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Mining 2030

Artisanal and Small-scale Mining: a primer for institutional investors

PREPARED FOR:

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About this report: This report was prepared for the Global Investor Commission on Mining 2030 ("GICM") to help them gain a deeper understanding of artisanal and small-scale mining (ASM), including who holds influence over the sector and through which mechanisms. The report was developed through a combination of desk-based research and structured interviews with key stakeholders across the ASM value chain, including a domestic bank, processing plant owner, public-private partnerships, industry associations, standards bodies, non-governmental organisations and a sustainable finance advisory firm. The views and conclusions presented in this report do not necessarily reflect the positions or endorsements of the Commission, its individual members, or their respective organisations. This report is intended to serve as background material to inform the Commission's deliberations regarding potential next steps on ASM.

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INTRODUCTION

Artisanal and Small-Scale Mining ("ASM") plays a vital role in the global mineral supply chain, contributing significantly to employment, economic development, and resource extraction, particularly in developing countries. Despite its economic importance, ASM has traditionally been marginalised within international policy discussions, often overshadowed by concerns about its environmental, social, and governance ("ESG") impacts. Historically, discourse surrounding ASM has focused on issues such as poor working conditions, child labour, environmental degradation, and weak regulatory frameworks, while its positive contributions to local economies and sustainable development have been comparatively overlooked. However, in recent years, ASM has gained increased recognition as a key player in the supply of minerals essential for the global energy transition, technology, defense, and jewellery industries.

As the demand for responsibly sourced minerals continues to grow, integrating ASM into formal value chains has become a critical priority for policymakers, industry stakeholders, and international organisations. Efforts to enhance the sector's legitimacy through formalisation, access to finance, and responsible sourcing initiatives are reshaping the narrative around ASM. The sector's role in fostering rural livelihoods, empowering women miners, and supporting economic resilience in vulnerable communities is increasingly acknowledged. However, significant challenges remain, including limited access to markets, weak governance and accountability structures, and ongoing concerns about human rights violations, environmental impacts and connections to transnational organised crime.

This report is designed to support the Global Investor Commission for Mining ("GICM") 2030 by **helping investors understand how ASM contributes to the value chain and identifying key mechanisms for its integration into responsible value chains legitimately**. It examines ASM's role within supply chains, analyses the sector's current landscape, and explores both challenges and opportunities for sustainable development. The report highlights critical levers of influence—such as financial access, regulatory frameworks, responsible sourcing initiatives, and technological advancements—while also assessing the role of key stakeholders, including international financial institutions, supply chain actors, policymakers, and civil society organisations. By providing a comprehensive analysis of ASM's evolving position in the mining sector, this report aims to inform policy discussions and strategic interventions that promote sustainability, inclusivity, and economic viability.

PART 1 : UNDERSTANDING ASM

2.1 Typology & Characterisation

ASM refers to formal or informal mining operations that primarily utilise **simplified methods for exploration**, extraction, processing, and transportation of minerals. ASM is typically **low in capital investment but high in labour intensity**, relying on manual or rudimentary technologies (OECD, 2016). ASM is a highly diverse and multifaceted sector prevalent across much of the developing world. It encompasses a wide range of mining activities, varying in scale, levels of organisation, and operational methods (IGF, 2017). Within this broad spectrum, distinctions between 'artisanal', 'small-scale', and 'semi-mechanised' mining are typically outlined in national mining legislation. These classifications are often based on factors such as the type of equipment used, the depth of mining operations, the surface area covered, or the volume of minerals extracted.

ASM is driven by a **combination of necessity and opportunity**, influenced by economic, social, and survival factors. As portrayed in **figure 1** below, ASM is not only vital to global prosperity, but also key to poverty reduction. ASM miners play a crucial role in supplying raw minerals essential for modern communication technologies, low-carbon and clean energy solutions, construction materials, and luxury jewellery. ASM

production is notable in many important supply chains and its contribution continues to rise. For example, in the late 2000s, ASM contributed 5% of total cobalt global supply and now represents upward of 12% (World Bank, 2024). Artisanal and small-scale gold mining ("ASGM") has seen a significant rise in production, growing from approximately 304 tonnes in 2002 to around 669 tonnes by 2018. By 2022, it was estimated that ASGM directly employed between 15 to 20 million people, while also providing indirect support to an additional 300 million individuals (Raab, 2024). ASGM alone is supporting the livelihoods of 3.5% of the world's population.

