criteria for Environmentally and Socially Responsible Operations**.

On knowledge management, the Global Project collected materials on improving various aspects of ASGM into a searchable resource library, and commissioned new knowledge products when gaps in the literature were detected, so that projects could build on existing knowledge and accelerate progress. Finally, the Global Project led programme communications by creating a unified visual identity and providing a common coherent strategy that went beyond communicating the outputs of the programme to focus on achieving a more balanced portrayal of ASGM enabling policy makers, investors and the media to recognize how many miners in the sector are striving for ever more environmentally and socially responsible mining practices. A detailed description of the Global Project's activities, results and lessons learned can be found in the **Global Project Assessment** report.

Objective of the Report

This report provides a cross-programmatic assessment of the first phase (2018-2025) of the programme. The report first examines planetGOLD's strategies for ASGM development in terms of formalization, technology transfer, financial and market access, and communications, and includes observations and recommendations for activities under each pillar. Common challenges, divergent approaches, and successful methods are discussed against the background of gender and Indigenous issues. The report then reflects on sustainability of outcomes and concludes with general observations and final recommendations.

Methodology

This cross-programme comparative analysis is based on the results documented through the country-level reporting of all eight phase one planetGOLD projects, and the planetGOLD Ecuador partner project. As of July 1, 2025, all planetGOLD projects have completed implementation activities, except for planetGOLD Kenya, which is expected to finish in December 2025. Ecuador will continue its efforts under phase two as a formal member of the planetGOLD programme.

Information in this report is derived from country-specific case studies and cross-programmatic analyses for specific programme pillars that were produced in 2024 and early 2025. Readers interested in more detailed information are invited to visit the planetGOLD website, where the background materials related to each pillar can be found at the following links:

Formalization

The reports compiled on the webpage **Documentation of planetGOLD Formalization Interventions** provide summaries of all phase one planetGOLD country projects' formalization support activities.

Access to Finance

The comparative analysis of phase one planetGOLD country projects detailed in the report ***Cross-programme analysis of planetGOLD ASGM financial access interventions*** highlights key similarities and differences among financial mechanisms researched and developed among the phase one planetGOLD country projects, as well as lessons learned, based on eight **detailed case studies**.

Technology Transfer

Commissioned for the fifth meeting of the Conference of the Parties to the Minamata Convention on Mercury, ***Making Mercury History in Artisanal and Small-Scale Gold Mining*** provides an overview of mercury-free technical interventions carried out across the planetGOLD programme as of June 2023. A more detailed exploration of technology transfer initiatives is available for **Indonesia**, **Colombia**, Philippines (**Sagada** and **Paracale**), **Guyana**, and Peru (**here** and **here**).

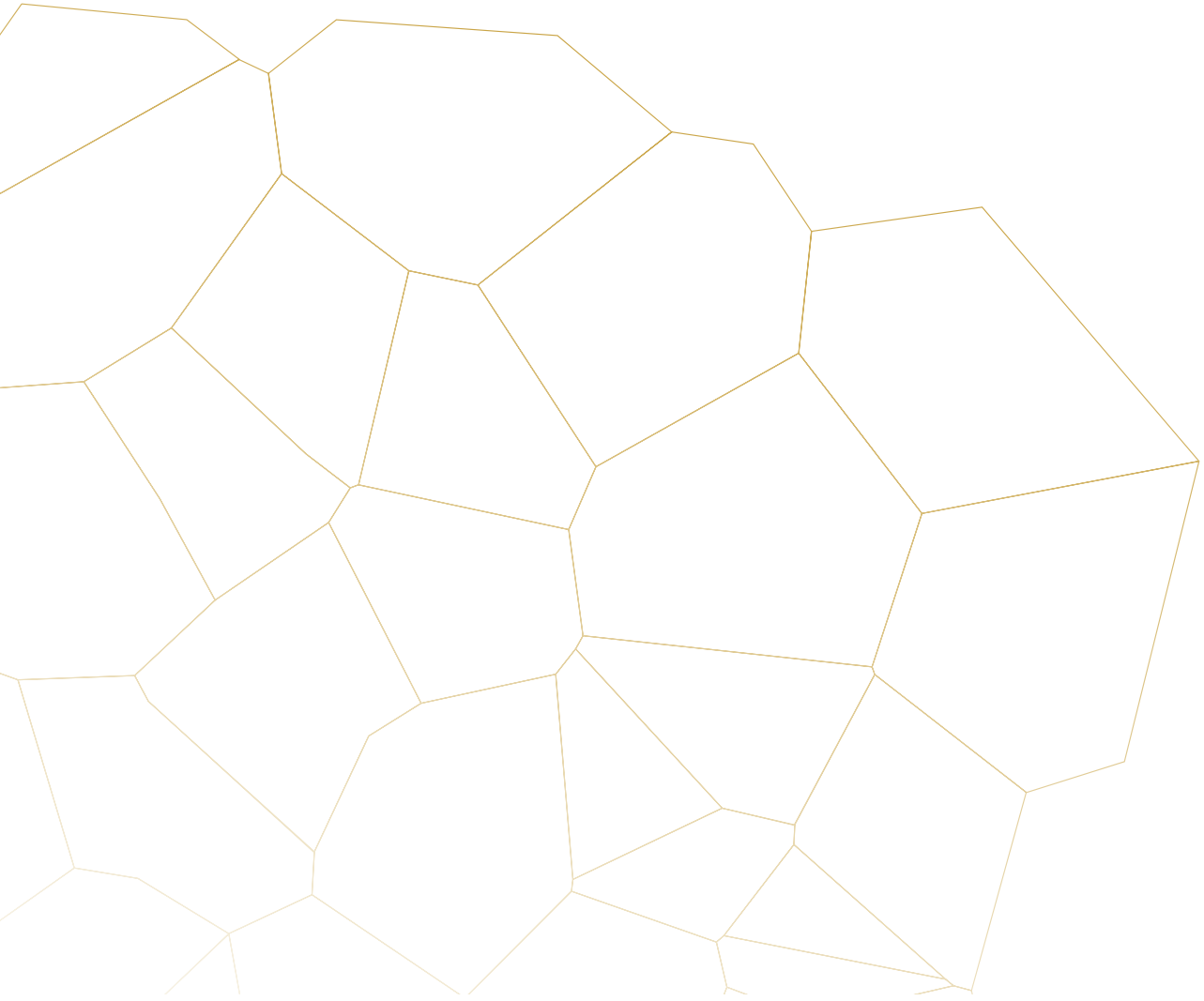
Market access

The report ***Documenting planetGOLD programme experiences with ASGM supply chain mechanisms*** assesses due diligence and supply chain mechanisms undertaken by phase one planetGOLD country projects.

Communications and Awareness Raising

The reports compiled on the webpage **Documentation of planetGOLD Communication Interventions** provide summaries of all phase one planetGOLD country projects' communications activities.

Data from reports written before 2025 were updated via country project team interviews in February 2025. As needed, other existing project documentation was consulted, including planetGOLD annual progress reports[3], project implementation reports, mid-term reviews and for completed projects, terminal evaluation reports.



3 planetGOLD Annual Progress Report, 2019-2020; planetGOLD Annual Progress Report, 2020-2021; planetGOLD Annual Progress Report, 2021-2022; planetGOLD Annual Progress Report, 2022-2023; planetGOLD Annual Progress Report, 2023-2024

Analysis of Formalization Interventions

Background

Artisanal and small-scale gold mining is characterized by widespread informality, which presents a host of challenges, including non-payment of taxes, hazardous working conditions, the widespread use of mercury, and, in some contexts, the occurrence of child labor in and around mining operations. Informality keeps ASM operators in a cycle of poverty and exploitation, making them reliant on informal financing and exposing them to risks of extortion and corruption in the absence of relevant licenses, permits, and compliance certificates.

The transition to legal, formally recognized and compliant ASGM activity is a prerequisite for achieving access to finance, which is, in turn, key to enabling ASM operators to invest in mercury-free, more efficient processing technologies. Consequently, formalization is a key foundation for the entire planetGOLD programme. The term "formalization" includes not only legal recognition but also the process of integrating ASGM into the formal economy, society, and regulatory system. The planetGOLD country projects not only supported the formalization of miners participating in the programme, but aimed to support improved ASGM policies, build capacity of miners and relevant government authorities, and increase the provision of services among agencies and institutions that address different dimensions of the ASGM sector.

Number of miners assisted in their formalization process

11,619

5,375 6,244

* As of June 2024.
Data reported from: Burkina Faso, Colombia, Ecuador, Mongolia, Peru, and the Philippines.

Strategies Undertaken by planetGOLD Projects

Although the specific legal, policy, regulatory and enforcement contexts differed among the planetGOLD country projects, teams generally adopted three common strategies to catalyze ASGM sector formalization:

- Legal, policy and regulatory reform
- Governance training of ASGM organizations and relevant government authorities
- Assistance with the formation of cooperatives and licensing processes for specific target groups

LEGAL, POLICY AND REGULATORY REFORM

The development and improvement of legal and regulatory frameworks is fundamental to creating a policy environment that enables the development of a formal, responsible, mercury-free ASGM sector.

As a first step to support improvement of the policy framework, several country projects recommended, and in some cases supported, the creation of national ASGM policies,

including assisting with ASGM National Action Plans (NAPs) as required[4] under the Minamata Convention. The planetGOLD Peru project provided resources to run problem diagnosis, convened stakeholders, and supported the creation of a Multi-Sectorial National Policy[5] aimed at providing transformative, holistic, and comprehensive solutions to regulate and support ASGM improvement. Importantly, the policy identified government institutions central to achieving the goals from a multi-sectoral perspective. The planetGOLD Burkina Faso project recommended the establishment of a national consultation framework among state actors responsible for ASGM, while planetGOLD Philippines recommended the establishment of an inter-agency task force to facilitate ASGM governance. The planetGOLD Guyana project supported the Government of Guyana's Ministry of Natural Resources (MNR) in the development of the country's NAP, through a baseline data collection exercise at several mining sites and development of Guyana's Mercury Baseline. The planetGOLD Indonesia project assisted the Ministry of Environment and Forestry in developing **the Indonesia NAP for ASGM,** published in 2022, which acknowledges the need for ASGM formalization to encourage miners' access to alternative mercury reduction technologies.

Many projects across the programme undertook detailed analyses of the existing legal and regulatory frameworks around the ASGM sector, with the goal of identifying key elements where the projects could assist policy makers in improving or developing new regulations related to the sector, resulting in several recommendations to policy makers for legal and regulatory reforms. A common recommendation was to clarify and simplify licensing, to facilitate a more efficient pathway for small-scale miners to secure permits. In the Philippines, where the *Minahang Bayan* (People's Smal-Scale Mining Area) designation system governs access to legal operating areas, the process of securing a small-scale mining contract under this policy can take several months, if not years, and involves multiple government departments, including the Mines and Geosciences Bureau, the Environmental Management Bureau, and several local government units. The planetGOLD Philippines project recommended simplifying the applications for the People's Small-Scale Mining Area small-scale mining contracts and mineral processing licenses, reducing bureaucratic barriers and making legal compliance more accessible for ASGM miners.

To promote efficiency, transparency, and institutional continuity, the project also supported the development of a Knowledge Management (KM) platform tailored to the needs of the artisanal and small-scale gold mining (ASGM) sector. Developed in close coordination with the Mines and Geosciences Bureau (MGB) and key stakeholders, the platform serves as a centralized digital resource hub for miners, regulators, and partners. Beyond housing technical and training materials, the platform plays a key role in streamlining the application process for mining permits and licenses, providing step-by-step guides, downloadable templates, regulatory checklists, and explainer tools that demystify complex

4 NAPs are required for countries that declare "more than insignificant" ASGM in their territories.
5 Política Nacional Multisectorial para la Pequeña Minerpia y Minería Artesanal (2021 – 2030). Entregable Final según la Guía de Políticas Nacionales del CEPLAN. Julio 2022. Decreto Supremo No. 016-2022-EM.

procedures. By simplifying access to legal and procedural information, the KM platform supports miners and associations in navigating formalization requirements more efficiently and confidently. It also reinforces the capacity of local governments and MGB regional offices to deliver consistent guidance and support.

The planetGOLD Kenya project also focused on improving the processes for permitting and licensing artisanal miners, since the Mining Act of 2016 inadequately defined critical aspects of licensing, permitting, degree of mechanization and operational scope for ASM, especially for the artisanal mining category. The planetGOLD Kenya team supported the development of amendments to include permitting for artisanal miners, to adjust the Mining Act's definitions of ASM activities based on operational output and production, and to clarify the requirements and procedures for acquisition of licenses and permits. In Burkina Faso, the planetGOLD project recommended measures focused on enhancing environmental protection measures, preventing child labor, promoting gender equality among miners, advancing social protection initiatives, facilitating direct access for miners to international markets, and harmonizing taxes, fees, and royalties. The planetGOLD Colombia project recommended 22 policy regulations, including: the differentiation of small-scale and subsistence mining[6], which allowed for more simplified processes for subsistence miners through the Genesis miner registration platform; the regulation of temporal environmental licenses while miners embark on regularization[7]; and a regulation defining the registration process of subsistence miners.[8]

In Mongolia, during the planetGOLD project's first implementation year in 2019, the country's ASGM sector experienced a downturn due to the suspension of the nation's ASM regulation. At that time, government officials' negative impressions of the mining sector (especially ASGM), perceiving it as the cause of environmental damage such as river pollution, led them to suspend ASM activities through the suspension of key clauses of the ASM Regulation 151/2017. The issuance of ASM land permits and new mining contracts

6 Article 326, Law 1955 of 2019. Plan Nacional de Desarrollo 2018 – 2022. Small-scale and subsistence mining are distinct under Colombian law, with different recognition pathways.
7 Resolution 0448 of 2020, which regulates Article 22 of Law 1955 of 2019.
8 Resolution 40838 of 2019, which regulates Article 327 of Law 1955 of 2019.

planetGOLD Mongolia

were therefore suspended, and existing mining contracts were not renewed. The suspension impacted more than 40,000 ASM miners across 19 out of 21 provinces. It took almost three years (2019-2022) to finalize amendments to the ASM regulation to allow resumption of activities. During this time, planetGOLD Mongolia actively participated in a government taskforce, using this as an avenue to introduce recommendations from two project reports analyzing the country's legal framework for ASGM and policies, and practices related to the gold trade in Mongolia.[9] Recommendations made by the project that were subsequently incorporated by the government in the 2022 revision of the ASM regulation included, among others: expediting the decision-making process for land approval applications by transferring provincial representative approval to a lower level; increasing the role of the soum (district) governor on environmental protection and gold supply chain due diligence; increasing the environmental responsibilities of artisanal miners; requiring miners to record their gold origin to create a traceable gold supply chain; and clarifying what machinery and equipment is allowed in mining operations. The new regulation also formally recognized the ASM National Federation as the organization designated to provide capacity building training for artisanal miners and gave it signatory and monitoring roles in mining contracts, which the project supported. The final issuance of the new ASGM regulation (Government Resolution 296/2022) was considered a major achievement in providing a formalization pathway for ASGM in Mongolia.

Several projects also focused on providing support to local entities that have responsibilities for ASGM oversight. For example, both planetGOLD Philippines and Indonesia engaged local governments to incorporate ASGM into their development planning, enabling them to provide support for miners navigating the permitting process. In Kenya, the project supported the facilitation and convening of country ASM committees which are responsible for the granting, renewal or revocation of artisanal mining permits in their target areas, which eventually led to the gazetting of the final members of the licensing committees by the Kenyan government. The planetGOLD Indonesia project and its partner, the Ministry of Environment and Forestry, produced four guidebooks on the use of mercury and its impacts and alternatives, which were then used as guidance to assist the development of 12 Regional Action plans at the sub-national level, translating the national mercury targets into the specific context of each province or regency.

In addition to the reform of ASGM-specific regulation, several projects recognized the need to improve the regulations and processes related to the sale and trade of ASGM-produced gold, to increase miner engagement with the formal market system. The planetGOLD Peru project provided technical assistance in the development of the regulation of the National Registry of Gold Traders and Processors, which provided a digital protocol for the registration of gold transactions, as well as the development of an online application to increase its transparency. The Mongolia project's study on **artisanal and small-scale**

9 https://www.planetgold.org/sites/default/files/planetGOLD_Mongolia_2021_Legal Framework Analysis Report_FN_EN.pdf
https://www.planetgold.org/sites/default/files/planetGOLD_Mongolia_2021_Gold%20Trade%20Report_FN.pdf

gold trade urged the Government and other key stakeholders to promote formal gold trading. The project had constructive and intensive engagements with the Bank of Mongolia. For example, the project facilitated a miner visit to the regional gold buying center in Mongolia's second-largest town, where the Bank of Mongolia is responsible for assaying and purchasing gold, allowing the Bank to explain its role and how miners can engage with it. The project also worked with the Financial Regulatory Commission (FRC) on the licensing and control of gold aggregators in the sector.

FORMALIZATION TRAINING

Projects across the planetGOLD programme supported miners in their formalization processes by delivering training, direct assistance, and other outreach activities to improve their ability to understand and comply with regulatory requirements. Projects also engaged national and local government officials in improving their understanding of the ASGM sector and the application of policies and regulations.

The planetGOLD Colombia project trained more than 2,000 miners in the formalization and regularization process. That project also provided training to 28 government entities on ASGM regulations, the Genesis registry for subsistence miners, and related matters to increase their capacity to oversee the ASGM sector. The planetGOLD Kenya project engaged in the training and capacity building of 1,600 miners and 100 government staff on licensing acquisition and permitting procedures, including deliberately targeting women who have exclusivity to some of the cooperatives as part of gender mainstreaming. In Indonesia, the planetGOLD project developed a **training module** that was specifically designed to strengthen the capacity of subnational governments in understanding their responsibilities to manage the ASGM sector as mandated by Law 3/2020.

The planetGOLD Mongolia project assisted provincial and village governments in understanding the 2022 updated ASM regulation, focusing especially on addressing barriers to the issuance of land permits and obtaining longer-term ASGM contracts and mining agreements. To complement this work, the project also conducted meetings, site visits, and workshops to help ASGM miners and communities understand the content of the new ASM regulation and their rights to get incentives in obtaining permits and helped them prepare the documentation needed to formalize their mining activities. In the process, the team identified a language gap between the legal narrations and the everyday Mongolian language, especially among ASGM miners, and subsequently developed **formalization guidelines for ASGM miners** to close this gap. Trainings on responsible mining practices, through environmental management, land rehabilitation and better occupational health and safety, were also delivered to miners.

Similarly, planetGOLD Philippines also provided training and technical assistance to both miners and local authorities to build capacity for legal and responsible operations. Miners received support on how to comply with the permitting and environmental regulations, while the government officials received capacity building to support and

regulate ASGM in their jurisdictions effectively. A significant achievement of this intervention was the establishment of a national Core Group of Trainers within the Department of Environment and Natural Resources – Mines and Geosciences Bureau, who underwent specialized training on ASGM rules and regulations, making them well-equipped to guide ASGM stakeholders in regulatory compliance and ensure sustainability of the project results.

ASSISTANCE WITH FORMING COOPERATIVES, LICENSING AND LAND TENURE

Across the nine phase one countries, planetGOLD projects dedicated significant time and effort to helping mining organizations understand, navigate, and comply with the legal frameworks that govern their operations. Several projects across the programme aided miners in the formation of cooperatives as well as licensing or permitting processes for selected target groups. At the directive of the State Department for Mining, planetGOLD Kenya supported the creation of 23 cooperatives by bringing miners together through advocacy on the importance of cooperatives to their operations, assisting 16 in successfully completing the registration process.

The planetGOLD Philippines project encouraged the formation and legalization of miner associations and cooperatives, supporting their legal registration, providing guidance on cooperative formation, assisting in contract renewals, securing permits, and providing support on environmental compliance support, safety training, and guidance on securing community consent—all of which are prerequisites for licensing. Overall, the project supported the formalization of 805 miners within 20 small-scale mining associations. The project also assisted a mining association in obtaining a Good Standing Certificate for associations selling gold to the Bangko Sentral ng Pilipinas (the Philippine Central Bank), enabling partnerships with reputable buyers, reducing dependence on informal traders, and further encouraging miners to pursue formalization. The planetGOLD partner project in Ecuador also helped guide miners through the processes of registration, tax compliance, anti-money laundering regulations, and licensing, including marketing licenses to sell gold legally.

In Indonesia, the planetGOLD project there supported the formation of 38 cooperatives, and guided groups through permit applications. However, due to regulatory delays, only one cooperative obtained an environmental permit by project closure (see “Challenges” below). The planetGOLD Burkina Faso project helped an estimated 2,500 miners (1,900 men and 600 women) organize into 13 cooperatives, including training on business planning and licensing procedures. The project also established a women’s ASGM cooperative, supported its formalization and recognized the members’ equal rights with men. These formalized cooperatives, including both the mixed-gender groups and the women’s cooperative, are expected to endure beyond the project’s duration. The planetGOLD Mongolia project facilitated the formalization of ASGM miners by assisting mining organizations in accessing land

through a contract with the local governor based on a "Land Conclusion" and in obtaining permits. As of project closure, the planetGOLD Mongolia project had supported 158 miners in successfully formalizing their operations and obtaining permits (108 men; 50 women). The planetGOLD Peru project assisted miners in navigating the *REINFO* system, a national platform that recognizes operators in the process of formalizing. While REINFO status does not grant a full mining license, it is a prerequisite for progressing toward legalization and is tied to the submission of environmental management plans. The planetGOLD project provided direct assistance in preparing and submitting documents, supported training on business formalization, and partnered with established nongovernmental organizations such as Solidaridad to help miners move from informal status to active participants in legal supply chains.

Three planetGOLD countries—Colombia, Indonesia and Peru—stand out for having implemented a tiered approach to prioritize support to potential beneficiaries, based on their level of formalization. The Colombia team assisted miners in identifying the most appropriate formalization channels based on their characteristics (subsistence or small-scale mining) and the specific mechanisms through which they can become fully lawful. Under the small-scale category, the project detailed three types of mining groups based on their current legal status and then focused their formalization efforts on the "Type 2" miners (miners with rights but without permits). For subsistence miners, the project opted for mass registration campaigns in local municipalities through the online registration portal "Genesis," an opportunity that also allowed for the identification of key bottlenecks in the online registration process and the provision of timely suggestions.

Similarly, the planetGOLD Indonesia project mapped project sites by legal maturity: Category I: Areas that had a WPR (designated People's Mining Area) and IPR (People's Mining License), but no IUI (Business License for Processing and Refining); Category II: Areas with WPR only, lacking both IPR and IUI; and Category III: Areas with none of the legal prerequisites—no WPR, IPR, or IUI. The project set a target to support the establishment of 38 new cooperatives, to add to the 22 existing cooperatives, and then, based on the categorization, aimed to support both existing and new cooperatives with a WPR to obtain IPR and IUI (i.e., Category I and II); and to establish WPRs for sites within Category III.

The planetGOLD Peru project designed and applied an ASGM operator categorization tool according to the fulfillment of formalization criteria, categorizing miners into four categories based on mining and surface rights—consequently developing a holistic approach to support local operators to complete the formalization process. The project supported the miners missing surface and land rights with their registration with the tax authorities and REINFO. Consultancy teams further aided in developing operations plans and environmental safeguards to regularize mining permits.

Gender and Vulnerable Groups

Women face unique challenges in the ASGM sector, particularly related to role division and pay inequality. These are primarily the result of cultural norms and traditional gender roles that relegate women's mining activities to above-ground gold processing activities that include ore crushing, concentration and mercury-amalgamation[10], excluding them from the higher-paying underground work. In addition, most women take on a variety of unpaid roles, including managing household chores and childcare, disproportionately affecting their ability to spend time earning a livelihood, and further reducing their income levels compared to men. Only in Mongolia and the Philippines did the women report a more equal gender relationship with their male peers and a more common presence of women in leadership positions in small-scale mining organizations in both countries. Country projects in the planetGOLD programme undertook a range of specific measures to enhance formal recognition and participation of women miners, as detailed below.

LEGAL RECOGNITION AND POLICY SUPPORT

Most of the country projects provided targeted support to women miners in their formalization journey. The planetGOLD partner project in Ecuador significantly increased the visibility and recognition of women in the ASGM sector, particularly jancheras[11], enabling them to not only improve their economic opportunities but to reduce exploitation. The project worked towards the recognition of jancheras through legal instruments that provided them increased visibility in the supply chain and access to a better price for their collected mineral. This initiative resulted in a new regulatory instrument in Ecuador that allows the work of the jancheras to be legally recognized as a productive, formalized economic activity, thus enabling them to sell their minerals legally and at a fair price. Advocacy campaigns reinforced efforts aimed at formalization and equitable pricing for the ore collected by jancheras, addressing the economic inequality faced by women in the sector. Similarly, in Peru, the planetGOLD team conducted a study that systematically characterized pallaqueras (women mineral selectors) for the first time, highlighting their high exposure to domestic violence, their relation to childcare and home care, and their exposure to mercury use. The project subsequently supported the creation of pallaquera groups and associations and later aided in the creation of a gender-in-ASM workplan to mainstream gender policies in ASM. The project aided the Peruvian Directorate General of Mining Formalization in drafting a gender plan, with the objective of eventually establishing a regulatory definition that legally recognizes pallaqueo as an economic activity so that women can work legally and sell their ore at competitive prices.

10 The amalgamation process is used to extract the gold from the crushed ore. The mercury is added to the concentrates (crushed, milled, and concentrated ore), capturing the gold particles and forming an amalgam. The amalgam is then smelted, recovering the gold.
11 Jancheras are women mineral sorters in the ASM sector of Ecuador.

In the Philippines, the planetGOLD team supported roundtable discussions on gender that led to the creation of the Interagency Council for Women Workers in the Informal Sector in one of the target locations, established via an Executive Order. This council will provide a platform to discuss challenges and opportunities for women in the informal sector, including ASGM, and will pool resources to conduct research and data gathering on gender-related ASGM issues. The planetGOLD Indonesia project developed a **guideline for gender mainstreaming in ASGM** leveraging several rounds of stakeholder consultation and feedback round, a process that included received validation from relevant ministries and institutions. This guideline aligned with Presidential Instruction 9/2000 concerning gender mainstreaming in national development and subsequently informed the inclusion of a gender lens in the creation of the Regional Action Plans, as well as the planetGOLD project's efforts.

TARGETED TRAINING AND AWARENESS-RAISING EFFORTS

Several countries provided targeted training to women in ASGM as part of their formalization efforts. The project in Ecuador provided formalization training and capacity building programs, focused on gender equity, leadership, formalization and the development of women-led businesses, empowering women to take on more prominent roles within the sector on top of receiving technical support for mercury-free practices.

As part of the project's gender strategy, planetGOLD Colombia provided training workshops for public servants on the gender approach, as well as the implementation of public services attuned to women's needs, such as gender-based violence attention protocols. As a result of their efforts, 38 public servants were trained in gender-based violence attention protocols, two municipalities developed gender-based violence referral pathways, and one healthcare protocol for mercury contamination was devised with a gender-sensitive approach.[12]

The planetGOLD Philippines project facilitated and organized a series of capacity-building activities for women in ASGM to strengthen their participation in the sector and ensure their voices are heard in decision-making spaces. In addition to basic advocacy training, the project conducted entrepreneurial and leadership workshops designed to enhance women's skills in managing livelihoods, organizing within mining associations, and taking on leadership roles. These sessions provided not only technical knowledge and guidance on legal processes, but also practical tools for economic empowerment and organizational development.

The planetGOLD Indonesia project conducted ASGM **gender mapping in its six project areas** and developed **a training module for gender awareness and sensitization in ASGM communities**, based on evidence from the project locations including gender justice, the role of women in ASGM and opportunities for women in ASGM formalization.

12 planetGOLD Colombia. (2023). Acciones de salud pública para la prevención y minimización de personas con exposición a mercurio y sus compuestos.

The gender module provides guidance in conducting participatory gender training at ASGM communities and mining sites. It promotes gender equality and covers topics of gender mainstreaming in village development, ASGM, mercury campaigns, and household financial management. Furthermore, the project supported the elaboration of the concept of a gender-responsive village, based on the idea of encouraging village authorities to promote gender balance in their institution and the community level.[13]

In contrast to other planetGOLD countries, planetGOLD Mongolia's **gender mapping** found that women and men miners tended to have almost similar rights when it came to decision making and determining financial matters. In the targeted areas, ASGM non-governmental organizations (NGOs) tended to be headed or chaired by a woman. This indicated that women have higher education than men and they are actively involved in management and legal compliance tasks. Nonetheless, to reinforce gender equity, the project trained gender focal points to promote human rights and gender equality at the project sites.

COOPERATIVE AND WOMEN'S ORGANIZATION FORMATION

In Burkina Faso, out of the 13 mining cooperatives whose creation was supported by the planetGOLD team, one was exclusively for women. The other cooperatives that were created also had women in their membership. Each cooperative's leadership consisted of six members, and it was structured to ensure that at least one position is held by a woman, with women typically holding the position of treasurer within the leadership body. In Kenya, the planetGOLD team supported gender mainstreaming through the formation of all-female cooperative groups, and by offering training and assistance to women-led groups to establish mining cooperatives and complete the registration process. This in turn facilitated the issuance of necessary licenses and permits to the women who own and work in these cooperatives and enhanced the ability of women and marginalized groups to access financial products in the market. The planetGOLD Colombia project supported in the creation of the national Network of Mining Women, a gender-focused initiative made up of more than 320 members as of June 2024, who benefit from association training as well as capacity building in financial literacy and environmental protection.

