



EGPS
EXTRACTIVES GLOBAL
PROGRAMMATIC SUPPORT

**Achieving Sustainable and
Inclusive Artisanal and
Small-Scale Mining (ASM):
*A Renewed Framework
for World Bank Engagement***



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Roseline Nyambu at her mine in Kenya. Credit: World Bank.

EXECUTIVE SUMMARY

Artisanal and small-scale mining (ASM)¹ has played an increasingly active role in national development and international trade over the decades. As of 2024, those engaged directly and indirectly in the sector's labor value chain make up more than 225 million people working across Latin and South America, Africa, and Asia. Studies estimate that women account for between 18 percent (World Bank 2020, 91)² and 50 percent (IGF 2018) of the 45 million people who work directly in ASM. Artisanal and small-scale miners work in diverse mineral supply chains—ranging from well-known minerals and metals such as gold, cobalt, copper, and semiprecious and precious gemstones to lesser-known materials such as salt, gravel, and quarry rock. Growth in the share of artisanal or small-scale mined material has grown significantly. Take, for instance, gold: in the 1990s, ASM contributed 4 percent of total global supply and now represents 20 percent. Or cobalt: in the late 2000s, ASM contributed 5 percent of total global supply and now represents upward of 12 percent. Or sapphires and diamonds: the ASM supply makes up 80 percent and 20 percent of global supply, respectively. Lastly, ASM-mined tantalum and tin make up 25 percent and 25 percent of global supply, respectively (IISD 2017).

Growth is explained by multiple factors.

Internationally, ASM growth is driven by continued strong demand for a variety of minerals, including gold and technology-dependent minerals such as tantalum and coltan as well as diamonds, precious and semiprecious stones for the jewelry industry. Nationally, across many parts of the world, ASM growth is explained by domestic economic, environmental, and social drivers, including limited job opportunities in rural environments and more recently climate change impacts on farming and other nature-based livelihoods. These factors lead to increased migration into nonfarm economic opportunities. In fact, today ASM is the predominant nonfarm rural income in many parts of the world.

Strong demand presents opportunity to scale up ASM support efforts. Stakeholders are eager to see how support to the sector can be better coordinated, scaled up, and sustained.

Findings from the various consultations and interviews suggest stakeholder appetite for a new approach to support ASM: one that focuses on the professionalization of the sector in service of national development targets such as employment creation, well-being, and revenue generation. Whereas commitment remains to market-linked standards, there is recognition that efforts to build domestic infrastructure for a well-regulated and legal ASM sector deserve more sustained and concerted focus. Specifically, interventions such as environmental and social performance at mine sites, financial inclusion, and domestic trade and commercialization. Emphasis should be on the central role played by government in regulating, monitoring, and fostering the sector's development. Consideration toward incentivizing miners and governments to develop, own, and apply standards designed to improve mine performance and governance are important. Fostering sustainable

and inclusive ASM is possible, but it will require a new way of working, one with a sharper understanding of the objectives at hand. As this paper argues, a general shift in perception is required: moving from viewing ASM as a risk to acknowledging its potential for wealth creation and national development. For that, better data and research will continue to be required alongside reforms to how interventions are conceived.

It is important to take stock of lessons learned from decades of investment support to the sector in favor of sustainable and inclusive ASM in service of national development agendas of client countries. ASM creates jobs, but in its present state it also leaves significant environmental and social legacies that are too costly for governments and mining communities to bear. Concerted efforts to scale and deepen engagements will require a laser focus on topics prioritized by ASM actors and governments: environmental stewardship, occupational health and safety, productivity, and domestic revenue mobilization. Of utmost priority will be sustained support to governments to lead and coordinate technical and financial partner efforts under a coherent policy umbrella including national ASM strategies and plans.

Since the 1980s, the international community has invested over US\$1 billion in support of ASM. The World Bank has financed just over a third of this total investment, with a focus on regulatory reforms and government capacity building. The remaining sum has been spread across a range of donors and topics, including mercury abatement, gender empowerment, child labor prevention, and community engagement. Whereas many stakeholders concede important results have emerged from these hundreds of projects, a sentiment remains that long-term impacts are difficult to identify. Scale and sustainability of ASM programming has been hampered by a variety of issues, including short project durations with small sums of money, the complex operating environment characterized by vested interests and poor governance, the near absence of government involvement in many programs, and the heavy emphasis, particularly in the last decade

or so, on “piloting” approaches without a plan for medium-term scale-up. The donor community could significantly improve impact by pledging commitments to longer-term programming with much more ambitious scales of financing.

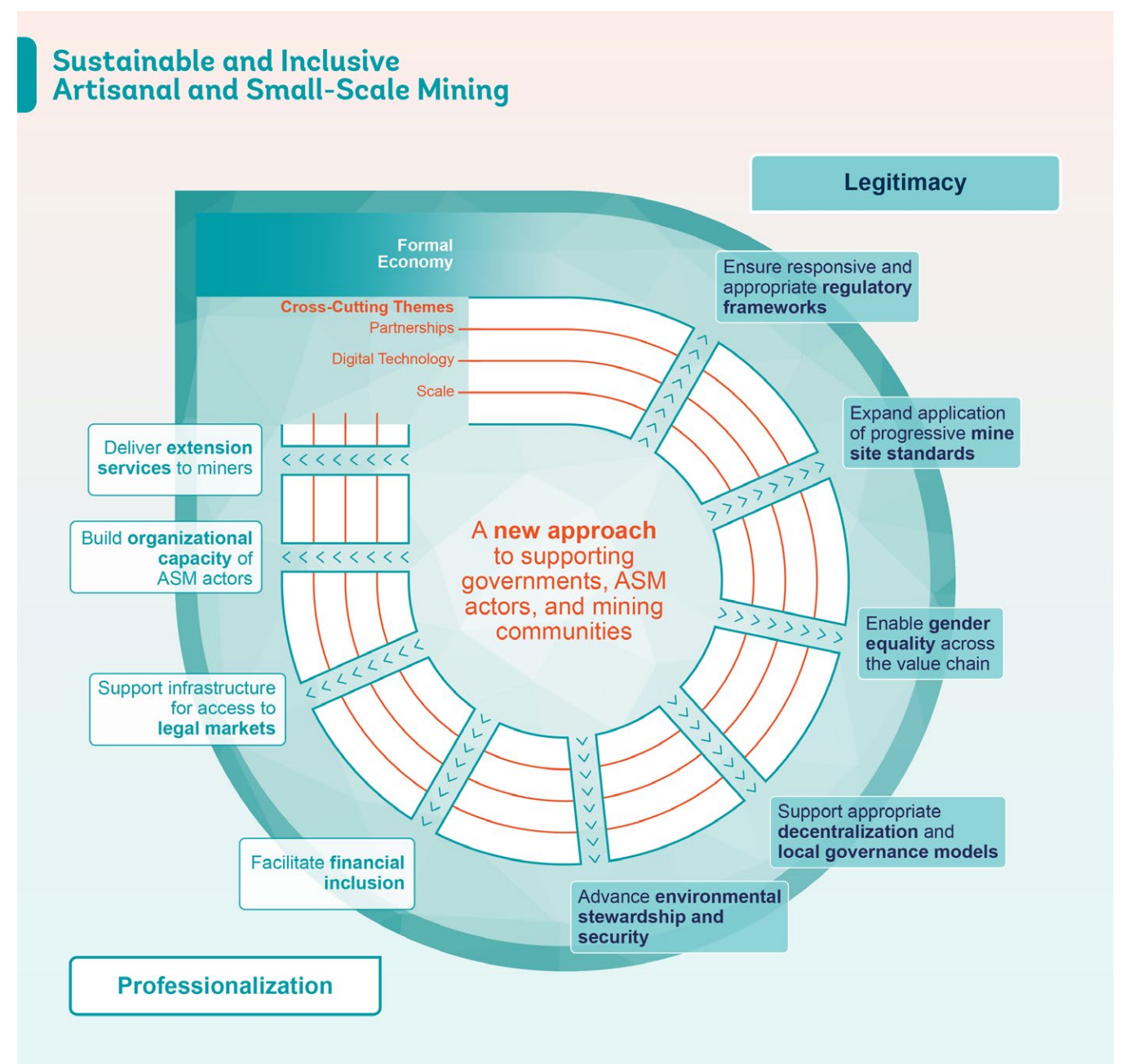
The past 20 years have seen increasing efforts for market compliance and due diligence processes to ensure ASM minerals continue to comply with standards that allow sourcing in global supply chains. The need of downstream end-user and manufacturing companies to mitigate risk related to the sourcing of artisanally mined product for many communication and clean energy technologies has significantly influenced ASM support in the last two decades. Over this period just over 50 percent of all donor investments into the ASM sector have gone to supporting “mine-to-market” programs with a variety of traceability and certification systems tracking flows of ASM material to the end user.³ Some mine-to-market programs have also focused on environmental and social performance at sites—but not all. There is a current need, as expressed by ASM actors and governments, to create better complementarity between international market objectives and those of domestic actors whose objectives are to professionalize the sector for greater national development impact.

Supporting well-regulated and developed ASM will contribute to the World Bank’s goal of a world free of poverty on a livable planet. A new approach to supporting ASM will require partnerships to de-risk investment into the building blocks necessary to improve access for miners and other ASM actors—namely, mine site performance standards, investments in domestic legal markets and regulated finance, and other governance priorities. Fundamental to a new vision of support to the sector is a shared understanding of impacts and how to support governments and ASM actors to address them at the domestic level. There is an important role for the World Bank to play in convening partners around a shared vision of ASM sector improvement—both at the global level and at the country level—in a way that creates the platform for investments to be made and for government to play its central role in sector management.

To achieve a scaled-up approach of investment for our client countries, the World Bank’s engagement with the sector requires a more forward-looking approach: from risk mitigation to development opportunity. In particular, a forward-looking approach to ASM development opens opportunities to (i) marry climate and ASM development agendas through strategies of decarbonizing operations, introducing circularity where appropriate, and regenerative mining; (ii)

leverage digital solutions for improved earnings and access to regulated finance; (iii) progressively improve working conditions on sites; and (iv) create realistic governance models that account for multistakeholder involvement and promote sustainable solutions to security of tenure. The World Bank will continue its support to regulatory reforms in line with the above. A new framework (Figure ES1) for engagement outlines these areas of intervention (and more).

FIGURE ES1 World Bank Sustainable and Inclusive ASM Support Framework



Source: World Bank.

Many ASM intervention areas in the framework are familiar to the World Bank, but others are relatively new. The World Bank will remain

committed to improving the regulatory environment for ASM (Intervention Area 1), capacity building of government and ASM actors (Intervention Area 8), provision of extension services (Intervention Area 9), and gender (Intervention Area 3). The World Bank will also significantly scale up its support to domestic financial inclusion (Intervention Area 6), commercialization (Intervention Area 7) alongside improving mine site standards (Intervention Area 2), environmental stewardship (Intervention Area 5), and local governance (Intervention Area 4).

The recently released One World Bank Group Partnership Charter provides the foundation for thinking big about partnerships. Building on

the charter's principles, the World Bank seeks to be a valued partner across national, regional, and global ASM spaces. Through its commitment to partnership, the World Bank respects the pivotal role of countries and their governments in leading national development strategies and programs while also seeking to leverage the unique strengths of a diverse array of development actors, including multilateral institutions, the private sector, civil society, and NGOs. Given the scale of resources and commitment required to really make a sustainable impact on the sector's development, that multistakeholder partnerships will be critical for unlocking, leveraging, and coordinating a variety of support sources. The World Bank believes by fostering harmonization and alignment across institutions and creating a culture of mutual learning, development solutions that achieve greater efficiency, innovation, replicability, and scale can be found. Partnerships may take multiple forms and consider a range of interventions:

promoting knowledge and data, spearheading new investments in specific technologies or approaches, or scaling up proven pilot models.

To maximize its full capabilities, the World Bank will foster deeper internal collaboration across the International Bank for Reconstruction and Development (IBRD), International Development Association (IDA), International Finance Corporation (IFC), and Multilateral Investment Guarantee Agency (MIGA) to promote financial inclusion, advance gender equality, support the development of small and medium enterprises, and enhance domestic commercialization across the ASM sector. These partnerships will leverage the World Bank's comprehensive development expertise, IFC's private sector investment capabilities, and MIGA's guarantees (political risk insurance and credit enhancement) to investors and lenders to create a robust suite of activities aligned with the ASM support framework put forth.

In short, ASM is vital to global prosperity and poverty reduction, but the sector must also lead in environmental stewardship. As heard from miners and other stakeholders, safety and well-being along with environmental stewardship, increased domestic revenues, and improved productivity will be important outcomes to judge success. These are the incentives that will help development efforts be taken up more readily and widely by ASM actors and governments themselves. World Bank support to country clients will need to be more adaptive in their funding timelines, with a view to scaling from the start to achieve outcomes in the most effective and lean way possible. Importantly, World Bank interventions should be more participatory and ASM actor-centered, given time and resources to build the trust and create incentives for behavior change.



Roseline Nyambu, artisanal miner in Kenya, presents her mined gemstone. Credit: World Bank.

BACKGROUND

The World Bank has engaged in the artisanal and small-scale (ASM) sector since the early 1980s, providing at least US\$320 million in financing to governments, miners, and a range of support partners in more than 31 countries. Most financing has been through lending and grants financing to government entities, with a smaller proportion from trust funds in support of analytic and capacity-building work. Over the course of the same period, the World Bank has also championed several important global ASM initiatives, starting with the Communities and Small-Scale Mining (CASM), Delve, an ASM Emergency Response Window during COVID, and more recently the launch of a new trust fund dedicated to ASM in West Africa and the Sahel region of Africa. The World Bank has also been an important interlocutor and adviser to various international initiatives concerned with ASM, including the Kimberley Process Certification Scheme (KPCS), ITSCi, the OECD Due Diligence Guidelines, and the CRAFT Code. Lastly, it has supported and participated in various public-private efforts to address important environmental and social impacts in mining jurisdictions worldwide.

Despite its impressive support and thought leadership, the World Bank has never articulated its position on the sector. The closest it came to doing so was in 1995, when the World Bank hosted one of the first global roundtables on ASM, in Washington, DC. The conference proceedings paper that emerged, “Regularizing Informal Mining,” articulated the World Bank’s understanding at that time of the sector’s challenges and the ways in which support could be organized. Since then, the World Bank’s approach to supporting ASM has largely followed the paper’s conclusions: (i) regulatory reforms to increase legalization of the sector, (ii) capacity building to government to strengthen its role in regulating and monitoring ASM activities, and (iii) advisory work to government and nonstate actors on environmental and social best practices, including the important topic of gender. Whereas historically the World Bank has focused most of its investment support toward government clients, it has modestly invested, especially in the

last decade, in capacity-building support to civil society and mining-related interest groups such as small-scale mining networks and federations, and Women in Mining chapters that serve ASM membership. Diversification of support signals broader development trends for partnership and multistakeholder alliances to improve general mining sector performance.

Support to a well-regulated and developed ASM sector could help the World Bank and its client countries meet the World Bank’s goal of a world free of poverty on a livable planet. Over the last 50 years, ASM has boosted the economic standing of millions of rural nonfarming communities around the globe. Significant research now shows ASM does so by way of its wealth creation. Across the globe, individuals end up in ASM because of constrained livelihood opportunities in areas that typically have already higher than average poverty levels relative to the rest of the country. Though the informal nature and unmechanized operation

Background

generally results in low productivity, the sector represents an important livelihood and income source for poverty-affected local populations. With more than 45 million people directly employed in ASM on all habitable continents (with up to 50 percent of them women), ASM serves to diversify household incomes to the benefit of upward of 225 million people. It also further creates economic ecosystems in otherwise marginalized and isolated environments by employing an estimated 270 million in indirect and downstream activities (Hilson and McQuilken 2014). By way of these sheer numbers alone, the World Bank’s mandate to *end extreme poverty and boost shared prosperity on a livable planet* could be aided by a more concerted, coordinated, and scaled up support program to the sector.

Given the scale of support envisaged to tackle the key structural challenges facing the sector’s development, the World Bank has an important role to play in de-risking large-scale partnership investments. While ASM is garnering recognition for its wealth creation potential, it also receives significant attention for the environmental and social impacts it engenders when left unorganized and unregulated. For decades, a large amount of support has focused on addressing these impacts through remediation works, abatement strategies, or pure banning of ASM—with few sustainable results to show for it. In more recent decades, the

approach to de-risking has focused on traceability and certification schemes driven by market interests to allow “clean” and “conflict-free” ASM product into international mineral markets. But the pilot nature of many of these projects has inhibited them from catalyzing significant resources to address structural barriers to the sector’s development. Fundamental to a new vision of support to the sector is a shared understanding of impacts and how to address them—namely, to view them as consequences of the sector’s informality, and thus work on the structural challenges preventing the sector from developing sustainably and in a manner that is inclusive and cost-effective. There is an important role for the World Bank to play in convening partners around a shared vision of ASM sector improvement—both at the global level and at the country level—in a way that creates the platform for investments to be made and for government to play its central role in sector management. To achieve a scaled-up approach of investment for our client countries, the World Bank’s engagement with the sector requires a more forward-looking approach to risk: from mitigation to prevention. In the area of environmental impacts, in particular, a forward-looking approach opens opportunities to marry climate and ASM development agendas through strategies of decarbonizing operations, introducing circularity where appropriate, and regenerative mining.



RATIONALE

The impetus for this artisanal and small-scale (ASM) position paper comes as the World Bank's Extractives Unit rethinks its mining for development strategy.

The paper is part of a larger reflective process ongoing in the unit to take stock of interventions and approaches applied over the years, to adapt according to emerging global development agendas, and to refine our offerings to client countries. Practically, the paper dives into several areas of ASM intervention applied across World Bank programs over the last five decades to understand what has and has not worked well. These reflections, however, cannot happen in a vacuum of efforts by other international actors to support the sector. Nor can an internal reflection process disengage from important, ongoing debates about ASM's future. For these reasons, the work to define a World Bank position on ASM development took stock of the literature and debates on ASM and reviewed development efforts of other key partners in support of ASM. Most importantly, our research engaged directly with ASM miners and their governments—our two primary beneficiaries—through quantitative and qualitative surveys to understand needs. Therefore, the paper builds on candid assessments of past World Bank lending and Advisory Services and Analytics, analysis of key ASM debates, findings from in-depth case studies, and outcomes of qualitative and quantitative interviews with a wide variety of stakeholders involved in supporting ASM.

The intent of the paper is to articulate the World Bank's vision for support to ASM and how this translates into a typology of interventions for clients. In this sense, the paper's principal audiences are World Bank Country Management Units and government clients. But given the paper's important findings on support to the sector, secondary audiences include bilateral partners (donors) and the network of stakeholders involved

in ASM who are critical for helping to build a new culture of scaled partnership to the sector.⁴ A new framework of support toward ASM that is intentionally *global and non-mineral specific* synthesizes the breadth of data and findings that emerged from the research.⁵ The framework offers a simple visualization of World Bank intervention areas and describes how partnerships will be key to leveraging resources in favor of scale.



Women miners hauling bags of waste rock from underground tunnels to the surface and depositing on the spoil heap at 3T mine in Rwanda. Credit: James McQuilken/Pact.

METHODOLOGY

The World Bank task team explored the context of artisanal and small-scale mining (ASM) as it stands. This included an inventory and assessment of past practices and support provided to ASM over a 50-year time frame (both internal and external), with a view to discussing avenues for World Bank financing and technical assistance in the future. To achieve this research goal, the team posed two research questions:

- ▶ What lessons can we learn from the last 50 years of support to ASM?
- ▶ What can be the most strategic support offered by the World Bank in support of a new era of ASM development?

Research took place over one year and included the following methods.

Literature Review and Program Analysis

The focus was on understanding why investments in ASM interventions have not brought scalable results. The analysis looked at nine priority areas of interventions: (i) legal and regulatory reforms with focus on security of tenure, (ii) access to finance and markets, (iii) mine services and decentralization, (iv) access to geological information, (v) occupational health and safety and environment, (vi) organizational capacity; (vii) gender equality, (viii) ASM–large-scale mining (LSM) cohabitation, and (ix) public administration of the sector. From the analysis of literature and programs, a phase 1 summary report was developed that

- ▶ Summarized the key debates on the specific formalization topics;
- ▶ Noted where thinking diverges on approaches to each topic;
- ▶ Summarized elements of success (in brief) with citation of concrete examples to support;
- ▶ Described why failures in approaches have occurred; and
- ▶ Developed, for deeper investigation in phase 2, a working hypothesis on why formalization efforts have not led to impact at scale.

Method 1: Literature review on ASM formalization

The team performed a rigorous database search to identify and compile a comprehensive bibliography of literature on ASM formalization from the 1980s to the present. Literature was sourced from available online databases, stakeholder websites, and academic literature to identify relevant academic, white paper, and gray literature on ASM formalization. Cataloged literature was reviewed and analyzed for integration into the phase 1 report.

Method 2: International program scan

The team completed a desktop and/or web-based research on international programs supporting ASM formalization since 1990. The catalog provided details on 248 projects associated with the ASM sector. Information found in the catalog includes program scope, funding envelope, beneficiaries, geographic areas of intervention, and implementing partners.

Method 3: Evaluation of World Bank ASM lending

The team compiled a database of all World Bank lending operations since the 1980s that have had a component on ASM formalization.⁶ As with method 2, the details included scope of lending activities, recipient country, total financing, results frameworks,

and evaluations through available activity completion reports and IEG reports, among others. The purpose will be to do follow-up interviews with select World Bank task team leaders in phase 2 below. A World Bank project evaluation was performed using two main sources of evidence: (i) a portfolio-level document review of past and current World Bank ASM projects, and (ii) interviews with task team leaders who led ASM-related projects and possessed good knowledge of the sector in at least one geography. In total, 55 project reviews were carried out, capturing ASM intervention and stakeholder types included in the project, ASM-related outcomes achieved, challenges faced, and lessons learned. Interviews were held with task team leaders to further understand project-specific successes, challenges, and lessons along with views on the World Bank's future work in the sector.

Method 4: Stakeholder mapping, interviews, and public consultations

Based on the literature and program review and historical efforts through the World Bank's Delve program, the team developed a stakeholder map to codify the network of entities for engagement in the consultation and refinement stage. A series of external consultations were conducted through bilateral discussions as well as structured sessions at prominent mining forums (the World Bank conference "Business Unusual: What Future for ASM Communities Post Covid-19?," Mining Indaba 2023, OECD Forum on Responsible Mineral Supply Chains 2023, Mining Indaba 2024, the London Bullion Market Association and World Gold Council-sponsored Sustainability Summit 2024, and the 2024 Cobalt Congress) to socialize, validate, and refine emerging findings and the support framework. External engagement was held with over 350 individuals from across government, development institutions, LSM organizations, financial institutions, mineral supply chain stakeholders, civil society, academia, and miner groups.

Method 5: Peer review process

In accordance with World Bank protocols, a structured peer review process was undertaken to subject the draft paper to formal review and

comment by external and internal stakeholders. Peer reviewers included external development institutions, sector experts from academia and mining consultancies, industry associations, and World Bank colleagues from relevant Country Management Units and the International Finance Corporation.

Deep Dives and Miner Engagement

Phase 2 built on the literature and program catalogs with the intention to explore more intensely key topics within a working ASM development framework. Analysis of the World Bank and external project catalog applied the development framework to understand historical intervention efforts across geographies, funders, targeted beneficiaries, and implementing entities. The analysis also pursued understanding the lived experience of miners and their future priorities.

Method 1: Miners' survey

A mixed methods survey instrument was developed to solicit miners' perspectives from the Delve Exchange program, with 281 respondents across three different consultation formats (WhatsApp discussions, web-based survey, virtual/in-person forums). Participants represented 34 countries, with about half being women and half being men.

Method 2: Deep dives

Experts were asked to develop deep dives on specific topics as background papers. The topics were (i) extension services, (ii) land tenure and regulatory frameworks, (iii) access to finance, (iv) digital technologies and gender, and (v) ASM-LSM coexistence.

Outputs

In addition to the main report, research outputs included (i) the ASM literature review, (ii) an international program catalog, (iii) a World Bank project evaluation, (iv) a stakeholder map, (v) the miners' survey findings, and (vi) five stand-alone deep-dive papers.



ASM gold miner in Zimbabwe. Credit: Maggie Dougherty/Pact.

WHAT IS ASM AND HOW DOES IT CONTRIBUTE TO DEVELOPMENT?

Artisanal and small-scale mining (ASM) is a term used to define a range of mining activities that employ basic tools for extraction and processing with a tendency toward high labor intensity. ASM can include men and women working on an individual basis as well as those working in family groups, in partnership, or as members of cooperatives (OECD 2016, 65). ASM operations can employ as little as a few people to several thousands. Most ASM, due to constraints in effective regulation, occurs informally; or when in protected environmental areas such as national parks or preserved ecosystems, illegally; and when supporting armed groups, illicitly. Though methods used to mine tend to result in low productivity, the sector represents an important livelihood and income source for poverty-affected populations. With the effects of climate change on farming and other nature-based livelihoods, and the subsequent increase in migration to other economic opportunities, ASM has become the predominant nonfarm rural income in many parts of the world.