Many individuals turn to ASM due to **poverty and limited alternative livelihoods**, making it a crucial fallback in regions where formal employment is scarce. In such cases, ASM serves as a means of subsistence, providing essential income for those with few other options. However, beyond necessity, economic factors also make ASM an attractive choice, as it often offers a quicker, higher, or supplementary income compared to other available work, particularly in subsistence-based economies (Zvarivadza, 2018). As such, ASM can be **emancipatory** as it enables families to educate their children at school or university or to raise the capital needed to develop their family businesses. Additionally, social drivers play a role, as individuals may pursue ASM not only for financial reasons but also for **personal aspirations**, including a sense of independence, dignity, professional identity, and social status. These varied motivations highlight ASM's complex roles as a livelihood of last resort, a solution to economic and social problems, and a viable opportunity for economic and social advancement. The World Bank estimates that perhaps as many as 315 million people are directly and indirectly supported by ASM (World Bank, 2024).

Figure 1 *Creating a new unifying narrative for ASM (World Bank, 2024).*

ASM VALUE CHAINS

ASM is a **highly diverse sector**, encompassing individual miners, involving a variety of organisational structures and actors. It encompasses both men and women, working either individually, in family units, in partnerships, or as part of ASM organisations and legally recognised associations, which can range from small groups to organisations involving hundreds or even thousands of miners (OECD, 2016). ASM can range from informal individual miners who engage in mining as a means of subsistence, as well as small-scale formal commercial enterprises that extract minerals in a responsible and regulated manner (IGF, 2017).

Many ASM activities are carried out by individual miners, who work independently using basic tools and often without legal permits (Hilson & McQuilken, 2014). In some regions, ASM is family-based, with household members sharing responsibilities in extraction, processing, and selling minerals, particularly in rural areas where mining serves as a seasonal supplement to agriculture (World Bank, 2019). Some ASM operations consist

of small, loosely organised groups of miners, often formed due to economic necessity or local social ties. These groups typically work in a single excavation site and may rotate roles, including digging, transporting, washing, and selling minerals. These groups may be financed by local power figures in exchange for a share of production (OECD, 2016).

Such financial support, typically provided by local power figures such as mineral dealers or exporters, is exchanged for a share of the production and is critical to the day-to-day functioning of these mining groups. The funds are used for a wide range of essential expenses. These include **obtaining the necessary mining licenses** and **covering legal or administrative fees**, such as supporter and union registrations. There may also be informal fees that are required from customary leaders or extorted from armed groups or security forces (e.g., to gain access to land that should be out-of-bounds, such as protected areas or industrial mining concessions, or to be able to pass along transportation routes where there are checkpoints). A significant portion of the financing goes toward **purchasing or leasing basic mining equipment** like shovels, pickaxes, sieves, and water pumps, as well as **covering fuel and maintenance costs**. Operational expenses also include **daily subsistence needs** for miners—such as food (commonly rice), water, and shelter—as well as transportation to and from the site. In some cases, miners receive small cash allowances or partial wages, particularly in semi-formalised arrangements. Supporters (their financiers) may also cover social welfare expenses, including medical costs, school fees, or funeral contributions, and occasionally provide small personal incentives such as clothing, mobile phones, or cigarettes to ensure miner loyalty (Levin & Gberie, 2006).

In some ASM communities, miners form **cooperatives or small companies** to gain legal recognition, access financing, and improve bargaining power. Cooperatives or ASM organisations are supposed to help miners formalise operations, improve working conditions, and negotiate better prices with traders and exporters (IGF, 2017). However, in reality this is not always the case. A prominent example of elite capture of cooperatives is Democratic Republic of Congo ("DRC"). Congolese mining cooperatives are authorised to produce, sell and transport the ore to the processing or trading centres, or processing the ore directly if they have obtained specific permits by the Ministry. Reportedly, cooperatives in the mining sector mostly operate under the control of individuals or a group of individuals, who pay artisanal miners for the diverse functions at the site and who do not represent permanent members of the cooperative but rather are transitory moving to work for different cooperatives according to where they can get the better deal. Thus, the cooperative model in the mining sector in the DRC does not always protect the interests of diggers (EITI, 2023).