In Peru, the planetGOLD team established or strengthened organizations of pallaqueras (women mineral sorters), to provide them with some legal support in the absence of regulation officially recognizing them at a national level. The project provided technical support to strengthen the management of 6 already-established associations in the Puno and Arequipa regions and supported the organization and legal constitution of a new pallaqueras association in Arequipa as well as the Piura region's first-ever association of pallaqueras. Based on this experience, the project subsequently created a practical

13 Based on the concept, a gender-responsive village was established in the Logas Village, Kuantan Singingi regency in cooperation with the Ministry of Women Empowerment and Child Protection. Among others, the Logas village regulation regulates the number of women (50%) as members of village institutions, the involvement of the representatives of women groups in decision-making processes, and the requirement of gender information in the village profile. The Logas village also developed the 'do and don't practices' in the ASGM operations due to the impacts on women.

guide called **The ABC's for Setting up an Association of Manual Gold Selectors**, which in simple terms presents the process that groups of pallaqueras must follow to become legally constituted. This guide will continue to be disseminated in collaboration with the project's partner, the National Network of Women in ASM.

INDIGENOUS AND TRADITIONAL GROUPS

In two countries, planetGOLD project activities also focused on issues related to the rights of Indigenous and traditional groups. The planetGOLD Colombia team started the application to recognize ancestral artisanal mining as part of Colombia's non-tangible cultural heritage. In partnership with a local NGO "Grupo de Dialogo Sobre Mineria en Colombia," they sought to position ancestral mining as a legitimate and dignified activity that conforms to Afrocolombian people's culture. Specifically, the partnership sought the differentiation of ancestral artisanal mining within the subsistence mining category. This distinction acknowledges that while ASGM may provide a subsistence livelihood for the rural poor, it is also a culturally embedded practice for traditional land dwellers.[14]

In Sagada, one of the project areas under planetGOLD Philippines, the permitting of the mercury-processing plant faced opposition from a downstream Indigenous community because of the planned use of chemicals in the processing plant, specifically leaching reagents like cyanide. The mining community itself preferred the leaching plant, as it would significantly increase gold recovery from 30% to over 80%. However, because of consultations with the downstream Indigenous community, the design for the Sagada plant was changed to a gravity-only approach, out of respect for the downstream community's preference for a chemical-free operation. The local government expressed gratitude that the project took the time to consult with the downstream community, because lack of consultation could have sparked tribal conflict between the mining community and the downstream communities.

Global Project Support for Formalization

The Global Project supported the formalization activities of the countries by connecting them with global experience and promoting information exchange. Relevant reports and other information related to ASGM formalization were collected from open literature sources, from which a curated collection was created with global-scale studies and national level case studies on key formalization policy and initiatives. One gap identified in this literature was the lack of a synthesis report on the issue of how cross-border taxes and royalty policies affect ASGM. To fill this gap, the Global Project commissioned the report: Taxes, Fees, Royalties and the Formalisation of ASGM Producers and Exporters, which

14 Castillo & Echavarría. (2021). Postulación para la inclusión de la minería artesanal ancestral de metales preciosos como forma tradicional de producción en Colombia, en la lista representativa del patrimonio cultural inmaterial de la nación.

examines the relationship between national fiscal regimes and the formality of the artisanal and small-scale gold mining (ASGM) sector, and evaluates whether and to what extent a country's fiscal regime – the total of taxes, fees, and royalties – acts as significant factor pushing ASGM producers and exporters into informality.

The Global Project also supported knowledge exchange on formalization issues among countries, including sharing of experience and challenges across the program during regular bimonthly meetings as well as country-led sessions within the Annual Programme meeting. Formalization-focused sessions were also included in the Global Forums, bringing together experts on topics on issues such as criminality in ASGM; models for cooperation with the large-scale mining sector and dispute resolution; biodiversity and deforestation; indigenous groups and FPIC; communications and the media; and taxation policy. Finally, during the final year of the Phase 1 of the programme, the Global Project produced nine separate reports to document the formalization activities and outcomes of each planetGOLD country project, to ensure that experiences and lessons learned were captured.

Challenges and Lessons Learned

INSTABILITY, REGULATORY UNCERTAINTY AND INCONSISTENCY

Institutional and regulatory instability and lack of security created challenges for several countries. For example, in Burkina Faso, a series of regime changes led to staff turnover within the mining administration. As a result, the project's direct contacts within the technical ministries changed, impacting the progress of activities, particularly those involving ministry stakeholders. Similarly, in Colombia, planetGOLD reported escalated criminal activity which led to violence in some mining communities, creating conditions where progress was not possible in those areas.

The key partner organization for Mongolia, the Ministry of Environment and Climate Change, underwent ministerial leadership changes five times, with each Minister having different perspectives toward the ASGM sector. Similarly, at the local government level, there were multiple government personnel movements, significantly slowing down the project's formalization efforts. To solve this issue, first, planetGOLD Mongolia prepared an introduction kit of the project, available for distribution to new officials. Second, the project organized face-to-face meetings with newly appointed officials, which were crucial to explaining the government obligations on international conventions like the Minamata Convention and to providing the background and importance of the planetGOLD project. Lastly, establishing Memoranda of Understanding (MoU) has been an effective platform to maintain commitment and government willingness to support the planetGOLD Mongolia implementation, and the broader topic of ASGM.

In Indonesia, changes in the mining laws created unclear responsibilities and requirements to obtain mining and environmental permits. The authority to legalize ASGM repeatedly changed while the subsidiaries' Law 3/2020 detailing the process of formalization was not available until the end of 2022—and many others were not concluded until 2023, such as the government regulation on the establishment of ASGM areas. Even now, some clauses within different regulations are still vague and open to various interpretations between different levels of government, across ministries, and internally within ministries. As one specific example, miners are required to have an environmental permit per the mining law, but the basis for the environmental permit lies in the environmental law, which does not specify procedures for environmental permitting of people's mining in Indonesia.[15] Since procedures were unclear, most provincial governments did not want to advance the process of the environmental permits until the Ministry of Environment and Forestry clarified this issue.[16]

Country project experiences in Mongolia and Kenya demonstrate how years of international help can be negated by policy changes and governmental inconsistency. The planetGOLD projects in these countries had to work around national ASGM bans, spending a great deal of time and effort in working to clarify regulations to allow ASGM activity to resume. As described earlier, in Mongolia, after passing a national ASM regulation in 2017, the government suspended this regulation two years later, significantly impeding formalization efforts and impacting tens of thousands of small-scale miners across the country from 2019 to 2022. The suspension also significantly limited the planetGOLD Mongolia project's ability to support miners' formalization during the life of the project; however, findings and recommendations from the project's analysis of the country's legal framework17 served as inputs for the government to eventually revise and approve new ASM regulations in 2022. Despite the newly amended regulation, as of the publication of this report, mineral rights necessary to feed planetGOLD Mongolia's new plant were still outstanding. Likewise, the planetGOLD Kenya project advocated for the lifting of a moratorium the government had imposed in December 2019, which restricted the processing and issuance of mining licenses and renewal applications. This was eventually done in 2023 after which the county committees could be operationalized.

Other institutional challenges faced the planetGOLD projects in different countries. For example, because planetGOLD is a programme focused on mercury reduction from ASGM, pursuant to the Minamata Convention on Mercury, the national environment ministries

15 Depending on the size of a project, there are several levels of environmental documents to obtain environmental permit or environmental letter. Environmental Impact Assessment document (ANDAL) and its environmental management and monitoring documents (RKL/RPL) are required for an environmental permit (large-scale projects); RKL/RPL are required for an environmental permit (medium-size projects); or agreements with nearby communities, village and district governments are needed for the application of the environmental letter (SPPL).

16 An exception was the North Sulawesi Province; this province interpreted that the IPR application process has been delegated to the Provincial Government (Law 3/2020), therefore, the Governor has the power to decide the requirements for the environmental permit. In this case, the North Sulawesi Governor agreed to advance the environmental letter (Surat Pernyataan Pengelolaan Lingkungan – SPPL). Subsequently, the project was able to assist with the technical assessment for the environmental letter and other required documentation for the IPR submissions.

17 https://www.planetgold.org/sites/default/files/planetGOLD_Mongolia_2021_Legal%20Framework%20Analysis%20Report_FN_EN.pdf

are the natural counterparts for country projects. However, formalization of ASGM and mercury reduction require the joint leadership of mining and environment ministries. In some planetGOLD countries, these ministries explicitly co-executed the project (e.g., Colombia and Peru) while in others, close collaboration between authorities had to be managed through inter-agency agreements, task forces, steering committees and other mechanisms. Other ministries often played key roles in particular activities, such as ministries for women, labor, education (especially vocational education) and others. In some cases, these overlapping jurisdictions among different ministries proved difficult to manage, especially where different ministries had different views towards the ASGM sector. In response to this challenge, many Phase1 projects prioritized capacity building for government actors responsible for ASGM oversight. Across countries, these investments in institutional capacity proved essential for operationalizing reforms and improving service delivery to ASM communities.

MISTRUST/LACK OF AWARENESS

In some countries, the theme of mistrust was common. In some countries, miners associated formalization with taxation and interference by the government, assuming that formalization would eventually lead to a loss of income. In Peru, the project found that miners distrust official programs for many reasons, including abandonment after the project cycle ends, fear of being reported to the authorities, and suspicion about the efficiency of new technologies, among others. The team addressed these concerns and built trust by implementing an in-situ, learning-through-practice approach.

In Indonesia, the project found that convincing miners to join and work in a cooperative setting was not easy. The idea of cooperatives was new to most ASGM miners, because some are secretive and tend to work individually or in an informal group to avoid disclosing the location of their gold and the quantity that they extract. To solve this, the project conducted socialization with the message that forming cooperatives is more efficient: although ASGM miners can operate individually, obtaining permits in that case is expensive, and it is time-consuming to meet all documentation requirements. The project successfully convinced ASGM miners to organize in a cooperative setting so that they collectively could prepare all the requirements to obtain technical and environmental permits. Also, the project communicated to miners that the project's assistance for ASGM legalization could only be advanced if the miners were part of a cooperative.

PERSISTENT NEGATIVE PERCEPTIONS OF ASGM

Continued negative perceptions among officials and the general public is an ongoing challenge for making improvements in the ASGM sector. For example, in Mongolia, harmful impacts of mining including ASM have been reported widely, including human rights abuses like violence between informal ASGM miners and security and police

officers.[18] This has led government officials and Mongolian society at large to develop widely negative perceptions of the sector. Using the human rights-based approach as a mode put forth by a previous ASGM project in Mongolia[19], the team applied the rights and duties lens in facilitating the amendment of the 2022 ASM regulation.

COMPLEX AND/OR SLOW GOVERNMENT PROCESSES

While many planetGOLD country teams facilitated cooperatives' organization, licensing, and permitting, most teams observed that the underlying systems remained too complex for ASGM miners to navigate independently. It is notable that some countries operate under centralized, bureaucratic frameworks with significant documentation and coordination burdens, while others piloted decentralized and partially digital systems to improve access and transparency. What emerges from these diverse experiences is a shared lesson: legal reform requires an iterative and tailored process, grounded in the realities of governance and the lived experience of ASGM operators.

Several planetGOLD teams (Philippines, Kenya, Mongolia) assisted governments to reform and streamline their licensing processes but the changes required sustained advocacy and coordination across ministries. Further, lack of nationally consistent protocols and limited technical capacity at the local level meant that the quality and timeliness of implementation varied significantly. In some regions, permit applications were processed more quickly; in others, processing was significantly delayed due to capacity limitations and a lack of understanding of ASGM-specific issues. Thus, teams focused on working with local governments and training them to better understand ASGM and incorporate it into their development planning, to facilitate more localized support to miners.

The slow pace and frequent shifts of regulatory reform processes also affected the ability of miners (and local governments) to clearly understand and comply with their obligations. Programme teams adapted through regular engagement with relevant government agencies and active participation in policy discussions, as well as capacity-building activities, while awaiting legal clarity. These experiences illustrate the value of scenario planning and diagnostic assessments to identify regulatory roadblocks early on, so that targeted advocacy efforts can begin as soon as possible.

SUPPORT FOR PROFESSIONALIZATION OF MINING ORGANIZATIONS

The experience of phase one planetGOLD countries shows that effective formalization support to miners goes beyond administrative handholding. It involved building the capacity of miners to operate as legal economic actors, whether as cooperatives, small

18 https://www.delvedatabase.org/resources/a-rapid-assessment-of-gold-and-financial-flows-linked-to-artisanal-and-small-scale-gold-mining-in-mongolia
19 https://www.unep.org/globalmercurypartnership/resources/report/sdc-experiences-formalization-and-responsible-environmental-practices-artisanal

businesses, or informal associations pursuing legitimacy. Training sessions on bookkeeping, workplace safety, environmental stewardship, and responsible gold trading helped reinforce the idea that formalization is not simply about avoiding penalties and paying taxes but about improving ASGM's viability and long-term reliability as a source of livelihood.

IMPORTANCE OF GENDER-FOCUSED APPROACHES

Gender-focused approaches were incorporated into many planetGOLD country projects and took several forms. Some countries (Burkina Faso, Peru, Colombia) aimed to strengthen women's visibility, leadership, and access to the formalization process. These changes not only increased the visibility of women in the sector but also enabled their integration into formal markets. Several projects actively supported the creation of women-only cooperatives or promoted the inclusion and leadership of women within mixed cooperatives (Burkina Faso, Peru, Colombia, Kenya). Recognition of the roles and rights of groups of women mineral sorters was a major policy milestone in Andean region countries. Broader efforts to organize women miners into national women's networks have improved the collective voice and negotiation capacity of women miners within the sector and policy processes. Dedicated capacity-building programmes for women miners complemented organizational support, including training workshops, creating gender guidelines and establishing Gender Focal Points. Training for public servants on gender principles, as well as specific issues such as gender-based violence response protocols and gender-sensitive healthcare services addressing mercury contamination, further institutionalize support for women miners.

Importantly, the emphasis across projects was not solely on numerical inclusion, but also on strengthening women's leadership roles and agency within organizational structures. Whether through mandated gender quotas or through programmatic support for women-led cooperative management, projects helped embed women within decision-making positions, laying the foundation for more equitable sector governance over time. These efforts demonstrated the importance of combining formalization support with empowerment initiatives that recognize the distinct barriers women face in ASGM, ensuring that women are not only included in numbers but empowered to lead and benefit from formalization outcomes.

Recommendations

The formalization efforts undertaken across the nine phase one country projects in the planetGOLD programme provide a rich foundation of lessons for future interventions. While local contexts varied widely, several patterns emerge that hold true across regions. Formalization consistently proved complex and slower than initially anticipated, yet it remains the key enabler for advancing environmental, financial, and social improvements in the ASGM sector. Several key insights that stand out from phase one country project experiences are detailed below. See **Annex 1** for a table summarizing each priority area and supporting recommendations.

Simplify and decentralize formalization processes: When legal reform was pursued together with administrative restructuring, decentralization of licensing processes, and cross-ministerial involvement, projects were able to reshape not only the formalization process but also the government's approach to and relationship with the ASGM sector more broadly. Simplification of licensing and other ASGM regulatory reforms remains a long-term agenda item that will likely require continued technical assistance, especially in countries with multiple regulatory authorities involved in ASGM. Understanding the institutional and political root causes of delays to regulatory reforms and designing engagement strategies accordingly is key to improving efficiency and impact. Early bottleneck diagnostics to help identify ways to streamline licensing requirements and address other reforms can help to further this process. Ongoing training and compliance assistance for miners will also be needed. Information about regulations needs to be available in accessible, non-technical language, especially in countries with linguistic diversity or complex legal frameworks.

Ensure long-term, consistent government ownership and political will: Without consistent government ownership of the project and clear political will to support ASGM, it is difficult to achieve sustainability. Formalization reforms and systems should be embedded in multiple government systems and with other partners. In these cases, early and structured cross-ministerial coordination is vital for coherent and efficient formalization pathways. Future programmes should consider clarifying and codifying roles and responsibilities to safeguard against inconsistency and mismatched interests. Solutions undertaken by planetGOLD projects to codify institutional relationships to the programme proved useful, including creating formal Memorandums of Understanding between different ministries, creating orientation packages for new officials, and prioritizing early relationship-building. This type of proactive approach ensures that institutional memory and project priorities are retained, and momentum is maintained even amid political instability. Ongoing refresher training and integration of ASGM formalization content into civil service systems should also be ensured to maintain momentum as staff turnover drains institutional knowledge.

Strengthen gender-responsive formalization: Whether through mandated gender quotas or through programmatic support for women's leadership in management of mining cooperatives, initiatives should embed women within decision-making positions to lay the foundation for more equitable ASGM sector governance over time. Wider efforts to organize women miners into national networks improve their collective voice and their negotiation capacity within policy processes and the sector more broadly. Creating gender guidelines and building capacity of government officials on gender principles including issues such as gender-sensitive health services related to mercury exposure will further institutionalize support for women miners. Future projects should include targeted efforts to support women-only and mixed cooperatives, to build women's leadership and agency, and provide gender-relevant training to government officials.

Tailor support to mining organizations' maturity and digital needs: To maximize the efficiency of business support provided to miners, targeted approaches that empower them to operate as formal economic actors are required. Project may use tiered models to segment mining organizations by legal and organizational readiness, then design differentiated support pathways for each. Several projects (Indonesia, Peru, Colombia) developed specific tools for prioritizing formalization assistance to ASGM operations, to most effectively use governments' limited resources. Using clear and equitable prioritization methods can help countries make progress against the often-overwhelming backlog of formalization needs of miners.

Digital tools can support the provision of efficient services to mining organizations, if they are user-friendly and miners are equipped to utilize them. The creation and navigation of digital tools was another method used by phase one countries to support the provision of more efficient services, such as the Peruvian Ministry of Mines' registry of gold traders and Colombia's Genesis platform for registering subsistence miners. Digital access—when available—may reduce barriers to entry and enhance uptake, especially in contexts where miners face geographic or administrative challenges. However, digital access and literacy remain uneven across countries, and the success of these platforms depends heavily on outreach, training, and the user-friendliness of the tools developed. Going forward, projects that develop digital solutions should ensure user-friendly project design from the start and should require robust outreach and training on these tools.

Conclusions

The experiences of planetGOLD phase one country projects demonstrate that formalization is not merely a legal exercise, but a transformative catalyst for improving financial inclusion, responsible market access, environmental sustainability, and social protections in the ASGM sector. While substantial progress was made across all participating countries, formalization remains complex, politically sensitive, and often misunderstood by miners and, in some cases, by relevant government authorities themselves, requiring sustained trust-building and systemic reform.

Future programmes must recognize that formalization is often perceived by miners primarily as a tool of taxation, surveillance, or an administrative burden, rather than an opportunity. Addressing this mistrust is critical. Communication strategies should frame formalization clearly and consistently as a pathway to economic empowerment, enabling access to finance, entry into formal gold markets, eligibility for technical support, and the realization of higher, more stable incomes. Achieving lasting impact will require flexible, adaptive programming, strong government commitment, and a deep investment in building trust with miners and their communities.

Analysis of Access to Finance Approaches

Background

Artisanal and small-scale miners typically struggle to access formal financial services. As part of baseline assessments of ASGM baseline financial needs, the planetGOLD teams across all countries initially reached out to prominent microfinance institutions and banks to learn about what products are accessible to, if not tailored to, the needs of artisanal and small-scale miners.

In all but one (Peru) of the nine countries, these assessments found that formal financial service providers (including domestic banks or microfinance institutions) did not offer financial products or services suitable for ASGM conditions. Common barriers to formal finance include:

- ASGM operators are widely perceived as unreliable for timely repayment of loans and are assumed to be a high default risk.
- Finance providers are wary of potential reputational risks of engaging with informal (and potentially illegal) actors. In many cases the informality of (large parts of) the sector, including missing licenses and permits, prohibits engagement.
- Financial institutions often lack sector expertise when reviewing ASGM loan applications, making it difficult to evaluate the loan applications' validity.
- ASGM sector's predominant use of cash and resulting lack of formal transaction records as evidence for production and profitability, make it difficult to understand the bankability of ASGM enterprises.
- Lack of geological data to understand the potential gold resource creates uncertainty around the economic viability of potential investments in ASGM.

Amount of money successfully accessed through financial products/ mechanisms

$1,784,161 USD

* As of June 2024.
Data reported from: Burkina Faso, Colombia, Ecuador, Indonesia, and Peru

Absent formal finance, ASGM operators instead access informal sources, largely from family members, friends, and business partners for loans and equity investments, while some rely on pre-financing from gold traders or processors. Informal loans often have unfavorably high interest rates or are repaid through exclusive gold offtake, often at discounted gold pricing.

This chapter describes the efforts of planetGOLD countries to develop and implement mechanisms to improve finance for artisanal and small-scale miners, as part of the effort to drive the adoption of more responsible, mercury-free mining practices.

Strategies Undertaken by planetGOLD Projects

The interventions developed by the different planetGOLD phase one country efforts can be grouped into the following strategies:

- Private sector partnerships with the commercial finance sector
- Alternative ASGM financing mechanisms created to (a) respond to a lack of readiness of the domestic financial sector to invest in ASGM, (b) reach the more remote ASGM operators, and/or (c) serve those that cannot yet qualify for credit through the formal financial institutions
- Close collaboration with the government through Central Bank-based approaches that helped de-risk finance

Generally, teams engaged with existing service providers to either develop a new product or adjust their current products and services so that the due diligence process fits the risks and profile of ASGM, and the terms offered are affordable to the sector. Working with existing national providers was deemed necessary for the mechanisms to be sustainable and scalable.

PARTNERSHIPS WITH THE COMMERCIAL FINANCE SECTOR

As the planetGOLD programme aimed to catalyze systemic change and long-term access to finance, all projects engaged with commercial banks and microfinance institutions to help those entities build a greater understanding of the sector, its needs, and potential. Some projects were then able to work with select institutions to develop financial products for ASGM.

The planetGOLD Colombia and Burkina Faso projects provided first-loss loan guarantees to partner financial institutions to help de-risk their entry into the ASGM sector. The planetGOLD Colombia project provided a USD 66,000 loan guarantee to Cooperative Financiera of Antioquia (CFA), a local partner financial institution, enabling them to cover up to 30% of any losses incurred from making loans to miners. As loan repayments were made, guarantee funds became available to other beneficiaries, ensuring continuous access to credit. As a result, 50 loans worth USD 313,960 have been granted as of June 2024. Further, the CFA recently introduced a product called the Rotary Fund, which enables mining organizations to sustain financial inclusion in their regions through “community banking” loans. The total fund value is approximately USD 9,900, with a maximum allocation of roughly 2,600 USD.

Like Colombia, planetGOLD Burkina Faso provided a USD 50,000 guarantee covering 33% of the total capital made available through its financial partner, Coris International Bank. From the launch of the fund’s operationalization in January 2024 through the end of June 2024, 3 loans had been distributed from the fund, totaling USD 113,000. On top of the 33%

guarantee offered by planetGOLD, the bank's ability to draw on a low-interest, government-backed Green Climate Fund when issuing loans has allowed the financial institution to offer the miners an annual interest rate of 8%, the lowest across all the projects. The ability of projects to provide a loan guarantee was a critical factor in the creation of these mechanisms. In contrast, planetGOLD Kenya was unable to finalize a promising partnership with a potential micro-finance partner because the partner required a first loss guarantee as a condition to engage in what they perceived to be a high-risk sector, which the project was not able to provide.

The planetGOLD Peru project and its financial partners developed four financial products for the ASGM sector: the Crece Minero (Mining Growth) credit, the Mujer Pallaquera (Pallaquera Woman) credit, both developed in partnership with local microfinance institution Caja Ica; the Minero Emprendedor (Mining Entrepreneur) credit, developed as a pilot project by Caja Rural de Ahorro y Crédito Los Andes; and a financial mechanism dubbed the "4Ps." Under the 4P model, planetGOLD Peru signed a collaboration agreement among Caja Los Andes (a microfinance institution), Solidaridad (an international NGO supporting artisanal mining in the country), and Minera OREX (a local processing plant). Loans were made to small-scale miners who supplied ore to Minera Orex, which in turn made loan repayments on behalf of the miners, deducting loan payment amounts directly from their ore payment. Collectively, the planetGOLD Peru project's financial inclusion efforts resulted in the provision of USD 715,714 through 95 loans to 91 individuals and 4 mining entities. The planetGOLD Peru project published the report "**Establishment of Financing and Loan Alternatives To Promote Financial Inclusion in ASGM**" in November 2024, describing these efforts in detail.

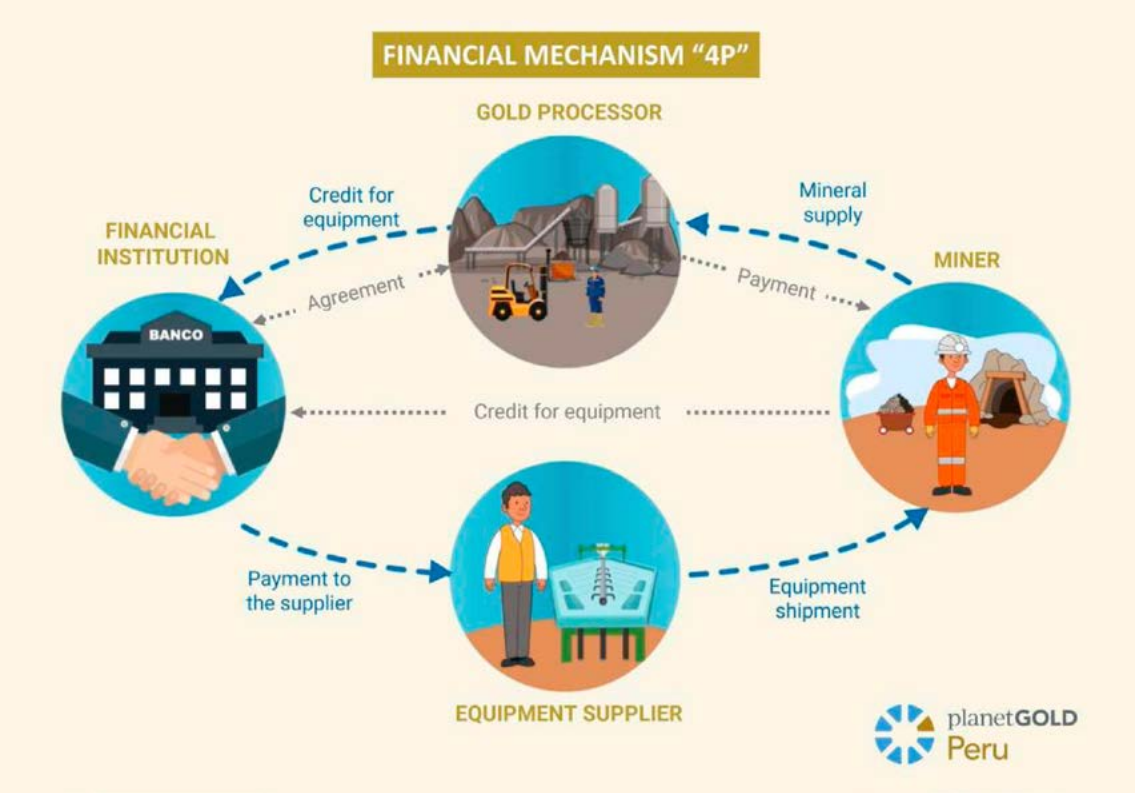


Figure 2: Illustration of planetGOLD Peru's "4P" financial mechanism (source: planetGOLD Peru)

ALTERNATIVE ASGM FINANCING MECHANISMS

Recognizing that commercial banks cannot serve all ASM operators, projects explored alternative financing options in some cases. The planetGOLD Mongolia project opted to use this approach after engaging with several formal financial institutions and concluding that they would not be able to overcome the insurmountably negative perception held by these institutions of the ASGM sector. The planetGOLD Philippines project pursued alternative financing arrangements to augment separate efforts with the Central Bank to increase access to finance (see below).

Under its technology transfer project component, planetGOLD Mongolia upgraded existing processing facilities to expand mercury-free capacity. However, rather than the project taking repayment for these upgrades, the project devised a plan to channel repayments as capital to seed a revolving fund managed by a miner-controlled social enterprise registered as a Savings and Credit Cooperative. The Financial Regulatory Commission issued the Savings and Credit Cooperative (Baatarvangiin Khishig Arvijikh, made up of 44 members, 33 of whom are women) a license in July 2024 and the Savings and Credit Cooperative was officially inaugurated in September 2024. In December 2024, the project signed a cooperation agreement with the two processing plant owners (Shijir Khishig Partnership and Positive Mind LLC) and the Savings and Credit Cooperative. The revolving fund will be dedicated to driving the uptake of mercury-free equipment by repeated investments in the upgrading of equipment.