Artisanal and small-scale miners make up the world's largest mining workforce. Industrial mining employs about 7 million people worldwide, whereas ASM is the primary source of employment for at least 45 million people across 80 countries, with regional employment as share of global estimates as follows: South Asia, 15.9 million (36 percent); East Asia and Pacific, 13.9 million (31 percent); Sub-Saharan Africa, 13.2 million (29 percent); and Latin America and the Caribbean, 1.7 million (4 percent) (World Bank 2020). When combining ASM's direct labor figure with its indirect one—at least a further 134 million and perhaps as many as 270 million people (depending on the multiplier used) are supported in service and downstream industries (World Bank 2019a, 71)—the scale and possibility of ASM's contribution to economic growth takes on greater significance. Attention has traditionally focused on minerals

used in major international supply chains and important end products, though it should be noted that ASM equally plays a very important role in “development” minerals. In fact, artisanal and small-scale miners are vital in providing raw minerals for modern-day communications, low-carbon and clean energy technologies, construction materials, and luxury jewelry goods. Illustrative examples include gold and gemstones found in jewelry (Ghana, Indonesia, Malawi, Myanmar, the Philippines, Tanzania, and Zambia, to name but a few); tin and tantalum for laptops, smartphones, and electronic devices (Democratic Republic of Congo and Uganda); cobalt (Democratic Republic of Congo), lithium (Zimbabwe and Nigeria), rare earths (Burundi and Myanmar), mica (Madagascar), and manganese (Indonesia) used in the batteries of electric vehicles; phosphates for fertilizers vital to agriculture; coal (India) essential for energy

production; salt (Uganda) for domestic and international consumption; and stone aggregate for road construction and housing (World Bank 2020).

Women make up a significant portion of the global ASM workforce. Studies estimate that women account for between 18 percent (World Bank 2020a, 91)⁸ and 50 percent (IGF 2018) of the 45 million people who work in ASM. The large range indicates the dearth of gender-disaggregated data, which partly obscures women's visibility in the sector. Women's contributions to the sector are largely overshadowed by the act of extraction, such as digging, which is almost exclusively undertaken by men. As such, women's work has been relegated to the periphery both literally and metaphorically—even though they often perform strenuous and sometimes dangerous manual tasks, such as sorting, crushing, grinding, milling, washing, sieving, sluicing, sieving, panning, concentrating gold (which often requires the use of mercury or other toxic chemicals), and transporting. Women also provide cleaning services and sell food and other goods on site (Jenkins 2014; IGF 2018). Increasingly, women are assuming roles more upstream in the value chain, such as pit bosses, mine owners, and financiers, but their percentage remains small compared with their male counterparts (Gouby 2024).

ASM has only increased over the decades.

ASM has played a central role in rural economic development for decades, and its role is only growing larger as the world's economies become more interconnected. In the late 1990s, the International Labour Organization (ILO) estimated that upward of 13 million people worldwide were engaged directly in the sector (ILO 1999). Today, that figure is estimated to be at least 45 million direct laborers. As highlighted above, ASM product is notable in many important supply chains and its contribution continues to rise. Take, for instance, gold: in the 1990s, ASM contributed 4 percent of total global supply and now represents 20 percent. Or cobalt: in the late 2000s, ASM contributed 5 percent of total global supply and now represents upward of 12 percent. Or sapphires and diamonds: ASM supply makes up 80 percent and 20 percent of global supply, respectively. Lastly, ASM-mined

tantalum and tin make up 25 percent and 25 percent of global supply, respectively (IISD 2017).

Despite the sector's significance to domestic and international economies, ASM remains largely misunderstood and underrepresented in development debates. Unlike large-scale mining (LSM)—which benefits from decades of industry efforts to build the evidence base for its contribution to sustainability⁹—ASM's importance has yet to be communicated. Take, for instance, jobs, where the international community concerned with ASM has for decades relied on old, recycled data sets (World Bank 2019a). Or consider fiscal revenues, where most ASM-produced minerals exit countries unofficially, or are underreported, making revenues largely impossible to quantify. Little recorded evidence exists in literature on the contributions ASM operators make to infrastructure development—though anecdotal and observational data from site visits record how ASM operators play a central role in infrastructure development (clinics, schools, and so on) in areas otherwise largely not accessed by government services. A few dedicated research projects have also shown how ASM catalyzes an entire ecosystem of new small businesses in mining areas. But the research on these various topics remains too little to paint a comprehensive global picture on ASM's contribution to national development.

Instead, public reporting and perceptions of ASM tend to emphasize the sector's disproportionate negative impacts.

As summarized in the *2019 State of the ASM Sector* report (World Bank 2019a), ASM was initially considered a “dirty, destructive and illegal” activity, and the scant early scholarship on the sector echoed these sentiments (Noetstaller 1995). Since ASM first attracted academic scholarship in the 1980s, the sector has remained marginalized on the periphery of international development agendas (Hilson and McQuilken 2014), largely because of the lack of complete, accurate, and reliable data (World Bank 2019a). Instead, the negative environmental impacts (Meech, Veiga, and Tromans 1998; Veiga and Hinton 2002; Chenje 2000; Guenther 2019), poor working conditions (World Bank 2020; ILO 1999), child labor (Hilson 2012; Pact 2016; HRW

2015), and adverse health and safety effects (Bose-O'Reilly et al. 2008; WHO 2016; van Straaten 2000) have captured the greatest media and academic attention. As a result, the narrative surrounding ASM has tended to focus on its negative impacts rather than its positive development potential (de Haan, Dales, and McQuilken 2020).

For these reasons, the World Bank founded Delve in 2016 with the objective of shining a light on ASM's contribution to global development.

Delve (www.delvedatabase.org) has led the way in facilitating the collection and exchange of data on ASM hitherto unavailable in the public domain and/or accessible electronically. Its launch has inspired researchers and development practitioners to conduct surveys, and to gather and share the economic, social, and environmental data collected. Users have access to a centralized gateway of aggregated data on the sector's contribution to global development with transparent sources. The initiative's biannual flagship report, the *State of the ASM Sector*, provides a detailed analysis of the sector's contributions to specific Sustainable Development Goals (SDGs).¹⁰ Through partnerships with national practitioners, a series of country profiles have been developed. These profiles provide a succinct introduction to ASM in specific national contexts and showcase available data sources.

Because of dedicated academic research programs and data initiatives like Delve, a collective picture of ASM's contribution to development is slowly emerging. The most important being realistic employment statistics. Delve's first task was to shed light on the "recycling" of ASM data that had plagued the sector for decades. As the first *State of the ASM Sector* report declared, "the ASM sector faces a wide-ranging global data gap...defined by the near total absence of national and subnational baseline exercises that collect qualitative and/or quantitative data, and the corresponding lack of data shared collectively in the public domain" (World Bank 2019a, 1). Based on a call to action in 2019, Delve was able to update ASM employment statistics by soliciting contributions from recent research onto the site. Acknowledging that gaps continue to persist, it was nonetheless the first time

aggregate jobs numbers could be made available with transparent sources coming from fieldwork and publications. Furthermore, indirect labor statistics are also more reliable with work done to agree on the multiplier used to calculate indirect jobs in ASM (World Bank 2019a; Philipps et al. 2001). During the COVID-19 pandemic, Delve trialed a global data collection exercise in over 30 ASM countries to understand the constraints miners and mining communities were facing. Most recently, the *2023 State of the ASM Sector* report collected primary data on the topic of gender (World Bank 2023a). Through these types of exercises, a clearer picture of ASM is slowly emerging—one that recognizes how dynamic and resilient the sector really is.

A second approach to improving ASM data has been a steady application of in-depth surveys in mining communities to understand the economic relationships underpinning the sector's operations and their contribution to fiscal revenues. Country case studies now elucidate the value ASM brings to local economies. In a study of Kenya, for example, Alliance for Responsible Mining (2017) concludes that ASM gold in the mining village of Osiri alone injected US\$1.9 million per year into the local economy. Whereas, in the same study, at the district and national levels, ASM gold mining generated US\$37 million and US\$225 million per year, respectively. Gemstone mining in Taita Taveta generates a production value of US\$120 million per year, of which roughly US\$50 million per year is spent locally. It is estimated that ASM gold and gemstone mining nationwide together generate a foreign exchange influx into the country in the range of US\$500 million per year. In Uganda, clay brick production and gold production in the Karamoja region alone inject US\$500 million and over US\$15 million, respectively, into local economies annually. In the Central African Republic, as much as US\$144.7 million may be injected into the economy from informal artisanal diamond mining revenues and spin-off economic enterprises (Barreto et al. 2018c). Lastly, in Mongolia, more than 60,000 artisanal miners of gold, coal, fluorspar, and other minerals are estimated to contribute more than US\$811 million per year to the country's GDP, with an additional estimated US\$505 million spent in local economies near mining activities (World Bank 2012, 4).

A third approach has been the use of qualitative and quantitative methods to establish ASM miners' earnings and spending patterns. One notable methodology, that of Financial Diaries, has been applied to several ASM contexts in Africa (Ghana, Liberia, Malawi, Mali, Sierra Leone,¹¹ and Mozambique).¹² Appealing for ASM research has been the method's ability to track, longitudinally, income earned from miners, and equally importantly, to gain understanding of how miners choose to spend their earnings. With a similar goal in mind, the life histories methodology has been used to create a picture of how ASM has lifted people out of poverty and the way miners choose to redistribute their earnings into livelihood diversification and wealth creation (Perks 2019; Hilson 2016; Hilson and Maconachie 2019; Hilson and Hu 2022). Based on a wide variety of site-level surveys, it is possible to claim that ASM provides well above any rural income alternative (Banchirigah 2008; Hilson and Banchirigah 2009; Barreto et al. 2018c; Carson et al. 2005; Cartier and Bürge 2011; Hilson 2011; Perks 2011a; Perks 2019; Tschakert 2009) with earnings ranging from US\$70 a month to over US\$1,000 a month in countries such as Burkina Faso (Luning 2008), Côte d'Ivoire (Helbig de Balzac 2023), Democratic Republic of Congo (Perks 2011a; Geenen 2014; IPIS 2014; Radley 2019; de Brier et al. 2020; Radley 2020), Ghana (Bansah, Yallah, and Dumakor-Dupey 2016; Bansah 2019; Owusu, Bansah, and Mensah 2019), Rwanda (Perks 2019), Tanzania (Phillips et al. 2001; Fisher et al. 2009; Bryceson and Jönsson 2010), and Uganda (Barreto et al. 2018b). Additionally, a variety of studies suggest that miners perceive themselves more well off than farmers (Geenen, Stoop, and Verpoorten 2021) and believe themselves to earn more (de Brier et al. 2020; Barreto et al. 2018c; Hilson 2011; Tschakert 2009; Perks 2019).

A fourth approach has been the use of case studies to illustrate the relationship between ASM and key SDG indicators. Building on the recognition of ASM's complex and diverse ecosystems, targeted case studies generate practical context-specific insights to inform and inspire broader development policy and practice. As a core feature of the *State of the ASM Sector* reports, 42 case studies have highlighted the

work of academics, mining associations, and development practitioners from 22 different countries since 2019. Case studies profile countries and showcase the work of organizations to achieve decent work (SDG 8) and gender equality (SDG 5). Together these works form both a record of ASM's development importance and a call to action to improve its performance in relation to the SDGs.

A major policy conclusion drawn from these various research methods is that ASM creates wealth in service of miners, their families, and the ecosystem that supports the trade of ASM-produced minerals to the international markets. It does so in three principal ways. First, mounting evidence shows how miners reinvest profits from mining back into their operations to increase productivity. This, in turn, sees earnings rise. Second, miners prioritize human development needs in their families, and often do this despite not having been afforded the same opportunity as children. Schooling beyond basic primary education is one of the biggest investments miners make, and it is not gender discriminated (Perks 2019; Barreto et al. 2018c; Dales and Ramasamy 2019; Stylo, de Haan, and Davis 2020; Zolnikov 2020). Other investments are in assets such as brick houses, vehicles to improve mobility, and "luxury" consumption items like beer, sugar, bread, and so on added to the household diet on a regular basis (Phillips et al. 2001; Walsh 2003, as cited in Hilson and Maconachie 2019; Dondéyne and Ndunguru 2014; Perks 2019; Hilson and Hu 2022). Third, miners use proceeds from mining to diversify their household income. Agriculture (Maconachie and Hilson 2011; Perks 2019; Harris 2019) and small businesses are the two most common alongside purchasing of land. Instances are common where miners will put their spouses in charge of these secondary income streams, and miners will often also provide capital for their sons and daughters to start businesses of their own after they graduate from school. If better supported, ASM's contribution—particularly to domestic resource mobilization—could be even greater.



Artisanal miner panning for gold in Ghana. Credit: Morten Larsen/World Bank.

CONSTRAINTS FACING THE ASM SECTOR

Core to the development challenge facing the artisanal and small-scale mining (ASM) sector is the failure to find appropriate space—both literally and figuratively—for it to flourish in a well-regulated manner.

A policy tension has historically existed for mineral-rich host governments: finding the right degree of support toward both large-scale mining (LSM) and ASM activity. Except for a few countries, the international community and host governments have over the last five decades tended to prioritize the former—given the tangible benefits LSM investment can offer in terms of employment, revenues, and foreign direct investment (FDI)—resulting in timid policy responses and limited program interventions for ASM. Regrettably, and as this paper outlines, most of these policy and programming responses have been incapable of legitimizing and legalizing ASM in domestic mining economies. As discussed in more detail below, major barriers to achieving a formal ASM economy have been, but not limited to, (i) onerous and unrealistic processes required for ASM operators to gain security of tenure and be in compliant, (ii) under-capacitated government services, and (iii) lack of geological data to identify suitable mineralized deposits. Despite these barriers, however, ASM has only grown in scope and scale: from an estimated 13 million miners in 1999 (ILO 1999, 80) to 45 million in 2024. Today, it has assumed the position of top nonfarm rural income in many parts of the world.

A chief constraint facing the sector's formalization is geological knowledge on, and availability of, mineralized lands that can be tenured for ASM actors. This constraint has several underlying factors—including ineffective policies and regulatory frameworks,¹³ lack of support toward geological works on suitable areas, and underperformed or failed attempts at creating ASM spaces. Another important factor is the perceived overabundance of mineral claims resting in the hands of foreign industrial mining companies where mineralization is perceived to be exceptional. A surveyed Peruvian miner underscores this point with his response to how licensing processed could be improved:

“The right of everyone to have the opportunity to exploit’ does not exist because many industrial mines concessions occupy large territories [even] when they are not [actively] working.”

One of the most disturbing consequences of a lack of tenured ASM areas has been increasing conflicts between ASM and LSM actors across jurisdictions in Africa, Asia, and Latin and South America. These conflicts, often on industrial concessions or directly adjacent to them,¹⁴ can manifest as vandalism to property, sabotaging of LSM operations, stealing of mineral product, and demonstrations blocking road access.

The worst forms of violence are intimidations targeted at industrial mining employees on sites, personal attacks (sometimes resulting in death) on employees, and arson. Governments, industrial companies, and international partners have tried many different ASM-LSM solutions but with limited results to date (Perks 2011a; Mutemeri and Perks, forthcoming). The World Bank and the International Finance Corporation (2009) and the World Gold Council (2022) have published lessons learned on pilots to create viable coexistence models that provide a glimpse of potential pathways for future work. As ASM grows in scale and demand, it is increasingly caught in direct competition with LSM interests for political and geographic space. Because of the rise in conflicts, and the poor results achieved through heavily focused police and military responses, several LSM industry associations (and their members) are increasingly prepared to engage more proactively on ASM coexistence approaches should the right legal frameworks be in place to support their efforts.

Even if appropriate areas are available for ASM actors, the categories of permitting along with the provisions for legalization are simply too onerous and restricting to make compliance possible. Most mining legislations foresee at least one ASM category, but some have two, differentiating between “artisanal” and “small scale” using a combination of the criteria.¹⁵ ASM licenses are exclusive and limited in duration, but the duration is much shorter than for an industrial operation. Most artisanal licenses are granted on a yearly basis, and small-scale licenses are perhaps granted for up to three years. The division between artisanal and small scale also creates impediments to “upgrading” and introducing improved mining techniques. By defining artisanal licenses as nonmechanized, mining codes essentially condemn miners to practicing illegally or practicing with rudimentary techniques, which given the activity remains largely unmonitored, leads to significant environmental degradation,¹⁶ with enormous resource wastage through “high grading,” which can render otherwise payable ground unpayable, or perpetually mined. Such practices also violate circular economy principles and thus are a barrier to resource efficiency.

The paper’s findings point to the excessively complex administrative and bureaucratic procedures for licensing that are often out of reach for the average miner. Eighty-one percent of miners surveyed for this position paper cited processes taking too long as the most common difficulty encountered with obtaining or renewing a license. In fact, after access to finance, obtaining a license was the most frequently cited barrier miners experienced, with most respondents from all regions surveyed characterizing the licensing process as difficult or very difficult because of the overabundance of steps along with the costs. Licenses are usually issued in a centralized manner involving multiple agencies, with miners’ having to travel great distances to navigate multiple ministerial offices to complete paperwork. In addition to licenses, many mining jurisdictions require miners and buyers to get separate identity cards, which must be renewed on an annual basis.

Without security of tenure, and a clear understanding of the geological potential, ASM operators cannot mobilize sufficient regulated financing to run viable operations, nor are they incentivized to be compliant. In the absence of regulated financing, miners rely on cash sponsors and illicit financing sources to carry out their activities. Many miners have financier relationships that they have built up over time. Overturning these in the absence of viable domestic buying and financing solutions is simply not realistic, and trying to do so can often cause further conflict in mining communities in the short term. With these types of financing arrangements, miners and government lose out. Miners continue down paths of short-term mining investments with few insights into building a fully sustainable operation that adheres to high environmental and social standards. Environmental and social legacies accumulate, making it more difficult for governments and miners alike to contemplate addressing them in a holistic, cost-effective fashion. As time goes by and negative impacts accumulate, governments are forced to choose more drastic solutions—repressions, raids, and violence—which may temporarily halt negative practices but not resolve the underlying structural problems in a meaningful way. Once governments have turned their attention elsewhere, miners

resume old practices. In order to to widen alternative financing options, significant volumes of public and private sector financing instruments need to engage with the domestic markets to facilitate two things: (i) investments in sustainable ASM operations, and (ii) domestic buying capacities by both private and public sector actors that can facilitate sale into legal international markets. But the scale of investment required necessitates quite a concerted effort at the national level to de-risk the sector.

Artisanal and small-scale miners face disproportionate health and safety risks resulting from regulatory inattention and a deficit of capacity support. Informality, poverty, and a lack of technical and financial support are the key underlying factors that drive injuries, fatalities, and recurring illness in mining areas (Hilson and McQuilken 2014; Singo et al. 2022). In fact, beyond efforts to eliminate the use of mercury use in artisanal gold mining, few efforts have been made to address occupational health and safety (OHS) associated with ASM comprehensively.¹⁷ As a result, informal ASM operations often use materials and methods that put the health and safety of the miners and those around them in danger. Worse still, many countries do not have established compliance mechanisms and reporting systems for miners, and few if any facilities or resources exist to address health and safety problems in the ASM sector. Therefore, many ASM-related accidents, fatalities, and ailments

are likely undocumented and underrepresented in national and international statistics. Consider research published by the World Bank in 2020 that quantified for the first time the relative safety of the ASM sector, estimating a fatality frequency rate (FFR) of 0.47–0.64. This rate is 10 times higher than current-day LSM but is comparable to LSM FFR rates in the 1960s as well as with many modern occupations like fishing and logging in the United States today (World Bank 2020, 27).

The gendered division of labor, anatomical and biological differences, employment patterns, cultural beliefs, societal roles, expectations, and responsibilities contribute to gender-specific patterns of OHS hazards and risk. Often these differences result in differentiated, and sometimes higher, risks of negative OHS impacts in ASM for women. Such health and safety risks extend beyond OHS to include social protection where rates of sexual and gender-based violence (SGBV) are increasingly well documented but remain overall unaddressed (World Bank 2023a). The International Labour Organization’s conventions on workers’ rights and elimination of child and force labor (ILO 1998), along with its mining sector-specific conventions (ILO 1995) and guidance on health and safety in mines (ILO 2001), are often cited as standards, but in reality these forms of guidance for governments lack specificity when it comes to their actual application.

TABLE 1 Internal and External Factors that Influence the Severity and Character of Impacts

External Factors	Internal Factors
Fragility of the ecosystem	Size and scale of the operation
Prevalence of extreme natural events (e.g., floods, droughts)	Stage of the mining life cycle
Vulnerability of surrounding communities to reduction or degradation of key ecosystem services impacted by artisanal and small-scale mining (e.g., water scarce regions)	Level of mechanization
Political interference, corruption, instability, conflict	Appropriateness of technology in use
Degree of regulatory oversight and enforcement	Level of professionalism of the organization (as a factor of organization, formalization, and capacity)

Source: World Bank.

When poorly managed, ASM can have wide-ranging and severe environmental impacts with local and global consequences.

Such impacts include water contamination, deforestation, and other habitat destruction, hydromorphological change, and air pollution. An ASM rush in some geographies can completely denude a forest or productive agricultural land, causing an almost irreversible land-use change. On the other hand, research by the World Bank (2019b) found that against a backdrop of rapid environmental change, the presence of ASM in forest ecosystems can slow the pace of change as it can inhibit other natural resource-dependent livelihoods (for example, charcoal making, logging). The research also found that the types of impacts and their severity (that is, scale, scope, and degree of remediation) and character (that is, permanence, frequency, acuteness, direct/indirect/cumulative) differ according to a range of internal and external factors, such as those in table 1.

Land degradation is often the most visible environmental impact of ASM, especially when resulting in tropical deforestation.

Broadly speaking, ASM's impacts are broken down into three categories: land, water, and air (table 2). These first-order impacts can have additional impacts on ecosystems and the services they provide nearby communities. ASM rushes tend to trigger the most rapid land degradation. For instance, as recently documented in Côte d'Ivoire, an artisanal and

small-scale gold mining area of over 447 hectares in April 2021 increased to over 6,834 hectares by August 2022—an estimated increase of more than 1,500 percent in eight months (World Bank Group 2023). In the Peruvian Amazon, artisanal alluvial miners cleared around 40,000 hectares of forest between 2001 and 2014 alone, in many cases within protected areas or in their buffer zones (Álvarez-Berríos, L'Roe, and Naughton 2021). Deforestation is particularly impactful in its scale, as it is driven by the need to clear land to reach subsurface minerals in alluvial mining and to obtain both mine support and housing materials in the adjacent communities that expand with mining rushes.¹⁹ Miners typically employ uncontrolled felling of all types of tree species (Ouattara et al. 2022). All these actions lead to loss of vegetation and ecosystem damage. Water-related impacts include increased sedimentation from river dredging and inadequate solid byproduct and wastewater management practices in land-based mine sites. Wastewater after mineral processing is typically discharged into the soil or directly into water bodies (rivers, lakes, ocean). Such disturbances of the hydrographic network result in the loss of biodiversity of these aquatic environments and pollution of community water sources. The latter occurs as unregulated ASM activities release overburden material, wastewater (which may contain heavy metals, and in the case of gold mining, mercury and cyanide), and sewage into nearby streams and rivers. Mercury can also accumulate in fish, poisoning downstream

populations that consume them. Additionally, mine sites can continue to contaminate well beyond their productive life, as ASM miners rarely have the motivation or financial and technical means to secure or rehabilitate sites to diminish their environmental impact after they leave. As a result, the mines can prevent nearby communities from using the land for productive agriculture or other livelihood means and reduce environmental security and health by exposing them to contaminated soil and water well after miners are gone.

Environmental impacts frequently lead to new or the intensification of adverse impacts on people and thereby poverty.

When ASM changes the environment, it often affects local communities' access to the ecosystem services they depend on, which in turn affects food security, access to clean water, exposure to health hazards, livelihood, business viability, and more, resulting in elevated risks of social and economic impacts and conflict. Women and children, already vulnerable to severe social risks in ASM communities, are typically disproportionately adversely affected by environmental degradation.

While most mining jurisdictions have institutional structures dedicated to ASM regulation and support, these services typically lack capacity and appropriate tools to truly monitor and improve the sector's performance.