ASM also takes place **illegally within industrial mining (large-scale mining, "LSM)" concessions**, leading to local tensions. In some situations, ASM will already be present and exploiting the minerals before industrial prospection and exploration begins. Artisanal and small-scale miners (and their financiers) also often move into an area in pursuit of **opportunity** following the presence and drilling activities of a junior or LSM company (Jorns & Levin-Nally, 2020). However, in some cases ASM operations can also exist in partnerships with LSM companies, where small-scale miners are allowed to work legally within designated areas under agreed frameworks (OECD, 2016). Such collaborations are commonly established through bilateral agreements between LSM and ASM entities where legal frameworks allow, or through tripartite agreements, involving government authorities, LSM companies, and ASM cooperatives or associations in some cases. For example, in Colombia, the government has implemented policies to facilitate the formalisation of ASM through contractual arrangements with LSM companies. These arrangements, known as 'Operation Contracts,' allow ASM miners to operate legally within areas designated under LSM concessions. The primary objective is to promote coexistence between ASM and LSM, encouraging sustainable and responsible mining practices (ARM, 2020). ASM also frequently operates illegally in **protected areas**, such as national parks, forest reserves, and conservation zones, driven by the high mineral potential in these regions. Miners often enter these areas without permits, clearing forests, diverting waterways, and using hazardous chemicals like mercury and cyanide, which severely impact biodiversity and local ecosystems (Villegas, Weinberg, Levin & Hund, 2012).

The ASM sector encompasses **all stages of the value chain**, including inputs, extraction, trading, primary and secondary processing, and export. ASM also encompasses the full mining life cycle, from exploration and development to active operations, closure, and even post-closure activities. ASM therefore encompasses a wide range of participants who play essential roles across various stages of the mining value chain. These roles are often defined by local terminology and practices, reflecting the cultural and operational nuances of mining communities (IGF, 2017). Various terms are used depending on the cultural context, with each role having its own unique profiles of risk and reward and systems of accountability (Buxton, 2013).

Generally, miners, or diggers, remove overburden and then extract mineral ore from the earth, often using **manual tools and labour-intensive** methods though increasingly extraction is mechanised (World Bank, 2020). There may also be highly specialised roles at the pit, from mine site managers and pit managers to equipment providers or operators and rope pulley operators. **Haulers** transport these extracted ores from mining sites to processing areas, either manually carrying sacks or using rudimentary vehicles like bicycles or motorcycles. Where the ore is in primary hard rock (as opposed to alluvial sedimentary deposits), either the material goes to a formalised processing plant (such as can be found in Ecuador, Peru, Mongolia, the Philippines, Mauritania, Tanzania, etc.) or manual processes are followed; first, **crushers and millers** break it down using basic mechanical devices or manual techniques to facilitate further processing; then **processors** separate valuable minerals from the ore through methods such as panning, sluicing, or amalgamation.

The sector also **relies on license holders, individuals or entities who legally own mining rights** and ensure compliance with regulations, as well as **landowners** who generally give permission to mine their land through customary land tenure processes. **Financiers** provide crucial financial support, covering expenses such as equipment, supplies, and operational costs, usually in exchange for a share of the proceeds.

CASE STUDY: PRE-FINANCING SUPPORT FOR ARTISANAL GOLD MINERS IN MONGOLIA – THE SAM PROJECT

In Mongolia, ASGM have long struggled to access formal finance due to systemic barriers such as lack of collateral, unregistered operations, and geographic isolation. Most miners work in remote regions without land titles or credit histories, making them ineligible for traditional banking services. To address this, the Swiss Agency for Development and Cooperation ("SDC") implemented the **Sustainable Artisanal Mining Project**, which introduced pre-financing mechanisms to support miners.

The project facilitated the formation of miners' cooperatives, which were then provided with pre-finance in the form of equipment, tools, and operational capital. These cooperatives were also connected with responsible buyers, including the Central Bank of Mongolia, and received training to improve environmental practices and safety standards. By professionalising operations, these miners began to build a financial track record, increasing their credibility. However, significant barriers remain, and financial institutions still view ASM as high-risk, and while policy frameworks are supportive, local-level implementation is often inconsistent. Without continued external support and deeper engagement from the banking sector, the sustainability and scalability of such financing models remain limited (SDC, 2019).

Today, the planetGOLD programme has supported ASM miners to establish revolving loan funds.[1]

At the commercial level, dealers and traders act as intermediaries, purchasing processed minerals from miners or processing plants and selling them to local or international markets. This intricate network of roles highlights

[1] Susan Keane, personal communication to Rebecca Pein and Estelle Levin-Nally, 10th April 2025

the complexity of the ASM sector and its significance in the livelihoods of millions worldwide (Sewpershad & Tufo, 2024). **Figure 2** below depicts an example of a simplified ASM value chain in the DRC.