The planetGOLD Philippines team is aiding the operation of the mercury-free processing system as a social enterprise. A Memorandum of Understanding (MoU) was signed between the planetGOLD project executor, the local Municipal Government, Department of Labor and Employment, and the partner small-scale mining association in January 2025. The MoU states that the Municipal Government will assist monitoring the operation of the mercury-free processing system installed by the project and collaborate with registered mining association to identify social development projects to be financed by 1.5 percent of the profits generated by the plant.

As a complement to their work with microfinance institutions, planetGOLD Colombia, in an effort to avail financing to artisanal miners in remote regions, facilitated the setup of local peer-to-peer savings and credit groups in partnership with VITAL, a local microfinance institute. This resulted in the groups saving a total of USD 55,000 as of May 2024, with 100 members accessing loans worth a total of USD 25,000, at an average of USD 100 per loan.

Another promising development is the potential for local pawn brokers to act as lenders to ASGM operators. Given their widespread geographic coverage, these entities provide a convenient and familiar partner for miners to access finance. In the Philippines, the planetGOLD project worked with the country's largest pawn broker, PJ Lhuillier, to pilot loans to partner mining associations of the project. Notably, the Central Bank is also working with PJ Lhuillier on a pilot programme to use pawn broker sites as authorized

gold buying stations for the Central Bank's domestic gold buying program. In Indonesia, pawn brokers are already involved in miner finance: for example, the project documented that the state-owned pawnbroker (PT. Pegadaian), which offers secured loans to miners with personal assets used as collateral, provided USD 36,101 to a miner in Kuantan Singingi.

CENTRAL BANK-CENTRIC APPROACHES

Two planetGOLD country projects worked with Central Banks to facilitate access to credit from local financial institutions. These mechanisms were created to instill confidence in the commercial partners by providing proof of legal, responsible operations and hard evidence of a mine production track record.

In both Ecuador and the Philippines, the Central Banks have existing programs to buy ASM gold and are proactive in supporting the formalization of the sector. The Ecuador planetGOLD partner project in Ecuador worked with BanEcuador B.P., a public development bank, and the country's Central Bank, so miners that had been vetted and authorized to trade with the Central Bank could access debt financing from BanEcuador (see Figure 3). As of June 2024, USD 210,000 had been successfully accessed by miners. The project enjoys backing across the government: the country's Ministry of Environment, Water and Ecological Transition and Ministry of Energy and Mines are also parties to an inter-institutional agreement created to implement this financial mechanism. These ministries are responsible for providing training and technical assistance on environmental issues, best environmental practices, and the most efficient mining techniques applicable for use to the target beneficiaries, per the country's regulations for mining activities.

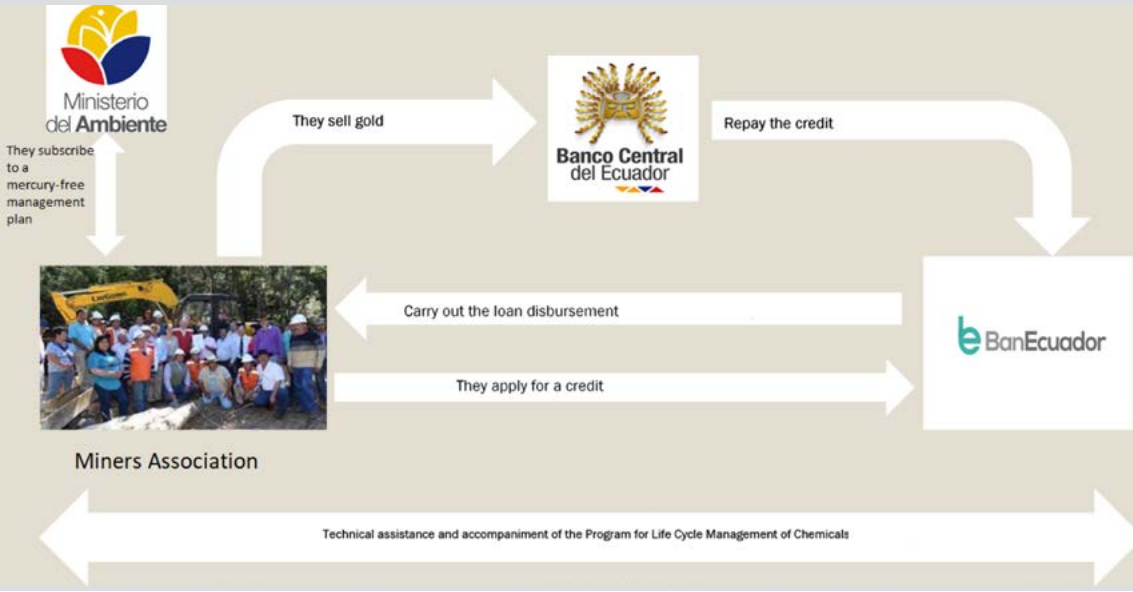


Figure 3: Elaboration of the planetGOLD financial mechanism, working in partnership with the Central Bank of Ecuador and BanEcuador, a public development bank (source: National Program for the Environmental Sound Management and Lifecycle of Chemical Substances)

In the Philippines, the planetGOLD project supported the development of a mechanism whereby mining operations that meet responsible mining criteria can enter into a supplier agreement with the Central Bank. The supplier agreements then can act as a form of collateral when miners seek debt finance from local banks.

Figure 4: Collateralization of the planetGOLD Philippines supplier agreement (source: planetGOLD Philippines)

FINANCE TERMS

The financial mechanisms designed by these planetGOLD country projects also tailored specific terms (interest rates, grace periods) given ASM conditions.

Interest rates

Interest rates offered across the various countries and between financial service providers differ greatly, and in some cases are quite steep, but are largely considered competitive for their respective context. High-interest rates as observed in Colombia, for example, can be linked to the national inflation rate of almost 10%, which resulted in CFA, for example, increasing its interest rate from 17% in November 2022, to 40% in June 2023. In Peru, at 45%, Caja Municipal Ica is factoring in the increased risk of banking an individual artisanal miner through an interest rate more than double their enterprise offering of 21%. In contrast, relatively low-interest rates are on offer in Ecuador and Burkina Faso. In the case of Coris International Bank in Burkina Faso, the interest of 8% is able to be offered because loans have been secured through the 33% guarantee provided by planetGOLD Burkina Faso, as well as the bank's ability to draw on a low-interest, government-backed Green Climate Fund when issuing loans. In Ecuador's case, the low interest rate of 12.77% may be attributed to Ecuador's use of USD as its national currency, contributing to its comparatively low inflation rate at just 2.35%.

Grace periods

Except for planetGOLD Ecuador, none of the other countries noted the grace period offered to artisanal miners seeking loan financing. In Ecuador, the grace period was noted to extend to up to 12 months for loans and up to three years for long-term asset financing deals.

FINANCIAL LITERACY AND BUSINESS TRAINING

Understanding that many ASGM operators lack the financial literacy to enter into formal financial agreements, all projects except planetGOLD Guyana analyzed engaged in improving the financial and business management capacities of target ASGM beneficiaries. Six out of the nine countries (Colombia, Peru, Ecuador, Kenya, Indonesia and Philippines) also aimed to strengthen the capacity of formal financial institutions to better understand the ASGM sector and its financing needs. The planetGOLD Indonesia team, after assessing the accessibility and suitability of existing financial products for miners, provided training to the financial partners that covered the redesign of existing financial products to better suit the ASGM sector, as well as the assessment of ASGM records (such as gold sales records, records of ore production, etc.). The team also integrated gender specific recommendations regarding the design of financial products during these training courses. The planetGOLD Colombia project contributed to the establishment of a "Financial Inclusion Roundtable," a series of meetings bringing together relevant national stakeholders to articulate actions for financial inclusion issues in the mining sector, meetings led and coordinated by the Ministry of Mines and Energy, which resulted in the development of the countries "Financial Inclusion Strategy." planetGOLD Colombia also partnered with planetGOLD Ecuador to organize a benchmarking exchange between the two countries in July 2023, seeking to establish cooperation frameworks between both countries for the financial inclusion of ASGM in the region.

The miner-centric training delivered by planetGOLD countries generally comprised basic financial management, which includes record keeping, savings, and business planning. For example, planetGOLD Peru published *Educación Financiera para la MAPE*[20] which outlines a gender-focused financial education program designed for artisanal and small-scale gold mining (MAPE in Spanish) in Peru. Developed and validated through fieldwork in Puno, Piura, and Arequipa, the program highlights the importance of financial literacy in making informed funding decisions, fostering good financial habits, and building trust with financial institutions. Targeting both mining company managers and workers, the program introduces "CREDIMAPE" credit products and is structured into four modules: financial basics, best practices, business finance management, and access to financial products. Each module includes tailored materials and exercises adapted to the mining sector's needs, ensuring practical applicability in different regions. Three countries

20 planetGOLD Peru (2024). Educación Financiera para la MAPE: Programa con enfoque de género desarrollado para la minería artesanal y de pequeña escala (MAPE) de oro en Peru. planetGOLD Peru; Ministerio del Ambiente, and Ministerio de Energía y Minas, Peru. July, 2024 (in Spanish).

(Kenya, Indonesia and Peru) also reported efforts to educate miners about the formalization process explicitly as part of the process for accessing finance.

Notably two countries (Colombia and Ecuador) had financial service providers lead miner financial literacy training, ensuring that the training was tailored to meet the expectations of those institutions once miners applied for finance. In Colombia, the financial partner CFA offered five trainings targeting organized mining organizations and individual artisanal miners. VITAL, the local partner promoting village savings and loans associations, provided local training on equity distribution, savings through the purchase of shares, and the management of a social fund for the miners in the rural population. Furthermore, planetGOLD Colombia actively supported miners in developing loan investment applications. In Ecuador, the project co-hosted a series of educational and sensitization workshops in partnership with the financial partner BanEcuador, initially to establish eligibility for credit, followed by socialization of the financial products available to them.

Finally, some countries (e.g., Indonesia) also supported the application process of miners to ensure all forms were filled correctly and relevant supporting documentation was provided.

Gender and Vulnerable Groups

Women face structural barriers when accessing finance. One common barrier is their lack of assets in the form of land or machinery that could be leveraged as collateral. Further, projects found that it was easier for groups to access financing than for individuals, but women were reported to be less likely to be organized in groups in several countries, including the Philippines, Burkina Faso, Kenya, Peru, and Ecuador. Where the finance mechanisms exclusively target organized groups, this results in a quasi-exclusion of women from investment eligibility.

Projects undertook a variety of measures to counter financial barriers for women. Colombia, Ecuador, Burkina Faso, Indonesia, and Peru reported concerted efforts to enable women's financial inclusion in their respective mechanisms. For example, the Colombia project, having set a goal of reaching at least 20% of women as part of the loan beneficiaries, facilitated the creation of the peer-to-peer loan, savings, and credit groups to reach artisanal miners in more remote areas, from whom an overwhelming majority (80%) of the participants are women. This resulted in 300 members receiving microloans ranging from USD 20 - USD 900, resulting in a total of USD 25,000 in microloans. Working with local women's organizations, the project has not only supported the organization and formalization of women miners in the country but also provided women-centric financial education training and supported miners in developing loan applications.

To further support women miners in Colombia, the planetGOLD team helped to establish the Red de Mujeres Mineras (Women Miners Network), which seeks to develop individual, social, and relational capacities to achieve common goals. As of June 2024, the network

had established 20 regional groups—three in Sur de Bolívar, 11 in Antioquia, and six in Cauca—with a total of 321 members. In Burkina Faso, the planetGOLD project gave preferential access to the financial mechanism to groups with mixed gender composition.

The planetGOLD Peru and Ecuador provided technical support and training to women miners, encouraging group formation and strengthening their efforts to create alternative livelihood options. Under planetGOLD Ecuador, a key aspect of the project's support is to support the development of an inclusive national policy that recognizes women miners ("Jancheras") in the mining code, to encourage their participation in the formal sector, and allow their access to formal financial products. Under planetGOLD Peru, the project strengthened women's associations, consolidating the National Network of Women in ASGM as a key strategic partner. Moving forward, the National Network of Women in ASGM with the support of the NGO Solidaridad, will play a crucial role in maintaining outreach efforts and encouraging more female miners to join formal associations, ensuring the sustainability of the project's impact under the Emprende Pallaquera initiative.

The planetGOLD projects in Colombia and Indonesia reported to have trained the staff of the financial institutions to address gender inequalities within the ASGM sector as part of the design of financial products tailored to the needs of women miners. Also in Colombia the engagement of women in the sector was implemented in partnership with local women miners' associations, ensuring a knowledge transfer to national organizations beyond the project's lifetime.

Global Project Support for Access to Finance

Given the central importance of finance to support the transition to mercury-free technology, the Global Project included a specific component to bolster the efforts to raise the visibility and knowledge about ASGM among the financial sector, in support of efforts to expand access to finance. As one aspect of this work, the project conducted extensive education and outreach to the international investment community, to help "demystify" ASGM, highlight its potential as an investable sector, and learn how to best communicate information about ASGM investment opportunities in language understandable to investors. The Global Project aimed to learn what might attract the interest of international investors in the sector, to gauge their potential appetites, to educate them about opportunities in the sector and to address common biases against ASGM.

Another aspect was to support country projects in implementing financial mechanisms in their countries, through knowledge exchange among projects and at the Global Forums, development of synthesis reports on finance, focused peer-to-peer exchange and development of an investor toolkit, outreach materials for financiers as well as financial literacy training materials for miners.

To help ensure comparable documentation of project activities, the Global Project prepared a template to guide the description of project activities relating to ASGM access to finance in a consistent manner. This template prompts country projects to report on activities and results from the implementation of actions to support ASGM in accessing finance. The project then created eight project reports documenting the efforts of planetGOLD phase one country projects to establish financial mechanisms for the ASGM sector, as well as a summary of experience across the programme.[21]

Challenges and Lessons Learned

While some of the successes and learnings from phase one planetGOLD countries' efforts might be specific to regulatory and cultural contexts, general observations and lessons learned can be used to inform future development and scaling of financial inclusion efforts.

MINERS' PERSPECTIVES ON DEBT FINANCE

ASGM operators often lack the financial and business literacy to make well-articulated loan requests to formal financial institutions. Furthermore, many ASGM operators are hesitant to commit to formal debt financing as they perceive the requirement to make consistent repayments, irrespective of their production, as high risk. While debt financing at a fixed rate might be more advantageous in the long term, many miners prefer risk sharing and flexibility offered through informal financing arrangements. For example, informal financiers may take a percentage of each batch of gold produced, which miners may view as more convenient and less risky, compared to loan agreements with set monthly payments that do not include grace periods to account for uneven production. Miners are also hesitant to enter into formal agreements from fear that disclosure of their production volumes and profitability to the bank might attract the attention of the government and lead to taxation. Finally, cultural limitations regarding property ownership by women can result in de facto exclusion of most women from access to loan products that require property as collateral.

SCALE OF OPERATIONS

The scale of operations within the ASGM sector can pose a challenge for formal finance. From the perspective of financial entities, individual ASGM projects are often too small and offer too little return on investment to merit the administration and due diligence required. ASGM projects need to be aggregated to meet the scale requirements, posing a significant barrier to investment. To address these complexities and risks associated with ASGM finance, an intermediary or partner investor can become involved in bridging the gap between small-scale operations and large investment requirements; however, achieving financial viability will be difficult for these intermediaries without assistance from the public sector.

21 https://www.planetgold.org/cross-programme-analysis-asgm-financial-access

NON-FINANCIAL BENEFITS FOR OPERATORS SEEKING FORMAL FINANCE

Some planetGOLD countries found that enhancing financial products with non-financial benefits was one way to attract more miners to formal finance. ASGM operators onboarded by the CFA to receive credit are granted life insurance, a funeral plan, and a financial lien tax exemption on top of the credit received. Also in Colombia, the savings groups embedded a social welfare fund in the design of their mechanism to offer financial support to participants to deal with calamities. In Peru, artisanal women miners receiving credit under one of the four mechanisms created, "Credit Pallaquera Women," have the option of choosing between a discount for on-time payment or insurance coverage for cancer diagnosis.

DRIVING ASGM FINANCIAL ACCESS AMONG EXISTING BANKS

Awareness raising: The lack of understanding by formal financiers about the ASGM sector necessitated most country projects to provide education and awareness raising to banks and other financial institutions. In some countries, this included emphasizing the business advantages of being among the first institutions to serve a large, underserved sector. Similar efforts in Mongolia, however, resulted in the realization that the ASGM sector was too small and dispersed to warrant the development of a sector-specific financial product, as the effort required to onboard and manage ASGM clients appeared disproportionate to the potential return.

De-risking investment into the ASGM sector: In addition to general awareness-raising, country projects de-risked ASGM finance in a number of ways:

- The first loss guarantees provided by the respective planetGOLD country projects in Colombia (30%) and Burkina Faso (33%), enabled CFA and Coris Bank International to provide loan financing, with CFA eliminating the requirement for collateral, a factor that disproportionately affects women.
- Because the finance sector perceives the ASGM sector as extremely high risk, providing formalization support and capacity building through 3rd-party financed (e.g., donor) support to ASGM operators led to increased financial literacy and overall improved business conduct by the ASGM operators, increasing the trust of participating finance institutions in the investability of the mine sites.
- Coris Bank International's access to low-interest financing through the government-backed Green Climate Fund enabled them to offer very competitive financing terms to the ASGM operators.
- Leveraging supplier agreements and sale receipts, between ASGM operators and the Central Banks, as is the case with planetGOLD Philippines and Ecuador, can encourage local banks to offer loans to ASGM applicants.

- The involvement of intermediary actors in the supply chain reduces the risk of formal institutions lending directly to miners. For example, the ore-selling strategy employed by planetGOLD Peru under the 4-P model is unique in its use of a processing facility as an intermediary in the financial instrument.

ENSURING THAT FINANCIAL ACCESS LEADS TO RESPONSIBLE MINING

By including responsible production requirements as part of finance deals, financial institutions can help direct financing toward improving the environmental and social performance of ASGM. Coris Bank (in partnership with planetGOLD Burkina Faso) required a commitment letter to meet the planetGOLD version of the CRAFT Code (the planetGOLD Criteria for Environmentally and Socially Responsible Operations), while compliance with the planetGOLD Criteria was a prerequisite for supplier agreements in the Philippines. Further, close collaboration with the government in provision of finance can also help drive overall professionalization of the sector, as is being explored in Ecuador where the Ministries of Environment, Water and Ecological Transition and that of Energy and Mines are party to the Interinstitutional Agreement with BanEcuador and the Central Bank of Ecuador. This allows for more oversight and government-led capacity building to coincide with the provision of financing. In the absence of government-led formalization efforts, partnership with NGOs or planetGOLD country programmes has been shown to help aid an uplift of mining practices.

ADOPTING REALISTIC TIMEFRAMES FOR FINANCIAL INCLUSION EFFORTS

Building capacity and changing the mindsets of both miners and financiers is a long process. Phase one planetGOLD projects officially started in 2018 or 2019. For the six planetGOLD teams that were able to successfully pilot ASGM finance provision, it took until 2023 and 2024 (like the case with planetGOLD Burkina Faso), towards the end of the phase one project timelines, for the target beneficiaries to start receiving credit. This is a testament to the time and effort it takes to initiate and drive financial inclusion efforts. Regarding their engagement with the Central Bank, the planetGOLD Philippines project acknowledged that, given the fact that it is a larger financial institution than other commercial entities, the longer decision-making process and the bureaucracy of the bank increased the time required for the team's financial inclusion efforts.

BENCHMARKING ACROSS PROJECTS

Despite differences in local regulation and formalization levels of the different implementing countries, Colombia, Ecuador, and Mongolia projects made concerted efforts to learn from other initiatives and projects implementing similar mechanisms. For example, as part of the dissemination strategy for the financial product, a visit to exchange experiences of Central Banks of Ecuador and Colombia was carried out by the planetGOLD Colombia

program in July 2023, in conjunction with the Central Bank of Colombia, the Ministry of Mines and Energy of Colombia and other financial and civil society entities seeking to establish cooperation frameworks between both countries for the financial inclusion of ASGM in the region. The planetGOLD Mongolia project has facilitated cooperative management and development training to improve the capacity of the members of the Savings and Credit Cooperative, alongside a benchmarking visit to the provinces in the country to learn from established and successful Savings and Credit Cooperative experiences.

Recommendations

Behavioral change: A mindset shift, through targeted capacity-building efforts, is needed for miners to shift from informal to formal financiers. Success stories from other ASGM operators can be leveraged to catalyze the change. Building the capacity of ASGM operators around financial literacy, record keeping, and formalization, as was done by all planetGOLD phase 1 countries, can also support the mindset shift.

ASGM-centric products: Designing fit-for-purpose financial products is crucial to incentivize ASGM operators' adoption of formal products. Design considerations should include: grace periods to allow miners to start fully utilizing equipment to stabilize and increase gold production before making repayments; flexibility on repayments to allow penalty-free upfront and additional payments when production is higher; payment breaks that allow for a pause of monthly repayments without risking immediate default, accommodating lags in production brought about by factors such as mine development, mine flooding due to the rainy season, equipment damage etc. Finance providers should also consider what non-financial incentives they can offer to ASGM operators to encourage miners' participation.

Awareness raising of financial institutions: Educating existing financial service providers on the sector is crucial to ensure that the bank's business opportunity to support ASGM is aligned with the bank's requirements and expectations, and that the partnering banks are invested and have ownership in the process as a potentially profitable business endeavor. Where possible, banks should consider hiring or collaborating with technical specialists/ field-based due diligence officers to support credit evaluations. Further, encouraging field visits of representatives of financial institution partners to ASGM sites can deeply enhance understanding of the realities faced by the sector.

De-risking: First loss guarantees, capacity support to miners, access to low-interest government capital, leveraging supplier agreements, and engagement of intermediaries in transactions are practical tools to help lower the risk perceived with investment and enable banks to engage with the ASGM sector formally.

Promoting responsible mining through finance: The planetGOLD Criteria and other responsible sourcing frameworks can be effectively employed as a requirement by financial institutions to encourage responsible, mercury-free mining. Partnerships with government entities or NGOs to confirm conformance with these criteria can reinforce the application of these frameworks.

Allowing time for change: Projects aimed at driving the financial inclusion of the ASGM sector should take a long-term perspective, anticipating that results will take 5-10 years, allowing for sufficient time for ASGM operators, formal financial service providers and governments to develop, test, improve and scale systems that are fit-for-purpose. To counter the bureaucracy of larger institutions such as Central Banks, projects should manage their expectations and seek private sector partnerships, in parallel with this engagement, for quicker implementation of their projects.

Learning from experience: Implementing countries should prioritize information sharing with their peers to learn from their experiences in navigating the challenges encountered while trying to facilitate access to finance for the different projects. A lot of the challenges faced were not unique to one country or region, and efforts to have regular cross-country information sharing sessions can be valuable for the implementation of the different projects.

Conclusions

While planetGOLD projects created and applied a range of novel finance mechanisms in a variety of contexts, increasing finance offerings to ASGM from formal public financial entities remains a long-term goal. De-risking the sector has proven difficult because miners still largely remain informal, and even formal miners continue to have challenges accommodating the bank's normal lending procedures. The most successful strategies involved loan mechanisms catering specifically to ASGM, backstopped by first-loss guarantees provided by planetGOLD projects, and miner-led savings and credit organizations. Increasing financial literacy and improving business conduct were essential to all efforts at improving access to finance, but equally important is continuing education of the finance sector with ASGM, to increase familiarity and level of comfort with this potential customer base. Finally, because lack of access to finance an expression of the informality of the sector, addressing formalization is a necessary precondition for significantly expanding finance offerings to the ASGM sector.

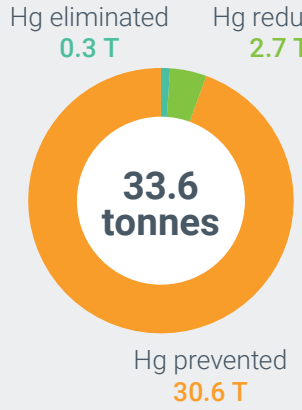
Analysis of Technology Transfer Activities

Background

When used properly, technologies and practices that reduce or eliminate the use of mercury in ASGM can extract a greater amount of gold than traditional methods using mercury amalgamation, leading to more income for miners and their families and fewer risks to their health, their communities, and the environment. The appropriate technologies and processes depend on the ore type, available resources, and social and economic factors.

All planetGOLD projects promoted and piloted alternative, mercury-free technologies and processes with artisanal and small-scale gold miners. While every site is unique, these mercury-free production methods usually involve improved crushing and milling techniques, improved gravity concentration tools such as centrifuges and shaking tables, and/or chemical leaching. Projects also carried out training and capacity building activities to increase miners' knowledge of, and comfort with, mercury-free mining practices. This chapter provides an overview of the interventions carried out across the planetGOLD programme to reduce and/or eliminate mercury through technology transfer, technical support, training, and sharing knowledge of best practices in mercury-free gold processing.

Amount of mercury abated



* As of June 2024.
Data reported from: Burkina Faso, Colombia, Ecuador, Guyana, Indonesia, Mongolia, and Peru.

Preparatory Activities

Successfully piloting mercury-free technologies required projects to carefully select appropriate target sites and groups to work with, to secure cooperation of key stakeholders, and to perform analysis to help select technologies suitable for the local social, geological and technical contexts.

SITE SELECTION

Selections of sites for pilot testing and training on mercury-free technologies were made based on a variety of social and technical factors. Social factors included degree of formalization, willingness and readiness to co-invest, scale of operations, accessibility, and security, among others. The projects sought sites in areas with high concentrations of miners to ensure strong participation in training events and to increase the likelihood of independent replication of project initiatives. One of the most important selection factors across the projects was the degree of formalization; technology transfer sites needed to be formalized or be in the process of formalizing, to ensure the sustainability of technical initiatives, while also enabling projects to pilot innovative financial mechanisms and to legally commercialize the gold produced from those sites.

From a technical perspective, intervention sites also needed to be sufficiently productive and have sufficient ore reserves to feed the processing plants at demonstration sites for the duration of testing and training initiatives. Installation of permanent infrastructure (e.g., the Philippines, Burkina Faso, and Colombia) required several years of remaining exploitable ore reserves. Access to equipment and maintenance repair supplies and materials were important aspects to consider, though in practice most mining areas were quite remote, making shipping of equipment and access to basic materials and inputs challenging.

The scale of mining was also important to consider in light of planetGOLD's ambitious mercury reduction targets. ASGM often invokes the image of subsistence miners panning alone in creeks and manually breaking rocks, but because these poorest miners cannot afford to waste mercury, their application is usually sparing, and their recovery of excess mercury is very high. Thus, they are of less concern in terms of mercury emissions. Small-scale miners, who have more capital infrastructure, richer ores, higher degrees of mechanization, higher costs and higher throughput, generally emit far more mercury because they are less sensitive to the cost of mercury losses and more willing to use excess to guarantee maximal recovery. These richer, more organized and more mechanized operations are the more important target for mercury abatement initiatives because the potential reductions in mercury contamination are far greater.

SECURING COOPERATION FROM KEY PARTNERS AND STAKEHOLDERS

To ensure acceptance and sustainability of the technical interventions, projects needed to gain the trust and cooperation of key stakeholders, including miners themselves, governments, and local communities. Critical government partners included agencies that grants permits, usually the Ministry of Mining and the Ministry of Environment, to provide necessary consultation and approval throughout technical transfer processes. As discussed in the Formalization chapter, unfamiliarity with ASGM among government staff can lead to challenges in terms of licensing and operational continuity. It is also important to be aware of historic inter-ministerial disharmony to mitigate its potential effect on implementation. These institutions need to understand and buy-in to the technology transfer activities to ensure long-term sustainability and further dissemination through training. To this end, some planetGOLD countries worked explicitly with government-affiliated vocational agencies and training bodies to institutionalize training on technologies. These institutions will continue to train miners long after planetGOLD has ended.

The planetGOLD projects in Colombia and Indonesia took advantage of already existing strong national training institutions—Servicio Nacional de Aprendizaje (SENA) and Badan Pengkajian dan Penerapan Teknologi (BPPT), respectively—which have carried forward the knowledge and resources from previous internationally funded ASGM projects as well as national initiatives. In Guyana, the project worked with the Guyana Geology and

Mining Commission (GGMC) to ensure knowledge and resource continuity; GGMC will continue to train miners in mercury-free techniques in the foreseeable future. In Burkina Faso, the project worked with the General Directorate for Vocational Training to establish a set of standard vocational training curricula for miners and mining experts, where the participants can obtain recognized educational certificates. These training and geology agencies are also commonly recipients and long-term managers of equipment that has been donated for the purposes of training.

Local or regional miners' associations were important partners to help with scaling up training and dissemination of new technologies, as well as acting as stewards and disseminators of mining equipment. For instance, planetGOLD Colombia donated their mobile labs and training plants to regional miners' associations, who in return agreed to continue regular training initiatives to help generate widespread mercury-free technology uptake. Advocates for vulnerable groups, such as women's miners' associations, were also important partners. In Colombia, for example, regional women's associations were key for facilitating technology transfer activities focused on women.