Constraints to government capacity include (i) a lack of trained personnel and equipment to conduct fieldwork and provide training and education to ASM communities; (ii) limited infrastructure to support extension services in rural settings, such as transportation and communication networks; (iii) limited capacity by government agents to provide effective extension services, including the ability to develop and implement policies and programs, and to monitor and evaluate the effectiveness of those programs; (iv) lack of communication and consultation on extension service design, which means many programs are not tailored to the specific needs of miners; (v) training and education materials often in a written form that may not work well for illiterate mining populations to manage ASM on their own, especially considering the disperse and rural nature of many ASM operations; and (vi) building

the right incentives for miners to change behaviors at site. This is particularly true for environmental performance, where most environmental standards applied to ASM are derived directly from industrial mining and are simply too cumbersome and costly for miners to comply with. Vested interests and poor governance of mines and the surrounding communities also make regulating the sector extremely difficult.

Digital solutions and information technology (IT) infrastructure have not been sufficiently applied (and studied) to assess their ability to solve ASM constraints.

Increasingly over the last decade, there has been a rise in piloting of various digital solutions to the ASM sector, including, to name but a few, (i) the use of mobile phone technologies to reach miners with knowledge and best practice at ASM sites, (ii) investment in communication infrastructure and digitization of permitting processes to facilitate remote licensing, (iii) one-stop-shop approaches to registration, (iv) access to finance through mobile banking, and (v) remote sensing technologies for monitoring sites.²⁰ While it is believed that the adoption and implementation of digital technologies within the ASM sector potentially presents a significant opportunity to elevate the productivity and incomes of ASM operators, little applied research has accompanied these small pilots to know how effective and scalable these solutions might be.

Gender inequality remains a major challenge.

Although women constitute a significant portion of the ASM labor force and meaningfully contribute to the productivity of the sector, there is a serious lack of recognition of their value, ultimately hindering gender equality. SGBV, modern slavery, forced labor, and indebtedness are all commonplace in ASM, with gender inequality and GBV in a complex by-causal relationship. Operating under the cloak of invisibility, women have been left out of policy discussions, national legislation, development interventions, and research agendas (Hinton 2011). To this end, researchers caution that policies seeking to realize the sector's potential may unintentionally further marginalize women if gendered dimensions are not considered (Hilson et al. 2018; Buss et al. 2019; Bashwira Nyenyezi and

TABLE 2 Summary of Typical First-Order Environmental Impacts from ASM

Land	Water	Air
Land degradation including deforestation and forest degradation	Blocking, diverting or damming riverways	Diesel and other fossil fuel emissions
Top soil removal	Disturbance of riverbanks and the substrate, leading to increase of sediment in waterways	Particle dust pollution
Sediments and erosion	Contamination of water through mining waste, such as mercury and cyanide use	Pollution due to burning of heavy metals and gaseous pollutants
Soil contamination		Noise pollution

Source: World Bank.

Akilimali 2023). The *2023 State of the ASM Sector* report goes even further to provide analysis of select national mining codes and land ownership frameworks; it finds that, respectively, 67 percent and 80 percent of these frameworks are gender-blind or gender-neutral (World Bank 2023a). Encouragingly, the same report provides emerging evidence of government’s inclusion of women in development of formalization interventions,²¹ though it cites concerns regarding institutional and financial capacity to advance gender equality through policy and programs. Beyond government efforts, it is critical to recognize the voice and agency of women who choose to work in the ASM sector. Mining organizing structures representing women’s interests, whether at a national or subnational level, have proven to be an important vehicle for improving women’s visibility in ASM and enhancing voice and agency (World Bank 2020).

Increased discussion over potential penetration of ASM economies by illicit financial flows (IFFs) has drawn attention to the security dimension of ASM once again. Armed conflict and its relationship to ASM has influenced ASM development responses over time, starting with the “blood diamonds” crisis in West Africa in the 1990s followed by the two wars in the Democratic Republic of Congo. Of late, attention has turned to West Africa and the Sahel—particularly the relationship between violent extremist groups and jihadists and illicit ASM gold. Bilateral donor action to address the concern has risen in the last few years. For instance, in 2023 the US government issued its latest gold directive, signaling concern about IFFs in the global gold trade. Alongside these types of political measures, some bilateral donors are drawing funds from security and stability departments to fund ASM interventions in bordering states around Burkina Faso, Mali, and Niger. But understanding (and then tackling) the problem is complex. IFFs are multidimensional, comprising several different kinds of activities, blurring appropriate courses of action (UNODC and UNCTAD 2020). In fact, IFFs linked to the ASM sector can take on many different forms and there is a vast assortment of actors exploiting the ASM sector, both in degree and culpability. These actors range from small-time buyers illegally smuggling

minerals across borders to designated terrorist groups directly engaging in ASM or extorting ASM operators (GI-TOC 2017). It is therefore extremely difficult to track and value IFFs linked to ASM.

More data and research are required to understand the full extent of the link between armed groups and ASM illicit flows. Whether to do with gold and West Africa and the Sahel or the 3Ts in the eastern Democratic Republic of Congo once again, the international community still struggles to fully identify and understand the problem of (in)security and ASM (Mavrellis 2021). For instance, the United Nations Environment Programme (UNEP) and Interpol estimate the illegal exploitation and trade of mineral resources at US\$12 billion to US\$48 billion annually (Nellemann et al. 2016, 20), but these are thought to be gross underestimates. Gold has received the most attention in seeking to value IFFs from the sector, especially from ASM. For example, the Global Initiative against Transnational Organized Crime valued illicit gold mining in nine Latin American countries alone at roughly US\$7 billion a year (GI-TOC 2016). A more recent report by SwissAid (2024) suggests that more than 435 tons of gold was smuggled out of Africa in 2022—equivalent to more than a ton day—which, at the price of gold on May 1, 2024, corresponds to a value of US\$29.6 billion effectively being lost to African countries. Furthermore, as stated above, it is difficult to differentiate between small-time smuggling to extremist capture. It is clear that the issue of IFFs and the potential link to security requires considerably more dedication for data collection and research, including, as SwissAid (2024) points out, agreeing on methods for quantifying ASM production and trade.

Governments’ interest in developing ASM is rising again. The motivations lies in three key topics: (i) domestic resource mobilization, (ii) border stabilization, and (iii) job creation. As concerns the first, careful consideration must be given to establishing an attractive fiscal regime (both for mining and for small businesses) that incentivizes ASM actors to mine and sell legally into the domestic market. Considerable evidence demonstrates that high ad valorem rates and

operating taxes only cripple development of the sector and drive ASM actors into informal and illicit trade channels. It is also important to consider benchmarking against neighboring mining jurisdictions to reduce competition for cross-border capture. Regarding the second topic, points have been made above about the potential relationship between armed groups, terrorism, and other violent extremism and mining in fragile border areas. Governments that wish to capture more domestic resource mobilization will equally need to address security imperatives and tackle vested interests in established trade chains. As concerns the third topic, as discussed in the preceding chapter, wealth creation is an important outcome of ASM activity. With rural landscapes shifting because of climate change and the increasingly fragile role of agriculture in rural economies, ASM presents an important income alternative or diversifier. But to ensure that jobs created are meaningful, governments will need to focus on creating a professional cadre of ASM actors and investors who can champion environmental and social standards on mine sites in compliance with international mine standards and best practice.

Strong demand presents opportunity to scale up ASM support efforts. Stakeholders are eager to see how support to the sector can be better

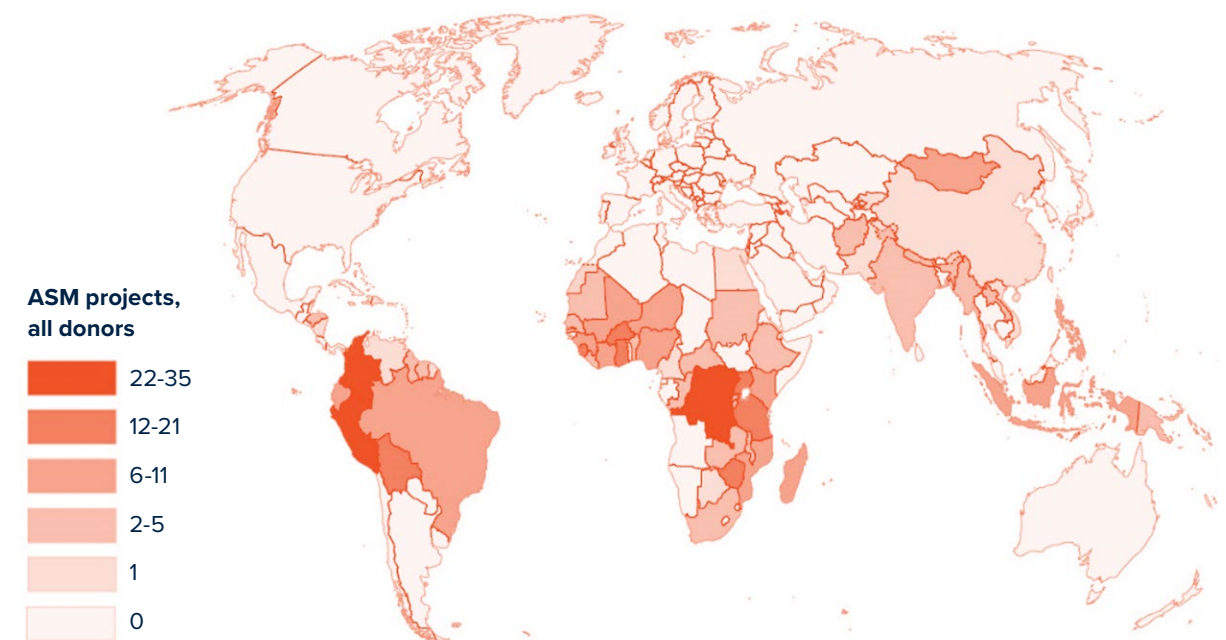
coordinated, scaled up, and sustained. Findings from the various consultations and interviews suggest stakeholder appetite for a new approach to support ASM: one that focuses on the professionalization of the sector in service of national development targets such as employment creation, well-being, and revenue generation. Whereas commitment remains to market-linked standards, there is recognition that efforts to build domestic infrastructure for a well-regulated and legal ASM sector deserve more sustained and concerted focus—specifically, interventions such as environmental and social performance at mine sites, financial inclusion, and domestic trade and commercialization. Emphasis should be on the central role played by government in regulating, monitoring, and fostering the sector’s development. Consideration toward incentivizing miners and governments to develop, own, and apply standards designed to improve mine performance and governance are important. Fostering sustainable and inclusive ASM is possible, but it will require a new way of working, one with a sharper understanding of the objectives at hand. As this paper argues, a general shift in perception is required: moving from viewing ASM as a risk to acknowledging its potential for wealth creation and national development. For that, better data and research will continue to be required alongside reforms to how interventions are conceived.



RESPONDING TO THE CHALLENGES OVER THE DECADES: FORMALIZATION

Since 1982, the international community has invested at least US\$1 billion in supporting the artisanal and small-scale mining (ASM) sector. Even then, this is a modest estimate given data limitations. The research for this paper identified 318 projects as implemented between the 1980s and 2020s—248 of them implemented by international partners and 70 through the World Bank. But of the 248 projects implemented by international partners, only 32 percent had available financial data, totaling US\$726 million over the period. Gold has been the main mineral of international partner support. The World Bank’s support over a similar period totaled another US\$320 million. Therefore, given that only a third of international partner support can be quantified, it is quite likely that total support has exceeded well over US\$1 billion since the 1980s. Whereas the World Bank has focused support primarily on governments (80 percent of projects supported government institutions and reforms), other donors focused more on miners (63 percent of projects worked directly with miners).

FIGURE 1 Geographical Distribution of ASM Projects Implemented by All Donors, 1982-2024



Source: IBRD 47723, December 2023.

Whether World Bank or other donors, geographic focus has predominantly been Africa. In fact, 53 percent (160 projects) of all World Bank and other donor projects cataloged have been directed to Africa over the last five decades. The World Bank has worked on ASM in at least 17 African countries and other donors have worked in at least 29 (figure 1). Beyond Africa, other donors have worked extensively in Latin America and the Caribbean (31 percent of non–World Bank projects), while the World Bank focused on global projects (18 percent of World Bank ASM projects) and East Asia and the Pacific (13 percent of World Bank ASM projects). Low coverage of South Asia by all donors should be seen as a missed opportunity, given the region hosts roughly 15.9 million artisanal and small-scale miners, representing 36 percent of the estimated global ASM working population (Delve 2024).

Overall support to the ASM sector has increased over time. For non–World Bank projects, the trajectory of project growth has been impressive, rising from only two funded projects in the 1980s to 128 in the 2010s. The World Bank similarly ramped up funding from only two projects in the 1980s to 37 in the 2010s. However, for the World Bank, since 2020, no more than two ASM projects have been approved in any year, whereas the 2010s saw six years with three or more ASM projects approved (figure 2).

Whereas formalization is by far the most popular term used to describe efforts to support ASM, it does not have a universally agreed definition. The term has come to capture a range of interventions to support and develop a well-regulated ASM sector. But despite the decades

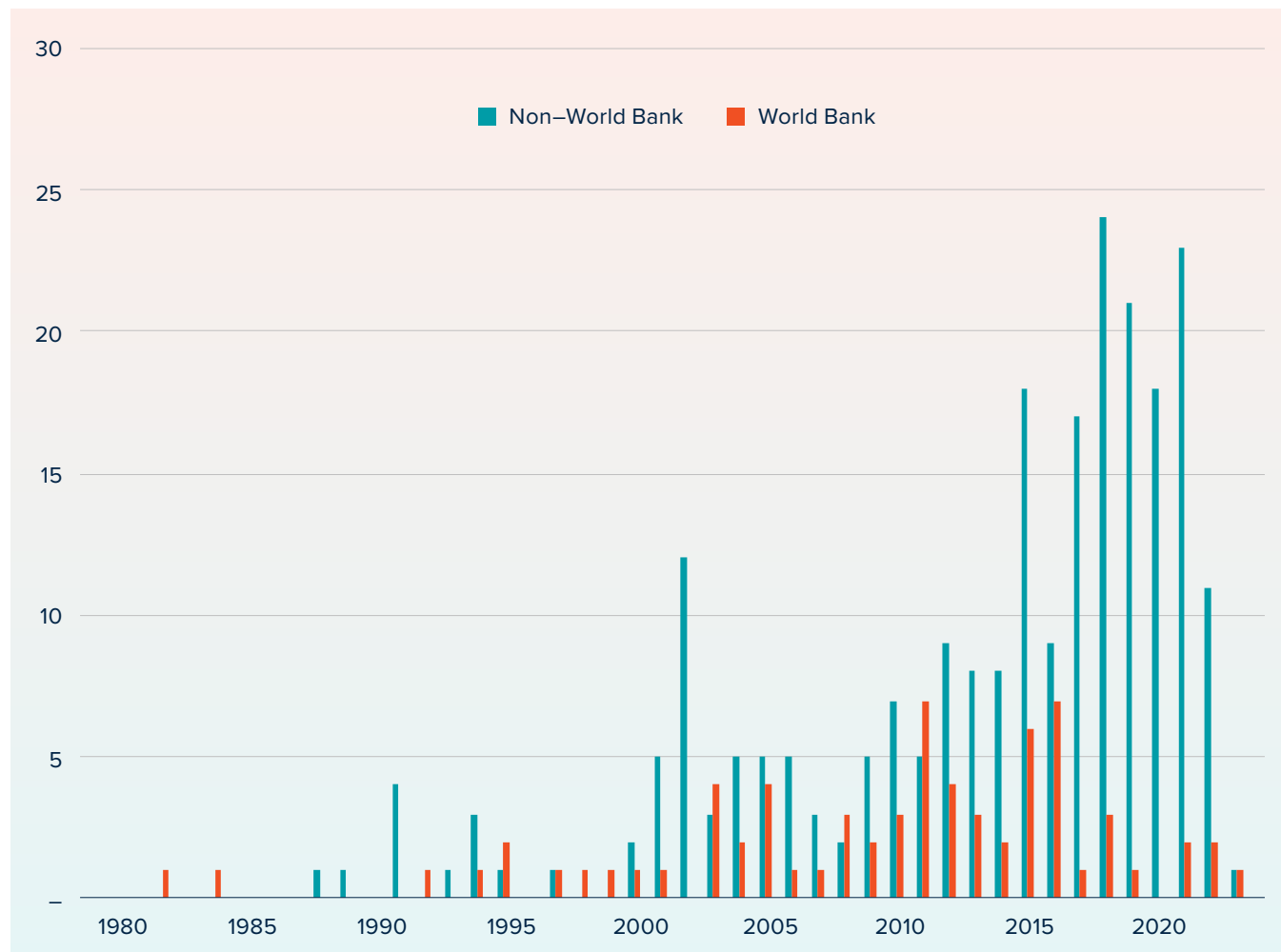
of the term’s use, there remains no consensus on what formalization *actually* means. For instance, during stakeholder consultations, 35 ASM “formalization experts” were asked to define the term. Thirty-five different definitions were given, expressed by variations in approaches, themes, and narratives.²² However, despite the lack of a universal definition, most practitioners and policy makers agree on a broad set of interventions to govern support to ASM (see figure 3). Broadly speaking, these are summarized through various approaches to supporting ASM as outlined below.

of focus. Compared with these other donors, the World Bank had little focus on market access and connecting miners to service providers. Among all donors’ projects, integrating market access along with gender in ASM have increased over time, demonstrating the international shifts in the sector (as explored in the paragraphs below). Notably, the percentage of all donors’ projects focusing on environmental protection has dropped over time as donors have integrated a wider range of formalization interventions into their projects.

Formalization interventions applied in projects have reflected broader development policy influences over time. The broader development paradigms in place at any given time have largely influenced the extent to which certain interventions (and not others) have been prioritized in ASM programming (see figure 5 and annex). Early days of support—which emerged largely out of the World Bank and some United Nations’ agencies in the late 1970s and 1980s—privileged entrepreneurship development, the notion being that small-scale miners could be assisted in growing their activities through investments in technology and improvements to site operations. It was a “mine

World Bank ASM projects integrated on average four distinct formalization interventions into their projects. In general, World Bank projects showed a more holistic project design compared with other donors—integrating four formalization interventions into a given project compared with on average only two formalization interventions into a given project by other donors. Other donors focused mostly on organizational capacity development²³ (36 percent), improving and enforcing mine site standards²⁴ (30 percent), market access²⁵ (26 percent), and operational capacity development²⁶ (25 percent). Figure 4 summarizes these areas

FIGURE 2 World Bank and Non–World Bank ASM Projects Approved by Start Year



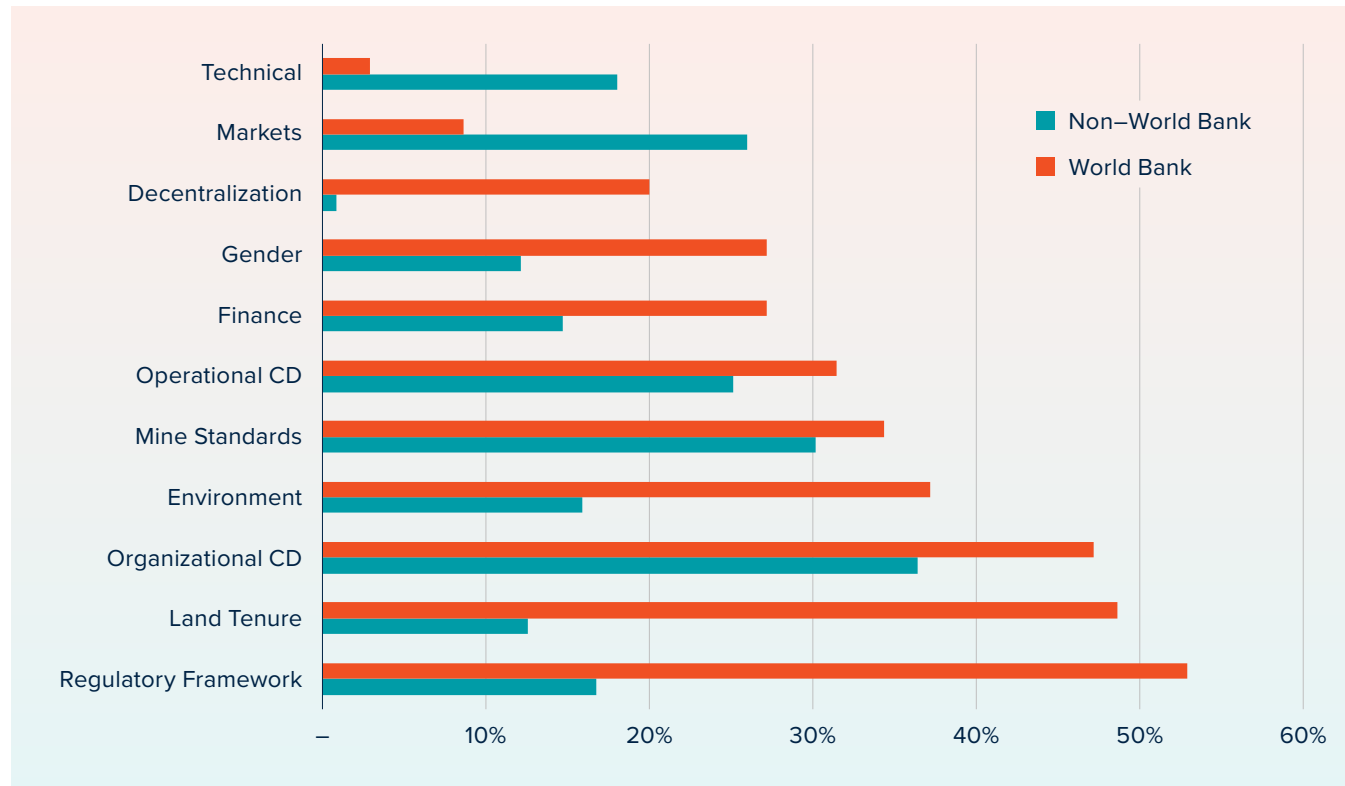
Source: World Bank.

FIGURE 3 15 Most Common Formalization Interventions



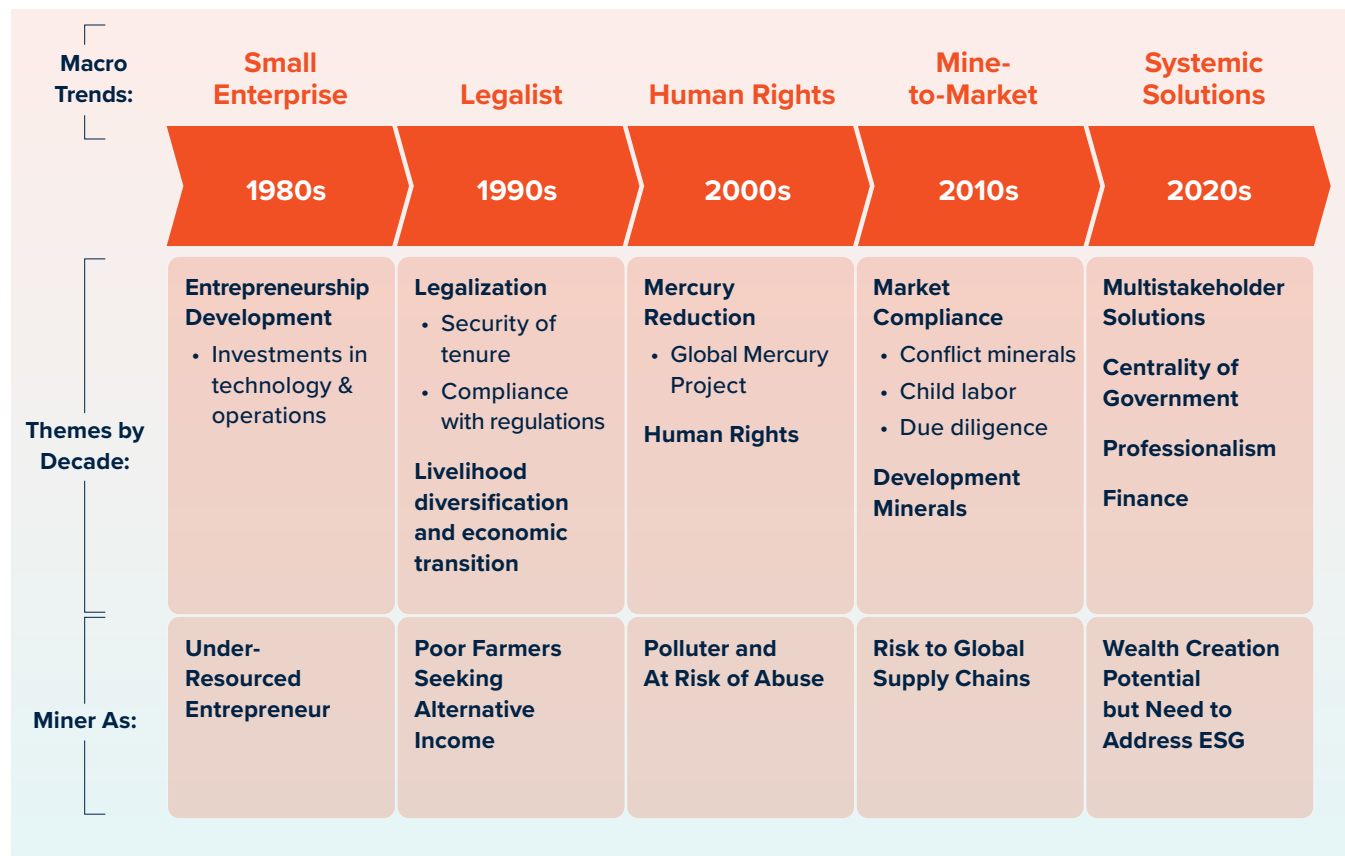
Source: World Bank.

FIGURE 4 Percentage of ASM Projects by Formalization Intervention, 1980s-2024



Source: World Bank.

FIGURE 5 ASM Formalization Approaches Over Time



Source: World Bank team. Note: ASM = artisanal and small-scale mining; ESG = environmental, social, and governance.

development” approach that mimicked conventional, private sector–led approaches to mining writ large. For this reason, ASM formalization was first articulated as a process consisting of actions that would progressively bring informal mining activities into the fold of statutory regulation (Davidson 1993; Barry 1996; Hinton, Veiga, and Veiga 2003; World Bank and IFC 2009). Securing tenure—through appropriate mining permits or titles—has traditionally been considered the first, and most important, step in formalizing ASM. Other activities under a process of formalization would typically include geological information support, environmental and social standard setting and compliance, mining techniques, and basic organizational development of small-scale mining entities (Barry 1996).

Past formalization efforts reviewed for this paper confirm this early-days approach centered on security of tenure and legalization. An analysis of the World Bank portfolio showed that 63 percent of its past ASM lending operations focused on reforms to regulatory frameworks, with 54 percent of the same lending operations also focused on mining tenure and 59 percent of project focused on capacity building for mining organizations to legalize. In this sense, most World Bank past support was on *legalization* of the sector, and such an approach aligned well with the World Bank’s position at the time (Barry 1996). But it did lead to siloed responses in projects, with the example of the Mining Sector Development and Environment Project highlighted in box 1.

By the 1990s, however, global debates on poverty reduction gained prominence, influencing a formalization approach focused less on entrepreneurship and more on livelihood diversification and economic transition. This formalization approach assumed that most miners had “fallen” into ASM because of poverty, and that by extension, if alternatives were proposed, miners would simply transition out. What practitioners failed to realize was that “mining itself [was] the alternative livelihood,” in that it was the most accessible, lucrative opportunity for many in the face of failing economies, expanding populations, and rising poverty. Efforts to redirect miners into other livelihoods have failed to appreciate

BOX 1 World Bank Project Focus: Addressing Environmental Damage and Miner Health in Ghana

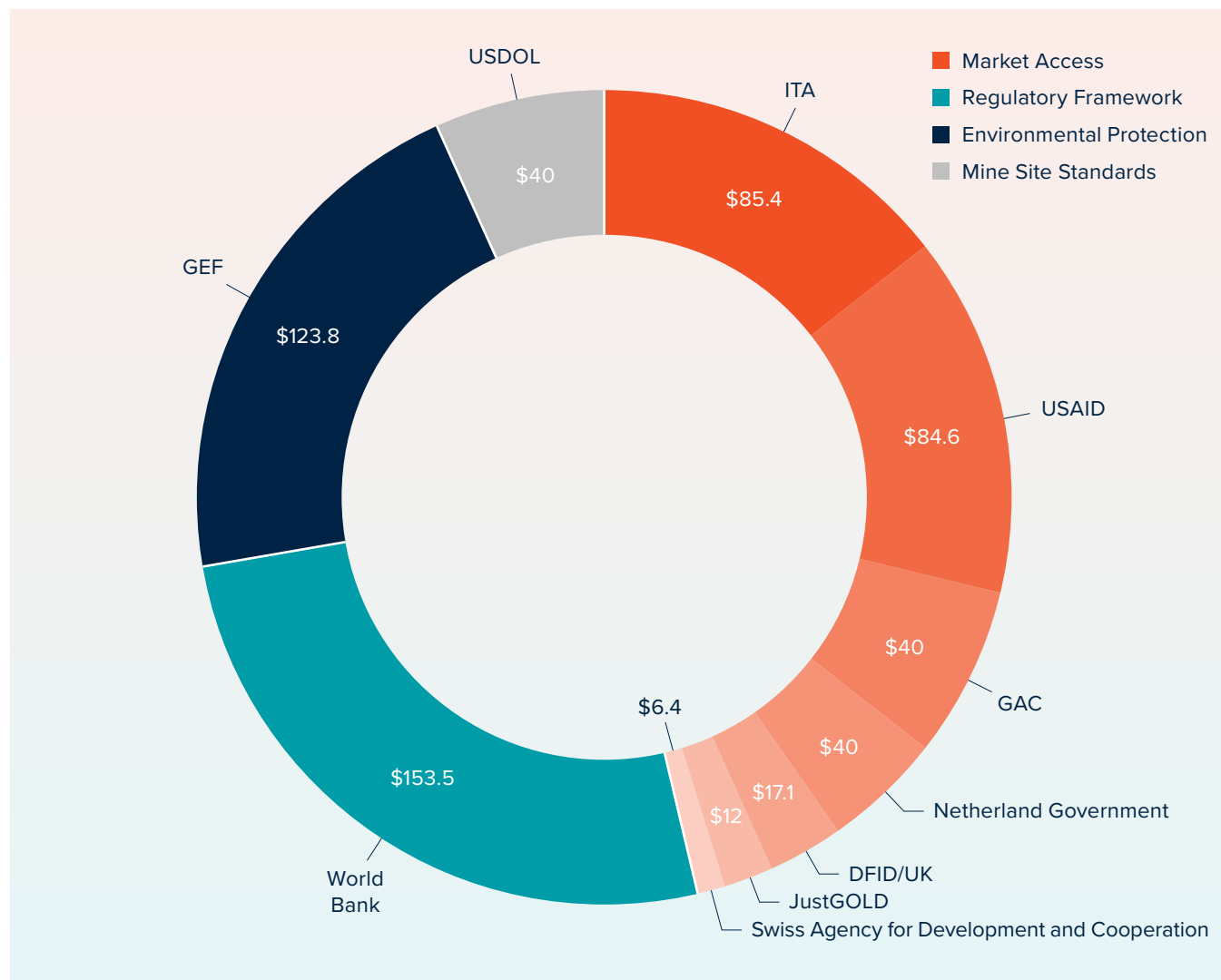
The Mining Sector Development and Environment Project (MSDEP; P000966) was an example of a 1990s–2000s artisanal and small-scale (ASM) project that focused narrowly on environmental and social concerns within the sector. The project, implemented 1995–2001, aimed to build capacity of Ghana’s government to encourage environmentally sound investments in the sector and support ASM techniques to improve productivity and reduce environmental impact. As assessed by the project’s Implementation Completion Report (ICR) at completion and the Project Performance Assessment Report (PPAR) (completed post-completion in 2003), the government capacity-building activities providing equipment and geophysical surveys were quite successful, with the PPAR finding improved capacity in the Ministry of Mines to “police and enforce” mining regulations. However, technical support to miners was largely unsuccessful, as miners found introduced ore processing equipment, glass retorts, and facemasks designed to reduce use and exposure to mercury to be too expensive, fragile, and difficult to use in their local conditions. The PPAR noted that a more holistic approach could have been more successful, especially focusing on access to financing as a model for encouraging sustainable uptake of non-mercury equipment, noting that “successful adoption of the machinery would have required either some form of credit scheme for the sale of the equipment, or the setting up of a service provider to own, operate and rent the equipment out for a fee.”

the level of infrastructure, capital, and market access required to outcompete ASM's livelihood appeal (Siegel and Veiga 2010). In fact, the sheer multiplication of ASM workers across the globe from the 1990s to the late 2000s complicated such a formalization approach, as ASM cemented itself as the dominant nonfarm income source in rural settings around the globe.

The past 20 years have seen increasing efforts for market compliance and due diligence processes to ensure ASM minerals continue to comply with standards that allow sourcing in global supply chains. The need of downstream end-user and manufacturing companies to mitigate risk related to the sourcing of artisanally mined

product for many communication and clean energy technologies has significantly influenced ASM support in the last two decades. Over this period roughly 50 percent of all donor investments into the ASM sector have gone to supporting “mine-to-market” and “mine site standard” programs with a variety of traceability and certification systems tracking flows of ASM material to the end user (see figure 6).²⁷ Some programs have incorporated environmental and social performance at sites—but not all. There is a current need, as expressed by ASM actors and governments, to create better complementarity between international market objectives and those of domestic actors whose objectives are to professionalize the sector for greater national development impact.

FIGURE 6 Known ASM Project Funding by Donor (US\$, millions) and Primary Intervention Area, 2010-2024



Source: World Bank.

In the mid-2000s, an important program attempted to draw attention away from “conflict,” semiprecious, and precious minerals.

Launched in 2015, the ACP-EU Development Minerals Programme, financed by the European Commission and the United Nations Development Programme (UNDP), marked another shift in the ASM development agenda with its recognition and focus on development minerals, domestically mined and consumed minerals, and materials critical for infrastructure development that are dominated by informal artisanal and small-scale quarry workers. For example, in Uganda the economic contribution of the ASM development minerals is seven times the value of official production of all minerals and 4.2 times the value of unofficial artisanal gold production (Barreto et al. 2018b). Development minerals have long been obscured by a focus on metals, energy minerals, and precious gemstones, which represent a minority of global mineral production. The ACP-EU program mobilized partnerships and organizations to raise awareness of the development mineral sector, produced a collection of valuable national baselines assessments, and contributed to a significant uptick in policy reform across several countries (Franks 2020). While the ACP-EU Development Minerals Programme continues with the launch of a third phase in 2024, further research, resources, and actions are needed to elevate the sector's importance on the ASM formalization agenda.

The COVID-19 pandemic lockdown proved an important testing ground for new approaches to support ASM communities. At the height of the initial lockdown, as mineral prices dropped and mining sites closed, artisanal and small-scale miners, their families, and their communities suffered significant declines in income and rising food insecurity, as surveyed by the World Bank and partners.²⁸ The World Bank responded rapidly with the only global emergency response effort for ASM communities during COVID.²⁹ The emergency response supported the efforts of 33 international, regional, national, and local organizations to assist ASM communities in 22 countries in four regions. Support provided to partner organizations allowed artisanal and small-scale miners to continue

working during the pandemic, improve a range of organizational and site practices, and build long-term resilience to shocks. Results from the two-year response period were considerable, but what stood out was the untapped benefit of technology to truly transform the lives of miners, particularly women. Of note were the economic benefits miners experienced as a result of digital trade platforms introduced in Malawi, Tanzania, and Zambia for the sale of gemstones,³⁰ and the establishment of the first global network for miners powered by social media.³¹ A second important lesson was the demonstrated effectiveness of working with local organizations, especially Women in Mining chapters, which played a critical humanitarian role on the front lines of ASM communities during COVID. The success stories that emerged out of the pandemic became an important inspiration for the World Bank to think differently about support to the sector.

Today discussions around formalization are moving back to those early days of professionalization, but with much more deliberate integration of regulated financing and market access. Based on stakeholder consultations, emphasis once again is on how best to incentivize miners and governments to develop, own, and apply standards designed to improve mine performance, with third parties bringing services to ASM operators to build capacity and open trade opportunities. Findings from the various consultations, interviews, and project reviews suggest appetite for a new approach to support ASM: one that combines several components of approaches championed during past decades with emphasis once again on the central role to be played by government in de-risking investment into the sector, facilitating the domestic ecosystem required to market ASM products and finance the sector. It is anticipated, given the scale of resources and commitment required to really make a sustainable impact on the sector's development, that multistakeholder partnerships will be critical for unlocking, leveraging, and coordinating a variety of support sources.



THE MISSING MIDDLE: WHY SUSTAINABILITY AND SCALE SEEM ELUSIVE

The “missing middle” refers to factors that have impeded the ability of the international community to scale up artisanal and small-scale mining (ASM) interventions and observe sustained outcomes over the last 50 years. Over the course of the research, interviewees and project records confirmed that there is no shortage of positive examples of ASM interventions achieving genuine success across a variety of intervention areas. At the same time, many stakeholders observed that project success was often limited to a small sphere of influence. Repeatedly, stakeholders expressed frustration that while ASM projects delivered good results, formalization efforts were unable to move beyond pilots. Many stakeholders expressed a desire to see much more scaled-up interventions in ASM communities commensurate with both the size of the problems being addressed and the potential of the sector to contribute to development. Therefore, it was important to gain an understanding from stakeholders on the major factors leading to limited scalability and sustainability of interventions over time.

The five most recurring factors cited by stakeholders over the course of the research:

1

The relative infancy of formalization interventions

2

Lack of well-calibrated incentives for behavior change

3

Lack of long-term vision to graduate out of pilots

4

Absence of government at the center of many formalization efforts

5

The complexity of the sector, including vested interests, which are difficult to address in a project context

First, despite five decades of investment, formalization remains in its infancy. Several individuals interviewed during the research said how development of the ASM sector is in its infancy compared with other rural development activities such as small-scale farming or forestry. Such infancy has engendered the following: (i) a high level of competition among intervention practitioners who are figuring out their core competencies; (ii) a high level of risk aversion among funders to engage with a sector they do not have experience with, which therefore leads to (iii) the funding of small pilot projects with short time frames and disconnected from many other institutional processes; (iv) a high degree of ill-informed interventions resulting from a superficial understanding of the drivers and constraints to ASM in specific intervention locations; (v) a lack of cohesive narrative on ASM that connects projects across a common understanding of formalization; and (vi) little well-documented best practice that practitioners can then build on for replication effect.

Second, the incentives for miners to formalize are not well calibrated. In several intervention types studied—such as regulatory frameworks related to mining and land tenure, mine site standards, safeguarding the environment, and geological and technical support—evidence shows that attempted improvements failed to scale up or could not be sustained because they lacked sufficient buy-in from artisanal and small-scale miners. As highlighted earlier, for instance, regulatory frameworks created systems that were too onerous and expensive for miners to comply with, permitting offices were not close enough to mine locations, mine site and environmental standards were too complex, and interpretation of geological data was too difficult to access and understand. With most governments unable to fully monitor ASM and enforce stringent policies, informal miners had little incentive to comply. This is not to say that reform of the sector is not important, nor that miners are not keen to improve practices. Rather, there has been less engagement on the fundamentals of ASM as a business with results that demonstrate profitability is possible while also being legal and compliant.³²

In this sense, the cost for miners to engage with formalization interventions has often outweighed the benefits of doing so because compliance and reforms have a price that does not always solve the commercialization challenges they are facing. Not only does the disconnect in understanding the purpose of formalization stifle miners' motivation to engage; it can in some cases be unaffordable. The heavy focus over the last few decades on standards, due diligence, and market compliance criteria has fundamentally faced this challenge where projects to improve traceability of mineral supply chains come at a high cost of doing business for miners but is not accompanied by measures to improve business and operational constraints of mining operations.

Third, formalization interventions are not designed with scale in mind. For most of the last 50 years, the ASM formalization community has been in a learning phase, attempting to establish a “winning formula” for formalization. Such experimentation requires rapid, low-cost micro-interventions where organizations isolate and test a set of strategies and tactics. Whereas the pilot approach has merit within a larger trajectory of medium-to-long-term interventions, today pilots have become the norm in many instances for formalization efforts. The result has been a series of one-off interventions that are funded and last one to three years. Usually, these have been costly and not necessarily fit for scaling up. Some stakeholders went further, arguing that pilots should only be allowed if nestled within a longer-term commitment framework to build learning and relationships with government, ASM communities, and other interventions. Many stakeholders remarked that the large-scale mining industry employs a long-term commitment trajectory, so why should ASM be any different?

Fourth, a good number of projects over the last decades have failed to engage substantively with the actor most critical for ASM success: government. Most stakeholders consulted, even miners themselves, conceded that despite the fraught political economy of ASM, government remains the most critical actor who can make the sector succeed in the long term. Yet, they

also conceded that government is not brought in early enough to the formalization processes. This has particularly been the case in the last two decades, when more and more ASM formalization interventions have relied on market forces and measures to create domestic pressure for reforms—whether through traceability or transparency of supply chain schemes. The exception to this observation is the OECD Minerals Guidance, where host governments both negotiated protocols and introduced policies to embed the guidance at the national level. Though working with government may seem more difficult, government can, if properly engaged, play an extremely important influencing role, as highlighted repeatedly by World Bank staff interviewed for this paper—everything from reforms of policies and legislation to setting the tone for formalization to take place. As noted by many stakeholders consulted, national frameworks for formalization led by governments are critical to sustainability, yet few exist in practice. For these reasons, one of the key principles for future support to ASM by the World Bank will be ensuring the “centrality” of government alongside miners in meaningful creation of development programming.

Fifth, external factors often contribute to challenging project implementation conditions. Project assessments commonly cited external factors that were considered beyond project control as significant limiters to success and sustainability. ASM is a complex sector with many stakeholders and cultural and political differences subject significantly to a variety of forces beyond the control of major stakeholders. Such forces include frequent government turnover and administration change, poor governance, vested interests, political maneuvering and disagreement, changes in commodity prices, conflict, fragile situations, and the disperse nature of ASM—all of which challenged projects by the World Bank and other donors. Successful projects demonstrated pre-implementation investments in policy research and stakeholder consultation to understand how different actors benefit from the status quo and if the implementing institutions have sufficient leverage to overcome entrenched power dynamics to benefit the poorest and most vulnerable stakeholders. Ensuring political will at the start, flexibility during implementation, and long-term engagement all appeared as mitigation measures to counteract, to a degree, these challenges.



WHAT DO MINERS SAY?

Hearing the voices of artisanal and small-scale miners is critical for understanding past formalization measures and reimagining support to the sector in the future. Miners' perspectives were captured through a global survey across 34 countries that explored experiences, perceptions, barriers, and future priorities. Notwithstanding inherent limitations in respondent biases (due to access, literacy, and language) and the rich diversity of experiences across this global sector, the survey findings provide a snapshot of lived experiences and evidence to further research into the real challenges facing miners.

Protecting miners' health, managing environmental impacts, and increasing productivity are consistently voiced as priorities by miners. Ranking the most important changes miners wanted to see in their lives, these three themes were the most cited across all regions, age groups, and gender.³³ The emphasis on environment, safety, and productivity counters global stigmas against miners as purely profit driven, operating with disregard for the local environmental degradation and worker safety. It also supports a reframing of miners as agents of sustainable development—not to be scaled out by industrial operators or reoriented to alternative livelihoods but to be invested in as allies in natural resource management, enhanced safety management systems, and increasingly productive operators.

Access to finance is a critical barrier for artisanal and small-scale mining (ASM) operators. Findings from the miner survey emphasize how access to finance is the most significant and frequently cited barrier for sector operators.³⁴ This finding echoes with recent survey work with women miners (World Bank 2023). Put clearly by one female mine owner from Lesotho, "No funding, no operations." Barriers for miners to access finance fall into three areas: (i) lack of legal recognition of operations, (ii) lack of assets to serve as collateral, and (iii) lack of knowledge to complete the bureaucratic

processes and complex requirements associated with formal finance. Despite barriers, the demand for improved access to finance exists among miners. Greater access to financing was the most popular change respondents desired to see in their external environment. Government and mining associations were found to provide several supports to miners, but support related to access to finance was the least frequently cited form of support from both entities. Only 4 percent of respondents globally had received support related to access to finance from government, and only 13 percent of respondents had received financing support from mining associations. This clear misalignment between needs and support being provided remains an open opportunity for formal financial institutions engagement.

Dissatisfaction with government support to ASM is widespread among miners surveyed. Most respondents indicated dissatisfaction with the government's support to the sector, evidenced both globally and at a regional level.³⁵ Discontent was focused across three key themes. First, the lack of engagement by government with miners at the mine site was commonly cited and paired with a perception of decision-making taken at the national level without local consultation. One Burkina Faso female miner said, "The State forgets about us, doesn't consult us when it makes decisions to regulate the mining sector. Most of the

government's texts and decisions on the sector are out of step with our realities." The second key theme was the perception of a state bias toward large-scale mining with limited political will to recognize and support the ASM sector:

"There [is] very little political will in supporting SMEs. No training, no awareness, no finance facility. The whole country concessions [are] given to large-scale miners."³⁶

Finally, miners called out the lack of support services to accompany them in the process to become legal, citing specific deficiencies with regard to licensing, including protracted processing times and prohibitive complexity. Miners' expectations for government engagement and support focused on (i) greater engagement and dialogue in general with ASM actors, (ii) more capable institutions to provide services, and (iii) reduced administrative complexity for accessing permits and maintaining them thereafter.

Mining associations and other forms of representation of miners are recognized as valuable platforms for ASM actors to come together, share knowledge and experiences, and advocate for their interests. Encouragingly, miners highlighted the important role mining associations provide in supporting and promoting sector development. As advocates for miners' interests, associations function as strategic interlocutors with government, addressing specific challenges at the regulatory interface, like licensing operating times and administrative complexity; voicing the needs of miners to various institutional actors; and instilling a belief that change and greater recognition of the sector is possible. The miners provided numerous examples of technical training, recognizing how associations have given them new skills, increased women's participation in the sector, and improved access to productive assets like machinery or mining tools. Strengthening the financial management capacity of these often self-funded institutions remains a critical priority in their ability to sustain and expand support to miners.



Gold prospectors grind rock, North Sudan. Credit: iStock/Maciek67.

TOWARD A NEW VISION OF ASM SUPPORT: SUSTAINABILITY AND INCLUSION

The previous sections conclude that to date artisanal and small-scale mining (ASM) support has focused on a general objective of “formalization,” which has made for a patchwork of good but limited and isolated results to date. The logic of the formalization agenda was that if ASM was brought into the mainstream, many of the negative impacts associated with the sector could be better managed, and hopefully reduced. However, stakeholders consulted conceded that there is little shared understanding of what formalization means. Importantly, stakeholders pointed to the heavy focus of formalization to date on legalization, and the particular concern that a focus on legalization above any other intervention has detracted from more holistic approaches toward supporting the sector’s development. Furthermore, the piecemeal approach to addressing negative impacts of informality (such as gender, mercury, access to finance) has also, as argued in the section on the “missing middle” explained the lack of sustainability witnessed in the sector today. A recent Global Environment Facility (GEF) evaluation of its interventions in the artisanal and small-scale gold mining (ASGM) sector also concluded that scale-up and sustainability of interventions to ASM would only be possible if the GEF moved away from tackling mercury in isolation to other important formalization building blocks, such as access to finance, occupational health and safety, and capacity building (GEF IEO 2022).³⁷

Concentration on the process of “formalization” has missed an opportunity to define the characteristics of the ASM sector that stakeholders strive to create. Focus on an ambiguous formalization process has galvanized the international community to act in hundreds of thousands of ASM communities across the globe; however, it has detracted the same community

from answering a far more important question: what do we want the ASM sector to look like in the future? Without imagining and defining the sector to work toward, interventions are likely to continue to focus on small, piecemeal priorities of donors and industry. And importantly, as proven through engagement in this research, miners have strong views on priorities for ASM development

that need to be well considered. For these reasons, a descriptive, holistic, and positive vision of the future could inspire stakeholders to act in a joint manner toward a common and long-term goal. It is timely to consider this new framing of ASM sector support, given what many stakeholders shared during this paper’s consultations: ASM efforts have reached a crisis point where, as a community, we face “a stagnating policy dialogue [on ASM] which no longer raises questions nor debates issues that inspire governments [to act]” (Hilson and Yu 2022). The question thus arises: if we move beyond the general concept of a formalization process, what are the characteristics of the ideal state of ASM we would like to work toward?