Private companies, such as manufacturers and distributors of equipment, mineral analysis labs, mapping and prospecting companies, NGOs or universities who can perform environmental mercury analysis, were critically important for practical execution of projects and to support sustainability and further technology dissemination. In Guyana for example, a private geological exploration company was hired to undertake prospecting

planetGOLD Peru

on the areas of land identified for the first two demonstration sites. This body of work included sampling and assaying activities, and identified resource targets that will help miners maximize gold yields and minimize impacts.

Of course, all projects concentrated on getting buy-in from the mining communities themselves, as well as miners themselves. The aim was to reach as broad a population as possible in intervention areas, so that awareness and replication of mercury-free processes could spread to the greatest possible number of people. Typically, prior to introducing new technologies and techniques to miners in the mining regions, the projects held sensitization sessions in communities close to mining operations. The intention was to ensure that local government officials, community leaders and community members alike were all aware of the project objective, activities, and team. With the support of partners, the teams gradually introduced alternatives to mercury during discussions organized at central points where miners gathered. These discussions also presented opportunities for building relationships by sharing the details of the project's Accountability and Grievance Mechanism, which was designed to provide the communities with a process through which they could be assured of redress if any project activity resulted in any unintended negative impact.

As people grew familiar with the project, it was easier to identify groups who either understood the dangers of mercury or had an interest in the reduction or elimination of its use in the mining process. In many cases, women were concerned that they or their partners could suffer mercury poisoning from handling mercury regularly or that their families could consume dangerous amounts of mercury because of their heavy fish diet. Projects also made sure to keep communities informed about the arrival of equipment and recruitment opportunities for training, bringing together for example site managers, the village councils, and elders, making it possible to effectively prepare communities and anticipate the risk of conflicts of interest within and among them. For example, in Burkina Faso, women expressed concern about their jobs being displaced by the mercury-free processing system. The project addressed this concern through awareness-raising and ensuring the continued involvement and empowerment of women in the processing chain within the mercury-free processing system. In addition, the complaints management mechanism put in place contributed greatly to reassuring all stakeholders.

ANALYSIS OF ORE AND FEASIBILITY STUDIES TO SELECT TECHNOLOGIES

To identify clean and environmentally friendly technologies and adapt them to local conditions, most projects undertook detailed mineralogical and contextual analysis of the mines. At the very least they all undertook feasibility studies for gold recovery through various mercury-free processes, and some others also included studies on exploration and ore reserve estimation, social risks and biodiversity impacts. Based on the ore test results and feasibility studies, projects proposed alternative methodologies and technologies that would allow for better gold recovery and avoid the use of mercury. In some cases, it

was most efficient to retrofit existing ore processing plants to improve process flows and replace mercury application with new tools. In such cases, projects performed detailed process analyses to identify the critical weaknesses in existing systems that constrained production.

Different types of ore analyses reveal different relevant ore characteristics. Some tests are used to determine ore/concentrate/tailings grade (concentration of gold and other metals), others to determine concentrations of other important elements that can affect process efficiency or tailings toxicity. The gravity-recoverable gold test determines the maximum amount of gold that can be recovered with only gravity concentration methods. Another set of tests can be used to determine gold grain size distribution, which is important to choose appropriate concentration tools. For instance, centrifuges capture more fine gold but cost much more, whereas sluices are quite efficient at capturing coarse gold for much lower cost.

These tests require professional metallurgical laboratories that are usually not available near ASGM areas. To address this, planetGOLD Colombia designed, built, and operated three mobile laboratories in shipping containers that can be trucked to any flat and road accessible site, for an approximate cost of $105,000 USD each. They were set up in remote mining areas where miners from across the region could get ores tested and learn about mercury-free extraction. These labs were not just infrastructure for miners but also were an integral part of planetGOLD Colombia's training strategy, in which miners learn ore analysis as the primary input for the planning and ongoing optimization of gold beneficiation. These labs featured a large variety of analytical techniques, including ore characterization for mill design (optical mineralogy, moisture calculation, fire assays); ore processing efficiency monitoring (grinding tests, granulometry tests); optimization of chemical inputs (cyanidation kinetics, flotation tests, temperature and pH measurement of liquids); and gold mass and purity (acid digestion tests, precision weighing, density measurement for purity). As they are mobile laboratories, they are easy to assemble and transport and can be constantly relocated according to the needs of the mining groups in the different regions of influence of the project. At the end of the project life these labs were donated to miners' associations in the main project implementation areas.

planetGOLD Colombia

Specific Technologies Transferred by planetGOLD Projects

OVERVIEW OF MERCURY-FREE TECHNOLOGIES

Mercury-free gold recovery requires the use of a few key pieces of equipment to be integrated into the ore processing chain. While the exact combinations and calibrations of these tools vary, the goal is always to create a processing system that progressively separates gold from the host material and concentrates it sufficiently to enable directly smelting the gold into ingots. Figure 5 illustrates typical components of a mercury-free ore processing workflow, while Table 1 provides more details on these steps. For a more thorough explanation of this workflow and the most common equipment involved in mercury-free ore processing, see Annex 2.

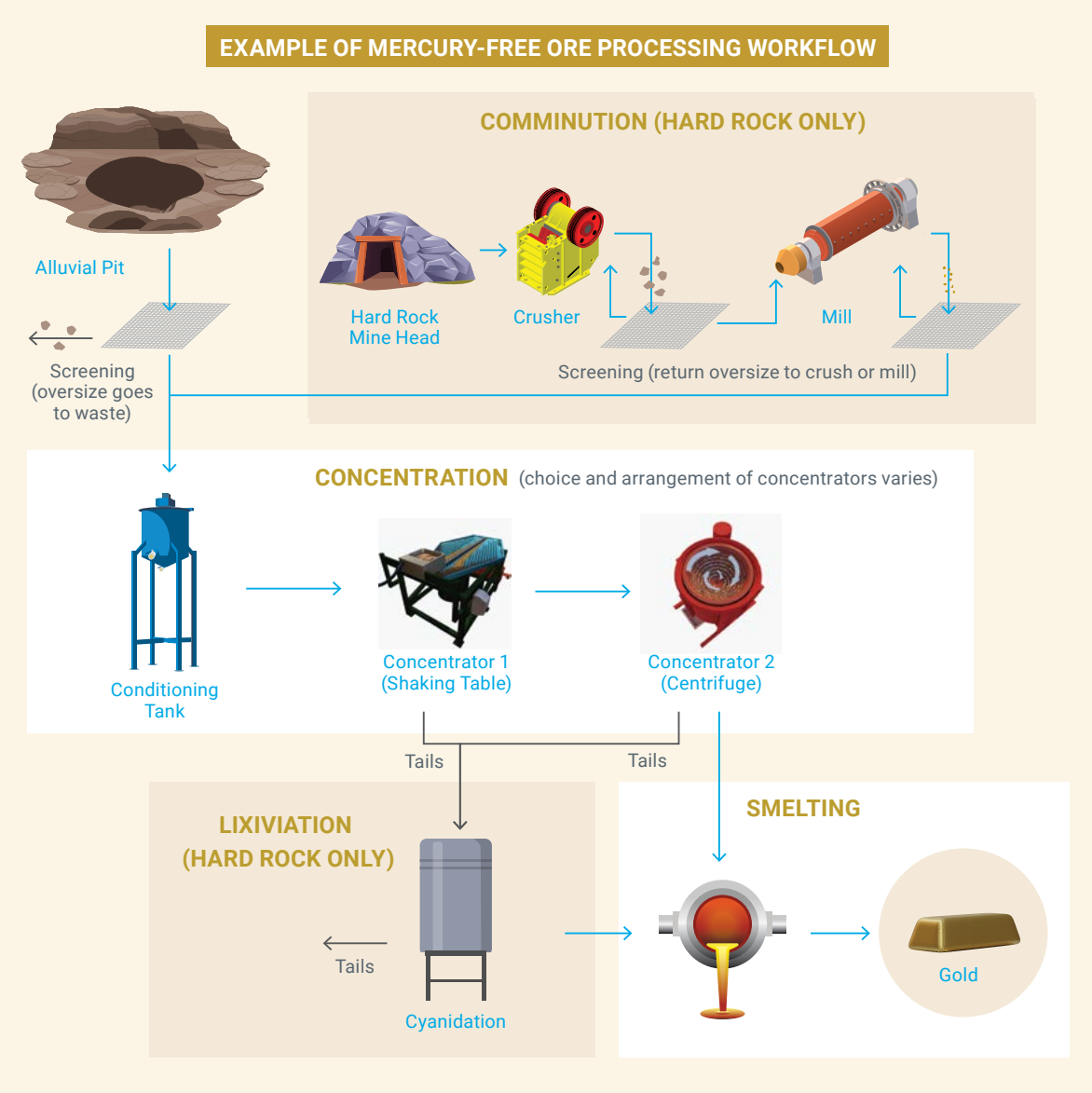


Figure 5: Typical components of a mercury-free ore processing workflow

STEP	PURPOSE	TYPICAL EQUIPMENT
Comminution	Hard rock gold ore is mostly quartz with gold grains trapped inside. Raw ore is crushed and then ground to reduce the size of ore grains, to maximize the amount of gold that is no longer joined to lighter material ("liberated gold") while minimizing the grinding of coarse gold into fine gold (which is harder to recover with gravity). (Note: alluvial gold has already been liberated by erosion and this step is thus not needed for most alluvial circuits.)	*crushers, ball or rod mills*
Classification and conditioning	Classification equipment separates ore particles by size so that only material of the ideal liberation size is fed to the concentration equipment. Agitation tanks mix the slurry to create the correct density.	*vibrating screen, cyclone, agitation tank*
Gravity concentration	Gravity concentration is used to efficiently separate heavy coarse/ liberated gold from lighter particles.	*shaker table, sluice (lined with carpets to capture material), spiral, centrifuge*
Smelting	This is the final physical separation step, whereby concentrates are melted to form a metal ingot that separates out from the non-metallic components which float to the top.	*torch, furnace*
Chemical separation/ Lixiviation	Where gold cannot be captured efficiently via gravity, these methods exploit chemical affinities of gold to separate it from the slurry by dissolution (cyanide) or scavenging with oily bubbles (flotation).	*flotation, cyanide, glycinate*

Table 1: Illustrative steps in mercury-free ore processing

DEPLOYMENT OF MERCURY-FREE WORKFLOWS

Seven of the nine planetGOLD projects introduced enhanced gravity-based methods for gold recovery. In addition, two projects introduced methods that rely on chemical-based gold extraction. In some countries, planetGOLD projects undertook efforts to build all-new mercury-free processing capacity, for use by miners and for training/demonstration. In others, country teams took stock of existing gold processing facilities in their project areas and opted to expand these existing facilities' ability to process ore without mercury. This was done through capacity building and the provision of mercury-free equipment or encouraging miners to sell their ore to existing processing businesses, thereby saving miners the trouble of extracting the gold. Project teams consulted with miners in the selection of these technologies to ensure they were appropriate for the local setting and would be accepted by miners. Once the appropriate interventions were identified, the teams engaged in appropriate licensing, procurement and commissioning of any new or updated equipment, and/or strengthened existing processing capacity. Miners and ore

processors were then trained to operate and maintain the new technologies. Projects constructing new facilities developed plans for transfer of ownership and sustainability of the equipment after the project ends. More details are provided below, and a summary of equipment selected by the teams is found in the table in **Annex 3**.

Improving existing alluvial gravity concentration

Alluvial gold is produced by digging up and concentrating old or contemporary riverbed sediments. Alluvial gold tends to be much lower in gold concentration, therefore the volume of material processed is generally much higher, making material throughput one of the most important parameters for alluvial miners. The primary concentration tool in alluvial gold mining is the sluice, and the main ways that projects improved sluice recovery was to implement two-stage Z-shaped sluices, which extend the time and surface area available for gold to settle. In Colombia, for example, the planetGOLD team provided new Z-sluices and carpets to subsistence mining communities. Notably, these sluices discouraged mercury use because they were made from aluminum and cannot be used with mercury-impregnated carpets because mercury will erode the aluminum deck. Other secondary concentration methods vary depending on the characteristics of each site and ore.

Aluminum Z-sluices provided in Colombia

In Guyana, the planetGOLD project demonstrated that mercury-free alluvial gold processing circuits led to higher recovery of gold for comparable costs when compared with processes that use mercury. To accomplish this, they created a mercury-free circuit in parallel to an existing traditional mercury-based operation. The mercury-free circuit included a Z sluice with optimal sluice slopes, as well as centrifuges and a shaker table. Ore

through-put and gold recovery were carefully tracked at both the mercury-free site and the traditional site. The recovery rates of mercury-free processing ranged from 95% to 99%, whereas the traditional systems recovered only 35% to 40% of the gold in the ore. However, one important difference was that the capacity of the mercury-free site was only 10 tonnes per day, whereas the site that uses mercury processes 10 tonnes per hour. Even though the mercury-free site achieved a higher *recovery rate* of gold from the ore, the traditional site obtained 40% more gold each day because they were able to process three times more ore in the same time frame. This disparity in processing capacity is a major hurdle for independent replication where access to alluvial material is not limited, as local miners can get more gold simply by processing more raw ore less efficiently. Most miners are primarily concerned with daily production, rather than efficiency with the resource. Thus, one of the main challenges was to convince operators that gold recovery efficiency is crucial, as it creates more value per unit of material processed, which means greater value is extracted from the disturbance of the natural resource.

New gravimetric plants

Several planetGOLD country projects installed new equipment that uses only gravity concentration for alluvial and hard rock ore processing. In partnership with local miners, planetGOLD Peru installed 16 ore processing plants across the country. Each alluvial plant has a vibrating screen, agitation tank, shaker table, and smelting kit, and each hard rock plant includes this equipment plus a crusher and ball mill for comminution. This system can capture up to 90% of the gravity recoverable (coarse) gold, and any tailings are sold to a cyanidation plant, thereby reducing the burden of long-term waste management. The planetGOLD Peru project's alluvial processing plants match the volume of concentrates produced by the high-capacity primary sluices. These upgrade plants have a very small footprint that is easily accommodated in a typical mine site, and they simply take the place of the mercury amalgamation step without requiring any modification to the upstream circuit.

Click to view the Peru project fact sheet with flowchart

The planetGOLD Burkina Faso project built a chemical-free gold ore processing plant designed to accommodate both alluvial and hard rock ore. It has the usual crushing and grinding equipment with screens for size control and a conditioning tank to optimize slurry density and feed rate to the shaker table. The plant can recover between 70% and 85% of the gold in the ore feed.

The planetGOLD Philippines built two ore processing plants in the communities of Paracale (Camarines Norte) and Sagada (Mountain Province). The gravity concentration process includes centrifugal concentrators, a helicoidal concentrator, shaking table, and gold smelting tools. As with other plants, the slurry is preconditioned to give it the optimal pulp density and rate of feed to the concentrators. The helicoidal concentrator is particularly interesting, as it is a very new technology and seldom known or used anywhere else in the world. It is relatively easy to construct, including by local fabricators. The tailings are stored in the settling tanks awaiting chemical processing, which Paracale has on-site as well. Although a leaching circuit was planned for Sagada, consultations with surrounding communities found that locals were concerned about the environmental risks, which led the project to use only gravity concentration at that mine site and to develop a process for transporting final tailings offsite for further processing (see "Lixiviation" section below).

Modifications to existing hard rock processing plants

The fastest, easiest, and cheapest way to increase mercury-free processing capacity is to modify an existing plant. Existing equipment, especially crushing and grinding circuits, can be optimized without having to purchase new equipment. Furthermore, existing facilities already have supporting access, water, and electrical infrastructure in place, and they are normally operating with a reasonably reliable ore supply. In these cases, interventions only need to focus on upgrading and supplementing the means of concentration and separation of the gold.

Projects in Mongolia and Colombia undertook this strategy, with planetGOLD Mongolia introducing new mercury-free processing systems in two existing plants, each with 3-5 metric tonnes per day processing capacity. The plants have a large tailings management facility to store the tailings, which contain roughly 30-40% of the total gold, for potential further processing by leaching or flotation.

The La Gabriela mine in Colombia is particularly interesting because the plant originally used cyanide to extract gold, but analyses indicated that high arsenic concentrations in the ore were consuming cyanide, which increased input costs and greatly reduced gold recovery. The planetGOLD project was able to help them improve recovery using only gravity concentration instead of cyanide. Upgrades included equipment such as jaw crushers, conveyor belts, hammer mills, ball mills, screens to optimize gravity circuit feed, shaker tables, centrifugal concentrator, magnetic separator, and electric smelting furnaces. The project has shown gold recoveries close to 85%, and operating and environmental costs were decreased significantly by suspending the cyanidation circuit.

Lixiviation

In addition to gravity methods, three planetGOLD projects have also included chemical leaching processes such as cyanidation as elements of new or existing mercury-free circuits. One of the most innovative aspects of the leaching circuit set up at the Paracale

processing plant in the Philippines is the use of glycinate to accelerate cyanide dissolution.[22] Glycinate is cheap and non-toxic, and it is being used in the large-scale mining industry to vastly reduce the amount of cyanide applied. This is a novel application of glycinate use in ASGM, and in addition to potentially reducing the application of cyanide, it also happens to be more selective for gold than other metals, leading to purer extracted gold.

At the second plant in Sagada, the final tailings will be sent to a cyanide leaching facility five hours away by car, where planetGOLD Philippines partnered with a local miners' association to install cyanidation tanks that will process gravimetric tailings to recover gold that is not recoverable by the gravity concentration methods at Sagada. Based on the analysis of samples obtained from Sagada, at least 50% of gold remains in the tailings after using gravity methods, and the project found that cyanidation of these tailings can boost total recovery to up to 95%.

In Indonesia, the Government formally banned the use of mercury in 2017 and committed to eliminate mercury use in ASGM by 2025. Consequently, an increasing number of cyanidation processing plants have been built by miners in ASGM mining sites around Indonesia. In line with this evolution, the project developed a micro-leaching tank model and rolled it out in villages where miners were still using amalgamation. Miners already have crushing and grinding systems and can only bear relatively small additional costs without direct assistance. The small batch cyanidation system is relatively inexpensive (under 3,000 USD), and its small size means it is easy to move and set up, making it a good option for empowering women miners to shift away from mercury use.

The planetGOLD Indonesia team assisted miners in optimizing their existing rod mills to achieve the fine and uniform grind necessary for cyanidation, and the system enables miners to monitor pH free cyanide and dissolved oxygen to ensure proper gold dissolution. The shape of the barrel in the micro cyanidation system was also adjusted in response to user feedback. In addition to the microleaching, the project also helped increase the efficiency of conventional local cyanidation plants.

In Kenya, the planetGOLD team aimed to set up a series of processing plants in their project areas, to be used by project beneficiaries but also as examples for other local miners to adopt. All gravimetric plants comprise process lines for both gravimetric equipment line and micro-leaching with an optimal continuous crushed and concentrate slurry flow rate of 5 tonnes/hour. As of the drafting of this report, plans were in progress to set up training plants in Masara and Osiri (Migori County), Rosterman and Bushiangala (Kakamega County), Chambiti (Vihiga County), and Lolgorian (Narok County).

22 https://www.planetgold.org/sites/default/files/pG%20PH_Paracale%20MFPS%20%288%20Nov%202023%29.pdf

Costs

Cost of technology was a critical consideration, since ASGM miners typically have limited access to capital and few means of obtaining formal finance. The costs of technologies deployed by the planetGOLD projects ranged widely, depending on the scale of production, the nature of the ore, the quality of existing infrastructure, as well as local culture and context. Simpler technologies aimed at small groups of miners (usually alluvial miners) had the lowest costs, while installation of new processing plants designed to service entire communities had the highest costs. Building new ore processing plants typically cost 10,000-30,000 USD per tonne, per hour of capacity, with lower capacity incurring higher relative costs. However, costs can spiral quickly if the land needs to be prepared, concrete foundations built, and utilities installed.

Costs given in the section below most often include not only the equipment but also shipping and transportation, as well as costs for expertise to set up, optimize and commission the plants. **Annex 3** contains a summary of costs by country. Of course, the least costly intervention of all was to convince miners to sell their ore to existing cyanidation plants, as was done in Ecuador and in Peru (see “Ore Sales Strategies”).

ALLUVIAL SYSTEMS

Each portable aluminum sluice system designed for the artisanal alluvial miners in Colombia and manufactured in the U.S. costs about 2,000 USD and can process about one tonne of material per day. Though these are more than 20 times the cost of the local sluices, they are more effective. Some of the beneficial aspects can be replicated more cheaply by building wooden sluices with better carpets and adding expanded metal gratings to create more turbulent eddies in the slurry flow. The planetGOLD Colombia team also commissioned a mobile alluvial ore processing plant with a Canadian-manufactured centrifuge for 40,000 USD. This plant can be brought directly to the miners to facilitate training in mercury-free alternatives. In Guyana, concession holders paid for the establishment of the demonstration plants, not including the costs of the mercury-free concentration tools which were loaned by the project. The total approximate cost of establishing a 10 tonne per day demonstration site was 160,000 USD, and the mercury-free equipment loaned by planetGOLD made up approximately 50,000 USD of this cost. The plant owner provided sluices, excavators, sand and water pumps, and all other additional material and equipment inputs. Due to the remote nature of the mine sites in Guyana, 25,000-40,000 USD was required for domestic transportation of equipment to the site (the region is only accessible by air or river).

HARD ROCK GRAVITY SYSTEM COSTS

Burkina Faso is landlocked but has better road access than the mine sites in Guyana. Therefore shipping, importation and transport of 48,000 USD of equipment from Colombia

cost only 9,400 USD. The quality, reliability, and price of Colombian equipment, plus the fact that it is manufactured specifically for small-scale miners, could make it a good choice for other planetGOLD projects as well. Furthermore, Colombian manufacturers produce mobile hard rock ore processing plants with a full suite of small-scale equipment for 80,000 USD. Each is built to fit in a container and be towed by a normal pickup truck. Colombia also produced a full mobile metallurgy laboratory in a shipping container for 105,000 USD. In Mongolia, each mercury-free processing plant cost approximately 175,000 USD, including manufacturing, import, taxation, as well as construction and infrastructure development. High logistics costs associated with being a landlocked country with extreme climate variability and challenging permitting environment have conspired to raise costs.

Total cost for the Philippines plant installations ranged from 200,000 USD to 580,000 USD due to major infrastructure construction and engineering works for gravity and cyanide circuits, equipment purchases and transport, permit acquisition, power installation, water supply works, commissioning, reagents, supplies, consumables, labor, construction of a training center, building a storage room and electrical room, setting up a tailings pond, operations and maintenance before turnover, among others. The costs are much higher for these plants because they were constructed from scratch, as opposed to other countries (Colombia, Peru, Ecuador, Mongolia, and Indonesia), in which equipment was added and processes optimized in existing plants which already had well-established structural, machinery, water and electricity infrastructure (and often secure tenure and permits). Indonesia's micro-cyanidation tanks accommodate individual miners and can be scaled to larger operations by adding new tanks. This is the second cheapest (<3,000 USD) hard rock solution because it integrates into existing plants without adding any heavy machinery.

Equipment Procurement

Peru and Colombia have thriving national mining equipment fabrication industries, and it is often possible to get locally built machinery, installation, and support. This makes local, independent replication of mercury-free initiatives much more likely. Peru, Ecuador, and Colombia also have equipment importers with distribution in the gold mining regions through which miners can obtain more sophisticated equipment such as centrifuges (usually from South Africa and Canada), shaker tables from the U.S. and China, and crushing, grinding, flotation and other equipment from China as well. In Burkina Faso there is no domestic mining equipment industry, and prior initiatives imported machinery from China.

The planetGOLD Burkina Faso project imported equipment from Colombia, as this equipment is of equal or greater quality for a competitive price. In Guyana, the equipment used in the demonstration sites are commercially available (not proprietary) products but are not currently available for purchase locally. The project demonstrated and promoted the Gold Cube for the final upgrading of the gold concentrates and many of the smaller miners have expressed an interest in the item, as it is very efficient, easy to use and

relatively inexpensive. However, this too is unavailable locally and a few miners attempted to import the item individually without success.

China was a convenient supplier for Mongolia and Indonesia, with high quality equipment available. Even some US manufacturers source large casted steel equipment from China for things like crushers and ball mills because they offer high quality the steel casting and welding for a price unmatchable in North America. Normally they replace the bearings and motors of Chinese goods, as these components can be substandard.

Ore Sales Strategies

Small-scale miners have been selling their raw ore to industrial processing plants for decades in Peru, Colombia, and Ecuador, and it is the easiest and by far the cheapest way to divert ore away from amalgamation processes. The projects in Ecuador and Peru took up the strategy of incentivizing small-scale miners and larger scale, mercury-free processing plants to work together while simultaneously minimizing the use of mercury. In this model, artisanal and small-scale miners sell their ore to existing processing plants that utilize mercury-free methods rather than processing the material themselves using mercury. The project teams put significant effort toward helping miners understand that certified ore analyses give them superior bargaining power when selling their ore to processing plants.

Click to view an overview of the Ecuador project's ore sales strategy

The project in Ecuador first worked to strengthen the capacity of three existing larger scale processing plants with optimized equipment and practices, so they could accommodate higher volumes of ore processing. The project then launched a communication campaign to convince artisanal and small-scale miners in surrounding areas to sell their ore to these plants. The planetGOLD Peru project similarly worked with mercury-free processing plants in Arequipa to assist small scale miners in selling their untreated ore to the plants rather than processing it themselves using mercury.

To build up miners' confidence in receiving a fair price for their ore, the project in Ecuador also improved the capacity of the laboratories at these processing plants, in order to ensure precise analysis of gold content, earn the miners' trust, and facilitate negotiation.

The Ecuador project was particularly fortunate in this respect, as there are many such processing plants that are accessible to miners who would otherwise use mercury, as well as independent analytical laboratories that can provide secondary verification. Overall, greater wealth is created because larger industrialized processing plants can extract more gold from the ore than amalgamation, increasing miners' earnings as well as those of the plants themselves.

Technical Training and Dissemination

Technical training was a key strategy for all planetGOLD projects, both to support sustainable direct transfer of technology to beneficiary groups, and to lay the groundwork for the uptake of new technology by a larger number of miners in the project areas. The resources of the project alone are not sufficient to directly fund and support widespread adoption of new mercury-free technology. Instead, the scale-up of mercury reduction relies heavily on training miners to use mercury-free processes so that they replicate them independently and disseminate their learnings to other miners. Therefore, wherever processing plants were upgraded with mercury-free equipment or new plants were built, country projects undertook processes of sensitization, cooperative design and training with miners. These sites have become key demonstration and training centers that can teach miners mercury-free techniques long after these projects close, with the aim to spur further behavior change and replication.

TRAINING TOPICS

Each planetGOLD project forged its own educational and outreach paths, but most have conducted technology-related training events on a range of mercury-free processing technologies, ore analysis and prospecting, crushing and grinding, classification and concentration, smelting, tailings management, and maintenance and repair. Miners were also given training on supporting topics such as environmental and processing licensing, and occupational health and safety. Where relevant, training included special topics such as flotation and lixiviation, use of mercury capture devices such as retorts, and removal of mercury from tailings.

TRAINING APPROACHES

The planetGOLD Colombia project used a holistic approach in the training of miners, using the following themes to guide miners in the development of mercury-free processes:

1. "I know my ore" (analyze key mineralogy and gold grain size)
2. "I know my plant" (design and optimize the plant to suit the ore)
3. "I manage my plant" (continuous monitoring and optimization of processes)

The first theme was supported by creation of mobile analytical labs that could be transported to present and future plant sites to directly train miners using their own ore, as mentioned above. For the second and third themes, two models were constructed to train miners in mercury-free processing practices, one for alluvial miners (60,000 USD) and another for hard rock miners (120,000 USD). Both fit neatly on a flatbed trailer and can be deployed anywhere. The alluvial model plant had sand and water pumps, a primary sluice on stilts, with secondary sluices and a centrifuge for concentrate upgrading. The hard rock model plant had a crusher, ball mill, agitator, pumps, centrifuge and shaker table. Hundreds of miners were trained and processed their ores using these training facilities, and they continue to be used by the mining associations to which they were given at the end of the project.

Figure 6: 3D equipment for training small-scale miners as part of planetGOLD Colombia's *"I know my plant"* process (agitator tank, fixed chute, mobile chute, ball mill, centrifugal concentrator)

The miners' ore dictates the design of their own processing plant, which was explained with the aid of **3D printed models** of the key ore processing technologies that their plants might employ. Miners were also trained to optimize the operation of these tools to maximize the liberation and concentration of their gold. Finally, miners learned how to safely operate and maintain their equipment, as well as how to adapt it to changes in ore. At the end of each training, the mining groups signed a commitment not to use mercury and to continue using clean technologies for the protection of the environment and human health.

In Burkina Faso, as mentioned earlier, planetGOLD partnered with the General Directorate for Vocational Training to establish a set of standard vocational training curricula for miners and mining experts, which would earn the participants nationally recognized educational certificates. The plant constructed by planetGOLD Burkina Faso was used as a training site for trainees seeking certification.