When imagining an ASM sector to strive toward, the concept of sustainable development is a good starting place. The United Nations defines *sustainable development* as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” As our starting point for adopting this definition for the ASM sector, we unpack the UN’s definition as focused on three things: (i) building an inclusive, sustainable, and resilient future for people and planet; (ii) harmonizing economic growth, social inclusion, and environmental protection; and (iii) eradicating poverty. To this end, the UN states that in sustainable development:

“there must be promotion of sustainable, inclusive and equitable economic growth, creating greater opportunities for all, reducing inequalities, raising basic standards of living, fostering equitable social development and inclusion, and promoting integrated and sustainable management of natural resources and ecosystems.”³⁸

The concept of sustainable and inclusive ASM development resonates with the World Bank’s expanded mandate to reduce poverty and boost prosperity while maintaining a livable planet. Striving toward sustainable and inclusive ASM also fulfills the triple bottom line integrated into the World Bank’s new expanded mandate, and

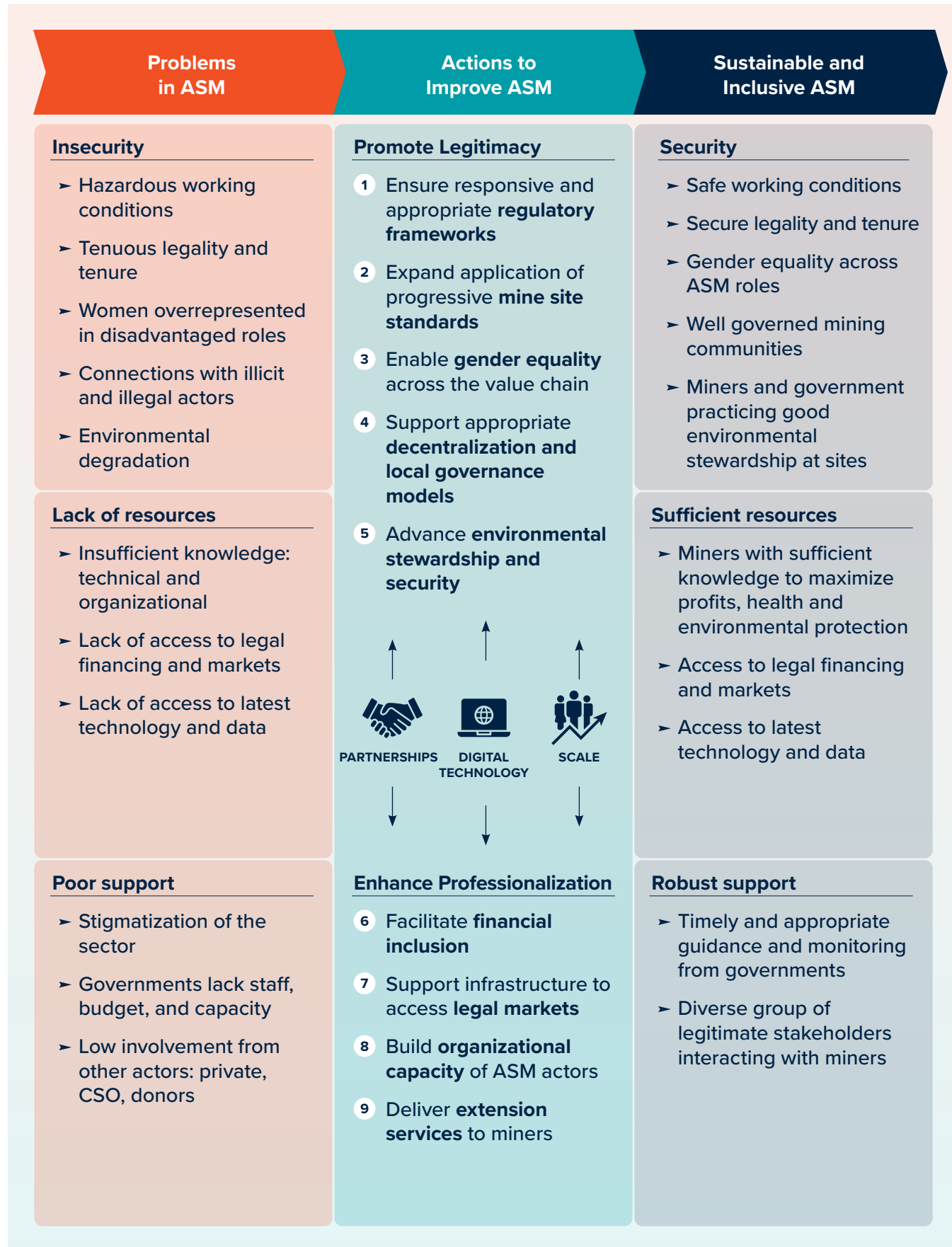
by consequence it contributes significantly to the issues that have emerged as most important for ASM stakeholders: improved incomes, health and safety, and environmental stewardship. The use of the term *sustainable* also reflects the ambition of other international institutions concerned with mining, such as the Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IGF) and in particular its adoption of the term *sustainable ASM* (IISD 2017).

There is strong alignment across various stakeholders that improving ASM should lead to better income for miners, improved security, and environmental stewardship. For instance, during the initial literature review and interviews, those consulted all saw formalization leading to improved occupational health and safety (OHS) and better incomes. Importantly, these aspirational outcomes correlated to findings from a larger quantitative survey conducted with 281 miners during phase 2 of the research, where miners identified two of their three top priorities as OHS and environmental stewardship.³⁹ To quote one miner from Kenya:

“Most miners work to fulfill their family and personal obligations. Their safety and environmental safety ensure that they go back to their families after the day’s work.”⁴⁰

Given widespread support by stakeholders for a long-term approach to the sector’s development that leads to prosperity, security, and environmental stewardship, the World Bank’s support to ASM focuses on sustainability and inclusion. The concept of sustainability implies a sector that can support both people and surrounding ecosystems for long-term prosperity, offering a positive framing of the sector to work toward. In the theory of change for the World Bank’s support to the sector, the characteristics of ASM proposed begin with security for miners and their communities but also identify the need for sufficient resources and support to build a prosperous livelihood while protecting their health and strengthening the environment (figure 7).

FIGURE 7 Theory of Change for the World Bank’s Support to the ASM Sector



Source: World Bank.

The characteristics of sustainable and inclusive ASM center around providing security, resources, and support to ASM actors and mining communities. The characteristics of sustainable and inclusive ASM mirror the problems with the sector that exist today. First, ASM should ensure security for ASM actors and mining communities. Lessons from previous ASM interventions show that if ASM actors (especially vulnerable groups) and those who support them do not have physical, economic, and legal security, convincing them to invest in improving their operations to achieve increased formality or environmental stewardship is extremely difficult. Second, ASM must provide ASM actors and mining communities with sufficient resources, including access to financing and markets that give them a fair price, technology and data for greater yields and efficiency, and knowledge to use these resources to their potential while also strengthening environmental security. Last, ASM should provide robust support to ASM actors and mining communities to facilitate this security and access to resources. Governments must be willing to take the sector seriously by allocating timely and adequate resources not only to support the sector but to monitor it. But governments cannot go at it alone—the support ecosystem should include the private sector, civil society and nongovernmental organizations (NGOs), miner associations, research institutions, and other groups with specific expertise in the sector.

Concepts of legitimacy and professionalization form the core of a new framework for support. To address the existing problems with the ASM sector and move toward sustainable and inclusive ASM, the World Bank proposes to carry out actions within thematic intervention areas grouped together in a support framework in the theory of change (figure 7) and detailed in figure 9. At both the Mining Indaba and OECD Forum on Responsible Mineral Supply Chains 2023 conferences, the World Bank asked participants to define *formalization*; the two most common key words to surface were *legitimacy* and *professionalization*. When the participants explained *legitimacy*, it frequently emerged to mean more than simply being legal. It meant genuine recognition and

conveying of abilities to operate. Expectations from miners was that government still held ultimate responsibility in matters of *legalization*, but quite serious reforms were needed to reimagine how security of tenure could be achieved. Discussions around the concept of legitimacy also focused on the expectation that with appropriate security of tenure, ASM actors would be considered legitimate mining stakeholders by others in policy and community-level circles. Implied in these findings is that perceptions of miners as “illegal” or “disruptive” could change for the better. When it came to professionalization, discussions evoked aspirations of investing in improved practices for ASM actors so that they could be seen as “serious” professionals in the field of mining. Unlike the emphasis in the past on government being the key provider of capacity and related services, many discussions revealed greater roles and expectations for private sector or third-party actors to deliver professional services to miners.

To achieve sustainable and inclusive ASM, the support framework built on legitimacy and professionalization requires addressing both at the same time. Legitimacy is seen as the enabling environment for sustainable and inclusive ASM, whereas professionalization is considered the process by which capacity is built. In this case, capacity building applies both to miners, so they can utilize the resources available to them in the most sustainable manner, and government officials, so they can provide the best support possible to the sector’s development. It is a pivot from past approaches by the World Bank to confer all responsibilities to the government for regulation, service delivery, and capacity building of ASM actors. In this new approach, a variety of services and responsibilities could be performed by third-party actors in partnership with government, leaving regulation as the prime focus of government action. Going back to the illustrative example of the GEF ASGM evaluation, since scalability in ASM requires enabling improved practices, support for a range of interventions across legitimacy and professionalization should be provided in tandem and be adapted to the needs and motivations of ASM actors themselves. Critical is inclusion, to ensure that mining

communities have participation in decision-making and avenues for redress as mining operations evolve in local environments.

Achieving sustainable and inclusive ASM also requires careful attention to several themes cutting across the support framework, especially ensuring interventions can be scaled up. In addition to addressing multiple issues in the sector at once, reviewing past projects also shows that

lasting improvements in the ASM sector require scaling up positive outcomes. Unfortunately, this has been one of the greatest failures of World Bank and other donors' ASM interventions—limited success in a project area is common, but catalyzing transformational change across a country is much more difficult. For this reason, the proposed support framework aims to consider scale across all interventions. Some technical aspects of scaling up are discussed in sections on individual intervention

areas below; however, others require innovative project design and management. One idea is to innovate in the project and funding modalities used. Most World Bank ASM interventions to date have been Investment Project Financing or smaller Advisory Services and Analytics (ASA) interventions. New interventions, especially those working heavily on legal frameworks, will consider using Program-for-Results or Development Policy Financing modalities, which have more success in dealing with the long and complex political process of changing mining code. Additionally, the World Bank will explore using longer duration interventions such as the Multiphase Programmatic Approach in specific geographies. This could allow multiple modalities to be used in sequence or in tandem, such as using an ASA to inform the design of a longer and larger project in the same geography. Longer commitments to countries or subnational regions could create a better environment for thorough stakeholder engagement, build trust with clients, and give more time to overcome hurdles and create lasting change.

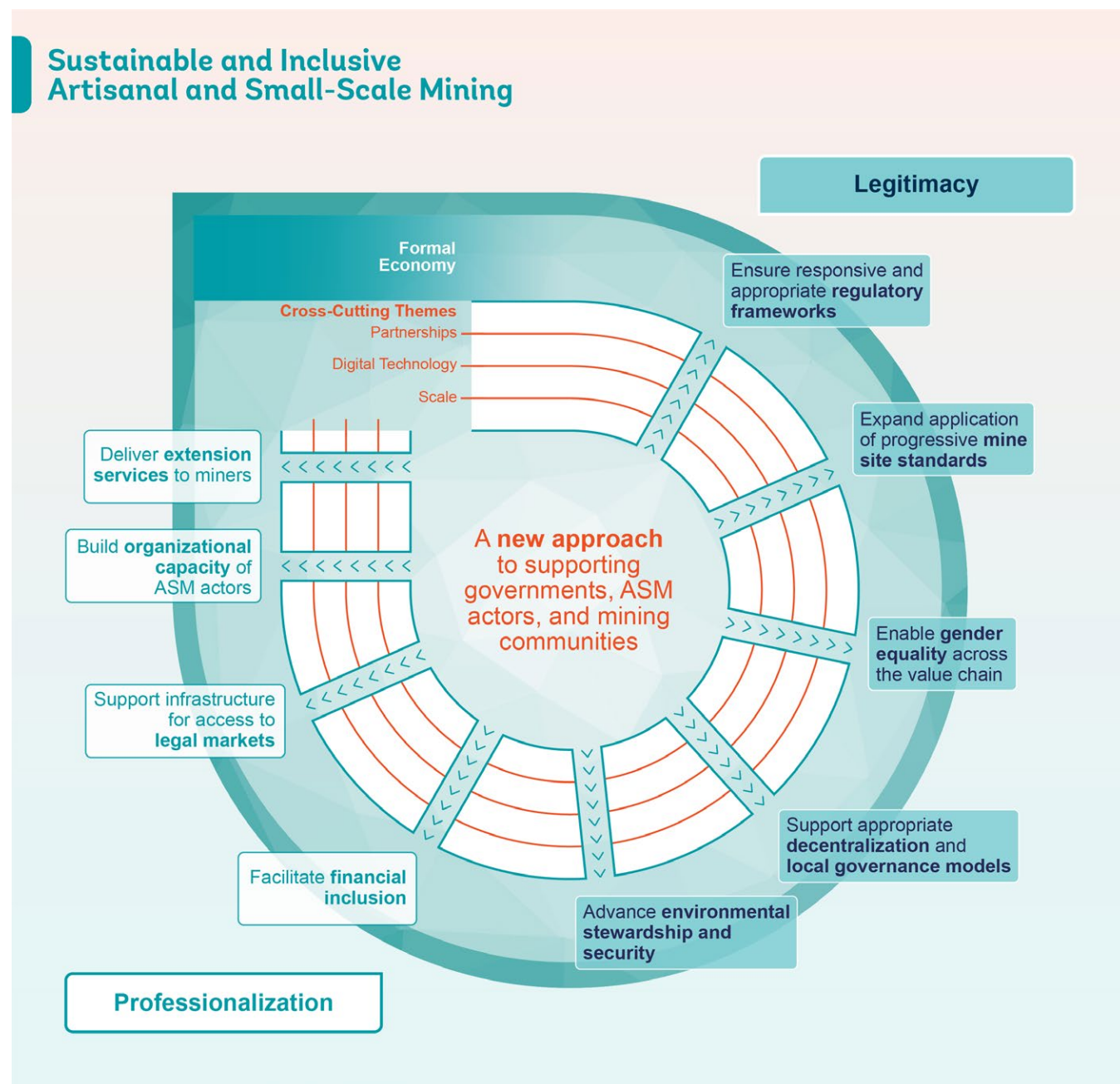
making every intervention area in the support framework easier and more cost-effective, from legal registration to organizational management, from due diligence to service delivery.

Many intervention areas have been core to the World Bank's support to date, but others will be relatively new. The World Bank will remain committed to improving the regulatory environment for ASM (Intervention Area 1), capacity building of government and ASM actors (Intervention Area 8), provision of extension services (Intervention Area 9), and gender (Intervention Area 3). The World Bank will also significantly scale up its support to domestic financial inclusion (Intervention Area 6), commercialization (Intervention Area 7) alongside improving mine site standards (Intervention Area 2), environmental stewardship (Intervention Area 5) and local governance (Intervention Area 4).

Despite the need for holistic and integrated interventions to achieve sustainable ASM, each intervention area within the support framework is complex and requires detailed attention. As we have learned and discussed in previous sections, the “missing middle” may be, in fact, as important as the interventions in favor of sustainability itself. For these reasons, it is important to highlight how interventions and their approaches found within the new framework will differ from (or conversely will reinforce) past efforts. Below we discuss the major ASM issues within each of the nine intervention areas and the proposed World Bank strategy for future activities within each. Much of the thinking is based on findings from a series of deep-dive case studies solicited for this position paper along with interviews, a literature review, and broad consultations over the course of the research.

Additional key cross-cutting themes include partnerships and digitization. One key lesson learned from past ASM projects is that a diverse set of partners offer value added in the ASM sector. Private companies add technical innovation, sustainable financing, and access to markets. Local NGOs facilitate trust and understanding of and access to mining communities and processes. Miner associations create opportunities for scaling up and local ownership of interventions. Across the support framework, the World Bank will seek to work principally with miners, miner communities, and governments, but also to integrate additional partnerships to maximize expertise and value added. Digitization will also play a critical part in

FIGURE 8 World Bank Sustainable and Inclusive ASM Support Framework



Source: World Bank.

Pillar 1: Legitimacy

Intervention Area 1

Ensure Responsive and Appropriate Regulatory Frameworks

Further work is required to refine the regulatory framework in favor of a sustainable and inclusive ASM sector underpinned by security of tenure.

Many areas mentioned throughout this paper do not align with ASM realities. Furthermore, ample research has shown how several existing provisions in legislation impede, not support, the emergence of a safe and well-managed sector. Four key areas for regulatory reforms are highlighted in ASM literature: (i) licensing categories and process, (ii) operating standards, (iii) fiscal regime, and (iv) securing access to mineralized deposits. As concerns the first, consider that while depth limits of 15–30 meters are set to avoid the horrific cases of miners being buried alive in landslides and tunnel collapses, this places limitations on the growth of a given mine site. Some argue that such limitations assume that ASM entities are incapable of financing and adopting more sophisticated underground techniques that would allow for more recovery. While depth rules are vital for safety, mining regulations make it difficult or impossible to tailor these rules to the specific site and capacity of the miners, and this rigidity impedes formalization. One approach that has been successful in countries such as Uganda or Tanzania has been to retain only one license category with, in the case of Uganda, a duration of 21 years for a small-scale permit holder.

The second area is in ensuring that mine and environment-related ministries adopt progressive mine site standards for ASM operations. These standards should uphold environmental and social principles such as those found in industrial operations but consider simplification given the size of operations. Pilots have been done to develop and implement environmental and social impact assessments (ESIAs) fit for ASM purpose that could be adopted in regulatory frameworks for universal application. Mine site standards are elaborated

further in Intervention Area 2. The third area for regulatory review is the fiscal regime associated with having small mining operations. This concerns not only ad valorem or other royalty taxes on production but more importantly the fiscal regime around maintaining ASM licenses. A review of the entire fiscal regime applied to ASM could yield opportunities to incentivize further formalization through reduction or simplification of the fiscal regime. The fourth area of regulatory reforms is securing access for ASM actors to prospective mining areas. Critical is to review rules and criteria around relinquishment and permit limitations for industrial exploration and exploitation regimes because they have increasingly become a source of social tension and conflict given the exponential growth of ASM over the last few decades. A careful evaluation of past work to build ASM corridors or zones,⁴¹ as well as community mining licenses,⁴² is warranted given limited success to date. But in any of these models, without geological information or work, the creation of new mining spaces is for naught, reinforcing the need for a system-wide approach to developing the sector.

Where mineralized deposits may be in short supply, flexible, participatory, and collaborative governance arrangements could provide tangible solutions to various land-access conflicts, especially between ASM and large-scale mining (LSM) actors. Conflicts in ASM are diverse, but many relate to land tenure and access to land, and it is possible that conflicts will increase as the green energy transition fuels mining booms and associated land pressures.⁴³ Adding to the potential for land-related conflict is that many mineral-rich countries have large tracts of land under customary or informal tenure systems. Customary land ownership is largely not captured in official cadastres or data sources, meaning that informal land use / land ownership practices—despite their prevalence—are not accurately reflected. By the same token, the legal and regulatory frameworks governing land use and ownership then may not consider the realities of land tenure arrangements surrounding ASM sites. In recent years, growing attention and effort

has been placed on securing the formal, legal recognition of customary land rights, especially for Indigenous peoples and local communities. It is noteworthy that as much as 65 percent of the world's land area is under customary systems, yet only a fraction of these areas are legally recognized under statutory systems.

As industrial companies continue to manage ASM-related incidences in and around their concessions, interest has grown among various stakeholders to trial and adopt legal instruments that could solve security of tenure challenges.

Some offer promise, such as where a mining company may be willing to consider relinquishment of parts of its concession should the government take on responsibility for it to be handed over to local ASM groups. Relinquishment could also entail a benefit-sharing-type agreement, with technical support services provided by industrial companies to help the ASM entity develop its mine, or at the very least to hand over geological data pertaining to that parcel of the concession. In other instances, a company may wish to retain its lease on the full concession but be willing to open it up to a responsible, well-organized ASM entity to develop. Here, again, a specific legal instrument is developed by the government to govern the flexible, collaborative arrangement between the actors.⁴⁴ Such governance arrangements, once tested successfully, could then be adapted into relevant mining legislation. Such collaborative arrangements also have potential to strengthen social sustainability in the ASM sector if agreements are participatorily developed and designed through a socially legitimate process.

Inherent to successful uptake of licenses by artisanal or small-scale miners is that of access to geological data, capacity building, digitizing licensing systems, and well-calibrated incentives for miners to legalize. In general, it is more sustainable and scalable to use a demand-driven approach to legalization, where ASM individuals and entities identify and apply for mining permits in areas where they have identified mineral deposits and have a track record in operating. However,

in cases where relocation to established ASM corridors is concerned, limited evidence would suggest that providing incentives to relocate—through financial or capacity-building services—can facilitate greater uptake. Regardless of the scenario, lessons from decades of support to regulatory compliance by the World Bank and other stakeholders reveal that organizational capacity building and financial support are essential for scaling up licensing uptake. Mining entities may not have adequate skills to navigate licensing paperwork and processes. Capacity support has proven particularly useful with women mining groups, but it need not be limited to women alone. Others may need financial support to travel to relevant mining offices if at a distance from their home areas. For these reasons, some countries are moving toward online licensing systems accessible either through decentralized mining offices in the most active mining regions (Tanzania) or through web-based applications that can be accessed on a mobile phone (Peru). Again, the need for a system-wide approach to supporting sustainable ASM is required. As Hilson (2013) suggests, the success of certain countries to promote ASM inclusion in legislative frameworks is often not a product of definitions per se; rather, success is often more “a result of being fairly in tune with the sector's development, implementing a series of appropriate policies in a timely fashion, and further refining regulations and mining ‘categories’ accordingly” (8).

Responsive fiscal regimes could significantly improve domestic resource mobilization capacity for governments and ensure better regulation of ASM actors. Particularly since the proliferation of informal mining in many mineral-rich environments of Sub-Saharan Africa starting in the 1980s, estimating the value of rents derived from ASM has been elusive. While some academics and policy circles maintain that the constraint to ASM taxation lies with the unwillingness of artisanal and small-scale operators to legalize their operations, and thus pay taxes, Hilson (2013) disputes these claims as lacking in evidence. Similarly, De Sa et al. (2013) propose that taxation should theoretically provide symbiotic benefit to government and small-scale

operators alike: for the former, it provides for a revenue base; for the latter, it should secure greater social protection and access to services. Though this proposition may be lacking in substantial evidence, given the extremely limited research into the application of taxation policies in small-scale mining, miners' voices suggest some alignment between theory and practice (see "What Do Miners Say?"). Ideally, in a given context, ASM fiscal provisions should be based on a sound analysis of the potential contribution ASM actors can make to the mining economy against their costs and investments over time. Equally important, however, is the question of how domestic resources mobilized are then redistributed. It has been

suggested and shown that a revenue collection system that captures and distributes at source can in fact deliver more value and return it quite quickly to the affected mining area, increasing local authorities' capacity to manage the sector more effectively. A symbiotic relationship between domestic resource mobilization, decentralization, and mine governance emerges, which could unlock solutions to a wide variety of governance issues affecting better ASM regulation. Few models exist that have been recorded, suggesting consideration toward trialing new revenue regimes and collection mechanisms in select ASM jurisdictions, with a heavy methodological focus on action research and learning.

Suggested activities under Intervention Area 1 for World Bank support:

- ▶ "Light touch" mining code reviews (and other supporting legislation) to look again at licensing categories and criteria and ensure they are sufficiently favorable for small-scale miners and that they are gender sensitive.⁴⁵
 - ▶ Analysis to accurately establish the fiscal regime for ASM in a given country.
 - ▶ In conjunction with Intervention Area 4, trial adaptive fiscal models for ASM.
 - ▶ Cross-sectoral reviews of proposed mining and land legislation to ensure coordination and harmonization.
 - ▶ Support "next generation" modernization of interoperable and multipurpose cadastre systems, including ASM permit categories.
 - ▶ In conjunction with Intervention Area 4, support digital systems for licensing processes and digital land administration processes, including sharing protocols to strengthen digital data availability in both land and ASM sectors.
 - ▶ In conjunction with Intervention Area 4, support evaluations of flexible/
- collaborative mining arrangements in practice in each country to determine their scalability and suitability for inclusion in regulatory frameworks, and support arrangements to be underpinned by "process legitimacy" as a core element of social sustainability (Barron et al. 2023).
 - ▶ Capacity support for miners to complete licensing processes.
 - ▶ In conjunction with Intervention Area 4, provide support to participatory and multistakeholder initiatives that can work toward new governance models in line with mining rights and their regimes.
 - ▶ In conjunction with Intervention Area 4, support capacity building, especially for decentralized agencies (see Intervention Area 4), to understand and apply core concepts of land tenure security and social sustainability relevant to ASM.
 - ▶ Support efforts of governments and other development partners to promote the recognition of customary tenure in jurisdictions where it is not yet legally recognized.

Intervention Area 2

Expand Application of Progressive Mine Site Standards

The need to improve health and safety at ASM sites is paramount for achieving decent work for all miners. Miners and communities face multiple health and safety risks. Many of these originate from the common informality of ASM operations. Poverty and general lack of technical and financial support and training for miners are also frequently suggested as further causes of injuries, fatalities, and recurring illness in mining areas (Hilson and McQuilken 2014; Singo et al. 2022). But it is worth noting that gendered division of labor, anatomical and biological differences, employment patterns, cultural beliefs, societal roles, expectations, and responsibilities equally contribute to gender-specific patterns of OHS hazards and risks, resulting in differentiated, and sometimes higher, risks of negative OHS impacts in ASM for women. Of all the possible safety issues, only mercury use in gold extraction and processing has received considerable academic and programmatic attention over the years (Bose-O'Reilly et al. 2008; Hilson et al. 2018; Veiga and Fadina 2020), namely through interventions over the last three decades funded by the Global Environment Facility (GEF), including the ongoing large, multiyear planetGOLD program (GEF 2022).

ASM mining sector standards have become diverse and apply to various stakeholders at different points on the value chain, commonly with commodity, geographic, or market specific focuses.⁴⁶ In general, when discussing mine site performance, interventions can be categorized into four main areas: (i) mine site stability and technical design, (ii) OHS, (iii) environmental stewardship, and (iv) social protection. Certainly, in the last decade more work has been done to improve how mine sites operate (World Bank 2020), though not always in a holistic fashion. One might find a mercury abatement program intervening with few considerations for other OHS issues on sites. Or considerable programming may be found in SGBV prevention but in the absence

of other physical and environmental problems found at site. Moreover, the multiplication of mine-to-market due diligence systems since 2010 has ushered in a culture of performance compliance focused principally on material traceability for the markets. The track record of ASM standards has been mixed, with notable achievements in enhancing formal market access, increasing investment from downstream supply chain stakeholders in mine site improvements, and, in specific cases, increasing miner well-being (Uribe Martínez, Sanchez Gonzalez, and Pellegrini 2021). Conversely, advocates have countered with valid critiques centered on unintended consequences—disengagement because of overly onerous standards with benefits not matching costs can further marginalize informal miners and entrench illicit actors (Parker and Vadheim 2017)—and narrow initiative parameters undermining effectiveness (KPCS 2019).

Effective standards for artisanal miners must be sensitive to both ASM realities and external stakeholders' expectations. One successful approach is the use of progressive standards that increase iteratively as the capacity and capability of operators improve. This approach recognizes that ASM entities may have limited resources and face challenges in meeting certain standards immediately, but that they are committed to improving working conditions and employment practices over time. This is achieved by setting targets or benchmarks with the direct involvement of ASM actors, who can then work toward achieving them with support and technical assistance. At the same time, it is also important to consider what external stakeholders—such as governments, downstream consumers, development organizations, and other formal institutions—consider to be important when setting expectations for decent work standards. These stakeholders' different priorities and motivations may arise from concerns for human rights, consumer pressures, or legal obligations. Standard-setting with and listening to these stakeholders' perspectives ensures that decent work standards are meaningful and relevant to a wide range of

stakeholders and based on widely accepted principles and frameworks.

The CRAFT Code has emerged as one of the most universally accepted tools for improving ASM site performance.⁴⁷ Dually, the code empowers both entities—to understand and comply with market expectations and enhance formal market access—and downstream supply chain actors by facilitating engagement with miners and standardizing risk management in their supply chains. Miners commit to prevent and reduce risks associated with legal compliance, human and worker rights, social welfare, ethics, and the environment. Operating as an open-source instrument, the CRAFT Code has expanded to provide flexibility and a set of guiding principles to enable adaptation into other standards or programs, referred to as CRAFT schemes (CRAFT 2.1). Other progressive standards and approaches (mainly in the form of manuals or toolkits designed for specific governments or project initiatives) do exist. It is more a matter of revisiting the various models, considering their applicability, and working with governments to ensure a progressive approach toward mine site improvements.

Required today is a systematic approach to improving mine site performance that serves miners, mining communities, and the environment holistically. It will entail addressing

the substance (that is, standards) as well as the delivery (extension services by government and third parties) of performance-based standards for actors. Reassuringly, considerable materials and standards exist today that could form the basis of extension services to ASM operators and mining communities (World Bank 2020). Mining associations and other umbrella network organizations have a significant role to play in encouraging attention to OHS and environmental and social performance at sites. For instance, during the COVID-19 pandemic, the World Bank facilitated the establishment of a global network for miners to remain connected and provide solidarity. The network, Delve Exchange, played a vital role in exchanging techniques to prevent COVID in ASM communities, with miners using the WhatsApp social media technology platform to connect. Since then, the Delve Exchange has expanded to include information-sharing on site techniques among its 1,000-plus members around the world. Currently in its second phase, the Delve Exchange is now developing open-source curriculum touching upon a variety of OHS and site performance topics to be disseminated through its existing channels. Whether the Delve Exchange, Women in Mining chapters, or ASM national organizations, working with and through these interests' groups to compel members to uphold safe and decent working conditions is an effective approach to behavior change at sites.

Suggested activities under Intervention Area 2 for World Bank support:

- ▶ Promote adoption and application of existing open-source standards and where necessary support the development of open-source “bolt-on standards” (to avoid duplication to the extent possible).
 - ▶ Support concerted partnerships with ASM associations to advance the decent work agenda.
 - ▶ Support governments to monitor and engage with ASM operators
- in meaningful ways to improve site practices.
- ▶ Facilitate country participation in market-oriented initiatives that promote key principles of progressive improvement and engagement with ASM entities.
 - ▶ Support research and interventions that are sensitive and responsive to the gender differences at mine sites that impact occupational health and safety.

Intervention Area 3

Enable Gender Equality Across the Value Chain

Women make up a significant portion of the global ASM workforce. Studies estimate that women account for between 18 percent (World Bank 2020, 91)⁴⁸ and 50 percent (IGF 2018) of the 45 million people who work in ASM. The large range is indicative of the dearth of gender-disaggregated data, which in part obscures women’s visibility in the sector. Women’s contributions to the sector are largely overshadowed by the act of extraction such as digging, which is almost exclusively undertaken by men. As such, women’s work has been relegated to the periphery both literally and metaphorically—even though they often perform strenuous and sometimes dangerous manual tasks such as sorting, crushing, grinding, milling, washing, sieving, sluicing, sieving, panning, concentrating gold (which often requires the use of mercury or other toxic chemicals), and transporting. Women also provide cleaning services and sell food and other goods on site (Jenkins 2014; IGF 2018).

Although women constitute a significant portion of the ASM labor force and meaningfully contribute to the productivity of the sector, there is a serious lack of recognition of their value in ASM, ultimately hindering gender equality. Operating under the cloak of invisibility, women have been left out of policy discussions, national legislation, development interventions, and research agendas (Hinton 2011). Gender-based violence (GBV), modern slavery, forced labor, and indebtedness are all commonplace in ASM, with gender inequality and GBV in a complex by-causal relationship. To this end, researchers caution that policies seeking to realize the sector’s potential may unintentionally further marginalize women if gendered dimensions are not considered (Hilson et al. 2018; Buss et al. 2019; Bashwira, Nyenyezi and Akilimali 2023). The *2023 State of the ASM Sector* report provides analysis of select national mining codes and land ownership frameworks and finds, respectively, 67 percent and 80 percent of these frameworks are gender blind or gender neutral (World Bank 2023). Encouragingly, the

same report provides emerging evidence of government’s inclusion of women in development of formalization interventions,⁴⁹ though it cites concerns regarding institutional and financial capacity to advance gender equality through policy and programs. Beyond government efforts, it is critical to recognize the voice and agency of women who choose to work in the ASM sector. Mining organizing structures representing women’s interests, whether at a national or subnational level, have proven an important vehicle for improving women’s visibility in the ASM sector and enhancing voice and agency (World Bank 2020).

Gender-specific organizing structures in mining have strong potential to strengthen individual women’s standing in ASM. The role of Women in Mining and other professional mining groups as key interlocutors for government in the development of interventions and as advocates to represent the interests of women in mining has been well validated (World Bank 2020, 2023a). Previous World Bank research has identified opportunities for the organizational strengthening within Women in Mining structures to promote sustainability, financial capacity, and leadership along with expanding inclusion and representation of female artisanal and small-scale miners’ interests. Additional efforts to elevate women into positions of leadership in mining associations, cooperatives, and other ASM organization structures are essential to expand gender considerations within these influential structures.

Efforts to promote gender equality in the ASM sector begin with a shared understanding of key gender dimensions defining male and female participation along the ASM value chain. The conceptual “gender relations” framework put forth by Danielsen and Hinton (2020, 21) provides four key areas of inquiry: (i) division of labor, (ii) gender norms, (iii) access to and control over resources and benefits, and (iv) decision-making. Rich gender assessment tools provide a practical guide for practitioners in this regard (World Bank 2012, IMPACT 2020). Formulating programmatic and policy reforms in response to findings necessitates

nuanced and context-specific interventions. Various programmatic efforts to date have proven promising, with efforts to increase women’s access to savings and financing (IMPACT 2019; World Bank 2020, 108), the creation of safe and culturally appropriate reporting mechanisms for abuses in mining areas (FCDO 2018), capacity building on self-organization and association formation (Alliance for Responsible Mining 2018, USAID 2018),

and market access schemes for female gemstone producers (Virtu Gem, Moyo Gems). Additionally, fostering an inclusive and participatory approach is paramount in effectively implementing gender equality initiatives. Active engagement with local communities, including women miners and their male counterparts, can provide valuable insights into the unique needs, aspirations, and obstacles faced by each gender within the ASM context.

Suggested activities under Intervention Area 3 for World Bank support:

- ▶ Apply gender-mainstreaming to the design, implementation, monitoring, and evaluation of all ASM-related activities.
- ▶ Work with women’s mining organizations to increase sustainability of ASM interventions, with a focus on inclusion.
- ▶ Focus on security of tenure and other economic rights of women to own and operate small-scale mines.
- ▶ Support national policy reform to incorporate gender-sensitive language, address gender norms, and promote gender equality in ASM practice.
- ▶ Build government capacity to implement gender-mainstreaming practices, policies, and programs into national contexts.
- ▶ Strengthen capacity and sustainability of women-specific mining groups and associations through a variety of mentoring, peer-to-peer learning, financial grants, and education programs.
- ▶ Make childcare at informal and formal ASM operations universal.
- ▶ Expand use of digital solutions to report on SGBV in mining communities.

Intervention Area 4

Support Appropriate Decentralization and Local Governance Models

Government presence in mining areas is critical for ensuring sustainable and inclusive ASM. In general, there is consensus that decentralization has its merits—namely, efficient, inclusive, and responsive delivery of services to local populations (Boex, Williamson, and Yilmaz 2022). With respect to ASM, empirical research suggests that locating problem-solving capacities close to the mine sites can enhance effective regulation of the sector. Various forms of mine decentralization have been observed over the decades in countries such as Guyana, the Philippines, Rwanda, Tanzania (see box 2), and Zimbabwe.⁵⁰ Depending

on the nature of government in countries, decentralization of mine-related competencies ranges from the deconcentrating of central mine ministries into mining areas to the devolution of regulatory responsibilities to local governments. Functions could include permitting and other approvals, information awareness on standards, and monitoring of site compliance. In more decentralized models, revenue collection is also a core function. One strong example of successful decentralization is Guyana, where the mining licensing system relies on 100 offices spread out over the country’s small territory, many with satellite connection to the headquarters in Georgetown (Hilson and Laing 2017). Another good case is the Philippines, where local governments manage ASM gold activities, including revenue collection. In

short, a one-size-fits-all model for decentralization does not exist.

Mining decentralization has not been without pitfalls. As with other experiments in decentralization, those to do with mine administration have encountered difficulties—namely, the cost of decentralization itself and its sustainability over time. Supporting the setup of mining offices and their long-term functioning in mining regions has significant budgetary implications for governments, and in a sector that does not receive a large share of national budget allocations compared with health or education sectors. In fact, supporting decentralization through brick-and-mortar infrastructure (including building renovations, vehicles, and broadband capabilities) has been an important part of World Bank lending operations to mine ministries over the decades. But it is not uncommon to encounter mining offices in mining regions where buildings have fallen into disrepair, vehicles are no longer operable, or computers no longer function after a World Bank project has closed. For these reasons, successful decentralization must combine conferring of administrative and fiscal responsibilities to ensure its outcomes are indeed delivering more effective services for local populations (Boex, Williamson, and Yilmaz 2022; OECD 2020) and in ways that can be sustained beyond external support.

It is therefore important to consider carefully appropriate interventions to pursue under a decentralization scheme and the approach to apply. Whereas traditional decentralization sought to apply uniformity across all geographic areas, today asymmetric decentralization is increasingly recognized as potentially more appropriate. Asymmetric decentralization implies differentiated support to subnational levels of government, based on several criteria (OECD 2020). For ASM, this could prove a very useful approach where specific decentralization models could be applied in a few mining areas. For instance, instead of rolling out a uniform program across all ASM areas, which would have significant budgetary implications, a government could start with one area that has

BOX 2 World Bank Project Focus: Decentralizing Miner Support and Monitoring in Tanzania

A key component of the Sustainable Management of Mineral Resources Project (P096302 and P151124) was to decentralize key portions of support and monitoring to artisanal and small-scale miners in Tanzania. The project addressed decentralization from multiple intervention areas, including updates to regulatory reforms to facilitate registration of miners, simplifying procedures for acquiring mining licenses, shifting inspection and extension services to local and regional mining offices, digitizing the mineral cadastre for easy access by these local permitting offices, and providing financial assistance to miners to formalize their operations. The project also encouraged financial sustainability of these efforts through grants to scale up ASM businesses and a partnership with the Tanzania Development Bank to give loans to miners. The results included increased job creation in ASM businesses from an average of 5 to 30 employees per operation, a reduction in average processing time for mining licenses from 18 to 2 months, and an increase from 4,000 to 35,000 miners holding licenses by the end of the project. The project’s success was attributed to strong political support, especially in the first phase, for reform, a focus on simplifying the licensing process for miners and inclusion of activities to ensure financial sustainability of ASM operations and their ability to access capital.

large and very active ASM activity and a track record of subnational competencies. Asymmetric decentralization could also allow for different interventions to be applied in different contexts of a country—for instance, targeting fragile border areas with specific decentralization interventions aimed at limiting the flow of illicit material outside the country. Here, remote sensing and other digital-based technologies could be trialed at a low cost to government in one location to evaluate results. The notion of differentiated approaches to decentralization has not been well applied or documented in the context of ASM regulation and could be the subject of valuable experimentation.

Information technology can offer governments cost-effective solutions to scale up monitoring of mine sites. As mentioned above, remote sensing technologies offer potential to significantly improve management of the ASM sector,⁵¹ particularly in countries where (i) ASM activity is very spread out and difficult to physically monitor on a continuous basis, often because of poor road infrastructure; (ii) the type of monitoring needed is clearly visible from satellite sensors (chiefly deforestation caused by mining); (iii) fragility or conflict infringes on the state’s ability to access these areas; or (iv) ASM activity is happening in protected parks and other off-limit areas. It is not uncommon that more than one factor may be occurring at the same time. In any of these instances, remote sensing tools can strengthen other forms of government monitoring systems by providing a low-cost and quite scalable solution. Two pilots have been successful in applying remote sensing technologies to monitoring: ASMSpotter and Charis UAS (Mutemeri and Perks, forthcoming).

But no amount of technology can replace the importance of regular mine site visits by authorities. The ASM sector operates with a high degree of personal trust and interpersonal networks. Changing miners’ behaviors at site—in favor of safer, environmentally friendly practices—

requires significant investment in building relationships between government, service providers, and miners, and in understanding the incentives that will motivate ASM actors to reform. At the same time, capacity of mine officials is crucial to communicate expectations and standards. As mentioned in Intervention Area 2, simplified environmental and social frameworks and progressive mine standards have proven useful in establishing shared expectations of what an artisanal or small-scale mine should look like and how it should operate. Capacity building for miners and government officials in these standards will improve chances of successful outcomes.

Beyond decentralization, local governance structures can play an important role in governing ASM, building participatory revenue management models, and creating greater transparency around resource management in general. Particularly in jurisdictions of West Africa where historically traditional leadership has played a very central role in governing resource exploitation, approaches to managing ASM activity could be better pursued through other forms of local governance. In Côte d’Ivoire, for instance, *comites locale de suivi* serve as an important one-stop shop to manage issues having to do with how resources (land, mining, fishing, and forestry) are balanced and optimized. In such instances, beyond ministries concerned with mining and the environment, local governance structures could be empowered to play a greater role in the granting of ASM licenses, the monitoring of performance, and the flow of minerals. Such structures have also, in some West African countries, played an important bridging role in security surveillance, especially in fragile, remote border areas. As stated in Intervention Area 1, flexible, participatory, and collaborative mine governance arrangements support resolution of land-access conflicts and provide a structure to manage distribution and spending from mine-related revenues.

Suggested activities under Intervention Area 4 for World Bank support:

- ▶ Test with purpose and with appropriate monitoring for learning, asymmetric decentralization in select countries with high ASM populations.
- ▶ Apply asymmetric decentralization equally to fragile, remote border areas to test specific measures related to security and governance.
- ▶ Invest in remote monitoring digital applications that can improve government oversight of ASM activities, particularly in remote and/or fragile conflict areas.
- ▶ Roll out mobile phone–based monitoring applications and other communication platforms so ASM communities can participate actively in site monitoring.
- ▶ Improve government presence in mining areas through infrastructure and upgrading of systems.
- ▶ Capacity build to ensure quality and caliber of mining officials in regional mining offices.
- ▶ Support governments to effectively budget over the long term for decentralization.
- ▶ In conjunction with Intervention Area 1, where precedent exists, look toward empowering and integrating local governance structures into the overall ASM management system.

Intervention Area 5

Advance Environmental Stewardship and Security

Environmental stewardship and security move beyond approaches solely focused on protecting, mitigating, and safeguarding communities against adverse environmental impacts from ASM. *Environmental stewardship* means motivating and enabling ASM miners and their communities to take responsibility for environmental quality, while *environmental security* addresses the relationship between environmental change, conflict, and human security. This approach recognizes that trying to prevent miners from mining or using more environmentally destructive mining methods without providing them with cleaner, safer alternatives is unlikely to result in long-term reductions in environmental degradation and may simply displace or temporarily delay environmental impacts. Environmental stewardship and security thus include approaches to ASM practices that encourage sound management of natural resources in tandem with activities that address miners’ needs and desires for personal, health, and financial security. Such interventions would combine

activities from several intervention areas, including activities that reduce air and water contamination while also improving occupational health and safety; the introduction of more circular, efficient, and cleaner mining equipment and techniques, and provision of access to financing for miners to have the means to adopt them; facilitation of access to markets that pay premiums for mining methods that promote environmental stewardship; supporting government monitoring and enforcement of mining bans in protected areas in tandem with giving miners secure mining tenure in areas deemed lucrative and appropriate; and targeting support for vulnerable populations in mining communities that are most impacted by environmental degradation. Such interventions would also seek to improve environmental outcomes at all stages of the mining life cycle, including where mining is done (avoiding key biodiversity areas, for example), how mining is done (cleaner technologies and environmental management systems), what is mined (maximizing value and recycling byproducts), and post-mining rehabilitation (improve environmental safety by reducing long-term exposure to pollution from closed mines).

Lessons learned reveal that interventions to mitigate the environmental damage caused by ASM have better chances of success when they are coupled with a greater focus on incentivizing behavior change for miners, introducing new tools and technologies (Hook 2019), and improving environmental governance.

Clean and green technology introduction is costly in a first instance when there is a small domestic market. In many developing countries, access to imported equipment is extremely challenging and high up-front costs and maintenance can prove a barrier to sustainable use of such equipment. Therefore, miners must be given incentives to move toward these technologies, including building confidence that the investment will be sound over the longer term. Guyana recently launched an effort with Inter-American Development Bank (IADB) assistance to “green” its gold sector, and the GEF, along with Conservation International, is leading an effort to brand and market jewelry made with mercury-free gold from Guyana’s artisanal miners.⁵² These efforts could offer up a learning model for other jurisdictions on how to address environmental stewardship in a way that incentivizes artisanal miners though benefits in other intervention areas, such as improving financial inclusion and access to legal markets. Technological advances can also help—for instance, remote sensing imagery can aid in tracking deforestation and water damage to identify scale and areas of intervention. For example, faculties in Ivorian universities and the United States Geological Survey (USGS) have used satellite imagery to track deforestation and other environmental impacts from gold and diamond ASM activities in Côte d’Ivoire over the last 20 years.⁵³ For gold, results from two gold mining areas of central Côte d’Ivoire—Dimbokro and Yamoussoukro—reveal marked temporal evolution from 2012 to today with respect to soil erosion caused by the removal of canopy plant at artisanal gold sites (Dibal et al. 2016; Tchindjang et al. 2016). Technologies such as ASMSpotter can also help governments allocate monitoring resources for mines based on changes in forest cover, such as in Guyana.⁵⁴ Underpinning enhanced monitoring through innovative technologies is the need for strong environmental governance. While governments must recognize

the legitimacy of ASM as a livelihood, clear environmental policies and strong enforcement are essential for reducing the environmental impacts of ASM (World Bank Group 2019).

Beyond mitigating the environmental impacts of ASM, future ASM projects can help ASM play a meaningful role in countries’ decarbonization plans.

Within the framework of a just transition, the World Bank is already helping countries with important large-scale coal mining operations transition to cleaner economies while also minimizing legacy environmental impact, thus improving environmental health and security. Such activities could be applied to the ASM sector, too. Activities can include reemployment support (especially to avoid associated livelihood activities that unduly impact the environment, such as wildlife trafficking), mine closure with careful focus on reducing tailings runoff, methane emissions, and other environmental impacts and activities to repurpose mining land for new economic use as described in the paragraph below. Furthermore, work on current mine sites includes traditional environmental protection activities, such as tailings and waste management and water protection and recycling, but goes beyond to reduce emissions by transitioning away from diesel-powered machinery toward renewable energy and encouraging resource efficiency (particularly use of non-wood sources for mine construction) along with circular economy principles, such as innovative ways of recycling tailings waste for other uses (such as minerals for batteries to store clean energy). The growing global focus on climate change has reinvigorated debates not only on how ASM can improve its environmental stewardship but also on how ASM fits into the broader effort to transition to clean energy.

Focusing on environmental stewardship and security also includes interventions that improve communities’ environmental security after mines cease to be productive.

Environmental security can be reduced in communities near legacy mines through a variety of mechanisms, including continued water and soil contamination

from acid mine drainage and heavy metals, exposure to unsafe tailings dams that are no longer managed, and topsoil degradation making mined areas difficult to farm. The World Bank can build off expertise in mine closure and rehabilitation in the LSM sector along with tested methodologies for rehabilitation in the ASM sector (World Bank Group 2019) to help government and communities

manage legacy and liability mines. Such activities include ecological restoration and reclamation of abandoned sites. Reclaimed mine sites can be converted to land uses such as clean energy development, productive agriculture, tourism, or natural landscape restoration (which could be eligible for carbon crediting or payment for ecosystem services schemes).

Suggested activities under Intervention Area 5 for World Bank support:

- ▶ Include environmental stewardship as part of holistic interventions alongside activities in other intervention areas, such as access to legal markets and financial inclusion.
- ▶ Support coordinated and interdisciplinary governance of ASM both to craft balanced policy and improve monitoring using, among other techniques, innovative technologies.
- ▶ Support small-scale mining entities to reduce their carbon footprint by incorporating renewable energy in their operations.
- ▶ Engage with communities and governments to rehabilitate and repurpose mine land for low-carbon, economically viable, and ecologically beneficial land uses.
- ▶ Convene cross-sectoral roundtables to design interventions that improve financial security for miners alongside environmental stewardship and environmental security for nearby communities.

Pillar 2: Professionalization

Intervention Area 6

Facilitate Financial Inclusion

Access to finance is an essential need of the global ASM sector. Finance has become a central tenet of various efforts to assist ASM in improving its environmental and social performance and in entering the formal economy. However, the sector’s complexity creates barriers to investment that are then exacerbated by the slim risk tolerance of many well-intentioned supporters: banks and financial institutions, development programs, civil society organizations, development banks, mining companies, refineries, jewelry companies, semiconductor manufacturers, and numerous other downstream businesses. These are reputationally

sensitive actors, with some using the commodities that ASM produces—gold, 3Ts, and diamonds, for example—in manufacturing or incorporating them directly into products. The concept of mine-to-market sourcing, whereby global brands (manufacturers, jewelers, or otherwise) meaningfully source gold, gemstones, 3Ts, or cobalt from rural miners, has been greatly encouraged over the last two decades but so far has led to vanishingly small flows of material or improvements in socio-environmental impacts at the mine site level. Rather, regulatory barriers for accessing finance seem to mount.

Additional regulatory developments have increased the costs and complexity of financing ASM actors. Section 1502 of the 2010 Dodd-Frank Act, while well intentioned to help reduce

the amount of minerals mined under conflict and duress, has certainly made it increasingly difficult for legitimate ASM actors and investors to support the legal trade of ASM-mined material emerging out of fragile and conflict areas such as Central Africa—and increasingly West Africa, the Sahel region, and parts of Latin and South America. The OECD’s guidance on due diligence is an excellent compromise and the first to elaborate a progressive improvement approach that allows essentially for immediate entry into markets based on relatively simple criteria. But even then, the commitment to continuous upgrading of operational conditions ultimately meeting high standards has never been heavily enforced, leading to ASM material entering the markets at a slow rate because of the costs of compliance and with little environmental, social, or governance (ESG) improvements. As well-meaning as the plethora of due diligence and certification schemes are, their implementation has inevitably led to a cost-and-effort asymmetry for sourcing ASM product.