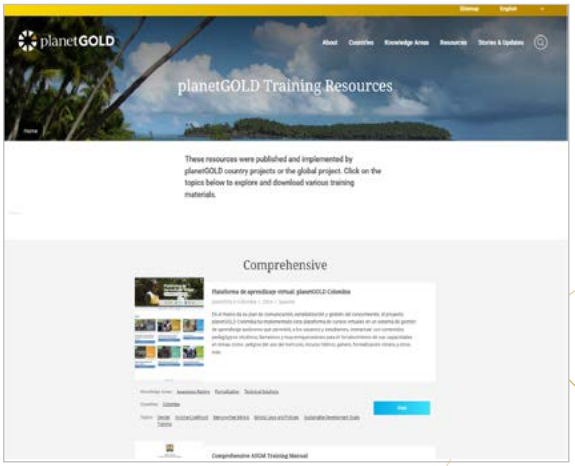
In Colombia and Indonesia, national technical training institutes have taken on long term administration and delivery of planetGOLD miner training initiatives and even maintain bespoke internet training modules to support these. In Guyana and Ecuador, this responsibility falls to the national institutes of geology and mining, and in the Philippines and Peru it is the local miners' associations that have stepped up to continue the trainings. Similarly, in Mongolia, the team provided substantial training on this topic jointly with the ASM National Federation.

The planetGOLD Guyana project's technology transfer approach included the establishment of three mercury-free demonstration sites, where miners came to see for themselves how the technology produced more gold at a lower cost. The concession (mining rights) holder at each site became the trainers for their sites, sometimes with the help of planetGOLD staff, but often independently. Their prestige and renown in their regions attracted miners and lent training events greater credibility. Each of the sites is very hard to reach, but within their area they could each serve as a training hub from which miners could come and see mercury-free plants in action. As mentioned earlier, one of these demonstration sites was located alongside a parallel mining operation that continued to use mercury. By monitoring both operations side by side, the project was able to show the higher gold recovery rates of the mercury-free operation. While the long-term goal was uptake of mercury-free methods, some miners trained at demonstration sites applied their new knowledge to reduce mercury use without making any changes to their ore processing methods. Simply realizing that the traditional approach of sprinkling mercury on the ground before excavating ore is wasteful, without benefit in terms of profit, led miners to stop this behavior, resulting to measurable reductions in mercury consumption.

Click to view an interactive tour of a Guyana project mercury-free demonstration site

TRAINING RESOURCES

Peru, Kenya, and Indonesia planetGOLD projects have taken what they have learned in the process of promoting and commissioning mercury-free gold extraction plants and created detailed best practices guides for their implementation. The planetGOLD Philippines developed an operations manual for small-scale mining associations to serve as a practical guide for day-to-day management, ensuring legal compliance, safe and mercury-free processing, and adherence to responsible mining standards. These materials could support greatly expanded independent replication and are currently being used by community trainers that were educated and equipped by planetGOLD projects, who continue to educate others on mercury-free mining.



This train-the-trainers approach multiplied the effectiveness of direct educational activities by the project. These planetGOLD practical user guides for installation and operation of small-scale gravity plants provide a comprehensive overview of gravimetric gold processing, plant installation, operation, management, and equipment safety. The documents offer practical guidance and key recommendations to help miners transition to mercury-free gold processing in a responsible and safe manner.

Gender and Vulnerable Groups

Country projects took a variety of measures to ensure inclusion of women in the transfer of technology and training. In Guyana, there was a conscious effort to include women from local government, women from the community and importantly, women miners. They arranged appropriate transportation to locations and provided meals to accommodate participants that came from far away. Suitable gender-specific facilities were in place at each camp to ensure that both men and women were comfortable during their time on location. In Colombia, women miners are often independent subsistence workers with no other way to support their families. For this reason, the project partnered with local women's mining associations to ensure greater than 50% participation of women in training and technology transfer activities in alluvial mining areas. Most of the community ambassadors trained by planetGOLD Colombia were also women, as they are more likely to keep up the cause of mercury-free ore processing.

Certain technologies also appeared to be more appealing to women miners. Women miners in Guyana were especially interested in the **Gold Cube** because it enables them to capture fine gold, increasing their incomes, and it can be shared among several women. It is cost effective, lightweight, durable, can work with different soil types and is easy to operate. The women miners expressed their doubts as to being able to replicate a mercury-free circuit such as the 10 tonne per day demonstration site, but they could easily use the Gold Cube to replace mercury in their own work. In Indonesia, one of the main advantages to the micro-cyanidation tanks developed by planetGOLD Indonesia is its small size and ease of use. This makes it accessible to women miners both in terms of cost and ease of operation.

INDIGENOUS PEOPLES

In Guyana, the third demonstration site was set up in Karrau Indigenous Village. Karrau expressed an interest in establishing a mercury-free mining circuit on village land. Given that the interest in mining was coming from the Karrau villagers themselves, it was relatively easy to comply with the planetGOLD requirements for free, prior, and informed consent (FPIC). Small-scale miners in Karrau have pursued traditional mining, using mercury, for many years. Under a new 10-year village development plan, Karrau is considered an entry point for several mining operations in the Cuyuni/Mazaruni mining area and a demonstration site there afforded the opportunity to educate other miners

about the mercury-free mining process. The project intervention created a space for the village to benefit from all the advantages of a more efficient and healthier approach to mining as an important income generator on which the community was already dependent (see **this episode** of Dispatches from the Field for more details).

By contrast, in the Philippines, consultations between the miners of Sagada and local Indigenous communities found that many people had serious reservations about plans to use cyanidation to extract gold from the tailings of the Sagada ore processing plant on site. The miners of Sagada decided to implement a plant that uses only chemical free ore processing and gravity concentration locally and then transport the tailings to a cyanide leaching plant. The project helped them identify and collaborate through an MOU with a cyanide plant five hours away to process tailings, thereby still gaining value from the material.

Global Project Support for Technology Transfer

The Global Project also supported technology transfer activities of the country projects through knowledge exchange with experts and creating of synthesis materials. One of the more innovative events held by the Global Project was a two-day **Virtual Technology Fair**, wherein experts with mercury-free solutions were invited to create highly visual presentations showcasing their technology, to mimic the experience of an in-person trade show. The Global Project also arranged a virtual meeting among country project technical experts responsible for developing and promoting mercury-free ASGM technologies.

One growing issue in ASGM is the proliferation of the use of cyanide, either alone or in combination with mercury use. Country projects noted that there was no specific guidance on cyanide in small-scale mining even though it is the most common gold extraction method in the large-scale mining sector, and it is already in use in many small-scale mining areas. To fill this need, the Global Project produced the report ***Best Management Practices for Cyanide Use in the Small-Scale Gold Mining Sector***, which reviews best practices for transporting, storing, using and disposing cyanide in a small-scale mining setting, where permissible by law. The project held a webinar providing an opportunity for the wider community to engage with experts on the topic.

Occupational safety and health (OSH) risks in ASGM were another common concern related to choice and implementation of mining methods and processing technologies. The Global Project developed a **series of materials** to provide country projects with accessible references on OSH. Multiple curated collections on the planetGOLD **website** relate to technology issues, including mercury-free ASGM, cyanide, geospatial data, tailings management, and environmental monitoring. Further, Global Forum on ASGM events organized by the Global Project featured sessions on technical solutions including mercury free production methods and recovering mercury from tailings.

To help ensure comparable documentation of project activities across the programme, the Global Project prepared a template to guide the description of project activities relating to technology transfer in a consistent manner. The Global Project then assisted in the cross-program documentation of country experiences with technology transfer, in a **report** that was published and presented at the 5th meeting of the Minamata Convention on Mercury Conference of Parties.

Challenges and Lessons Learned

PARTNERSHIPS FOR REPLICATION AND SCALING

The miners and organizations that received direct assistance from the projects will likely continue to realize sustained benefits given that they directly profit from these installations and have had the training and support to maintain operations in the long term. But more importantly, these sites can serve as models to inspire replication and progressive change toward mercury elimination in surrounding communities. These plants served as an important tool not only for demonstrating technologies but for conveying key fundamentals of mercury-free ore processing that could be applied in all aspects of mining and processing and at any scale.

Trained trainers are already training more miners and spreading knowledge and technology that could lead to the elimination of even more mercury. Further, by embedding expertise and resources with their partnering government agencies (especially training agencies), local government officials, NGOs, and private sector representatives, including donating equipment after the project's end and making explicit agreements to carry on training activities, the groundwork laid by the projects can be sustained by these local institutions.

Countries with the greatest promise for continued replication are those with government agencies that have strong mandates for ASGM training such as Guyana's Geology and Mines Commission, Colombia's National Training Institute, and Indonesia's Institute of Technical Training. These organizations are all actively continuing to push education and new plant installations. Other projects trained specialists from within the community to carry on educating miners after the project's close. In places including the Philippines, Colombia, Mongolia, and Burkina Faso, local mining associations were endowed with training plants when the planetGOLD projects concluded. In Kenya, the project signed a memorandum of understanding with the four county governments where the project is installing mercury-free plants, and each county will continue to manage these sites under their environment departments after the project closes.

Ecuador's ore selling strategy may scale up naturally with increasing confidence among miners in laboratory assays and the ore sales negotiations with mercury-free processing

plants upon which they depend. In theory, given the extensive amount of mercury-free ore processing capacity that exists already in southern Ecuador, a significant number of miners that can go mercury-free by selling their ore.

All planetGOLD phase one countries have National Action Plans for reducing and/or eliminating mercury from ASGM, which include strategies for miner training and promotion of mercury-free gold extraction that can continue and expand upon the initiatives undertaken across the planetGOLD programme. For example, as part of their National Action Plan implementation, Indonesia's Ministry of Environment and Forestry continues to support the establishment of mercury-free gold processing facilities (the micro cyanide leaching equipment, among other solutions) in several ASGM locations outside the planetGOLD project sites, such as in the West Sumbawa Regency and Kalimantan.

EFFICIENCY OF GOLD RECOVERY VERSUS PROCESSING CAPACITY

The planetGOLD Guyana project found that although the mercury-free gold recovery rate was much higher than that of traditional methods, the mercury-free circuit's capacity was ten times lower. This lower capacity meant less gold was produced per unit of time, despite the smaller system being more efficient at capturing gold. Scaling the demonstration plant from 10 tonnes per day to 10 tonnes per hour could require more centrifuge capacity and much bigger pumps and trommels, all of which scales very quickly in terms of costs, complexity, maintenance, and labor[23]. Labor considerations are especially complex, because the laborers tend to migrate to whichever mining operations make the most money every day. If more labor is required to get the same gold or potentially share it among more workers, mercury-free sites might have difficulty keeping their workers. Furthermore, increasing the number and complexity of equipment multiplies the likelihood of breakdowns and costly operational outages.

TAILORING WORKFLOWS TO THE ORE TYPES FOR BEST RESULTS

Each planetGOLD project drew from the same general set of standard tools and techniques in order to develop mercury-free mineral processing capacity among ASGM, but each adapted these tools and processes to suit the miners and particular conditions they faced, which highly influenced results. The first technical hurdle is always to understand the nature of the gold ore to design the best circuit of equipment and processes to maximize recovery. The planetGOLD Colombia team found that one of their partner mines had arsenic-rich ore that was poisoning the cyanidation process, increasing costs and throttling gold extraction efficiency. Their chemical-free solution proved cheaper to operate and recovered more gold, thanks to chemical analyses and laboratory concentration tests. This showed the value of analysis and adaptation to each operation and geology, as the project produced custom solutions for a variety of operational scales, ore types, and conditions in the region.

23 Another approach may be to simplify the workflow, even if this yields slightly lower recovery, allowing more material to be processed more quickly.

The planetGOLD teams in both Burkina Faso and Peru were able to design basic ore processing plants that could be adapted for hard rock and alluvial ore. Once it has been milled to the right size, hard rock ore behaves in similar enough ways to alluvial ore that the same concentration, upgrading, and smelting tools can be used for both. The planetGOLD Burkina Faso project built a plant that could accommodate both ore types, because both are present in its mine site area, whereas Peru used a common set of tools and chose the particular combination depending on the individual needs of the operation.

Alluvial ore in tropical zones can be quite distinct from that found in more temperate latitudes and elevations. Intense chemical leaching of calcium and iron in tropical soils recrystallizes in deeper soil layers, causing some ores to be cemented together. For this reason, planetGOLD Guyana's demonstration plant had a secondary circuit that crushed up these encrusted soils to liberate the gold before recirculating it into the primary sluice. In Peru, the gold in the glaciofluvial and colluvial deposits of Andean alluvial ores is not encrusted in this way, so the planetGOLD initiative there could focus solely on higher order processes like concentrate upgrading.

In Peru, alluvial sluices are often built into the landscape and fed very large volumes of primary material. This makes them difficult to adapt for more efficient recovery, with costs spiraling. Focusing instead on smaller, cheaper, and easily commissioned processing kits that upgrade concentrates (as done in planetGOLD Peru) may be more effective than trying to make the primary sluice concentration system more efficient. Larger operations with several sluices and different primary producers can utilize the mercury-free system on rotation, because the capacity of the plants outpaces the concentrate production from each primary sluice. The improved economics and lower logistical barriers improve the likelihood of independent replication.

LOCAL VERSUS INTERNATIONAL PROCUREMENT

Replication is already much simpler and therefore more likely in countries with locally built machinery, installation, and support. In Peru, the fact that most of the equipment used in planetGOLD's processing plants is, or can be, manufactured in country is likely one of the reasons that project was able to establish 16 plants, by far the most installations by any planetGOLD project. The fact that these plants are also small, generalizable/adaptable to alluvial or hard rock, and easy to transport and install (on Peru's excellent road system that reached far into most mining areas) enabled the project to efficiently install more mercury-free plants than others.

Furthermore, the Andean countries all have mining equipment suppliers and technical services (prospecting and mining professionals as well as equipment maintenance and repair) in the mining regions, meaning miners can access technical assistance and machinery relatively close to their operations. This not only accelerated project implementation but also supports greater independent replication after the project life.

Where bolstering local equipment supply is not possible, importing equipment can be a necessary and even cost-effective choice. Burkina Faso purchased an entire processing plant from Colombia's mining equipment manufacturers, as the quality of equipment is high and the shipping distance/costs are similar to that of South Africa, and less than for imports from China. Furthermore, the base cost of machinery is lower than those of North American manufacturers. Without access to oceans and a lack of domestic machinery production, Mongolia faced restricted options and inevitably high transport costs. Fortunately, Chinese machinery can be of very high quality at a lower cost and relatively easy to import.

In contrast, some Guyana miners reported they could not get equipment when they tried to do so independently of planetGOLD, presumably because equipment manufacturers and suppliers do not believe they can profitably extend services to these communities. With awareness of and demand for mercury-free technologies on the rise, more suppliers may start stocking equipment locally or regionally (e.g., in Brazil).

BUILDING UPON PREVIOUS KNOWLEDGE

Projects in Andean countries benefit not only from well-established and thriving mining industries, but also from decades of prior international assistance. Development agencies from around the world invested heavily in Colombia, Peru, and Ecuador especially, because the mining sectors (both formal and informal) in these countries were already so large and their mineral riches offered significant opportunity for widespread rural development if they could be formalized and supported with improved technology. For example, the Swiss Agency for Development and Cooperation (SDC) [24] spent years supporting Peru in spreading mercury alternatives, abatement technologies and training resources, which have created mercury awareness and improved professionalization upon which planetGOLD Peru's success has built further.

In Ecuador, donor support led to the creation of the world's first communal environmental impact assessment system, streamlining a process that had been too costly and complex for local miners to accomplish independently.[25] This enabled a huge increase in ore processing capacity in the country, and now there are plants with hundreds of tonnes per day of ore processing capacity in a small area of southern Ecuador to which ore is brought from across the country and from northern Peru. These processing plants can provide an efficient mechanism for mercury reduction, as local miners have their choice of numerous plants that can buy their ore or process it for a fee, and of analytical laboratories that can help them to negotiate a fair price. Although many of these facilities still need to improve in terms of environmental performance and laboratory capabilities, they provide an important initial intervention point from which to further advance the improvement of compliance, due diligence, and equitable business relationships.

24 https://www.gama-peru.org/gama/tiki-index.php
25 Initiative communal EIA: https://www.researchgate.net/publication/311922797_SDC_experiences_with_Formalization_and_Responsible_Environmental_Practices_in_Artisanal_and_Small-scale_Gold_Mining_in_Latin_America_and_Asia_Mongolia

In Colombia, projects like the Swiss Better Gold Initiative[26] and USAID's Oro Legal project[27] have provided support for development of ASGM for a decade or more, improving legal frameworks and advancing formalization, market access, and mercury awareness in governments and among miners. This substantial intervention background provided the planetGOLD Colombia project an enormous head-start.

MODIFYING EXISTING CAPACITY RATHER THAN NEW CONSTRUCTION

It is always cheaper and easier to modify existing plants than to build bespoke plants. Doing so lowers financial barriers as well as technical and, often, regulatory challenges, and increases the likelihood of replication. Indonesia realized that its design for a complete two tonne per day plant was too costly for miners to replicate independently. Furthermore, contemporary Indonesian rod mills can be optimized instead of replaced (for instance by changing the rotation speed of mills and feeding them with a uniformly crushed feed).

Focusing on improving cyanidation and making it more accessible to smaller operators and usable by women was vastly cheaper than building new plants, and it was more easily adopted into the process flow of any operation. Indonesia's national technology training institute already had infrastructure and a specific mandate to improve ASGM ore processing and reduce waste, providing a foundation for project activities. Ecuador similarly realized that building a plant was not cost effective compared to increasing capacity in existing processing plants and promoting new ore-selling business models.

CREATING AN ORE PROCESSING ECOSYSTEM

In the Philippines, the project was able to get community consent only for a chemical-free ore processing plant in Sagada (in which only gravity concentration is used) than a combined plant that includes lixiviation, but identified an existing partner cyanide plant in another location that could process the tailings of the chemical-free plant. This geographic separation of the gravity-only and cyanidation processes enables accommodation of communities, protecting sensitive environments and spreading out employment across more communities.

ADOPTING NEW TECHNOLOGIES

The Philippines case also shows that ASGM can skip development steps and adopt new technologies directly into their processes, such as the helicoid concentrator and glycinate acceleration of cyanidation. These tools created for the formal industrial mining industry in higher income nations can be matched to the scale and conditions of ASGM and greatly improve efficiency in so doing, and they can be applied in any other country to do the same. Glycinate especially should be promoted across planetGOLD as it can significantly reduce costly and hazardous cyanide use.

26 https://www.swissbettergoldassociation.ch/
27 https://www.planetgold.org/sites/default/files/USAID-Colombia_Oro%20Legal_Final%20Report.pdf

THE SIGNIFICANCE OF FORMALIZATION

Projects that made the least progress in their technology transfer interventions faced significant hurdles in terms of formalization, with some projects needing to push for legal reforms that would even make ASGM formalization possible, such as Kenya and Mongolia, where they faced outright bans but were able to eventually reverse those policies. Much effort was dedicated to supporting the formalization of operations where technical interventions were to take place, but this process can be time consuming, for instance where onerous permitting process apply to all processing plants regardless of size, or where there is a strict limit the size of equipment that can be used in ASGM. For example, the Mongolia project finally successfully helped formalize mineral processing plants, but as of the writing of this report, mineral rights were still outstanding.

Recommendations

Start early, it's a long road: Technology transfer is dependent on other pillars of the planetGOLD programme, yet it is critical to make progress in finding and preparing field implementation sites and partners as early as possible in the project in parallel with relevant activities under other pillars. Implementation of technology installations is a complex process with many dependencies, hurdles, and progress traps. It is critical to make significant early progress toward technical solutions and relationship building, bureaucratic advancement, and procurement that underpin their execution.

Find miners who co-invest: Many technology transfer implementation sites were operated by well-established mining operations with sufficient operating revenue to contribute significantly to the costs of establishing plants. For example, Peru supplied mercury-free equipment and support, and in exchange, miners had to provide the grinding equipment, all necessary concrete platforms, structures and utilities. In Guyana, partner mining concession holders provided excavators, sluices, pumps and labor for the demonstration plants, and tolerated lower daily productivity due to the lower daily throughput of the demonstration system. Such cooperative and cost sharing agreements were critical in both maximizing the number of implementation sites and the efficiency with which they were implemented but also guaranteed long term ownership and sustainability of the outcomes.

Localize equipment supply: Access to local suppliers and support for mercury-free mining equipment is more likely to result in miners being able to replicate the demonstration sites and implement what they learn from planetGOLD. Though all planetGOLD projects were able to augment mercury-free ore processing capacity, there was much less emphasis on improving local supply chains for mercury-free equipment. The planetGOLD countries with well-established local equipment supply and support implemented by far the most mercury-free installations across the widest geographic distribution. Further, local fabrication

can mean lower materials and transportation costs, which in turn can lower financing needs. Colombia implemented locally manufactured mobile demonstration plants for alluvial and hard rock mining, mobile analytical laboratories, and in situ changes in several existing plants, whereas Peru implemented mercury-free processing plants at 16 sites in three widely separated regions. Future projects should add components aiming to bolster local equipment supply and maintenance services. Where possible, publish universal design/manufacture plans for simple small-scale, mercury-free machinery so that it can be manufactured locally in ASGM areas, and train local/regional fabricators to produce them to a high degree of precision and quality.

More, cheaper installations: Some projects spent a significant amount of money on single plant installations, building the infrastructure from the ground up, and incurring maximum administrative and constructive labor. These projects had to race to finish their pilot plants during the life of the project, thereby costing precious time for training miners on the finished installations. By contrast, projects like Peru and Indonesia had a modular approach, applying key technological solutions that integrate into traditional processing facilities and matching their capacity. The cost was dramatically lower with many more pilot plants commissioned across several regions. Most importantly, matching the local capacity for an attainable cost increases the likelihood of replication, which is the central aim of planetGOLD.

planetGOLD Indonesia

Exchange novel and successful approaches among countries: Several notable initiatives undertaken by country projects in planetGOLD phase one could be applied widely throughout the programme and among other ASGM projects, including:

Use of glycinate in chemical leaching circuits – The most innovative and possibly transformative new method that should be further promoted is the Philippine project's use of glycinate to accelerate cyanidation and therefore reduce the amount of toxic chemicals that are used and that must be destroyed before discharge. This cheap, non-toxic innovation that is sweeping the large-scale mining industry could work in any operation that uses cyanide, at any scale, in any country.

Colombian-manufactured mobile processing plants and analytical laboratories – The mobile plants and laboratories piloted by planetGOLD Colombia are also highly replicable and transferable to many contexts and geographies. Local equipment manufacture in Colombia is of such quality, reliability, and price that it can serve other countries around the world, as it did in Burkina Faso. Increasing this sharing of procurement strategies across planetGOLD countries could also accelerate future implementation.

Ore selling strategies – Ore processing is hard and capital intensive. The most rapidly scalable way to eliminate mercury use is to relieve miners of processing altogether. Ore sales to established cyanide plants, as it exists in Peru, Colombia, Ecuador, and the Philippines, is an option available in most countries, even if it was not a strategy contemplated in places where it was an option, such as in Kenya and Indonesia. Larger scale cyanidation plants are common in most places where there are high concentrations of miners. It is important that countries explore the ore sales option wherever planetGOLD is operating, because it is the cheapest, simplest, most sustainable and effective means of eliminating mercury use. Centralized ore processing is also a more bankable idea that has already caught the interest of international investors, as large processing centers are aggregation points that create economies of scale for investment, gold-buying and exporting. Further larger processing operations are more likely to have the resources to manage and report due diligence compliance to international standards.

Form long-term partnerships for technical training: Countries with the greatest promise for continued replication are those with government agencies that have strong mandates for training artisanal and small-scale miners in more responsible practices. Partnering with national technical training institutes or other established vocational training organizations can help ensure the long-term administration and delivery of miner training initiatives. To support these training endeavors, projects should prioritize the creation of training modules, teacher guides, and other materials that can continue to be utilized by trainers either in-person or online.

Alluvial initiatives should focus on concentrate processing: When addressing alluvial ore processing, projects should aim to implement processing plants that match the volume of concentrates produced by the primary sluices, because secondary concentration is usually the process to which mercury is applied, and primary sluice throughput is large and requires costly and complex interventions to improve it. Concentrate upgrade plants are smaller, cheaper and faster to implement and can be shared between several primary production units.

Conclusions

Technological solutions are best when they match the scale and context of the partner miners. Ore processing plant interventions with smaller capital investments that integrate with licensed equipment and infrastructure have the highest impact value relative to investment and therefore are also the most attainable for regular miners and therefore more replicable. Projects adopting this kind of strategy succeeded in more intervention sites across a greater geographic distribution than those that invested ten times more in large highly efficient plants built from the ground up. Yet at these sites some of the most innovative and effective new methods have been applied at ASGM sites, potentially expanding mercury-free options for future projects. The global programmatic approach ensures that this knowledge is captured, shared, adapted and spread throughout nations that aim to eliminate mercury from ASGM.

Analysis of Market Access Efforts

Background

Facilitating miners' access to formal markets can improve their ability to obtain fair prices for their gold and to seek essential financial support such as loans and investments. In turn, this allows them to adopt more socially and environmentally responsible ASGM practices, including transitioning away from the use of mercury. However, ASGM producers commonly struggle to access formal gold markets for variety of reasons, instead relying on informal trading routes that can perpetuate a lack of transparency in the gold supply chain and leave miners vulnerable to a cycle of informality and uncertainty. Common challenges in ASGM supply chains include:

- **Legal barriers:** ASGM organizations largely operate informally, which can preclude them from obtaining mining rights, access to formal financing mechanisms, and access to formal markets. ASGM producers might also face limited access to formalized systems of gold trading, including accessible registered traders. The absence of a robust legal framework regarding gold trade and traceability can lead to challenges in demonstrating the legality and reliability of production, which is needed for participation in formal supply chains.
- **Geographic access:** Geographic remoteness of ASGM operations from formal gold buying centers typically hinder miners' access to formal market channels. ASGM production is aggregated in smaller quantities compared to large-scale gold mining operations, and exporting these smaller quantities is often not economically viable. Instead, many miners resort to selling to the nearest traders regardless of their formality, which can entrench financial dependencies, business transactions based on trust, and established practices.
- **Due diligence:** While formal gold buyers, such as refiners and jewelers, express willingness to procure responsibly produced ASM gold, buyers often perceive the sourcing of ASM gold as having high compliance risks. Thus, access to formal markets brings significant due diligence and responsible sourcing requirements that ASGM operations are expected to meet. However, meeting rigorous international due diligence standards poses a challenge for ASGM.

Projects in the planetGOLD programme sought to support miner market access as a crucial step towards integrating responsible ASGM sources into formal supply chains. This chapter presents a review and assessment of the implementation of the planetGOLD ASGM supply chain mechanisms to date.

Amount of responsible gold produced in conformance with the planetGOLD Criteria

672.12 kg

* As of June 2024.
Data reported from: Burkina Faso, Colombia, Ecuador, Mongolia, and the Philippines

Strategies Undertaken to Support Access to Formal Markets

MAPPING EXISTING GOLD SUPPLY CHAINS

To understand the existing supply chain dynamics and the potential challenges and opportunities, planetGOLD country projects in Mongolia, Burkina Faso, Colombia, and Guyana conducted studies to better understand the existing ASM gold supply chain. These studies were a key step in designing and implementing activities aimed at facilitating miners' access to formal markets. Such studies typically involved assessing gold trading practices of ASM gold supply chain actors, understanding the legal environment and regulations governing the ASM gold supply chain, mapping the key stakeholders and their respective roles and interests, understanding the needs of ASGM actors in order to adopt responsible mining and sourcing practices, and identifying potential incentives.

PROMOTING DUE DILIGENCE AND THE PLANETGOLD CRITERIA, ALONG THE SUPPLY CHAIN

The planetGOLD Criteria for Environmentally and Socially Responsible Operations were established as performance criteria for the planetGOLD programme and were expected to be integrated in all country projects' implementation. While the Criteria were initially developed as operational requirements for ASGM actors engaged with the planetGOLD programme, they also serve to demonstrate conformance with internationally recognized elements of responsible sourcing. The Criteria are aligned with the Code of Risk-mitigation for ASM Engaging in Formal Trade (CRAFT) Code and include additional requirements of the Minamata Convention on Mercury and the Global Environment Facility's Policy on Environmental and Social Safeguards.

Almost all the planetGOLD country projects provided comprehensive training on the planetGOLD Criteria to various stakeholders along the ASGM supply chain (mostly focused on miners but, on some occasions, also on traders, processors, or other actors). These training efforts aimed to improve alignment to responsible mining practices and standards, thereby strengthening miners' capacities to engage with formal markets. The training focused on advancing knowledge in areas such as mercury-free processing systems, occupational safety and health (OSH), environmental management, and compliance with regulatory frameworks. Training was tailored to specific needs and situations of artisanal and small-scale organizations, emphasizing practical tools for managing production, sales, and establishing connections with formal market buyers. The training initiatives encompassed workshops, advisory services, capacity-building sessions, and targeted meetings conducted with mining groups. The training included modules on legislation and regulations, production enhancements, financial literacy, and management. Moreover, continuous consultations and collaboration facilitated the improvement and revision of internal rules and mechanisms within artisanal and small-scale organizations.