Magnitude and risk are critical for deploying finance in support of sustainable and inclusive ASM. As explored in earlier sections, a key constraint to realizing scaled and sustainable ASM is the low appetite for risk, which has often translated into the “piloting” of solutions but never giving enough attention to how such solutions would be scaled up after completing the pilot. Learning through these decades of piloting shows that too little financing cannot significantly move the needle on sustainability of ASM practices. In fact, hardly any finance has been deployed successfully where desirable improvements continue post project and spread to neighboring sites. Finding ways to de-risk the deployment of capital is therefore essential for scaling up. The rationale should certainly be there: to tackle large development challenges like ASM with its 45 million-plus people in 80-plus countries, significant financing needs to be put on the table. Yet—as continues to be argued by many development partners, including the World Bank—it is challenging to distribute large sums into a sector where the perception of unmitigated risks is high.

Therefore, in thinking of new models of scalable finance, the principal concern is de-risking.

World Bank financial support to complex development challenges in other sectors provides ideas on de-risking strategies for ASM financial inclusion. Examples include (i) investment lending (IPF, P4R, DPO), whereby funding goes to governments in tranches based on achieved and defined milestones; (ii) guarantees with domestic, regional, and international financial institutions; and (iii) financial inclusion and access programs targeted directly to miners and administered by third parties. Each solution has its merits. Whereas direct investment lending reduces the risk of large sums being misdirected or misused, it depends heavily on an effective government monitoring system with clear and achievable results. Working with domestic, regional, or other financial institutions in support of loan guarantees for ASM actors has been a limited but very positive experience for the World Bank. Specific to ASM, guarantees overcome commercial lenders’ risk aversion (in this case, government or domestic commercial banks). There is also an intangible positive messaging that occurs through the influence and education that World Bank guarantees bring to client countries and miners, as the World Bank is considered a credible actor with a legitimate, respected mission. This helps reenforce the positive reasons to support ASM by other interested development partners.

More traditional financial inclusion strategies have been deployed by various NGOs and other donors to encourage access to finance through village savings schemes, digital banking, and small loan programs. One of the first village savings schemes offered to miners was in the Democratic Republic of Congo in the late 2000s by Pact. It worked from a successful women entrepreneur model built in Myanmar, aimed at increasing female agency in general. Since then, many NGOs have followed suit, intertwining village schemes or revolving schemes into ASM programming, many of which are still largely aimed at women miners.⁵⁵ PlanetGOLD has also successfully built in a financing component to

their mercury abatement efforts, responding to the challenge often evoked by miners that uptake of mercury-free technology is impossible without readily available outside financing. But the difficulty with these programs is the high cost of doing business. And despite laudable results over the decades, particularly in closing specific gender gaps, there remains considerable debate about such schemes’ ability to transform artisanal operations into truly viable small-scale ones.

Guarantees offer a promising means for the World Bank to scale up financing to ASM actors while promoting sustainable ASM principles.

In Tanzania, the World Bank implemented a successful guarantee mechanism with the Tanzania Development Bank to facilitate small business loans to ASM operators (see box 2). The loan program had a built-in advisory window to assist applicants with minimum requirements, including, among other things, possession of a primary mining license. The program succeeded in supporting site improvements through technology acquisition, upgrading of environmental protection, and ensuring OHS standards. Such a model could be considered on a much larger scale in ASM active client countries where access to finance is married to improving ESG at site. Certainly, in other sectors, the World Bank has a strong track record of establishing guarantees with domestic central banks and domestic commercial banks in support of SME development. Similar lessons can be drawn from the Asian Development Bank microfinance model for ASM communities in Papua New Guinea, the Fundo de Fomento Mineiro in Mozambique, and the MEDMIN-CEPAS Credit Scheme for Bolivian ASM miners. Such guarantee schemes need not be exclusive to ASM operators—they could extend to in-country traders and aggregators as well, providing a leg up to much badly needed infrastructure for domestic ASM markets to legalize for export.

Another objective of guarantees could be in support of government domestic buying programs. Here, guarantees would be structured toward central banks to establish a commercialization capability in-country. In such cases, based on past lessons, key to a government buying program is cash flow. Ample lessons can be drawn from the gold space to inform new models. Already, actors like the World Gold Council are reengaging in this sector and partnerships could be imagined across many active ASGM jurisdictions (World Gold Council 2022). As stated through the Tanzania case study (box 2), any guarantee would have to address ESG: improved practices at sites and assist with technology adoption for better environmental and social outcomes. In this way, guarantees can foster the development of a responsible ASM market by supporting responsible ASM operators.

Yet the World Bank need not always be a lender. Sometimes the private capital is there, but what is required is a framework for shared risk management. Take the emerging example of the World Bank and the World Gold Council’s Multi-Stakeholder Partnership Initiative for Sustainable Small-Scale Gold Mining. Here, LSM companies as well as impact investors are eager to support improved practices for ASM but do not wish to work directly with small ASM entities. Furthermore, they seek to participate in processes where there is a large degree of shared risks. The World Bank and the World Gold Council have established a partnership framework that outlines principles and develops a strategy of risk mitigation that is then agreed to by all parties. In such a scenario, the World Bank can function as a catalytic body, bringing relatively modest sums of technical assistance financing to the table very upstream to mobilize quite considerable amounts of private capital further downstream in aggregation and export.

Suggested activities under Intervention Area 6 for World Bank in partnership with IFC and MIGA support:

- ▶ Establish financing facilities (and provide the guarantees) within commercial or central banks to provide loans to registered ASM operators, traders, and aggregators, according to specific performance criteria.
- ▶ Pioneer multistakeholder partnerships that share risks of investing in ASM operations.
- ▶ Provide guarantees to central banks to buy domestic ASM product.
- ▶ Establish technical assistance entities within local mining schools or universities to help ASM loan recipients meet due diligence requirements and to build site performance capacity.
- ▶ Sponsor a challenge fund for innovative and scalable solutions to ASM financing.

Intervention Area 7

Support Infrastructure to Access Legal Markets

Access to legal and equitable markets is important for ASM actors and governments alike.

For ASM actors, it allows them to sell their product at a fair price. For governments, it ensures that revenue from domestic production is captured and put toward the country’s development objectives. Many barriers impede access to legitimate and equitable markets for miners. Some barriers have to do with international market standards (particularly those mentioned earlier around “conflict-free” material); others have to do with the limited domestic infrastructure to facilitate commercialization to the outside. Barriers vary in importance from mineral to mineral as well. But at the heart of most market challenges are capacity and financing. And whereas over the last two decades significant piloting has taken place to bring “clean” material to the international market, these initiatives are costly, heavily subsidized by international donors, and require a minimum threshold to participate, leaving many smaller ASM entities excluded. If sustainable ASM is to be achieved, then finding cost-effective solutions to the barriers facing miners to enter legitimate markets is critical.

Domestic commercialization is key. The organization of the domestic buying and selling environment is of prime importance, not only for

addressing illicit domestic or cross-border mineral trade but also for creating a vibrant domestic ASM sector. Central to the debate on commercialization at present is the role of government—whether through national mining companies or through domestic purchasing and refining structures. Whereas the role of government is certainly not a new topic of conversation when discussing commercialization, it is timely, particularly for the gold sector, given the alarming rates of illicitly traded gold entering markets and financing terrorism and armed groups across the Sahel and parts of South America. Here, we can observe for the gold sector the reinstating of government-run mineral purchasing facilities in Bolivia, Cameroon, Ethiopia, Ghana, Peru, and the Philippines, to name but a few countries. We can also observe the intense proliferation of government-owned and government-operated refineries across West Africa and into the Sahel, sometimes coupled with a gold-buying program. The message in all these cases is clear: governments are keen to play a very active role in the commercialization of their countries’ gold production. It is an understandable position for several security and development imperatives. Indeed, government-controlled buying schemes for gold can provide considerable control over what is otherwise a very difficult mineral economy to control. Because of gold’s easy transportability and value as a trading currency, it is viewed as more susceptible to predation and illicit involvement by criminal networks.

In government-controlled buying schemes for gold, the final buyer and exporter is the country’s national bank. In Ethiopia, artisanal and small-scale miners can deliver their processed ore to licensed gold dealers or specific cooperatives that have the legal authority to carry out gold transactions on behalf of the government; the licensed gold dealers or cooperatives then sell the gold directly to the National Bank of Ethiopia, which has branches in most rural areas. Zimbabwe has a very similar model, though with a commercial bank intervening at the rural interface; in Cameroon, a semiautonomous institution acts on behalf of the government. As stated earlier, the World Gold Council has reengaged on this topic in recent years, with a working group now established to coordinate efforts across seven central banks that have gold-buying programs to facilitate the entry of legitimate ASM gold product into the bullion market.

For many types of minerals, aggregation centers can be an important domestic infrastructure tool, providing a type of “hub and spoke” service for a wide variety of ASM actors. An aggregation center can take on many roles, from purely processing to prefinancing to service delivery (geological or site improvements) to equipment provider. In Peru, Dynacor runs a very comprehensive model, processing upward of 448 tons of gold material per day, with a quarterly gold production in Q2-2023 of 32,693 AuEq ounces.⁵⁶ In Rwanda, domestic exporters run similar services for the 3Ts.

Digital technologies and physical buying forums have helped certain miners leapfrog traditional commercialization structures in favor of better returns and more direct access to the markets. Such strategies have proved particularly valuable in the gemstone space. When domestic

traders could not travel to mine sites to purchase gemstones during the COVID-19 pandemic, the World Bank financed the establishment of online sales platforms for women miners in Zambia and Malawi. This gave birth to a whole new way for women miners to sell to the international jewelry market. Coupled with the online platform came technical assistance to improve OHS on sites and implement environmental and social standards at sites (World Bank 2023b). In another COVID example, following the opening up of physical travel, the World Bank financed trade forums in Kenya and Tanzania that brought together female miners to sell their gems to international buyers. In addition, women received gemstone valuation training from the Gemological Institute of America. In both cases, minimal investments in digital technologies and physical marketplaces led to women gaining three to five times more for their stones than if they sold them directly at the mine site to domestic traders (World Bank 2023; World Bank 2022).

As with other efforts outlined in this section, access to markets must leverage social and environmental standards to raise the bar on ASM performance and ensure alignment with market-recognized standards. With every potential input offered to mine operators (finance, equipment, technical assistance, and so on), an important reform should be improvement in how mining takes place—that is, safety, OHS, and environmental and social protection. We come back to the need for system-wide solutions in ASM communities, breaking past approaches focused on one of the myriad problems. Partnerships in such a system approach become even more critical but obviously require much longer lead times to put the right frameworks in place.

Suggested activities under Intervention Area 7 for World Bank in partnership with IFC and MIGA support:

- ▶ Improve domestic commercialization infrastructure that can absorb and export ASM product in much larger volumes.
- ▶ Provide technical assistance to miners to meet minimum compliance standards on certain mineral products requiring so for export purposes.
- ▶ Encourage aggregation mechanisms where it makes sense to build more volume of minerals in the domestic market and offer a variety of services to miners at reasonable costs.
- ▶ Link governments to peers who have built vibrant ASM commercialization infrastructure for lessons learned.
- ▶ Work with international markets to provide assurance on country efforts to create market access according to international standards.
- ▶ Work to reform a variety of enabling elements for effective trade to the international markets (insurance, shipping, export, import and international sales document, tax compliance and chain of custody).
- ▶ Reform, where necessary, regulatory frameworks to facilitate entry of domestic commercialization actors into the local trading market.
- ▶ Support marketing campaigns focused on consumers to improve the image of ASM.

Intervention Area 8

Build Organizational Capacity of ASM Actors

Capacity building for ASM actors is critical for sustainability of the sector. Considering the scale of individuals involved in the ASM value chain, and the limitations of government to effectively monitor all persons, most governments have moved away from models of monitoring individuals to models of monitoring entities, making the predominant vehicle for miners to register and operate a mine site a cooperative. But given the relatively new push by governments to enforce cooperative formation, there are understandably needs on a capacity front that have to be met to ensure these entities operate according to their obligations under the law (see box 3 for an example of how World Bank projects have successfully supported ASM associations). When linked with appropriate incentives—such as technical and financial support through regional associations or national federations—such a model of organizing the sector can prove compelling. For instance, in Rwanda, the government does not

require government-issued identification for national mining participation. Rather, its legislation dictates that permits allocated for small-scale and artisanal sites are accorded to mining cooperatives, which must demonstrate their capacity to adhere to labor laws and enforce regulation of labor activity at site (Perks 2014). These cooperatives are then knitted together by a federative cooperative structure that, in return for membership adherence, provides its cooperatives with technical and financial assistance. What stands out as a successful model in Rwanda is the capacity of its federation to commercialize minerals. In effect, by allowing the federation to be an exporter, it ensures that cooperatives are further incentivized to be federation members because they have a guaranteed domestic sales market. Furthermore, exporting capacity allows for profit generation that can then be reinvested in the structure’s functioning, including the services it can provide to its cooperative members. This again illustrates how a system-solution approach to supporting the development of sustainable ASM is important. Whereas semi-industrial or semi-

mechanized operations do not require cooperative structures to be formed—rather, small businesses—the constraints of organizational capacity still apply.

Organizational strategies that privilege institutionalization of small-scale miners’ participation can provide miners with meaningful social protection and economic capacity to grow their operations. Such institutionalization has inherent social and economic values, as it can facilitate dignified employment. Thus, while the choice by governments to allow for a higher number of operators inevitably engenders cost implications such as increased administrative capacity to process larger volumes of permits, and infrastructure necessary for field monitoring, the social benefits deserve equal consideration.

The World Bank’s internal project review demonstrated the importance of working with NGOs or mining associations (including women’s) in relation to capacity building for mining operations and for advocacy within the sector writ large. One of the reasons given for the importance is that these organizations have more on the ground and valuable sociocultural knowledge of the region where they work than international institutions. The World Bank—financed Mining Governance and Development Project (P149277) in Togo had a very positive experience working with NGOs that provided capacity building in basic business skills to ASM operators. As highlighted in the discussion on access to legal markets (Intervention Area 7), working with NGOs, cooperatives, and women’s associations to deliver capacity building to miners showed great success during the COVID pandemic. The World Bank is also demonstrating how to scale up capacity-building efforts for ASM actors by way of digital platforms.

Through the Delve Exchange, miners have leveraged the free and nearly ubiquitous messaging app WhatsApp to establish six regional peer-to-peer knowledge exchange networks. With more than 1,000 miners participating to date, the exchange groups, led by expert regional coordinators,

BOX 3 World Bank Project Focus: Supporting Mining Associations in Uganda

The Sustainable Management of Mineral Resources Project (P079925 and P111097) targeted mining cooperatives in Uganda for organizational capacity building in several ways. First, the project helped miners form cooperatives from individual operations, with 50 associations formed during the project. These associations were given training in operational and organizational topics, including mining methods, legal and regulatory issues, business skills, OHS, and community development. Training of about 1,000 association-affiliated miners were carried out by 180 project-capacitated professionals in a newly established Social and Environmental Unit in the Geological Survey and Mining Department. The training of trainers included providing postgraduate degrees, study tours, and provision of computers and modern office equipment. Additionally, the majority of small grants given by the project were directed to associations—18 grants in total—which were used to finance both mining and non-mining related businesses, including brick making, tree planting, and equipment for a women-led party supply rental business (41 percent of grant recipients were women). The project’s aim of focusing support on associations was designed to help increase the number of miners receiving licenses, thinking that organized miners would more easily gain capacity and willingness to apply for licenses. In fact, the project increased the number of miners receiving ASM licenses from 100 per year before the project to over 900 in the last year of the project. Focusing on associations was also a strategy for the project to improve sustainability of ASM reform—by supporting ASM businesses affiliated with the associations, the miners had more financial stability and ownership over their operations.

many of whom are miners themselves, have proved a model for sustained engagement and stimulated demand among participants for greater capacity-building opportunities. In response, the exchange is developing a series of open-access learning modules to guide miners in site-based

transformation activities. Lastly, the World Bank's 2023 *State of the ASM Sector* report demonstrated how professional mining groups like Women in Mining serve as key interlocutors for government in the development of interventions and as advocates to represent the interests of their members.

Suggested activities under Intervention Area 8 for World Bank support:

- ▶ Work directly with miners' associations, federations, and other interest organizations related to mining to develop and carry out outreach and capacity-building programs for miners.
- ▶ Invest in capacity building for miners' associations and federations themselves.
- ▶ Provide grant financing to miners' associations and interest groups that target actions on the ground in mining communities.

Intervention Area 9

Deliver Extension Services for Miners

The concept of extension services is evolving today toward approaches that focus on the grassroots, bottom-up practices that nurture sustainability and agency of actors in local communities (Muyanga and Jayne 2006). The term *extension services* is used in various economic sectors,⁵⁷ but the oldest and most common use of the term is linked to agriculture (Demiryürek 2014). Part of this approach aims to reach a larger group of beneficiaries, making implementation much more cost-effective. This has implied redefining who are the providers of extension services: the need to include private agents, such as NGOs, arrangements and alliances with producers and traders, national and international development partners. More recently, this concept has also referred to the technical training of ASM miners to improve their operations (Hoadley and Limpitlaw 2004; Hentschel, Hruschka, and Priester 2002).⁵⁸

There is a misconception today about the nature of extension services and therefore who is apt to deliver them. Like the origin of the concept of extension services for agriculture, the perception

is that extension services for the mining sector would basically be limited to technical support, based on technology transfer to improve mining practices with the goal of increasing production and productivity. Consequently, the extension service agent would be a mining technician, and training would be delivered by geologists and mining engineers. In the new concept of extension services, the providers of these services must have a much more multidisciplinary and versatile profile than that of a technician who provides specialized services. Certainly, the technical dimension of their profile must be covered, and this type of training must be provided as needed. But the concept of rural development introduces a role for the extension service agent to go beyond technical mine solutions to addressing challenges of a socioeconomic dimension as well, including those related to health aspects of the miners and their families, access to sanitary conditions, access to drinking water and electricity, the resolution of tensions and conflicts within mine sites, commercialization, and export. These are all new dimensions to extension services in addition to traditional areas of improving production practices and productivity in extraction and processing. Thus, the profile of extension services providers

should emphasize aspects such as communication skills, the ability to work independently, the ability to solve complex problems, negotiation skills, and leadership skills. In other words, the extension service agents do not necessarily need to have prior technical experience with the mining sector. The important thing is that miners receive technical training according to their needs. Thus, training the providers of extension services and stakeholder engagement to understand miners' needs are two of the most important dimensions of implementing any extension service system.

Historically, government agencies have provided extension services, but at a high price for delivery. In reviewing efforts over the decades by government agencies to deliver successful extension service programs, the following challenges emerge time and time again:

- (i) Limited human and financial resources. This includes a lack of trained personnel and equipment to conduct fieldwork and provide training and education to ASM communities.
- (ii) Limited infrastructure to support extension services in rural settings, such as transportation and communication networks. This makes it difficult for government officials to reach mining communities and provide services.
- (iii) Limited capacity by government agents to provide effective extension services, including the ability to develop and implement policies and programs, and to monitor and evaluate the effectiveness of those programs.
- (iv) Lack of communication and consultation on extension service design, which means many programs are not tailored to the specific needs of the communities and therefore not accepted or utilized fully by the miners.

- (v) Limited political will from government to invest resources and prioritize the needs of ASM communities.
- (vi) Mode of delivery is not suitable to miners' profiles. Many miners are illiterate and until recently extension services commonly produced large handbooks or guidance notes in writing.

For these reasons, extension services today are discussed in a hybrid fashion: conferring some responsibilities to government while opening opportunity for well-suited private sector actors to come in as well. Efficiency, effectiveness, and adaptability to local needs are key concepts in any economic sector intervention; however, they are particularly important for ASM extension services. The issues are linked to several characteristics specific to ASM, with the following standing out: (i) the diversity of operations and minerals extracted and processed (the sector is made up of hundreds of mining operations spread throughout many countries and it extracts and processes a large diversity of minerals); (ii) the majority of mining operations and activities are informal, but there is a need for activities and operations to become licensed to operate (through mining titles and licenses); and (iii) different levels of development and capacity among of mining operations. These characteristics, in practice (see box 4), mean that extension services need to be based on a hybrid system that allows for different sources of financial support and permits several networks of extension agents from a variety of organizations to create the conditions for delivering services in a sustainable way and that will enable the services to cover most of the ASM operations that need assistance. As mentioned in the discussion on access to legal markets (Intervention Area 7), new models are working well in some contexts that provide a one-stop shop or "hub and spoke" system to buy and process minerals and offer extension services to their ASM clients. This is but one type of extension service model in operation today.

BOX 4 Extension Services for ASM in Mozambique

The implementation of artisanal and small-scale mining (ASM) extension services in Mozambique illustrates an evolving approach to addressing the sector's needs. Mozambique was a pioneer in offering support systems for ASM with the creation of the Mining Development Fund (FFM) in 1988. The fund succeeded in giving financial assistance to small-scale mine exploration, supporting use of mining equipment, and forming associations. However, it faced challenges in issuing mining titles and diversifying support to non-gold miners, in part because of the nomadic nature of some ASM segments and the lack of a national ASM formalization strategy.

After the Mining Development Fund closed in 2013, the Geological and Mining Institute and later the National Institute of Mines (INAMI) took over some of its functions, focusing on forming associations and delivering training on health, safety, and social aspects. The support targeted members of associations and, often, left out host communities. In parallel, and sometimes in coordination with INAMI's efforts, the Provincial Directorates of Mineral Resources and Energy and the Department of Artisanal and Small-Scale Mining (DEMAPE) continued to provide technical and organizational support to mining groups, addressing specific issues like work accidents, conflicts, and child labor. Other government entities, including Environment and Health, carried out their work in mining communities but lacked coordination between their activities and the interventions of the Ministry of Mineral Resources and Energy (MIREME).

These assistance actions to miners involving the provinces suffered a significant reduction with the transformation of the provincial directorates of mineral resources into departments and a subsequent reduction in human and financial resources. Reduced assistance to artisanal miners was further compounded by INAMI technicians' dual responsibility to assist, upon request, large and medium-size mining companies.

In 2017, Mozambique developed a strategy for ASM, recognizing the need for a systematic extension service system. The Formalization of Artisanal and Small-Scale Mining Project worked in three provinces covering four pilot mining areas, with the vision for the government to learn, replicate, and scale the systems to the entire country. The project produced a terms of reference for implementing extension services, outlining different stages of providing extension services (rationale, methodologies, instruments, and actors), and identified the components of a national system of extension services (institutional, informational, monitoring, and evaluation). The second document provided recommendations for the creation of an institutional system to operationalize extension services and to incorporate experiences from agriculture and fisheries extension services, creating a structured approach to support ASM, and acknowledging the sector's need for stability, rights, and formal recognition.

In a hybrid system, several networks can intervene to deliver complementary knowledge and training: community agents, extension service agents, professional and technical institutions, and private sector actors.

Community agents support extension activities at the local level; they include traditional and community leaders and community organizations and associations, among others. These agents would be trained as needed by extension service agents and, when necessary, with the support of technicians. Extension service agents provide direct support to mining operations in the location where they are appointed to work. They are part of the local extension service network and may be hired as employees of the government or be contracted for a fixed period for other projects and programs. They must be trained by technicians. Professional and technical institutions carry out some specific technical interventions of greater complexity. National universities, research institutes, and laboratories are well placed to deliver short courses on specific topics. The Mining Centres of Excellence network across Francophone West Africa and the Sahel is an excellent example.⁵⁹ Private sector actors, the fourth key group, can intervene at the request of government to deliver training as well. Actors in this category could include (i) consultancy companies and individual consultants of national or international origin who may build the infrastructure for an extension service system and may also provide training to new technicians at universities, through courses aimed at this sector; (ii) associations and federations of ASM cooperatives that have existing relationships with mine sites and have an interest in seeing their performance improve; and (iii) NGOs or civil society organizations that can, based on specific projects, provide support to the extension worker, or implement a series of activities based on agreements or contracts. NGOs can also have a role in empowering local mining networks. Additionally, the model for miner-to-miner knowledge exchange remains a proven format, with historical roots in the World Bank's

Communities and Small-Scale Mining (CASM) initiative now reimagined with advancement in digital connectivity through the Delve Exchange. Though a hybrid system may seem vast in actor participation, and therefore costly to establish, the diversity in such a system can provide invaluable expertise that cannot otherwise be found within government resources.

Geological works are a priority extension service if successful small-scale mines are to be developed. The lack of geological knowledge on permits granted to ASM entities has been a major constraint to the sector's development. Traditionally, macro-level, country-wide geological information is expected to be paid for through public funding such as extension departments within relevant government departments (for example, ministries of geology, mining, and metallurgy, or through university faculties and departments). Sometimes these departments enter partnerships with international organizations such as the United Nations Environment Programme (UNEP), Germany's Federal Institute for Geosciences and Natural Resources (BGR), France's Geological Survey (BRGM), or the United Nations Development Programme (UNDP) to implement technical solutions. For example, in 2005, the United Nations Industrial Development Organization (UNIDO) worked with the Zimbabwe Ministry of Mines and Mining Development and the University of Zimbabwe to develop a "train-the-trainer" program in gold mining communities within an ASM area. The World Bank has also financed geological works for ASM sites in Tanzania and the Democratic Republic of Congo. But private sector consulting firms could also meet the demand for site-specific geological works, and some argue that a demand-driven approach to geological services could be more cost-effective and rational because a miner will seek services for an area they have permitted. In addition, satellite imagery, drone-based spectroscopy, and other cost-effective technologies have emerged that can perform powerful analysis for specific mineralized areas.

Suggested activities under Intervention Area 9 for World Bank support:

- ▶ Upgrade information delivery systems—for example, through mobile apps and websites or by using social media platforms—to deliver extension services.
- ▶ Develop appropriate handbooks, tools, and guides based on miners' literacy and capacity.
- ▶ Design and implement hybrid extension service systems to operate across major ASM areas in a country and ensure adequate long-term financing is built into their design.
- ▶ Build government, academic, NGO, and civil society capacity to deliver on extension service systems.
- ▶ Execute geological research on strategic and priority ASM areas in a country.
- ▶ Bring new technologies to service ASM exploration.



PARTNERSHIPS

If sustainable artisanal and small-scale mining (ASM) is to be achieved at a scale that delivers impact for ASM actors, mining communities, and client countries, partnerships will be essential. Building on the principles of the World Bank's recently released One World Bank Group Partnership Charter, the World Bank seeks to be a valued partner across national, regional, and global ASM spaces. Through its commitment to partnership, the World Bank respects the pivotal role of countries and their governments in leading national development strategies and programs while also seeking to leverage the unique strengths of a diverse array of development actors, including multilateral institutions, the private sector, civil society, and nongovernmental organizations. The World Bank believes that by fostering harmonization and alignment across institutions and creating a culture of mutual learning, development solutions that achieve greater efficiency, innovation, replicability, and scale can be found. Partnerships may take multiple forms and consider a range of interventions: promoting knowledge and data, spearheading new investments in specific technologies or approaches, or scaling up proven pilot models. The World Bank draws from recent implementation experiences to outline potential partnership models with select stakeholders.

To maximize the full capabilities offered by the World Bank, the World Bank will foster deeper internal collaboration across the International Bank for Reconstruction and Development (IBRD), International Development Association (IDA), International Finance Corporation (IFC), and Multilateral Investment Guarantee Agency (MIGA) to promote financial inclusion, advance gender equality, support the development of small and medium enterprises (SMEs), and enhance domestic commercialization across the ASM sector. These partnerships will leverage the World Bank's comprehensive development expertise, IFC's private sector investment capabilities, and MIGA's guarantees (political risk insurance and credit enhancement) to investors and lenders, to create a robust suite of activities aligned with the ASM support framework put forth.

To reach more miners and work more effectively in mining areas, the World Bank will explore a strategic approach to supporting ASM-focused networks and associations that have significant reach and relationships in existing mining communities. Examples may include but not be limited to Women in Mining chapters and small-scale mining federations and/or associations. A new addition has been the establishment of the Delve Exchange, which has widened outreach by way of digital technology and presents an entirely new way of transferring capacity and knowledge to the mine site.

To reach scale on important topics of global relevance to the mining industry writ large, the World Bank will seek out, on a selective basis, development partnerships with mineral-specific industry associations and other types of wide mining

Partnerships

membership associations that can organize and assemble on behalf of a large constituency. The emerging partnership with the World Gold Council for the West Africa and Sahel Multi-Stakeholder Partnership Initiative for Sustainable Small-Scale Gold Mining is a good example that could potentially be replicated to other minerals facing similar challenges, like ASM cobalt mining in the Democratic Republic of Congo with the Cobalt Institute.

To maximize support to country clients on national ASM development agendas, the World Bank will endeavor to work in clearly defined manners with other large institutions that support line ministries concerned with mining. This could include the Intergovernmental Forum on Mining, Minerals, Metals, and Sustainable Development (IGF), the African Minerals Development Centre (AMDC), and regional multilateral development banks (MDBs). In a similar fashion, the Extractives Unit of the World Bank will seek out a more strategic role in country-level dialogues within the Country Management Units (CMUs) to ensure maximum linkages between ASM and other relevant development sectors supported by the World Bank in a given client country.

To continue pioneering excellence in the ASM research agenda, the World Bank will reflect on ways to collaborate on a more strategic and long-term basis with a range of academic programs seeking to answer important development questions facing ASM. This could be through a large research program spanning several years or in-depth country analysis on a more short-term basis. Continuing to build the case for ASM's contribution to development will remain a priority. Research could also be nurtured through Delve and the State of the ASM Sector report series.

To expand on proven models and approaches for mine-to-market programs, the World Bank will continue to support innovations that have worked well, especially those efforts made during and after the COVID-19 pandemic that have significantly improved earnings for miners. Partnerships with Virtu Gem, Moyo Gem, and GemFair are excellent examples that have delivered meaningful results, especially for improving women miners' livelihoods.

The World Bank could consider partnerships with these leading programs and facilitate new mine-to-market programs through twinning programs facilitated by trade associations, ASM federations, Women in Mining chapters, or jewelry-specific initiatives such as the Chicago Responsible Conference and Initiatives in Art and Culture. Where applicable, work with the OECD to complement the scope of its "conflict-free" guidance.

To continue to mature data-informed operations, the World Bank will remain institutionally committed to the success of Delve and its sister initiative, the Delve Exchange. This could be through targeted partnerships to address data gaps on critical and understudied ASM themes (gender participation, illicit financial flows, informal trade and mineral traders, tax leakage, access to finance), minerals, or geographies. These partnerships with industry, academia, governments, and civil society can involve the formation of discrete working groups, the aggregation of existing yet undisclosed data, the development of new approaches for data modeling, and investment in new research, all with the intent to create public knowledge products (reports, fact sheets, webinars, journal articles) that can be used by policy makers and practitioners to develop scalable and sustainable solutions. Delve is positioned to expand platform content through this targeted partnership using existing formats (country profiles, State of the ASM Sector reports, blogs) and new formats and mediums (videos, podcasts, case studies, interactive content, contributed columns, and so on) that target nonspecialist ASM audiences. The Delve Exchange will continue to build partnerships with mining groups to expand access to the network's community for miner-to-miner knowledge exchange and the forthcoming ASM Academy.⁶⁰

To advance data collection and monitoring in ASM jurisdictions, the World Bank will continue to invest in capacity-building programs that work with governments and civil society to improve data management and monitoring practices related to ASM. Through Delve and its network of partners, the development of an ASM data management guidance is considered. This work could build on the Extractive Industries Transparency Initiative (EITI) and

other organizations working on data collection, such as SwissAid. In recognition of the sector's relative infancy in the development sphere, the World Bank is committed to enhancing the facilitation of knowledge exchange forums and platforms (in-person and virtual) to promote greater transparency, accountability, and learning from interventions and initiatives supporting sustainable ASM.

To facilitate the global exchange of knowledge and best practices, the World Bank will pursue the

coordination and hosting of an annual or biannual conference wholly dedicated to ASM as a space for knowledge exchange and coordinated action from practitioners, governments, and the broader development community to advance the sustainable ASM agenda. With Delve's forthcoming ASM project catalog, the World Bank is committed to maintaining an open crowdsourced record of historical and ongoing ASM interventions and leveraging this resource to highlight lessons learned, best practices, and shortfalls across the sector.



A man washing diamonds in a mine in Kono, Sierra Leone. Credit: iStock/Abenaa.

CONCLUSION: CREATING A NEW, UNIFYING NARRATIVE FOR ASM

Artisanal and small-scale mining (ASM) is vital to global prosperity. ASM is an important part of many mineral, metal, and precious stones supply chains without which the world would be less functional and less prosperous. These include the “green revolution” (cobalt and rare earths), luxury fashion (gemstones), and tech revolution (gold) supply chains, to name but a few.

ASM is key to poverty reduction. ASM is an important part of the rural economies in which it operates, providing direct livelihoods to over 225 million of the world’s most disadvantaged citizens, and it has the potential, through investment, to create long-term livelihoods that will create a brighter future for mining communities.

ASM must also be a leader in environmental stewardship. If the World Bank is to support its goals of reducing poverty and increasing shared prosperity, doing so must include building foundations on a livable planet. The World Bank believes that environmental stewardship for ASM is important not only for the planet but also for the ASM communities and actors themselves.

Findings from the various consultations, interviews, and project reviews suggest appetite for a new approach to support ASM. Discussions around formalization are moving back to those early days of professionalization, but with much more deliberate integration of regulated financing and market access. Emphasis once again is on how best to incentivize ASM actors and governments to develop, own, and apply standards designed to improve mine performance, with third parties bringing services to ASM operators to build capacity and opening up trade opportunities.

Sustainability of ASM, as the World Bank positions the end goal of the sector’s development, will require scaling through partnerships. If ASM is to achieve a recognized space in mining sector development strategies of governments, it will need targeted and strategic support from public and private sector partners. The reach and impact of ASM in rural communities and the global mineral trade economy are such that support cannot afford to be limited in time or resources. Scaling up and scaling out are required to translate the sector’s potential into a development reality. It is anticipated, given the scale of resources and commitment required to really make a sustainable impact on the sector’s development, that multistakeholder partnerships will be critical for unlocking, leveraging, and coordinating a variety of support sources.

As heard from miners and other stakeholders, safety and well-being along with environmental stewardship and raised earnings will be important outcomes to judge success. These are the incentives that will help development efforts be taken up more readily and widely by ASM actors themselves. World Bank support to country clients will need to be more adaptive in their funding timelines, with a view to scaling from the start in order to achieve outcomes in the most effective and lean way possible. And World Bank interventions should be more participatory and miner-centered, given time and resources to build the trust and create incentives for behavior change.



End Notes

- 1 ASM is a term used to define a range of mining activities that employ basic tools for extraction and processing with a tendency toward high labor intensity. ASM can include men and women working on an individual basis as well as those working in family groups, in partnership, or as members of cooperatives (OECD 2016, 65). ASM operations can employ as little as a few people to several thousands. Most ASM, due to constraints in effective regulation, occurs informally; or when in protected environmental areas such as national parks or preserved ecosystems, illegally; and when supporting armed groups, illicitly.
- 2 The estimate from the 2020 report is based on a review of 25 countries for which there is a data point in Delve on the number of women in ASM.
- 3 The reduction of “conflict” diamonds through the Kimberley Process was the most well-known campaign; a decade later, the United States Dodd-Frank Act, section 1502, provided a similar template for the “3Ts” (tin, tungsten, and tantalum) and gold in the Great Lakes region of Central Africa.
- 4 The network of stakeholders involved in ASM is broad. It includes ASM associations and networks, large-scale mining companies, downstream supply chain actors linked to ASM-produced minerals (processors, refiners, traders, manufactures, brands), academic researchers, financial institutions (formal and informal), service providers and consulting firms, and civil society (international and national nongovernmental organizations).
- 5 The authors recognize the critical importance of sensitivity to context and mineral commodity to any mineral development strategy but note that articulating these distinctions is beyond the scope of this global position paper.
- 6 Programmatic review dated back to the World Bank Small-Scale Mining Development Project in Bolivia (Loan 1331) approved in 1976, with implementation 1978–1982.
- 7 ASM employment in Europe and Central Asia, the Middle East and North Africa, and North America is less than 25,000 (<0.05 percent). Global employment is based on Delve database figures (<https://www.delvedatabase.org>).
- 8 The estimate from the 2020 report is based on a review of 25 countries for which there is a data point in Delve on the number of women in ASM.
- 9 Among others, key indicators tracked typically include (i) jobs (direct and indirect), (ii) fiscal revenues, (iii) infrastructure investments, (iv) downstream economic linkages, and, more recently, (v) net-zero and decarbonization commitments.
- 10 See the Delve website at <https://www.delvedatabase.org> (accessed March 21, 2024).
- 11 For the first five countries listed, the Financial Diaries exercise was sponsored by the World Bank through its COVID and ASM Emergency Window (World Bank 2023b).
- 12 Pioneered by development practitioner Stuart Rutherford, Financial Diaries compiles economic data on poor households, specifically through tracking daily tracking of cash inflows and cash outflows of poor households, compiled at set intervals over a designated period, with a view toward recording their financial transactions. See Kamath and Ramanathan (2016) for more information.
- 13 Regulatory frameworks include mining codes, regulations, other legal instruments, and the infrastructure required to regulate and monitor ASM activity.
- 14 In some cases, the conflict can be over different mineral resources. This has been observed with exploitation by ASM of a construction material like sand when its occurrence geologically and geographically overlaps with another commodity like gold or platinum being exploited by LSM.
- 15 A third category, the semi-industrial, is increasingly being used to overcome constraints found in the former two categories in terms of ceiling on investment, types of equipment that can be used, depth of operation, or caps on volumes of production. The semi-industrial category of license has particularly taken off in the last two decades in Sub-Saharan Africa, where foreign investors have acquired the license and “partnered” with local miners to exploit. The rise in use of the semi-industrial license has raised considerable concern both in the literature and with domestic actors on the grounds of environmental degradation and labor misuse. The criteria could be the size of the mining claim, the depth of the ore, the level of mechanization, the nationality of the miner, and the level of production.
- 16 ASM operations are done haphazardly and can be in riparian corridors, causing environmental damage such as land degradation and deforestation leading. Such effects are associated with increased greenhouse gas emissions, loss of biodiversity, soil erosion, and sedimentation of water bodies.
- 17 The largest investment being the Global Environment Facility–funded multiphased GOLD and GOLD+ programs, which support 25 countries with direct funding of US\$119 million (cofinancing US\$477 million) to implement their respective commitments under the Minamata Convention on Mercury: GOLD (10 countries, US\$45.2 million, cofinancing US\$135 million), GOLD+ (15 countries, US\$74 million, cofinancing US\$342 million); see the planetGOLD website at <https://www.planetgold.org/planetgold-phase-2>.
- 18 This includes methods such as (i) pit and tunnel mining that are not well secured or do not have proper safety guidelines, (ii) inconsistent use of proper personal protective equipment, and (iii) use of hazardous chemicals, such as mercury in gold mining, which are detrimental to human health and water contamination downstream.
- 19 Wood production is necessary for the extractive activity (support of galleries, construction of ladders, diversion of rivers) and household needs on the sites (wood for the construction of habitats, production of wood coal, firewood).
- 20 Some of the most common remote sensing technologies are satellite imagery, aerial photography, light detection and ranging (LIDAR), thermal infrared sensors, radar imaging, hyperspectral imaging, and global positioning system (GPS). Technologies can offer potential to significantly improve management of the ASM sector, particularly in countries where (i) ASM activity is very spread out and difficult to physically monitor on a continuous basis, often because of poor road infrastructure; (ii) the type of monitoring needed can be clearly visible from satellite sensors (chiefly deforestation caused by mining); (iii) fragility or conflict may infringe on the state’s ability to access these areas; or (iv) ASM activity is happening in protected parks and other off-limit areas.
- 21 Most government officials (83 percent, or 10 out of 12) stated that they considered or included women in the development of their formalization interventions.
- 22 Survey conducted at the World Bank conference “Business Unusual: What Future for ASM Post Covid-19?” December 2022, Nairobi, Kenya.
- 23 Activities and processes aimed at enhancing the skills, knowledge, and capabilities of organizations involved in mining, such as training, mentoring, and institutional development.
- 24 Establishment and implementation of guidelines, procedures, and specifications that define the acceptable practices and safety measures for mining operations, including equipment, processes, no worst forms of child labor, and worker health and safety.
- 25 Interventions that address miner’s ability to sell minerals through legal and equitable channels.
- 26 Efforts to improve the operational capabilities and efficiencies of mining companies, including training programs, process optimization, and technological advancements to enhance productivity and performance.
- 27 The reduction of “conflict” diamonds through the Kimberley Process was the most well-known campaign; a decade later, the United States Dodd-Frank Act, section 1502, provided a similar template for the “3Ts” (tin, tungsten, and tantalum) and gold in the Great Lakes region of Central Africa.
- 28 The World Bank and partners executed two periods of surveys (2020, 2022) concerning the pandemic’s impact on ASM communities. 2020: <https://www.delvedatabase.org/covid-19-impact-on-asm/covid-data>; 2022: <https://www.delvedatabase.org/covid-19-impact-on-asm/2022-covid-asm-global-survey>.
- 29 “Emergency Response for Artisanal and Small-Scale Mining Communities Impacted by COVID-19,” EGPS brief, World Bank, <https://www.worldbank.org/en/programs/egps/brief/emergency-relief-response-for-artisanal-and-small-scale-mining-communities-impacted-by-covid-19>.
- 30 VirtuGem: <https://virtugem.com>; Moyo Gems: <https://moyogems.com>.
- 31 See the Delve Exchange webpage at <https://www.delvedatabase.org/delve-exchange-en>.
- 32 See Levin-Nally and Tufo (2024).
- 33 Other response options were (i) easy to secure license, (ii) increased use of machines, (iii) securing rights to mine, and (iv) better income.
- 34 Over three-quarters of respondents rated access to external funds for their operations as difficult or very difficult, while over 60 percent of all respondents for each region identified access to finance as difficult or very difficult.
- 35 Greater than 50 percent of respondents globally and at all regional levels were unsatisfied or very unsatisfied with government’s support to the ASM sector.
- 36 A quote from a female colored gemstone mine owner from Malawi.
- 37 For these reasons, the newest round of the GEF planetGOLD ASGM funding takes a very comprehensive approach toward support to artisanal gold mining. It is an illustration of where, as a whole, the community concerned with ASM should be heading.
- 38 United Nations Sustainable Development Goals 2023: <https://www.un.org/sustainabledevelopment/development-agenda/>.
- 39 Yet curiously, despite a seemingly resounding sense of the importance of improved outcomes for miners’ well-being, rarely have the topics of OHS, income, or even environmental stewardship (beyond mercury abatement) received the focus they deserve.
- 40 Survey response from male Kenyan head of gold mining team.
- 41 Artisanal mining zones or *zones d’exploitation artisanale* (ZEA) could be a way to formalize miners en masse without requiring individual licenses; they could become forms of community-based natural resource management (CBNRM), they could provide more flexible management arrangements, and they could provide mineral tenure security for local miners. Countries cases include the Central African Republic, Côte d’Ivoire, the Democratic Republic of Congo, Ghana, Mali, and the Philippines.
- 42 Ghana and the Philippines are the two most prominent examples of successful community mining.
- 43 For example, Owen et al. (2023) estimate that more than half of the resource base for energy transition minerals and metals are located on or near the locations of Indigenous peoples and peasant groups.
- 44 Some mining laws, like those in Burkina Faso and Mali, allow overlap between ASM and LSM research permits under certain conditions, such as permission from the LSM holder. While this does not in itself solve all ASM-LSM issues, it does create the option for formalizing ad hoc coexistence practices. In addition, Burkina Faso created an unusual but intriguing instrument called the *intermédiaire agréé*, whereby the ASM regulatory agency (ANEEMAS) brokers an agreement between an entity like a cooperative, a customary site manager, or site financier and the government.
- 45 See World Bank (2023a).
- 46 For example: Diamonds: Maendeleo Diamond Standards, Kimberley Process Certification Scheme; Gold: Fairtrade, Fairmined; Tin, tantalum, and tungsten: ITSCI Programme for Responsible Mineral Supply Chains; Jewelry: Responsible Jewellery Council; International Conference on the Great Lakes Region (ICGLR): Regional Certification Mechanism; Smelter/refiner: Responsible Minerals Assurance Process; OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas; CRAFT Code; Forest Smart ASM Standard.
- 47 CRAFT stands for “Code of Risk-mitigation for ASM engaging in Formal Trade.”
- 48 This estimate from the 2020 report is based on a review of 25 countries for which there is a data point in Delve on the number of women in ASM.
- 49 Most government officials (83 percent, or 10 out of 12) stated that they considered or included women in the development of their formalization interventions.
- 50 *Decentralization* is defined as “the transfer of authorities and responsibility for public functions from central government to subordinates or quasi-independent government organizations or private sector” (Boex, Williamson, and Yilmaz 2022, 9).
- 51 Some of the most common remote sensing technologies are satellite imagery, aerial photography, light detection and ranging (LIDAR), thermal infrared sensors, radar imaging, hyperspectral imaging, and global positioning system (GPS).
- 52 “Guyana: Converting to Mercury Free by 2025,” Countries, planetGOLD, <https://www.planetgold.org/guyana>.
- 53 See, for example, Chirico and Malpeli (2013) and Ouattara et al. (2022).
- 54 See “How ASMPotter Helped the Guyana Government Identify ASM Site Developments,” Projects, Levin Sources, accessed May 15, 2024, <https://www.levinresources.com/what-we-do/case-studies/asmpotter-guyana-asm-developments>.
- 55 See the World Bank’s 2023 *State of the Sector Report* on Sustainable Development Goal 5 for several case studies.
- 56 *Dynacor Fact Sheet Q2-2023*, available at <https://www.dynacor.com/fact-sheet/>.
- 57 Sectors include fisheries, rural development, sustainable management of resources and the environment, and public health.
- 58 Hoadley and Limpitlaw (2004) use the term *extension services* in the context of help to build social capital (by involving ASM in networks), human capital (by making it possible to access training to skills and information relevant to the sector), and physical capital (by improving access to appropriate technology).
- 59 This initiative, originally funded by the World Bank and now cofinanced by the African Development Bank and the World Bank, brings together university departments in six countries.
- 60 The ASM Academy is a suite of miner-generated online learning modules for mine site transformation to be made available in 2025 by the World Bank.

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- 46 For example: Diamonds: Maendeleo Diamond Standards, Kimberley Process Certification Scheme; Gold: Fairtrade, Fairmined; Tin, tantalum, and tungsten: ITSCI Programme for Responsible Mineral Supply Chains; Jewelry: Responsible Jewellery Council; International Conference on the Great Lakes Region (ICGLR): Regional Certification Mechanism; Smelter/refiner: Responsible Minerals Assurance Process; OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas; CRAFT Code; Forest Smart ASM Standard.
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- 59 This initiative, originally funded by the World Bank and now cofinanced by the African Development Bank and the World Bank, brings together university departments in six countries.
- 60 The ASM Academy is a suite of miner-generated online learning modules for mine site transformation to be made available in 2025 by the World Bank.

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ANNEX 1 **Timeline of ASM Formalization Approaches and Events**

Period	Approaches to ASM formalization	Prominent events and declarations
1980s	Support to “entrepreneurial small-scale miners”	1988 – Ankara: Interregional Seminar on Small Scale Mining in Developing Countries
Early 1990s	Toward integration of technical, environmental, legal, social, and economic issues	1991 – Kolkata: National Institute for Small Mines 1993 – Harare: United Nations, Interregional Seminar on Guidelines for the Development of Small and Medium-Scale Mining
1990s	Special attention on legalization of ASM sectors	1995 – Washington, DC: World Bank, International Roundtable on Artisanal Mining
Mid to late 1990s	Relation between large mining companies and ASM Gender and child labor issues	1997 – Vienna: UNIDO, Global Mercury Pollution Deriving from Artisanal Gold Mining 1999 – Geneva: ILO, Tripartite Meeting on Social and Labor Issues in Small-Scale Mines
2000s	Community-related issues and sustainable livelihoods Human rights Mercury reduction Fair trade Fair mined	2001 – Communities and Small-scale Mining (CASM) initiative launch 2002 – Yaoundé: Seminar on Artisanal and Small-Scale Mining in Africa 2002 – UNIDO, Global Mercury Project launch 2003 – Kimberley Process Certification Scheme 2009 – African Mining Vision
2010s	Responsible mineral supply chains Mine-to-market	2010 – Lusaka Declaration: ICGLR Special Summit to Fight Illegal Exploitation of Natural Resources in the Great Lakes Region 2010 – US Dodd-Frank Act, Section 1502 2011 – OECD Due Diligence Guidance for Responsible Supply Chains of Minerals 2013 – Minamata Convention on Mercury 2015 – ACP-EU Development Minerals Programme 2017 – European Union Conflict Minerals Regulation 2018 – Global Environment Facility (GEF) planetGOLD program, Phase 1 2018 – Mosi-ao-Tunya Declaration
2020s	Systemic and multistakeholder solutions	2020 – GEF planetGOLD program, Phase 2 2023 – World Bank and World Gold Council Multi-Stakeholder Partnership Initiative for Sahel and West Africa

Source: Adapted from Hentschel, Hruschka, and Priester (2002); Mosi-ao-Tunya Declaration 2018.