In addition to training, several of the planetGOLD country projects actively supported miners in meticulously documenting their verified compliance. Demonstrating compliance plays a crucial role as formal market actors require this information to align with their responsible sourcing standards. Country projects such as Burkina Faso and the Philippines provided miners with diverse structured tools and resources, such as booklets or digital applications, to assist them in recording certain types of their activities related to their commitment to the planetGOLD Criteria. These records included equipment purchases, production data, and expenses, essential for demonstrating adherence to required standards. As part of this activity, capacity-building initiatives were undertaken to enhance miners' capabilities in record-keeping and due diligence reporting.

Demonstrating conformance on an ongoing basis was sometimes embedded in regular site operations. For example, in both Mongolia and the Philippines, compliance with the planetGOLD Criteria was demonstrated through monthly reporting prepared by trained CRAFT officers. These officers received training from the planetGOLD country teams and had access to the necessary resources to document compliance. Both country projects shared this information with buyers (Central Banks) and expect that this documentation will continue even after the project concludes, as the CRAFT officers are paid through their appropriate mining organizations, ensuring ongoing adherence to standards.

Some projects also aimed to bridge the information gap between miners and formal buyers through digital applications like Jari Emas (Indonesia) and Qori (Peru), enabling miners to share public information and showcase their adherence to specific criteria, such as mercury-free gold production or traceable gold supply chains.

Despite these efforts, the majority of planetGOLD country projects realized only slow progress towards compliance with the Criteria. Limited technical and financial resources, and organizational capacity hinder ASGM entities from implementing robust measures to control and monitor environmental, social, and other risks effectively.

FACILITATING ENGAGEMENT WITH MARKET ACTORS

Some of the planetGOLD country projects actively engaged diverse market actors, such as traders, processing plants, jewelers, international refiners, Central Banks and other stakeholders such as NGOs, and the media, in efforts to facilitate trade and export relationships and promote developments of the ASGM sector. These engagements took the form of multistakeholder training sessions, awareness-raising activities, organized events, collaborations, forums, and study trips. For example, in Indonesia, events involving jewelers, refiners, banks, NGOs, and media aimed to advocate for the ASGM sector integration in formal supply chains. In Mongolia, study trips and forums allowed stakeholders to explore the gold supply chain, discuss challenges, and highlight investment opportunities. The Mongolia team also hosted a visit by a refinery and the Swiss Better Gold Association, as part of ongoing discussions regarding future potential work. In Peru,

the project team engaged with processing plants and refineries to facilitate market linkages for aggregating and exporting ASM gold.

Engagement with Central Banks proved highly beneficial where it occurred. The planetGOLD Mongolia project collaborated closely with the Bank of Mongolia to facilitate gold buying from formalized miners, including hosting miners at regional buying centers. The programme's partner project in Ecuador worked to enable miners to sell gold to the Central Bank of Ecuador as a formal gold buyer. In the Philippines, planetGOLD worked with the Central Bank of the Philippines (Bangko Sentral ng Pilipinas (BSP)) to support associations in obtaining gold trader accreditation. By assisting these associations in meeting accreditation standards and navigating legal procedures, the project facilitated their formal participation in gold trading.

PILOTING SUPPLY CHAIN MECHANISMS

In Colombia, the project leveraged the existing network of Fairmined Authorized Buyers and international buyers that were interested in working with planetGOLD-supported miners (including several without Fairmined certification). Nine potential buyers were vetted through background checks and risk assessments. Among these were seven international buyers, while others operated within "free trade zones" in Colombia, enabling purchases in national currency. Once credible actors within the value chain were identified, interactions were facilitated by Fairmined Connect – which had been adapted in 2022 by ARM to record planetGOLD responsible gold sales while ensuring compliance with planetGOLD Criteria for gold purchases. Colombia piloted several ASM gold commercialization pilots in which gold from planetGOLD miners was traceably exported. Select reliable buyers underwent a background check similar to the viability check done for the planetGOLD project sites. Once the value chain actors were identified and interactions between them were forged, gold purchases were made, and trade movements were monitored. The project acknowledged that involvement of local traders was needed, as they play a crucial role in ensuring the legitimacy of gold origins and facilitating commercial relationships between miners and international actors.

ADVOCATING FOR BETTER REGULATIONS AND GOVERNMENT SUPPORT

As detailed in the "Formalization" section of this report, some of the planetGOLD country projects focused on advocating for improved regulations and government support to enhance miners' access to formal markets within the ASGM sector, such as Burkina Faso, Kenya, and Mongolia. Key activities included collaborating with governmental bodies to develop and refine regulations concerning gold trading, licensing, and monitoring.

ADDRESSING GEOGRAPHICAL BARRIERS TO TRADING

To address geographic barriers to markets, most planetGOLD country projects focused on advocating with the relevant government institutes to decentralize essential services. Some of the planetGOLD country projects worked on addressing logistical barriers by recommending strategic locations for gold buying offices, including those supported by the government, closer to ASGM production sites, thus facilitating easier access for miners to sell their gold to official institutions. In Ecuador, for instance, recommendations from planetGOLD contributed to the establishment of additional gold buying offices, strategically located near ASGM production sites. Moreover, engagements with Central Banks were undertaken to discuss the need to identify incentives for miners, support training on due diligence, and explore financing opportunities to foster their participation in formal markets. Another solution, which is currently being tested in the Philippines, is to involve pawn shops as gold trading hubs with accreditation as a gold trader for the BSP. This simplifies the process for miners to sell gold to the country's only formal gold buyer (the BSP), as they previously had to travel long distances to reach their buying centers.

Decentralization has, generally, proven to be a slow and administratively cumbersome process, as administrative capacity is often limited at decentralized locations, and further necessitates robust regulatory enforcement to ensure that decentralized buying and trading services operate according to the legal requirements and conduct traceability and due diligence efforts. In several phase one planetGOLD countries, the pace and comprehensiveness of developing these supporting services are not yet sufficient to significantly improve miners' geographic access to formal markets.

Gender and Vulnerable Groups

Cultural norms and discriminatory practices restrict women's participation in formal trading activities, limiting their engagement in formal markets. Women encounter substantial challenges in obtaining legal rights and permits due to cultural restrictions, often limiting their access to mining areas or formal trading spaces. This curtails their ability to engage in formal market transactions, hindering their economic advancement within the sector. Moreover, limited access to training and technical knowledge in gold mining perpetuates their exclusion from formal markets, preventing them from competing equally with men. The prevalent male dominance in the ASGM sector marginalizes women, relegating them to ancillary roles or informal activities and often limiting their representation in formal trading environments. Discriminatory practices, such as receiving lower prices for gold or facing unfair trading conditions compared to men, deter women from engaging with formal market entities.

While planetGOLD projects have focused on organizing women miners, providing technical education and training, and increased access to finance, as detailed elsewhere in this report, these gender-specific issues related to formal markets were not explicitly addressed

by the planetGOLD country projects (apart from work in Peru and Ecuador directed to women mineral selectors, a subset of women miners). As this lack of targeted action to support women miners' access to formal markets could hinder fulfillment of the programme's gender equity commitments, future interventions should include activities that explicitly address this gap. Facilitating women's access to formal spaces for trading and ensuring equitable opportunities within formal markets are crucial steps to empower women in the ASGM sector and promote their economic participation.

Global Project Support for Market Access

Market access is a global scale challenge, and the Global Project has undertaken to support country projects in advancing due diligence compliance among ASGM across the programme. The Global Project developed and promoted the **planetGOLD Environmentally and Socially Responsible Criteria** to ensure that ASGM entities engaged with the planetGOLD programme make efforts to avoid, minimize, mitigate, and offset adverse impacts to people and environment, and thereby help operations attract financing and access to formal markets. Furthermore, the planetGOLD website contains dedicated page on due diligence, with studies, training materials, guidelines and policy documents to help inform market access initiatives. Global Forums featured sessions on supply chain case studies, free prior and informed consent (FPIC) in the ASGM context, addressing criminality and human rights in supply chains, responsible export, and digital technologies to support responsible gold supply chains.

The ability of the Global Project to connect with international gold buyers also benefitted the country projects. For example, Italpreziosi, an Italian refiner and Programme Advisory Group (PAG) member, partnered with planetGOLD Colombia to source from a project beneficiary operation. As a result, in 2021 a supply chain was designed to flow mercury-free gold from the mining operation Mina La Gabriela to Grupo Altea (previously "Anexpo") and then on to Italpreziosi, finally reaching a luxury goods company.

To assist in the cross-program documentation of project activities, the Global Project commissioned a **report** to document planetGOLD country experiences with supply chain mechanisms. This report underscored the best practices for and importance of ASGM supply chain mapping for understanding local trade dynamics and fostering sustainable market linkages; identified incentives for ASGM actors to engage with formal markets; provided practical solutions to logistical challenges. The report also highlighted the crucial engagement of market actors beyond miners in ASGM market access initiatives, in particular local traders and downstream market actors to ensure market linkages will be sustained in to the future.

Challenges and Lessons Learned

PRIORITIZATION OF FORMALIZATION

Many ASGM producers in the planetGOLD-supported areas continue to operate largely informally. Where operators lacked basic formalization, planetGOLD project teams prioritized formalization interventions of ASGM activities, as these are the basis of success under other pillars. Facilitating miners' access to formal markets for these countries was often treated as something to address later, after formalization processes advance further, because operations without basic formalization would not be able to meet basic due diligence requirements.

UPTAKE OF RESPONSIBLE CRITERIA BY MINERS

Despite support activities, most ASGM producers still struggle to understand the purpose of implementing the planetGOLD Criteria and the benefits adherence can bring to them. In several countries, supply chain due diligence and traceability are rather new concepts. As a result, conveying the message of the importance of responsible sourcing proved more challenging than initially anticipated. For example, in Burkina Faso, the concept of due diligence was new to miners and there remains a need to conduct substantive awareness raising activities to ensure miners and other supply chain actors meet the formal buyers' reporting expectations. Moreover, in some other countries (e.g., Mongolia and Guyana), planetGOLD project teams had to convince miners that, although formal buyers might not necessarily offer financial premiums for complying with the Criteria, there are important health and economic benefits to the adoption of responsible mining practices. Also, in the Philippines, the project team witnessed how there was widespread misinformation about formal buyers' requirements that proved difficult to tackle. These country projects observed miners harboring skepticism about the merit of progressing towards Criteria compliance without clear incentives in the form of financial and technical support. The issue of incentives highlights different expectations between miners and the programme about the benefits that access to formal markets can bring. Incentives can go beyond financial benefits and encompass knowledge transfer, technical assistance, fair pricing and access to formal financing mechanisms. These incentives should be emphasized more clearly to encourage implementation of responsible mining practices that meet the planetGOLD Criteria.

Fundamentally, it is hard to demonstrate the benefits of leveraging adherence to the Criteria to access markets where planetGOLD-supported miners still rely on local, often informal, traders as their main market counterparts. Most of these intermediaries do not consider responsible mining practices in their gold trading decisions, nor do they themselves practice due diligence. Unfortunately, these traders are key intermediaries and without their involvement in traceability efforts, linking mining organizations with formal market actors becomes incredibly challenging.

DOCUMENTING ADHERENCE TO PLANETGOLD CRITERIA

The planetGOLD project teams faced difficulties in helping minders document alignment of practices to responsible sourcing requirements, due to their limited operational capacities (in terms of both technical and human resources) to monitor and report compliance to planetGOLD Criteria. Demonstrating good practices to the degree of quality required by most formal buyers remains a challenge. Miners at many sites were initially unfamiliar with the methods and tools used to monitor and report on their progressive adherence to responsible sourcing standards such as the Criteria. Challenges include illiteracy, inexperience in accounting, record-keeping, or other relevant skills, no designated focal person(s) in the mining organization with the responsibility to manage reporting, lack of access to computers, smartphones, and internet, as well as a general apprehension towards recording gold production and operational methods out of fear for increased taxation. Though training miners on the use and benefits of such methods was often one of the key activities of the planetGOLD country projects, additional capacity-building support is needed to ensure miners can continue the effective use of these reporting tools.

TRACEABILITY OF ASM GOLD

It remains challenging to track the ASM gold supply chain in most regions, as the transient nature of ASM gold supply chain actors complicate the ability of traders to trace the entire chain of custody of their purchases. Electronic record-keeping is not always feasible for miners in remote mining areas where internet and telephone connections are often limited, necessitating reliance on paper documentation, which increases the margin for error or potential dishonesty.

DISTANCE TO MARKETS

Most ASGM activity occurs far from gold buying offices and assaying laboratories, and the security risk and costs of accessing these services are too much for most miners and gold traders to bear. Inaccessibility of formal buying stations means many miners have no choice but to sell into local informal markets. In regions where criminal or non-state armed groups are known to target vehicles transporting gold (e.g., in Colombia, and Ecuador), local traders are by far the safest option. While this choice incurs lower prices for their gold, it does guarantee immediate cash payment without the complexities of travel and the associated security risks. As a result, the planetGOLD country projects expressed ongoing difficulties in supporting miners' access to formal buying entities.

LACK OF TRUST

The lack of trust among ASM gold supply chain actors presented a profound challenge for several planetGOLD country projects that aimed to support miners in engaging with formal markets. Miners express apprehension towards fellow miners, government agencies, processing plants, and support programmes like planetGOLD. This distrust manifests in multiple ways: miners prefer individual gold processing (often using mercury)

and sales due to fears of exploitation by others (also impeding efforts to organize miners into larger operations); negative perceptions stemming from historical experiences, such as agencies offering unfairly low prices; widespread skepticism about government integrity and the perceived absence of public services; mistrust in the price assessment of untreated ore by processing plants; and a lack of confidence in the transparency and fairness of formal buyers' pricing mechanisms, causing reluctance to accept fluctuating prices. Establishing credibility and rapport demands sustained, on-the-ground engagement, understanding miners' practices, organizational structures, and needs to offer tailored technical support. Yet building trust remains a challenging undertaking for the planetGOLD country projects. Persistent misinformation regarding formal market requirements has reportedly complicated matters, contributing to miners' hesitancy and skepticism. Building trust takes time and commitment, and progress very much depends on the nature of the existing supply chain dynamics when the project commenced.

CRITICAL ROLE OF INFORMAL TRADERS

Though intermediaries such as informal traders are often vilified in ASGM market access initiatives, ASGM operators in some countries (for instance, Burkina Faso, Colombia, and Indonesia) continue to be content with or demonstrate a preference for engaging with these intermediaries over unknown or less trusted (formal) traders or buyers. Miners' reliance on informal traders in such regions stems from various factors. Informal traders often play multiple roles, including provision of prefinancing for mining operations, and serving as suppliers of crucial resources like mercury, explosives, or mining equipment. Accessibility and trust play a pivotal role in perpetuating these ties with informal traders. Established trust-based relationships, often built on mutual understanding and simplified, documentation-free transactions, contribute to miners' continued preference for informal traders. Moreover, informal traders' flexibility in providing cash payments and offering services without stringent requirements like identification or retention fees, further entrench reliance on informal channels. These relationships contribute to a level of comfort, reliability, and familiarity that proved difficult to change in the lifetime of the planetGOLD projects. Despite claims from miners about informal traders giving low prices and stringent loan conditions, the established rapport and convenience they offer in transactions influence miners to opt for these familiar channels over less-known formal market actors.

Inadequate recognition or comprehension of these pre-existing ties with informal traders has impeded formal market access efforts in some countries. A key lesson has been that cutting out local intermediaries proved to be an unsustainable approach and made it difficult to scale the commercialization pilots to other ASGM sites, as these actors play a key role in establishing commercial relationships between miners and international buyers. In such cases, understanding these nuances and analyzing the existing trade practices to spot any unfair mechanism (e.g., miners not receiving fair payments based on quantities produced) can better inform interventions and incentives to shift miners

to formal markets. In contrast, urging miners to shift away from informal traders requires continual sensitization to raise miners' awareness about the benefits of engaging with formal traders, accompanied by gradual changes, recognizing that local supply chain disruptions may occur as a result.

Finally, local traders themselves struggle to meet government requirements for formal trading and exporting. Many traders avoid declaring gold, for example, to avoid taxes or links to informal activities. This has hindered planetGOLD projects, which aim to connect miners to formal markets that require all actors — including traders — to be compliant. Even when miners formalize, the lack of formal local traders prevents integration into formal supply chains. Working with traders who are formal, but lack relationships with ASM sites, was not a successful solution.

Recommendations

Map supply chain and market actors prior to designing interventions as a first step: Several country projects (e.g., Colombia, Guyana, and Mongolia) that supported miners' access to formal market actors commenced the work by mapping the country's ASM gold supply chains and broader market system, by identifying who is involved, which key transactions take place, the existing linkages between actors (e.g., ASGM producers depending on local traders for pre-financing), who represent support functions (e.g., suppliers of inputs, assaying laboratories), and which rules apply (i.e., what makes the market formal or informal). In the context of ASGM supply chains, while access to formal markets often focuses on international actors, the ability to recognize and work with local trading dynamics is fundamental to identifying sustainable supply chain mechanisms. Gathering information on these local dynamics allowed project teams to understand how existing markets function, enabling them to engage with the right supply chain actors and subsequently, identify and address bottlenecks. Finally, such an exercise ideally also identifies vulnerable or marginalized groups within trading practices. For example, women are often at a disadvantage when trading gold. It is therefore important to ensure that gender dynamics are considered in supply chain mapping exercises, specifically identifying challenges faced by women in accessing formal markets. Recognizing such challenges early in programmes provides the opportunity to design activities aimed at supporting specific vulnerable groups' access to market (e.g., awareness raising, engagement of women associations, trainings targeted to women, etc.).

Identify and engage local market actors for remote ASGM operations: Collaboration with governments to strategically decentralize gold buying and assaying services has shown some promising results. This generally requires the identification of suitable locations near ASGM production sites for establishing

additional gold buying offices, ensuring proximity and accessibility for miners. Another recommendation, as piloted in the Philippines, is to involve entities like pawn brokers, with locations across the country, as gold trading hubs. As described above, the project supported a pilot gold buying program that leverages pawnshops and mobile units as accredited BSP trading hubs, reducing travel barriers and enabling direct, formal gold sales.

Furthermore, to circumvent the practical barriers associated with transporting gold over long distances, planetGOLD countries increasingly recognize a need to actively involve local traders who already have established relationships with ASGM operators. Identifying and formalizing partnerships with these local actors is crucial, as well as acknowledging their existing relationships with miners, understanding the local context, and providing training on responsible sourcing standards and traceability. This recognizes that gold trading itself represents a livelihood opportunity, and reducing their role might not always be feasible or desirable.

- **Engage local downstream buyers**: National and international downstream market actors such as refineries, and jewelers, benefit from more awareness and guidance on assessing the legitimacy of ASM actors. Collaboration on how to reconcile responsible sourcing requirements with information ASGM actors can practically provide, while progressing toward full adherence to the Criteria, can be beneficial to all actors. The planetGOLD programme has created and curated useful resources on due diligence for suppliers and buyers that can continue to support downstream outreach.

- **Partner with Central Banks:** Partnerships with Central Bank domestic ASGM gold buying programs can not only reinforce formalization incentives for miners but also strengthen traceability systems critical for responsible sourcing. Future projects should actively pursue early collaboration with Central Bank domestic ASGM buying programs, where they exist, to anchor formalization within national market structures.

- **Build local capacity on sustainable supply chain mechanisms:** Training ASGM operations staff as dedicated CRAFT and planetGOLD Criteria officers, such as was done in the Philippines and Mongolia, enables the perpetuation of compliant due diligence activities far beyond the life of the projects. Once trained and onboarded in risk identification, assessment, monitoring, and documentation, these officers can also play an important role in maintaining relations with buyers. Long-term government commitment to encourage responsible sourcing and increased transparency is also essential.

Leverage cooperatives as market-functional entities: While many country projects (e.g., Kenya, Burkina, Indonesia) facilitated licensing by supporting the formation or strengthening of cooperatives, few projects fully leveraged cooperatives as vehicles for broader economic empowerment and market access. In many ASM contexts, the widespread practice of production sharing—where miners individually process their share of ore—results in fragmented production, which makes it harder to meet responsible sourcing requirements and participation in formal markets, as this typically requires pooling of material to achieve economies of scale. Where feasible, future projects should move beyond using cooperatives solely for licensing purposes and instead strengthen them as platforms for broader market access. Emphasis should be placed on building trust, effective governance structures, and market mechanisms to enable collective sales and potentially improve pricing for cooperative members.

Implement gender-responsive approaches: Facilitating women's access to formal spaces for trading and ensuring equitable opportunities within formal markets are crucial steps to promote greater economic participation by women. Promoting gender-responsiveness in ASGM supply chain mechanisms fosters a more inclusive and resilient market ecosystem, diversifying labor pools, reducing dependencies on a single demographic, and mitigating risks associated with social or economic disparities.

Conclusions

The insights from the market access activities of phase one planetGOLD country underscores the complexity of formalizing ASGM supply chains. Many of the challenges experienced by the country projects proved to be deeply rooted in systemic issues that require innovative and collaborative solutions, emphasizing the ongoing need for sustained engagement with stakeholders across ASM gold supply chains.

Analysis of Communication and Awareness Raising Activities

Background

Despite the significant contributions artisanal and small-scale gold mining makes to the world's gold supply and to local economic development in some of the world's most deprived areas, environmental degradation, unsafe work practices, and other negative impacts associated with the sector still dominate how it is perceived. This negative reputation blocks its potential: it weakens political support for suitable national policies and regulations, discourages investment, and limits miners' access to finance. It undermines the interest of fair and responsible buyers and even fosters hostility at times from other sectors and in public opinion.

Against the backdrop of this negative perception of the ASGM sector, the planetGOLD programme recognized the significant role that strategic, inclusive communications practices can play in helping build greater support for the ASGM sector—and in drawing attention to the benefits ASGM can bring to local communities when it receives adequate support and fair access to formal financing and markets. At a global level, the programme developed a strategic communications plan aiming to help planetGOLD engage investors, governments, the global gold industry gold buyers and consumers in supporting artisanal and small-scale miners, while also consolidating and strengthening support among programme stakeholders, donors and the development community. The communication plan recognized that achieving this would involve changing perceptions around artisanal and small-scale miners, particularly at the national levels and among the finance sector—by re-framing the issue around the social, environmental and economic benefits of supporting miners, and by engaging the media to cover the sector through a more solution-oriented angle.

All country projects in phase one of the planetGOLD programme developed their own complementary national-level communications plans based on this strategic approach, with distinct audiences, platforms and outreach tactics customized for their own context. These communication efforts were mainly carried out for the purposes of:

- Highlighting and reinforcing the socio-economic development potential of responsible, mercury-free artisanal and small-scale gold mining in the country
- Educating miners and local communities on the dangers of mercury exposure
- Encouraging behavior change among miners, primarily to take up more responsible mining practices
- Disseminating knowledge to advance progress in the country on formalization, access to finance and markets, and uptake of mercury-free technologies

Strategies

This chapter offers a cross-programmatic assessment of the communication and awareness raising strategies and interventions implemented by country projects participating in the first phase of the planetGOLD programme. The following strategies stood out across the projects:

- Campaigns and activities targeting miners and local communities
- Education initiatives with children and youth
- Engagements with the media
- Broad-based awareness raising and advocacy

CAMPAIGNS AND ACTIVITIES TARGETING MINERS AND LOCAL COMMUNITIES

In many cases, planetGOLD country projects developed flagship campaigns aimed at raising awareness among miners and members of communities where ASGM takes place, to provide education about the dangers of mercury, ways to avoid exposure, and on cleaner, safer alternatives to mercury use in mining. Often these campaigns also provided an organizing principle for outreach to broader audiences via digital and online outreach as well.

Campaigns including planetGOLD Peru's "**Expedición Mercurio**", the "**Colombia Libre de Mercurio**" campaign, the "**ValORO tu Trabajo**" campaign created by planetGOLD's partner project in Ecuador, planetGOLD Philippines' "**Behind the Gold Rush**" event campaign, and planetGOLD Kenya's "Say No to Mercury" campaign stood out for their wider community-centric approaches of blending different forms of communications such as digital media, roadshows and other in-person engagements, print media, YouTube, and social media to sensitize miners and the local public around the dangers of mercury and the livelihood potential of more responsibly-managed artisanal and small-scale gold mining. These teams typically worked together with local partners to reach ASGM communities, investing time in building trust and engaging directly with those most closely involved in ASGM. The Indonesia project, for instance, carried out door-to-door awareness-raising and campaign methods by directly visiting mining camps and miners' houses. The project worked collaboratively with the local university to conduct these activities.

The planetGOLD Philippines project created an ASGM Champion Spotlight Series — the Behind the Gold Rush interactive photo and video booth showcased at various local festivals and events across project sites — designed to honor individuals and groups advocating for a cleaner, safer, and more responsible ASGM sector in the country. The booth featured a range of infographic materials that helped visitors better understand and appreciate the project's goals and the realities of the ASGM sector, celebrate the contributions of ASGM Champions from diverse sectors, and inspire others to support responsible mining.

Across all countries, the awareness-raising campaigns enhanced community ownership through storytelling initiatives, painted murals, contests, photo exhibitions, ASGM forums and expos. These campaigns employed the following types of communication tools: educational and pedagogical kits (see examples from planetGOLD **Peru** and **Colombia**); workshops; printed handbooks; posters and signage in ASGM communities, videos distributed online, through local screenings, and via text message/WhatsApp groups; branded materials with key messaging such as t-shirts, notebooks, umbrellas, and stickers handed out in person or digital stickers distributed on WhatsApp.

As part of its campaign, planetGOLD Colombia developed a sustainability strategy known as "Ambassadors for a Mercury-Free Colombia," empowering community leaders, youth, and mining organizations to become local advocates for mercury-free practices, using materials the project provided. These ambassadors received training in environmental knowledge, health impacts, clean mining techniques, and gender equality, with the objective of ensuring that awareness raising about mercury's impacts and the benefits of alternatives can continue beyond the life of the project.

COMMUNICATION OUTREACH IN THE TIME OF COVID-19

Some planetGOLD countries developed targeted campaigns around the COVID-19 pandemic, which emerged at the inception of these projects. This proved to be an appropriate community support intervention, as these campaigns focused on disseminating health and safety information on COVID-safe ASGM operations, which, as was the case with Peru's "**MAPE sin COVID-19**" (ASGM without COVID-19) campaign, delivered scientifically sound, national healthcare system-approved messages.

The planetGOLD Peru project rolled out their COVID-19 campaign on both YouTube and WhatsApp. For the "**Minería sin COVID-19**" (Mining without COVID-19) campaign led by planetGOLD Colombia, the project partnered with seven local ASGM organizations to distribute a comprehensive biosecurity awareness kit to mining communities. This included safety protocols, self-care guidelines, and health education materials to protect ASGM workers during the health crisis. The strategy also included disseminating radio ads, podcasts, and animated videos.

Ecuador's "**Reglas de Oro**" (Golden Rules) campaign produced a series of seven videos providing miners with practical guidance on how to protect themselves and others from the spread of COVID-19. These videos, along with a set of posters offering similar safety recommendations, were distributed widely through WhatsApp, social media, and printed formats. Projects in other countries including Indonesia, Guyana, and the Philippines also produced outreach materials providing COVID-19 related health and safety information to miners and local community members. **Visit the planetGOLD website** for a compilation of COVID-19 awareness raising materials different projects developed.

EDUCATION INITIATIVES WITH CHILDREN AND YOUTH

Several countries created communications interventions targeting children and youth in mining communities. The main objective of this strategy was the expectation that the young ones can inform their immediate family and community on the dangers of mercury to the environment and their health, protect themselves from mercury exposure at a very young age, and should they choose to pursue mining as a career in the future, be educated on responsible gold production. Several country project teams visited local schools and other children's gatherings, partnered with professional storytellers, and hired educators to implement children's age-appropriate awareness sessions and engaging events on the dangers of mercury, ways to avoid exposure, and methods to make mining activities safer and more environmentally and socially responsible.

The planetGOLD Philippines project spearheaded a "**Youth for Responsible Gold**" educational roadshow to promote a safer, cleaner, and more equitable ASGM sector, targeting elementary and high school students and teachers, encouraging their advocacy for responsible mining. The series featured various engaging activities, including a documentary film screening, interactive storytelling, drawing and coloring activities, a collaborative mural painting by student artists, a photo exhibit, and a game booth. The events culminated in contests such as essay writing, poster making, jingle creation, spoken word poetry, and slogan-making. Youth engagement activities included art contests, mural painting, and interactive games, which fostered creativity and helped participants gain a deeper understanding of responsible mining in an enjoyable and interactive manner.

Creative campaigns for children and youths were conducted through art and storytelling events and contests in Mongolia, Colombia, Ecuador, and Peru. The planetGOLD Mongolia project conducted art competitions titled "**Make Mercury History**" for elementary and middle school children who belong to ASGM families and communities in the targeted areas to raise awareness about the dangers of mercury.

Under the "Colombia Libre de Mercurio" Campaign, the planetGOLD project engaged children through activities such as the "Couplets and Verses for a Mercury-Free Colombia" contest, where children and teachers in one of the project locations expressed the importance of avoiding mercury through poetry. In another location, the project carried out an ecological campaign, with children creating an awareness mural to spread environmental messages within their community. The project also held a children's storytelling contest in another region, where young participants narrated the dangers of mercury, leading to the publication of a children's book. The project engaged with youth through a gastronomic exhibition, encouraging them to explore ways to prevent mercury contamination in food sources.

The planetGOLD project in Indonesia held a **storytelling workshop** for teachers and storytelling competitions for students throughout the project, even partnering with a well-known professional storyteller and TV presenter in Indonesia to disseminate information. In engaging with children, the planetGOLD Indonesia team and professional

storyteller partners used children's stories, comic books, storytelling, music, and **videos**. In addition, the planetGOLD Indonesia communication team promoted **a storytelling competition for children** in the six project locations on the topic of gold mining and the impact of mercury.

The planetGOLD Kenya project trained youth in mining communities as awareness champions to ensure constant communication about the dangers of mercury usage on mine sites, while planetGOLD Burkina Faso focused on disseminating information about gold processing alternatives by training 150 youths in mercury-free processing technologies and supporting them in establishing a formalized cooperative. The planetGOLD Philippines project conducted storytelling sessions, using its bigbooks developed for children, during its educational roadshows to engage communities and humanize key messages on responsible, mercury-free mining.

MEDIA ENGAGEMENT

Across phase one projects, media engagement emerged as a key strategy for shaping the public's perception of ASGM. The media's access to broader audiences beyond mining communities was central to challenging stereotypes entrenched in the public's mind about the sector. Countries adopted a variety of approaches, ranging from traditional media like radio and broadcast television to structured journalists' trainings. Highlights from different country projects' engagement activities are summarized below.

In the Philippines, through six sessions under the Media Kapihan Series (Coffee Talks Towards Responsible Mining), 60 journalists were convened to equip them with the knowledge to encourage more accurate and empathetic sector coverage. The team also prioritized media engagements through interviews and guest appearances (PTV-4, a state-run broadcaster). Media engagement also expanded across multiple platforms, including television broadcasts, digital news features, radio programs, and print publications. The media were regularly invited to cover key project events, such as partnership agreements, trainings, turnover ceremonies, and public information campaigns. The Philippines achieved high media visibility, with guest appearances on state TV (PTV-4), documentary features on national channels (TV5), and stories in international outlets like Rappler and Reuters.

The planetGOLD Philippines team also launched the Gold Talk Show "In Responsible Mining, All Will Prosper" in Camarines Norte — the first-ever radio program in the country dedicated to promoting responsible gold mining practices and amplifying the voices of small-scale gold miners. It also aimed to empower miners by providing reliable information, facilitating timely discussions, and addressing pressing issues within the sector. Building on its success, planetGOLD Philippines partnered with the Philippine Broadcasting Service - Bureau of Broadcast Services and DZRH 107.3 FM Radyo Pilipinas Bontoc to launch the Mountain Province edition of The Gold Talk in April 2024. Notably,

the Provincial Information Office of Camarines Norte has pledged to continue the radio program after the project's completion—a strong testament to its impact and sustainability.

The planetGOLD Mongolia project engaged with 65 journalists from national daily newspapers, television, radio, online news, and other media organizations. The team organized two meetings with journalists to disseminate the project and to receive input for better media communication and activities. The planetGOLD Mongolia project organized two meetings with journalists to disseminate the project and to receive input for better media communication and activities. At least 150 news articles were written and published on media channels, sometimes leveraging interviews conducted on members of the team.

In areas where the internet was intermittent and COVID-19 made regular travel impossible, the planetGOLD Guyana team relied heavily on radio programs to reach broad audiences. Between November 2020 and March 2021, a program was included regularly in the national daily radio show "**Merundoi**," reaching an estimated 5,000 people in two major ASGM localities. Additional "conversational" radio pieces (i.e., broadcasts depicting two miners communicating with one another) were also employed. The conversations featured in mostly Guyanese Creole centered on methylmercury and its toxicity.

In Burkina Faso, the team organized debates on local radio shows to discuss ASGM formalization, featuring ASM trade unions and mining sector experts in Burkina Faso. The national TV station RTB **covered** the commissioning of the project's mercury-free processing system. The team also organized several journalist visits to provide firsthand exposure to the realities on the ground, challenging common misconceptions about artisanal mining. These initiatives helped journalists understand that artisanal miners are capable of improving their practices when provided with appropriate awareness-raising efforts. As a result, many journalists independently continued engaging with site workers beyond the project's scope. When looking for miners to train on mercury-free processing, the project leveraged nationwide recruitment notices for 150 learners for training on chemical-free mineral processing technologies.

The planetGOLD Colombia project worked with media partners and communication agencies to design and disseminate communication materials, including radio spots for both its campaigns. The partner project in Ecuador leveraged radio messaging to reinforce health and safety awareness messaging under the "Reglas de Oro" (Golden Rules) campaign and to persuade miners to sell untreated ore to mercury-free plants by addressing their concerns over fair pricing, gold recovery rates, and the reliability of ore assessments through radio spots that explain the benefits of mercury-free processing. The planetGOLD Kenya project took part in radio shows to disseminate information about the dangers of mercury use.

BROAD-BASED AWARENESS RAISING AND ADVOCACY

Interactive communication projects

Multiple countries (planetGOLD Peru, Mongolia, Guyana, and Colombia) employed interactive communications models and training to enhance the public's understanding of mercury-free technologies. The projects in **Peru** and **Mongolia** both used virtual reality video demonstrations of mercury-free technologies to promote responsible mining, especially at key events using VR headsets. The planetGOLD Guyana project team also collaborated with the planetGOLD global communication team to develop a **360-degree, interactive tour** of its Region 8 mercury-free demonstration project at an alluvial gold mine site. The demonstration site featured a series of mercury-free technologies that any small and medium-scale miner in Guyana could readily adopt. The objective of the 360-degree interactive virtual tour was to provide an immersive, educational introduction to each step in the mercury-free gold processing circuit. The team also featured the tour at key events, including the Responsible Mining Conference at the closing event of the planetGOLD Guyana project.[28]

The planetGOLD project in Colombia had a different approach: in collaboration with several partners, the project launched a **virtual training and awareness course** on the impacts of mercury on health and the environment as part of its awareness raising and knowledge management plan. Subsequently, in 2024, the project developed an online learning platform published on the planetGOLD programme website at **learn.planetgold.org**, consisting of six courses.[29] This allows users to interact with a 360° virtual tour of two mercury-free processing systems and access educational content to strengthen their skills on topics such as the dangers of mercury use, water resources, gender, mining formalization, and more. In addition to being available on the planetGOLD website, the courses are published on the official Colombian Ministries of Mines, Environment, and Health websites.[30]

Video & story production

Documentary films sharing the stories of miners and the realities they face in transitioning to more responsible methods were a popular form of video content created by several of the projects. The planetGOLD Philippines project produced a **documentary film series** dubbed the "Power of Gold: Stories from the Ground" to illuminate the challenges, achievements, and transformations experienced by the most marginalized ASGM operators, providing profound insight into their journeys, emphasizing their resilience and dedication in overcoming obstacles and driving positive change within the sector. The series was

28 The Guyana tour was also later incorporated in planetGOLD's global "360 Experience" which was featured at an exhibit at the 7th GEF Assembly in August 2023 and via an exhibit at the Minamata Convention on Mercury 5th Conference of Parties in November 2023.

29 The courses were designed and developed by Comunica within the framework of an alliance between Alinea International and planetGOLD Colombia, together with the Ministry of Energy and Mines, the Ministry of Environment and Sustainable Development, and the Ministry of Health. The courses are also available on the official webpages of these three ministries.

30 planetGOLD 2023 - 2024 Annual Progress Report, available at: https://www.planetgold.org/2023-2024-planetgold-annual-progress-report

disseminated via in-person screenings, Facebook, and YouTube. The Burkina Faso project produced a 26-minute documentary film on vocational training in mercury-free ore processing technology. The film aired on the national public television channel and two private television stations. YouTube and social media platforms such as Facebook and LinkedIn were also used as distribution channels.

YouTube proved to be the most popular platform for hosting video content. The projects in Colombia[31], Peru[32], and Indonesia created high-quality video productions to highlight project results, strategies, events, and testimonies from miners and community members. The Colombia, Indonesia, and Mongolia projects also used animated videos as part of their communications tools, with planetGOLD Colombia using the medium under the "Minería sin COVID-19" outreach strategy. In contrast, the Mongolia team used 2-dimensional animated videos to showcase responsible mining and gold supply chain issues. The project in Guyana leveraged YouTube to create a "**Women in Mining**" video series, highlighting trailblazers in the sector, similar to two videos produced under planetGOLD Mongolia, documenting the experience of two women trailblazers in the Mongolian ASGM sector. In the videos, these women shared their life stories in the ASGM field, from struggles to success.

The planetGOLD Indonesia project went a step beyond online distribution by leveraging digital billboards located on the main streets in target locations to broadcast a video aimed at humanizing miners and sharing ways to support their shift to mercury-free methods. Additionally, to illustrate the transition of artisanal and small-scale miners to mercury-free practices, the global planetGOLD project launched the video series "Dispatches from the Field," distributed on the programme website, YouTube and on social media. This series of short videos includes unique feature stories from all phase one country projects, highlighting the challenges and successes of miners on their journey to adopt safer, more responsible mercury-free methods.

Social Media

Social platforms enable wide and cost-effective messaging campaigns. With growing internet connectivity across the world, combining social media with traditional communication methods (e.g., radio, posters, and booklets) maximized the projects' impact by catering to both online and offline audiences. The use of local languages on social media platforms also proved to be key in creating online communities willing to learn from each other.

Facebook has proved to have more reach to more rural communities than any other social media platform, and was prioritized as a key communication channel across all projects. Nearly every country had a dedicated Facebook page to share educational materials and information, share posters and fact sheets, raise awareness of the dangers of mercury and promote mercury-free practices, to disseminate updates on project activities, and to showcase the ASGM sector's potential. Projects in the Latin America region opted to

31 YouTube videos available here: https://youtube.com/playlist?list=PLj9oUhARbzx4inE2oJR7eqOZTvEyiuoh7&si=zSSbkzrhnV57p3zk
32 YouTube videos available here: https://www.youtube.com/c/planetGOLDPer%C3%BA/videos

co-create **planetGOLD Latam**, a regional Facebook page dedicated to sharing information that could apply or be of interest to audiences in either Colombia, Ecuador, or Peru. Additional platforms leveraged by projects included X (formerly Twitter), LinkedIn, and Instagram. In some cases, WhatsApp was also used to share relevant project dates and updates with groups of miners and local community members, particularly in mining areas which often have little to no internet access but can still be reached with cellular service.

All projects also leveraged their social media platforms to share news and updates from the global planetGOLD programme, other planetGOLD countries' experiences, and relevant stakeholders regarding ASGM and its development. To maximize engagement, some countries aligned their social media campaigns with global observances such as World Environment Day and International Women's Day. Some projects, like planetGOLD Mongolia, leveraged their social media platforms to share information through their newsletters. The planetGOLD Kenya project took their social media engagements a step further by engaging and training some youth in mining with substantial social media following to progress communication of awareness creation and sensitization. Some projects, like planetGOLD Peru, utilized Facebook and YouTube to livestream some of their workshops for greater reach. In the wake of the pandemic and the rise of virtual and livestreamed meetings, these platforms proved to be instrumental in sharing information more widely.

Gender and Vulnerable Groups

Across most countries, gender mainstreaming was a deliberate element of all information, education and communication activities. Most country projects employed a multichannel approach for disseminating information, combining on-the-ground training, education materials, and digital outreach to embed gender narratives in the sector.

The planetGOLD Indonesia project stands out for considering gender mainstreaming in all awareness-raising and campaign materials and ensuring balanced gender participation in the training and capacity-building activities. The planetGOLD Philippines project used information collected from a contextual study they conducted, which highlighted several gender issues in ASGM at the two project sites, to inform a gender mapping report that was leveraged in communications material.

The partner project in Ecuador created the "Mujeres con Voluntad de Oro" campaign, which focused on the recognition and empowerment of women miners, specifically the jancheras—female mineral sorters who have long been marginalized in the male-dominated mining sector, aiming to elevate their visibility and address the socio-economic challenges they face. This campaign contributed to the October 2022 national government's publication of the legal instrument "Integrated management of mining waste of sterile material by base recyclers in the special regime of small-metal mining." This document

legally recognized the work of jancheras for the first time, marking a significant step forward in addressing the systemic undervaluation and invisibility of their labor.

The “Yo Me Reconozco” campaign by planetGOLD Colombia focused on promoting gender empowerment and equality. At the same time, community workshops in one of the target locations educated women on pathways for gender-based violence prevention.

STORYTELLING AND TESTIMONIALS

A dominant pattern is the use of personal narratives to elevate women’s roles and challenges. Targeted video content was the most popular medium used for this. Projects such as planetGOLD Mongolia, Philippines, Guyana, Burkina Faso, and Ecuador all developed videos highlighting women’s work and their contribution to the sector. The partner project in Ecuador used videos to advocate for the plight of women miners, unrecognized by the national mining code, and address the socio-economic challenges they face. The planetGOLD Philippines project was the only project that developed a storybook highlighting women’s significant role in the mining sector, serving as an educational tool to promote gender equality and empowerment within the ASGM community. The storybook features in-text translations in two local languages, making it more accessible to diverse audiences. The project also published two articles on women’s roles in ASGM, with one published on a national news agency, reaching a broader audience.

USE OF CREATIVE MEDIA TO DRIVE CULTURAL CHANGE

Projects in the Philippines and Colombia incorporated songs and contests to promote gender inclusion in mercury-free mining. In Colombia, women in mining and agriculture composed songs promoting mercury-free practices. The Philippines project produced a song highlighting the unique challenges of women working in the ASGM sector, launched during the 2025 Gender Forum, which the planetGOLD Philippines project team co-organized with other partner organizations in the Philippines. These engagements made communication participatory, engaging, and memorable.

COLLABORATION WITH WOMEN’S ORGANIZATIONS AND LOCAL PARTNERS

To ensure the sustainability of their interventions and enable greater reach to women miners, several projects worked with local community-based organizations, partners, and in some cases, women’s organizations. The planetGOLD Colombia project trained various local community-based organizations in continuing awareness efforts, equipping them with the tools to educate their regions on mercury-free mining, environmental protection, and gender issues. The project in Guyana partnered with the Guyana Women Miners Organization to reach women miners within their networks. In the Philippines, the planetGOLD team collaborated with the Philippine Commission on Women to do outreach and education, which led to the creation of a gender action plan.

Global Project Support for Communications

The Global Project led programme communications by providing a common framework and strategy for all country projects to adapt. The strategy went beyond simply communicating the outputs of the programme, and focused on achieving a more balanced portrayal of ASGM to policy makers, investors and the public. Through earned media, social media and compelling photographic and video products, the strategy depicted miners on different aspects of their journey to becoming responsible, mercury-free operators.

The project sought to create a unified visual identity and coherent strategic narrative about ASGM across the entire programme, through a regular community of practice and learning among all communications specialists across the programme. The aim was to present a more balanced view where media, governments, and lenders see how many miners in the sector are striving for ever more environmentally and socially responsible mining practices. A key global communications output was the issue brief ***Communicating about ASGM: Emerging trends, barriers, and recommendations***.

The Global Project created a **press kit** as a tool for reaching out to media, articulating the programme's theory of change, answering frequently asked questions, and directing journalists to assets and resources they could incorporate in their reporting. The Global Project also provided online and in-person media training to the country project communications coordinators so that they could also manage their media relations in ways that can reframe the ASGM coverage.

To assist in the documentation of project activities, the Global Project wrote eight country reports to document country experiences with communications interventions. At the Global Forum on ASGM events, the Global Project held sessions on educating miners through social media and other technology platforms and turning the tide of opinion on responsible ASGM.

Challenges, Lessons Learned & Recommendations

Across the nine planetGOLD phase one countries, communication interventions were instrumental in working to reshape how artisanal and small-scale gold mining is understood, both within mining communities and among broader public and institutional audiences. By leveraging a wide range of tools—from grassroots storytelling and school-based programs to social media, radio, and virtual reality—projects successfully engaged diverse stakeholders, raised awareness on the dangers of mercury, and highlighted the sector's development potential. See **Annex 4** for the estimated reach of different project interventions. Lessons from these projects' communication interventions are summarized below.

- **Multichannel campaigns drive greater impact:** Projects that blended communication channels—including radio, social media, WhatsApp, roadshows, videos, and print—had stronger visibility and audience engagement. COVID-related campaigns (e.g., MAPE sin COVID, Minería sin COVID, Reglas de Oro) served dual roles: meeting urgent health needs and establishing credibility, thus strengthening long-term perception change efforts.
- **Language and local context adaptation build trust:** Localized content—including Indigenous languages, cultural expressions like songs and poetry, and photo contests—were more relatable and effective. Tailoring content to local traditions and communication norms increased uptake, especially in more rural regions.
- **Strategic targeting of audience groups is key:** Communications were most effective when they differentiated messaging for miners, women, youth, community leaders, policymakers, and the general public.
- **Interactive events foster deeper engagement:** Events such as art competitions, forums, murals, youth festivals, and ASGM expos attracted community members, journalists, government officials, and miners. These events often created earned media, expanding awareness organically through local news and social media shares. Combining social media campaigns and face-to-face capacity building for ASGM miners and communities is important. The physical (face-to-face) capacity-building and awareness-raising events are needed especially for the ASGM miners and local governments at the project locations, especially where there is a strong negative perception of the ASGM sector.
- **Community champions and peer educators can sustain change:** Ambassador models empowered trusted individuals to act as messengers. Leveraging trained youth and community leaders helped reinforce messages within peer groups, creating horizontal communication structures that outlived project timelines.
- **Intentional media engagement is a game changer:** Transforming members of the media into allies—through training, exposure visits, and partnerships—led to more accurate and sustained ASGM coverage. Radio was especially impactful in low-connectivity regions.
- **Partnerships with stakeholders enhance reach and legitimacy:** Collaborations with ministries, media houses, universities, NGOs, schools, and mining cooperatives significantly boosted reach, legitimacy, and co-delivery of content. Partnerships enabled access to additional platforms, improved coordination with national plans (e.g., Minamata Action Plans), and helped tailor messaging to policy priorities.

- **Digital and immersive technologies enhance learning and accessibility:** Projects using 360° tours, virtual reality, and learning platforms (Peru, Mongolia, Colombia, Guyana) created accessible and engaging content for miners, regulators, and investors alike. Colombia's online learning management system exemplified how communications could support training on formalization, mercury risks, gender, and responsible mining in an intuitive, self-paced format.
- **Gender-inclusive communications break stereotypes:** Projects that elevated women's voices and visibility, through video series, storytelling, and leadership roles, helped address gender imbalances in mining narratives.

Conclusions

While several countries reported emerging shifts in public and media perceptions, long-standing challenges remain. These include limited digital infrastructure, persistent misconceptions about ASGM, and political or bureaucratic delays. Only in Burkina Faso and Peru did the projects report a noticeable shift in media attention on the ASGM sector. The planetGOLD Burkina Faso project noticed more media attention covering ASGM as journalists-initiated interviews with project staff to understand mercury-free technologies and formalization efforts. In Peru, the planetGOLD project noticed that journalists started distinguishing between informal and illegal mining, providing additional nuance on the complexities of ASGM operations to the public. Changing perceptions and narratives told by media takes time and will require repeated, consistent messaging. Engaging media outlets with narratives and real-life examples showcasing solutions that advance more responsible practices in the ASGM sector should continue to be prioritized in ASGM initiatives and projects.

Even the most innovative communication efforts may fall short if they are not supported by enabling conditions, such as access to finance. In Guyana, the promotion of mercury-free technologies faced limited impact due to the inaccessibility of the equipment for most miners and a lack of public and private sector commitment to finance adoption, rendering communication efforts insufficient on their own.

This highlights a critical lesson: for communications to translate into action, they must be paired with structural support, particularly financing, policy enforcement, and continued community engagement. As the first phase of the planetGOLD programme concludes, it is clear that strategic communication should remain a central pillar of ASGM programming and formalization strategies, not only to influence behavior but also to generate the political will and institutional commitment required for long-term change.

Synergies Among Programmatic Pillars

The pillars of the planetGOLD programme (formalization, access to finance, technology transfer, access to markets, and communications) are mutually reinforcing elements that together support the advancement of artisanal and small-scale gold mining. While all planetGOLD projects implemented activities under each pillar, practical experience confirmed that these activities were highly interdependent. Further, all these pillars were supported by capacity building and knowledge management elements of the programme. Some specific examples of these synergies are discussed below.

Formalization as a prerequisite for advancing other interventions

In all phase one countries, formalization was not only a strategic pillar of the planetGOLD programme but a clear precondition for accessing finance and formal gold markets, and for adopting cleaner mercury-free processing technologies. Without legal recognition and secure tenure, informal ASGM operations are unlikely to see the benefits of investments in long-term process improvements and professionalization. Informal operations are viewed as high risk by formal financiers and gold buyers, both of whom require regulatory compliance and adherence to norms of responsible production before doing business with miners. Additionally, short tenure lengths and uncertainty about mineral right extensions for ASGM limit the potential returns on investment for financiers. Lack of regulatory clarity also hinders timely delivery of assistance. As was seen Kenya and Mongolia, where ASM activities were legally suspended for much of the project life, project efforts first had to focus on overcoming these regulatory issues before technical interventions could take place in full.

Government and private stakeholders also generally will not engage with ASGM actors without formality or at least some degree of legitimacy. In planetGOLD Mongolia, for example, the Bank of Mongolia and local gold buying centers only engaged with licensed mining organizations, reinforcing the necessity of legalization for market integration. Similarly, planetGOLD Peru linked registration on national tax and mining databases directly to eligibility for technical assistance and market access. Several projects also reported that access to clean technology solutions could not be meaningfully scaled without legal recognition. In planetGOLD Philippines, mercury-free equipment demonstrations were targeted towards miners within registered associations or those holding valid contracts, while planetGOLD Guyana noted that only formal operations could partner with the Guyana Gold Board or benefit from its 360-degree demonstration sites. For these reasons, lack of formalization remains a formidable barrier to accessing technical assistance, formal finance and markets that enable transformational technological change.

Linking formalization of gold traders to market access

Like ASGM operations, local gold traders encounter difficulties in meeting the government requirements and formalities necessary for formal (licensed) trading and exporting, partially due to the root informality of the gold producers, but also thanks to the complexities of obtaining essential permits. Traders may refrain from declaring gold production to evade taxes or association with informal activities, making them disinclined to formalize. This circumstance has impeded the planetGOLD country projects in supporting miners' access to formal markets, as formal buyers require that all actors in the supply chain — miners as well as traders and suppliers — operate formally and demonstrate compliance with due diligence requirements. Even where planetGOLD country projects succeeded in supporting miners' formalization, the absence of formal traders operating locally complicated their ability to integrate ASM gold into formal supply chains. However, projects also learned that it was not advisable to bypass local (informal) traders and work with only with formal traders, since these formal traders often did not have established relationships with the ASGM sites. Formalization that focuses on all actors in the gold supply chain is needed. For example planetGOLD Mongolia project supported the FRC to formalize gold traders.

Linking technology transfer and access to finance

The choice of appropriate mercury-free technology is driven by a range of technical, economic and social factors, among them the ability of miners to access finance to purchase new equipment. However, miners are often reluctant to take on debt, and financial entities are in turn reluctant to provide finance because of perceived business and reputational risks. Selection of lower-cost technologies means less finance will be required to support its adoption; miners benefit from lower costs and debt, while financiers may be more accepting of risk if the amount of finance provided to each miner is relatively modest. Therefore, the complexity and local availability of technology promoted by planetGOLD projects is directly tied to the feasibility of the financial mechanisms tested, as well as the potential for that mechanism to support replication.

Linking new technology with financial benefits and legality

To encourage the uptake of new mercury-free technologies, planetGOLD projects strongly emphasized the financial returns of more efficient processes as well as the compliance benefits of operating without mercury. The planetGOLD partner project in Ecuador encouraged miners to sell their ore rather than process it themselves using mercury, by

highlighting the fact that mercury- free processing plants can recover at least 50% more gold compared to typical manual mercury-based methods. They also emphasized that ore selling allows miners to engage in formal gold transactions and avoid the use of mercury, which is illegal in Ecuador. Similarly, while demonstrating mercury-free technologies, the planetGOLD Guyana project showcasing that the more efficient mercury-free demonstration site yields higher economic returns with a smaller footprint on the landscape. They also raised awareness among miners of the benefits of complying with current regulations.

Linking miners' access to finance and access to formal markets

All phase one planetGOLD country projects shared how, in their experience, access to formal finance and markets are strongly interlinked, whereby the absence of one confounds access to the other. Continued difficulties accessing formal financing from banks perpetuate the reliance on unregulated, unreliable, and often insufficient financing methods. Informal pre-financing arrangements, often reliant on traders or collectors, create hardened dependencies and complicate miners' transition to formal markets. In practical terms, such arrangements mean that miners are simply unable to sell their gold to other (formal) buyers as this would cause them to lose out on traditional financial support upon which they rely to maintain their operations. This financial limitation prevents their ASM gold from investing in mining and organizational practices which would help them meet responsible sourcing standards.

Connecting communications to enabling conditions

Even the most innovative communication efforts may fall short if they are not supported by enabling conditions, such as access to finance. In Guyana, communications efforts to promote mercury-free technologies had limited impact due to the inaccessibility of the equipment for most miners and a lack of public and private sector commitment to finance adoption, rendering communication efforts insufficient on their own. This highlights a critical lesson: for communications to translate into action, they must be paired with structural support, particularly financing, policy enforcement, and continued community engagement.

Sustainability of Project Outcomes

The planetGOLD country projects used several strategies to ensure that the outcomes could be sustained after the project closed. These strategies generally included institutionalizing project activities within the operations of government entities, mining associations or other partners; identifying and training specific champions to carry on the work; and documenting and providing ongoing access to project results and learnings.

For technology transfer, dozens of mercury-free processing sites across the nine planetGOLD phase one countries can continue to operate for several years into the future, for as long as their licenses remain valid, and sufficient gold is available for extraction. Where these sites were developed as training sites by the projects, the facilities will continue to operate under the direction of the Mining Ministry or other relevant authorities, or through transfer of ownership to ASGM cooperatives who partnered with the project during execution. These sites will continue to produce mercury-free gold and provide training sites and examples for replication. In Burkina Faso, the Ministry of Mines will take over the technical vocational training curriculum (including using the mercury-free plant which acts as a training site), as memorialized in a memorandum of understanding, while certification of professional skills will be handled by a newly created certification agency. In Mongolia, the ASM National Federation in Mongolia will continue providing trainings. Finally, in some planetGOLD countries such as Colombia and Indonesia, local training institutions like SENA and BPPT will continue to be mercury-free ambassadors through education.

For finance, countries that worked with existing commercial finance institutions are seeing the continuing operation of finance mechanisms developed under the projects. For example, in Colombia, the loan mechanism developed in partnership with the Corporación Financiera Antioquia has disbursed more funds than originally committed due to initial success and high repayment rates. In Burkina Faso, Coris Bank will continue to operate the revolving fund it developed with the planetGOLD project there, with the supervision of the ASGM division of the Ministry of Mines. Further partnerships with Coris Bank are now being explored in other west African countries.

For maintaining access to formal markets, the domestic buying programmes of the Central Banks will continue to provide an avenue to ensure that ASGM entities are meeting due diligence standards. Because these domestic buying programmes serve specific interests of the Central Banks (e.g., to increase reserves), these efforts likely to be sustained. As part of an ASGM initiative led by the World Gold Council in cooperation with Banco de la República (Colombia), Banco Central del Ecuador, Bank of Mongolia, and Bangko Sentral ng Pilipinas, further work is being done to identify ways for Central Banks to support ASGM, and to align with domestic buying programs to other ASGM countries that adhere to the **London Principles.**

For knowledge management, planetGOLD country projects are using the planetGOLD website to share the results and learnings of their projects, which can serve as an ongoing resource for uptake and replication among ASGM in their countries. Some countries, such

as the Philippines, Colombia, Peru and Indonesia, have augmented their knowledge sharing through the development of country-specific platforms while others have used platforms run by other partners (such as the ASM Knowledge Hub in Mongolia). These platforms are aimed at providing specific formalization information to miners in the local language but also provide an opportunity for sharing information about mercury and mercury-free technologies, and other relevant materials. In addition to the sustainability of each country project's work, collective progress on mercury reduction globally will be supported in the future as new projects build on the strong foundation using knowledge compiled and shared at the global level. The resources of the Global Project are to be maintained by UNEP for the foreseeable future and therefore will continue to inform and guide subsequent projects in planetGOLD and beyond.

For communications, the planetGOLD digital footprint is large and persistent, with numerous resources tailored to a variety of cultures, languages, and contexts, so that miners can understand practical changes that have worked for miners like them. These communications resources can continue to be used and disseminated through planetGOLD global and country websites, social media, WhatsApp groups, and videos. Through awareness raising, media in all planetGOLD have gained a new understanding of ASGM solutions and the economic opportunity it entails, and this messaging will continue to influence policy and opinion. Crucially, community mentors and ambassadors, armed with planetGOLD knowledge and tools, can continue to spread the message and technologies of planetGOLD throughout their communities long after project closure.

Continuation of planetGOLD strategies under NAPs

The planetGOLD programme is designed to assist parties to the Minamata Convention to meet their obligations to reduce or eliminate ASGM mercury use, through a range of strategies identified in their National Action Plans (NAPs), including formalization, promoting of mercury-free technologies and provision of information, among others. Because these strategies align with activities undertaken by planetGOLD, the groundwork laid by planetGOLD can be built upon and sustained by governments and other collaborating stakeholders as they continue to pursue NAP strategies as required by the Convention. As one example, in Indonesia, the Ministry of Environment and Forestry continues supporting the establishment of mercury-free gold processing facilities (the micro cyanide leaching equipment, among other solutions) as part of their implementation of the National Action Plan on mercury elimination, in several ASGM locations outside the planetGOLD Indonesia project sites.

General Observations and Lessons Learned

While observations and lessons learned specific to each programme pillar are noted in the preceding chapters, there are several cross-cutting issues that influenced the outcomes and impacts of projects and the programme overall.

Influence of existing conditions on outcomes

Success of planetGOLD country projects in advancing formalization, access to finance and mercury-free technology transfer in ASGM can be, in part, attributed to the initial social, economic and regulatory conditions from which country projects began interventions.[33] For example, countries with already well-establishing mining sectors, including local manufacture and/or well-established supply chains for mining equipment, engineering services in country, existing ore processing facilities and services, and reliable transportation routes, already have supporting infrastructure than can be adapted or re-purposed to support development of responsible ASGM. Similarly, a strong history of ASGM regulatory development, including through long-standing support from development agencies, means some countries started from a place of better-developed and clarified regulations, as well as regulatory management systems, such as mining cadasters, artisanal miner registries, and streamlined environmental licensing provisions (such as with the Canadian development agency's assistance with the digitization of Peru's mining cadaster (PERCAN[34]), policy changes such as the communal environmental assessment experiment in Ecuador instigated by the SDC, or USAID's Oro Legal project to support professionalization of the ASGM sector in Colombia).

Greater overall social acceptance of mining as a legitimate industry is also a factor in project success. Peru, Colombia and Ecuador have centuries of history as mining countries, and mining (including ASM) is still an important GDP contributor and voting block. In contrast, in Mongolia, many see mining as incompatible with their traditional history as a pastoral culture.

Positive relationships with and among key stakeholders, especially governments, was also vital. In an internal survey, the planetGOLD countries reported having good to excellent relationships with government entities, NGOs, mining communities, and local communities, often attributed to alignment of mission among stakeholders, as well as effective strategies for policy dialog with governments. One country linked success with governments to ensuring clarity of project goals through well-documented workplans and activities. This approach helped in preventing additional government requests and maintaining project focus.

33 However these conditions can also change rapidly depending on political events.
34 https://constellation.uqac.ca/id/eprint/8882/

Another factor for success is the natural conditions in which the ASGM operations are recovering gold. Certain types of deposits (high grade, free gold as in many sites in Peru and Colombia) are more amenable to simpler, low cost, gravity-only technology, compared to low grade deposits and/or those with complex chemistries requiring complicated processing workflows (Indonesian and Kenyan gold can be quite fine and locked inside sulfide minerals).

Central importance of government policies toward ASGM

Clear and consistent government commitment to recognition and improvement of the ASGM was critical to the success of planetGOLD country projects. Countries identified challenges such as high turnover in government positions, rapid and substantial changes in government policy toward ASGM, and highly negative perceptions of mining by key government stakeholders, as significant barriers to progress, in contrast to countries where the government provided consistent support, tools and even financial resources such as mining funds to support the sector.

Issues with formality, from explicit bans on ASM (for example in Mongolia and Kenya) to mired licensing processes, created substantial barriers for some projects, sapping project staff efforts and time in combating these problems. Through ongoing engagement and advocacy, governments in Kenya and Mongolia ultimately lifted bans on artisanal mining, though the process drastically slowed the progress of implementing key project activities such as installing mercury-free processing plants. As of this writing, Mongolia's facilities are ready to receive ore but still await completion of land tenure processes for allowing extraction.

Bans on mercury use in ASGM, in countries such as Colombia, Ecuador, Indonesia, and Mongolia, had mixed effects on those projects' efforts. Mercury bans complicated projects' ability to work with miners that are criminalized for their use mercury, even where the intent is to transition them away from it. In these cases, projects are required only to work with those with legal or at least legitimate status, but this precludes outreach to a very large number of miners who still use mercury despite the bans. On the other hand, these bans have provided impetus to the transition to mercury-free systems (including cyanide) and centralized ore processing in these countries.

Challenges for scaling up

As mentioned above, phase one country projects focused engagement on miners operating within or on a credible path toward legitimacy or already legal. Most targeted actors fell within the OECD definition of "legitimate artisanal and small-scale mining organizations":

groups that could demonstrate a willingness to comply with the law and improve practices over time. In many cases the projects also focused on organized small-scale miners, who likely use and emit more mercury compared to artisanal miners. This decision may have been made by the projects themselves, or at the direction of relevant government ministries. While this strategy yielded measurable progress in formalization and technification, it also introduced a degree of selection bias. ASGM that were most informal, remote, rudimentary, or resistant to engagement, often due to historical marginalization or mistrust, were typically out of reach.

This conscious selection was not a shortcoming, but a strategic choice necessary for delivering results within the programme timeframe and making the greatest possible impact in terms of mercury reductions. However, achieving some form of progress with those outside the formal system, who are still the majority of miners, will be needed to further mercury reduction goals.

Putting miners at the center of interventions

Ultimately, for planetGOLD to achieve its mercury reduction goals, miners must make a deliberate choice to change their behavior and transition to alternative technologies or livelihoods. Therefore, any intervention undertaken in the program must be designed with miners' perspectives as a central consideration. Ideally, interventions deliver benefits that are attractive to miners while accomplishing programme goals such as mercury elimination.

For example, the process of formalization can be a complicated one that entails significant up-front costs in terms of legal fees, multiple trips to government offices, and investments to meet regulatory requirements. Yet miners often perceive that the only immediate outcomes of these efforts are taxation and government scrutiny. Arguments for the benefits of formalization, such as access to formal finance and possibly premium gold markets, are often speculative and slow to materialize. Formalization will only be replicated on a widespread basis when miners are convinced that benefits are assured, meaningful and rapidly realized.

Where finance is concerned, miners normally prefer equity to debt. Even though informal lenders are often accused of giving an unfairly low valuation for ASGM gold, miners may nonetheless prefer the terms of the financing. Informal lenders may provide low-cost or no-cost inputs (such as mercury) and may take a share of gold production as repayment. Taking a percentage of production, or a discount on the gold price, effectively shares risk among miners and investors, which formal debt finance cannot match. Incorporating grace periods and flexible payments into formal finance is a good start, but expansive growth in formal financing uptake by miners is more likely if it can match the benefits offered by informal lending relationships.

Technology interventions are most successful when they conform to the miners' scale of operations, context and complement existing systems. There will always be more efficient and advanced technical solutions available, but they may not be more attractive to miners if supply and maintenance are an issue, or if investment or new infrastructure demands are unattainable.

Finally, miners have a comfortable and convenient relationship with gold buyers, who meet them in their villages and mine sites and take on the very serious risk of transporting aggregated gold to the next tier of the supply chain. Improving market access must also incorporate miner-centered solutions such as opening more satellite formal buyer or central bank purchasing centers.

Ultimately, the best solutions that will lead to the most independent replication of development interventions are those that integrate significant collaboration and partnership with miners.

Value of a programmatic approach

Activities in the planetGOLD countries were supported by a programme-wide Global Project focused on knowledge management, communications and coordination. The Global Project's enabling resources and activities, along with its fostering of a community of support among projects, produced mutual assistance and motivation among projects in which they adapted each other's products and successful strategies. The Global Project also guided the establishment and application of the common standards for collecting and reporting progress, which the project further supported with training, guidance, and reporting tools.[35]

This programmatic approach used by planetGOLD ensures that individual countries do not work in isolation, but use a shared approach, enabling more rapid learning and impact. Country projects were able to share resources with and learn from each other in ways that further facilitated their progress beyond what might have been possible alone. This kind of concerted approach is especially appropriate for addressing a global issue such as mercury pollution.

The benefits of the programmatic approach were especially evident during the COVID-19 pandemic. All planetGOLD phase 1 countries were confronted with the pandemic just as they were starting up, and regular project meetings became a place to ask others how they solved common problems they were all facing. As members learned how useful it

35 For analysis of the planetGOLD Global Project throughout the first phase of the programme, see "planetGOLD Global Project Assessment: Phase 1 (2019-2025)" available at: https://www.planetgold.org/sites/default/files/PGold_GlobalRpt_F_20JUN.pdf

was to share setbacks as much as progress, this practice became generalized to all aspects of the project implementation.

Further, having a programmatic approach ensures that common methods inform country project interventions, allowing progress reporting to be more comparable across projects, which facilitates learning by practitioners and external stakeholders. Finally, being part of a global programme lends the projects, and ASGM as an issue, more weight and visibility than individual projects might have. This higher level of attention can help especially in terms of addressing perceptions among financial institutions, media, governments, and communities. Associating with the global planetGOLD programme lent legitimacy to the initiatives that the country projects were promoted. It was clear there is an international community backing up the project, which potentially helped top government and financial entities see that ASGM can be viewed as a legitimate livelihood that deserves appropriate regulatory support and financing.

Impact of the COVID-19 pandemic

Beginning in early 2020, the COVID-19 pandemic put a pause on and/or severely delayed planetGOLD country projects' activities. In most countries, especially at the beginning of the pandemic, lockdowns prohibited miners from working, and affected their ability to sell gold to formal supply chains. while travel bans affected the ability of project teams, government partners and other stakeholders to reach and engage with mining communities. Inability to travel also slowed or suspended preparatory work necessary for technical transfer interventions.

planetGOLD Philippines

However, in some cases, field staff embedded locally, for example in Indonesia and Colombia, were able to continue moving project activities forward. The pandemic also caused delays in supply chains from China and elsewhere, which significantly slowed delivery of needed mercury-free equipment.

Communications activities pivoted from awareness-raising around mercury and ASGM to campaigns about staying safe from COVID, especially in workplace settings. As described earlier, many countries developed COVID communications assets. In order to help projects address the common challenges faced during the pandemic, the Global Project created the COVID-19 Awareness Raising Materials for Miners & Local Communities website as a way to centralize and share resources created by projects working with the planetGOLD programme. It was widely used and many countries benefitted from the early work of others.

Formalization support was also affected, as stakeholder meetings and field activities were suspended due to lockdowns and travel restrictions. In Mongolia, for example, the original one-year timeline to facilitate the national ASM regulation amendment process was not realized due to COVID-19's impacts on all government activities and project activities, as well as limited political willingness from the government at that time to progress the amendment of the ASM regulation. Their strategy pivoted to virtual task force meetings and workshops, to maintain connection and some momentum through continued communication with government officials, and the project's legal environment review helped to inform these advocacy activities and engagement. Similarly, in Peru, lockdown restrictions delayed the process of the development of the Multi-sectorial National Policy for Artisanal and Small-scale Mining.

When COVID-19 caused difficulties in reaching planetGOLD Indonesia's project locations, which were spread across six provinces, due to travel limits and other measures to stop the spread of the virus, the project team adjusted implementation activities with the deployment of innovative digital platforms for communication and training. For example, the project arranged 12 online webinars covering topics of responsible gold mining processing, exploring opportunities in gold certification, and women's participation in empowering ASGM communities. Despite the COVID-19 related challenges, the project team was able to promote leadership and ensure efficient coordination and collaboration among various stakeholders.[36]

36 planetGOLD. 2023. "Terminal Evaluation (TE) Report of Global Opportunities for Long-term Development - Integrated Sound Management of Mercury in Indonesia's Artisanal and Small-scale Gold Mining (GOLD-ISMIA)." Available at: https://erc.undp.org/evaluation/documents/detail/22406 https://erc.undp.org/evaluation/documents/detail/22406

Recommendations for Future Programming

General Recommendations

Explicitly connect activities under planetGOLD projects to the objectives and strategies of the National Action Plans: The planetGOLD programme is designed to assist countries to comply with their obligations under the Minamata Convention regarding reducing mercury use in ASGM, as elaborated in each country's ASGM National Action Plan (NAP). To facilitate tracking the contributions of a planetGOLD project to NAP progress, it would be beneficial to explicitly connect planetGOLD activities and outcomes to particular objectives and strategies contained in the NAP.

To do so, planetGOLD project implementation and execution agencies should (a) ensure that they are interacting closely, and on a continuous basis, with the designated government entity (e.g., multistakeholder NAP committee) responsible for overseeing NAP implementation; (b) carry out a structured exercise to map the scope of work and project results framework of the planetGOLD project to specific NAP strategies and objectives, including mercury reduction targets; and (c) as the project is implemented, share project results so they can be used to inform ongoing NAP implementation.

These data can also be used as input for the formal review of the implementation of Article 7 (RIA), a process that must take place every three years as required by the Convention. Further, after the planetGOLD project has ended, the country can continue to track activities and results that were initiated under planetGOLD but carried forth by project partners per the exit strategy developed by the project (see recommendation below). The Global Project can assist in this exercise by recommending standard methodologies for tracking results, for use during the project implementation and after project closure, for consistency. The Global Project can also periodically collect data produced by countries after project closure to evaluate ongoing impacts and replication of planetGOLD interventions.

Focus initial project activities on fostering formalization and other key enabling conditions for project success and sustainability: A strong focus on clarifying formalization issues will enable more progress on all pillars, in countries that currently are less advanced in defining the regulatory framework for ASGM. More emphasis on identifying or creating local manufacturing and mining and processing services also will bring more benefits to the country, making necessary equipment more accessible and less complex to obtain, and lowering the finance requirements.

- **Consider tailoring the emphasis given to project pillars depending on the on-the-ground circumstances of the ASGM sector.** Because the pillars of planetGOLD are interdependent, it is important that projects take all pillars into account. However, the emphasis and sequencing of activities under the pillars could be different depending on local conditions. For example, many countries in the early stages of formalization efforts are unlikely to be ready for market-driven supply chain initiatives that require high levels of level conformance with due diligence standards. In such circumstances, greater emphasis and resources could be given first to the formalization and then finance pillar, which both promote legality and responsible practices, a precursor to the due diligence requirements of downstream buyers.

- **Reflect on how to complement the approach of working only with legal/legitimate mining entities, given persistent widespread informality**, either by investing in broader enabling environments or by partnering with other actors to reach more reluctant or remote mining communities. Without addressing this wider universe of ASGM actors, efforts to reduce mercury use at scale will remain limited in reach.

- **Build on efforts to create a better narrative around the benefits of ASGM.** Best efforts should be made to engage with media early, as it can help drive positive impressions of miners among stakeholders and provide consistent messaging from the start.

- **Take into account how new learning and communications technologies** can best used to stretch resources, ease data collection requirements and include broader audiences. Distance learning, 360-virtual tours and 3-D printed models of technology can all be used to stretch training budgets and help increase participation, where connectively allows. Projects should evaluate appropriate digital tools to recommend as part of interventions, from innovative supply chain tools to cutting-edge mercury-free technologies, to digitalized government formalization and data collection platforms.

- **Keep replication in mind.** All planetGOLD projects have ambitious mercury reduction targets. Such targets cannot reasonably be met simply through the direct technology transfer interventions at planetGOLD project sites; rather, achieving large-scale mercury reduction will rely on the ability of the demonstrated mercury-free technologies to be replicated elsewhere, supported by new finance mechanisms to allow new investments and new streamlined formalization approaches to allow more miners to operate formally. Therefore, all interventions undertaken by the planetGOLD interventions, particularly technology transfer interventions, need to be designed and implemented with ease of replication in mind, and results carefully documented so that others can more easily copy success and avoid pitfalls.

Practical Recommendations

- **Initiate the coordination and establishment of cross-programmatic standards** ahead of inception of individual country projects, if possible, so that there is time to establish common branding, messaging, reporting, and indicators well ahead of time, and then adapt as the programme unfolds. Countries have expressed that greater clarity and specificity on global project expectations earlier in the programme would have saved time and allowed them to comply properly from the beginning.

- **Incorporate sustainability considerations from the beginning of the project.** The choice of relevant partnerships and institutional arrangements for all project interventions should take into account how efforts can be taken forward by partners after the project closes. Country projects should create a written exit strategy from the beginning of the project, so that consideration of long-term sustainability is built in from the beginning of the project. The document can be revised over time as the project evolves.

- **Provide sufficient resources for participation across project languages**. This includes simultaneous interpretation during meetings, translation of documents and training materials, captioning of video etc. The establishment of regional gathering spaces (in person and virtual) where people can speak their own language to others who may have similar concerns and issues, can greatly increase active participation among all project and increase understanding. Ideally the global coordination project should include staff fluent in Spanish, English, and French, as well as knowledgeable in the technical nuances of technology transfer, formalization, finance, and due diligence.

- **As the programme progresses, pair advanced countries with similar challenges with those just starting out** to foster cross-learning and knowledge sharing. While each country will have unique legal, social and technical settings, experience has shown that countries can learn and accelerate progress by building on work of other planetGOLD country projects, In addition to regular virtual exchanges through regular regional coordination calls, teams could include visit their peers in the region (financed by country projects) and exchange on key challenges/ recommendations in person, which helps to cement relationships. Creating a common library of practical project management resources such as standard terms of reference for experts, training modules and communications assets (managed by the global coordinating project) could also make project execution more efficient.

- **Streamline project reporting.** As the number of planetGOLD country projects grows, it will become more important to streamline the process of reporting and collating/analyzing cross programmatic indicators. While online reporting of indicators is already available, this could be upgraded to a web portal that directly connects to a dynamic database could ingest and automatically update country and programme wide indicator values as countries input their regular monitoring data.

Conclusion

The planetGOLD programme has advanced the objectives of improving access to financial resources, channeling positive communications, spreading mercury-free mining practices and access to formal gold markets across the programme and beyond. Formalization was confirmed to be the keystone element of ASGM solutions. Some projects overcame significant barriers to formalization, opening opportunities for greater future improvements in all other aspects. Where formalization challenges were greatest, the least progress was made in terms of technological change, but important demonstration sites were developed in all planetGOLD countries that will serve as important examples and training sites that will lead to further replication. The programme also found that technological solutions that match the scale and context of the partner miners, and that integrate capital investments with existing licensed equipment and infrastructure, have the highest impact value relative to investment and therefore are also the most attainable for regular miners and therefore more replicable. Significant progress has been made with respect to finance, especially in creating and applying novel mechanisms in a variety of contexts, but broad adoption by formal public financial entities remains a long-term goal.

As the programme continues, it can be expected to continue to deliver meaningful impacts in each country while also generating more lessons learned about the effectiveness of interventions. The programmatic approach has been shown to be a more effective way to implement globally distributed projects that address a common theme, as it ensures that knowledge is captured, shared, adapted and spread to all parties that aim to eliminate mercury use from ASGM.

Annex 1: Overview of Formalization Priorities and Recommendations

PRIORITY AREA	UNDERLYING ISSUE	RECOMMENDATIONS
Simplify and decentralize formalization	Complex, centralized processes delay or deter formalization, even with support	• Conduct early bottleneck diagnostics • Streamline licensing requirements • Support decentralized responsibilities where needed
Ensure long-term and consistent government ownership and political will	Without consistent government leadership, it is difficult to achieve sustainability of project interventions	• Embed formalization in multiple government systems and with other partners • Use MoUs and steering committees to codify relationships and secure future commitments
Strengthen gender-responsive formalization	Gender inequity weakens sector governance, community resilience, and sustainable impact	• Support women-only and mixed cooperatives • Build women's leadership
Tailor support to mining organizations' maturity and digital needs	Large number of informal mining organizations exceeds available resources, requiring targeted response for progress	• Use tiered models: segment mining organizations by legal and organizational readiness, then design differentiated support pathways • Design digital solutions to be user-friendly and require training on them

Annex 2: Detailed Description of Typical Analytical Methods, Mineral Processing Systems, and Equipment

ORE ANALYSIS TESTS

For ore analyses, different types of tests reveal different relevant ore characteristics. Some tests are used to determine ore/concentrate/tailings grade (concentration of gold and other metals). These tests allow tracking of performance of gold extraction, and where relevant, allow the negotiation of a fair price when selling raw ore, concentrate, or tailings that contain fine gold (see “Ore selling strategy” in the technology chapter).

This is usually done by fire assay, but other methods can be used. Fire assay also indicates the relative concentrations of other important elements that can affect process efficiency (copper and arsenic can make cyanidation unviable) or tailings toxicity (high sulfur concentrations could lead to acid generating tailings that leach toxic metals).

The gravity recoverable gold test uses laboratory gravity concentration equipment to determine the maximum amount of gold that is sufficiently coarse grained and well-liberated from the host ore to be recovered with only gravity concentration methods. This report uses “coarse gold” to indicate gold that is gravity recoverable. Another set of tests can be used to determine gold grain size distribution.

In alluvial mining, knowing gold grain size distribution is the basis for choice of concentration tools. For instance, centrifuges capture more fine gold but cost much more and have limited capacity, whereas sluices are quite efficient at capturing coarse gold for much lower cost and higher capacity. Some projects also employed microscopy, x-ray fluorescence, and other methods to better understand grain shape, mineralogy and chemistry.

KEY GOLD EXTRACTION PROCESSES

Comminution: crushers, ball or rod mills

Hard rock gold ore, usually mined from tunnels or open pits, is mostly quartz vein material with gold grains trapped inside. This raw ore is crushed to the optimal feed size for the grinding mill, which grinds the material for the right amount of time to reduce the ore to the target gold liberation size. The goal is to reduce the size of ore grains in order to maximize the amount of gold that is liberated (no longer joined to lighter non-metallic particles) while minimizing the grinding down of coarse gold particles (fine gold is harder to recover without chemicals.) Finding the ideal liberation size allows optimal recovery of coarse gold by gravity concentration, thus reducing gold lost to the tailings.

Grinding the ore inevitably produces some fine gold, which is difficult to capture using gravity concentration methods alone, and often it leaves 30% or more of the gold in the tailings. Therefore, when discussing the efficiency of gold recovery methods of gravimetric plants, one often refers to the percentage of the "gravity recoverable gold" that can be obtained. For the purposes of this report, we will refer to this gravity recoverable gold fraction as "coarse gold".

Classification and conditioning: vibrating screen, cyclone, agitation tank.

Classification equipment separates ore particles by size so that only material of the ideal liberation size is fed to the concentration equipment. Each piece of equipment in the processing chain needs to be fed grains within a specific size distribution and slurry density. Cyclones also separate grains by size, and agitation tanks mix the slurry to homogenize it and dilute it to the correct density.

Gravity concentration: shaker table, sluice, spiral, centrifuge

ASGM most often mine ore with some relatively coarse gold. Gravity concentration is always the most efficient way to capture this gold, even if the residual gold in the tailings is to be leached out with chemicals afterward. Therefore, gravity concentration is the center of most of the interventions undertaken by planetGOLD.

Smelting: Torch, furnace

This is the final physical separation step, whereby concentrates are melted to form a metal ingot that separates out from the non-metallic components which float to the top.

Chemical separation: flotation, cyanide, glycinate

These methods exploit chemical affinities of gold to separate it from the slurry by dissolution or scavenging with oily bubbles.

TYPICAL EQUIPMENT

Trommel: Sometimes tropical alluvial gold ore grains are cemented together, and these hardened clumps are separated out with a trommel (a rotating screen), fed through a crusher to break up the cemented bits for recirculation back into the sluice.

Crusher: Reduces the size of the extracted mineral rich rock to the optimal feed size for grinding.

Vibrating Screen: Separates ore particles by size in order to create the optimal grain size distribution for gravity concentration and return oversized particles to the crusher or grinder for further reduction.

Grinding Mill: Liberates the gold, usually by tumbling it in a rotating drum with grinding media (steel balls or rods).

Agitation Tank: Homogenizes the mineral pulp and dilutes it to the optimal slurry density for gravity concentration.

Shaker Table: Separates ore particles by density, as the shaking keeps lighter grains moving with the water flow across collection channels in the table deck that trap the gold and push it to the concentrate receivers.

Sluice: Concentrates gold using long troughs lined with carpets that trap gold particles as they wash down the sluice channel.

Z Sluice: Most gold is concentrated in the first meter or two of the sluice before the slurry flow speeds up too much to allow gold to stay trapped in the concentrating medium (carpets and riffles). Adding a second stage forces the slurry to change direction and reduce the flow, thereby doubling the area of most effective concentration.

Gold Cube: This is a small, specialized upgrading z-sluice that forces the gold particles to submerge completely between stages to capture fine flaky gold particles that often float. It is meant only to process concentrates from a larger sluice.

Spiral/helicoidal Concentrator: Concentrates gold using a disk, cone, or drum with spiral channels that counter-rotate relative to the channel spiral so that heavy particles are lifted contrary to the flow of water that washes light particles into the tailings.

Centrifuge: Concentrates gold from the mineral slurry using a rapidly rotating bowl.

Smelting Kit: Melts the concentrate for liquid separation of the gold from the silicate minerals, either by torch or electric furnace. Gold concentrations must be >25% before smelting, otherwise too much gold will be lost to the waste slag.

Lixiviation/cyanidation: Dissolves the gold in the ore, enabling the most complete gold recovery of any method. Cyanide is the most common lixiviant, and so this process is also referred to as cyanidation.

Annex 3: Overview of Technologies Directly Transferred

Table A3.1. Summary of planetGOLD Technology Interventions

COUNTRY	ORE TYPE	% EQUIPMENT ADDED[37]	CAPACITY (TONNES PER DAY)	COST (X1000 USD)	NOTES
Burkina Faso	alluvial / hard rock	100	2	58	Complete plant. Cost includes shipping from Colombia and installation.
Colombia	alluvial	100	1	2	U.S. manufacture. Easily copied. No powered tools.
Colombia	alluvial	100	5	40	Local manufacture with centrifuge from Canada. Integrated circuit on a trailer.
Guyana	alluvial	30	10	160	Concessionaire paid for most equipment and setup. The planetGOLD project added 50,000 USD of mercury-free equipment.
Indonesia	hard rock	10	1	0.2	Micro-cyanidation tanks only.
Kenya	hard rock	100	10	100	Full hard rock plant with grinding and gravity concentration circuits and Indonesian style micro-leaching cyanidation tanks.
Mongolia	hard rock	100	5	175	Cost for complete plant, including major infrastructure and high cost of logistics.
Peru	alluvial	30	4	40	Concentrate upgrading only. Locally manufactured.
Peru	hard rock	50	4	55	Complete plant. Locally manufactured.
Philippines	hard rock	100	5	580	Complete plant including all new major infrastructure, cyanidation, training centre and tailings management.

37 Amount of new equipment added in each plant

Table A3.2. Summary of Equipment Installed for Select Individual Plants

	Burkina Faso	Colombia	Guyana	Indonesia	Mongolia	Peru	Philippines
Crusher	x				xx	x	x
Grinder	x				xx	x	x
Screen	x		x		X	x	x
Agitator					X	x	x
Shaker	x	xx	x		xx	x	x
Sluice	x	x	xx		X		
Spiral							x
Centrifuge		x	xxx				x
Smelting kit	x	x			X	x	x
Cyanidation				x			x
Recovery (%)	80*	85*	80*		90*	90*	95
Total recovery (including lixiviation)				90+			90
Capacity (tonnes per day)	10	5	10	0.15	5	4	5
Base cost (x1000 USD)	47	45	45	<3	175	37	576

**Indicates percentage of coarse (gravity recoverable) gold, which likely entails losses of 30% or more of the fine gold, but the original reports did not specify. Where no * indicated, these are percentage recovery of total (coarse and fine) gold.*

Annex 4: Results of Project Communications Interventions

COUNTRY	KEY COMMUNICATIONS INITIATIVES	ESTIMATED REACH
Burkina Faso	**Radio debates, mercury-free training sessions, mining students forum**	150 trainees, national TV coverage
Colombia	**Colombia Libre de Mercurio**	12,652 (8,103 women, 4,549 men)
Ecuador	**ValORO tu Trabajo, Reglas de Oro**	272 (ValORO tu Trabajo),
Guyana	**Radio shows, VR tour, women's videos**	5,000 (radio), conference audiences
Indonesia	**Door-to-door campaigns**	4,442 people in 6 locations
Kenya	**"Say No to Mercury" campaign, youth digital influencers**	Not quantified (but national scope)
Mongolia	**Art competitions, photo exhibits, forums, digital outreach**	1,065 (photo exhibit), 600 (children), 1.6 million social media views
Peru	**Expedición Mercurio, MAPE sin COVID-19**	58,000 (Expedición Mercurio)
Philippines	**Youth roadshows, Gold Talk, broadcast media outreach, digital outreach**	3 million people (including 400+ students, 60+ journalists)

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