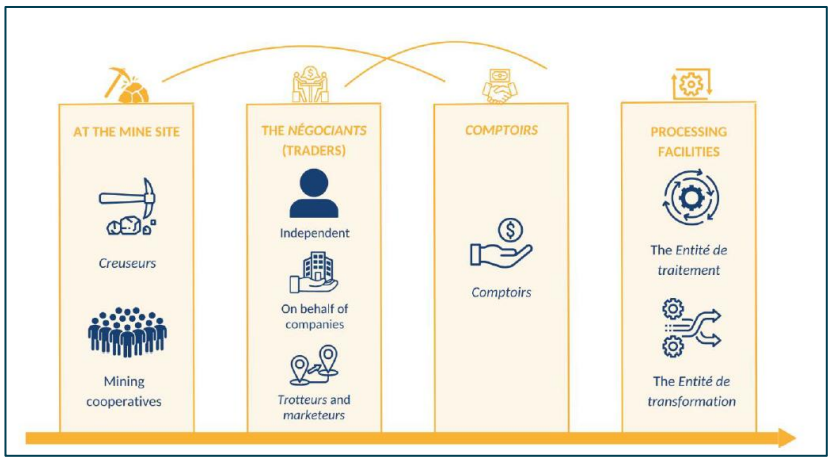

***Figure 2** Example of a simplified representation of ASM value chain actors in DRC (Sewpershad & Tufo, 2024).*

It is important to acknowledge that the roles present in **one mining site or region may not necessarily exist or be required elsewhere**. For example, in Mali, traditional gold washing follows a distinct socio-economic structure with specific roles. The *Dugutigui*, or landowner, is the hereditary custodian of the village land, while the *Damantigui*, or site owner, holds the primary authority over a gold-washing site. *Tomboloma*, a group of young villagers, serve as the mine police, responsible for maintaining order, enforcing regulations, resolving disputes, and coordinating with public authorities. They are selected for their integrity and deep understanding of local customs, representing the moral authority of the *Damantigui*. Additionally, there are ritual sacrifice organisers, who provide spiritual protection for gold washers against negative forces. The ambulant trader or gold buyer plays a crucial role as the primary supplier to the mining site, purchasing gold and ensuring access to essential goods. This organisational framework is unique to Mali's artisanal gold mining sector and is unlikely to be replicated in the same way in other countries (Keita, 2001). Furthermore, this ASM system is in rapid transition due to the influx of foreign capital, which is supporting the mechanisation of ASM activities, whilst driving greater corruption, elite capture, marginalisation of women from the sector, and environmental devastation.

ASM products enter formal global value chains through a variety of pathways, and these routes vary significantly depending on the commodity in question, the level of formalisation, and the regulatory environment in the producing country. Most ASM products are first sold to **local buyers or middlemen**, who may be licensed traders or informal actors. These intermediaries' aggregate production from multiple miners, move the mineral to the major buying centres and export hubs and serve as the first link to the broader value chain. They have to have significant working capital to play this role and sometimes act as agents of exporters in order to access this finance. Aggregated material is then often sold to **exporters or refiners**, who often operate in more formalised settings. Some exporters are required to conduct **due diligence** and obtain **export licenses**, especially for conflict-affected or high-risk minerals. For example, most gold mined by artisanal miners is initially sold to local traders or aggregators, who may be licensed or informal. From there, it moves through national or regional exporters to international refiners, many of whom are members of the **London Bullion Market Association ("LBMA"), the Dubai Multi Commodities Centre or the Responsible Minerals Initiative ("RMI")** and so apply their standards. While some ASM gold enters the formal market through certified schemes such as **Fairmined**, **Fairtrade Gold**, or the **Swiss Better Gold Initiative**, a large share is still traded informally or smuggled, making traceability and responsible sourcing difficult. Cobalt on the other hand is extracted by ASM operators and typically sold to cooperatives or local traders, then to processing and refining companies (often in China) before entering global supply chains for batteries and electric vehicles.

2.2 Geographical and geological aspects of ASM

WHERE DOES IT HAPPEN AND WHY?

Geological factors such as **availability**, **accessibility**, and **extractability of mineral resources** as well as a **lack of other livelihood opportunities**, influence the prevalence of ASM in certain locations. Certain deposits are more suitable for ASM due to their **size, depth and mineral concentration**. ASM is most common in areas where mineral deposits are **near-surface, high-grade, and economically viable** for small-scale extraction. Placer deposits[2], such as those found in riverbeds, are particularly attractive for ASM due to their easy accessibility and minimal need for advanced mining technology (Hentschel, Hruschka & Priester, 2003). Similarly, vein-hosted gold and gemstone deposits in structurally controlled zones, such as the Birimian Greenstone Belt in West Africa, encourage ASM due to their high-grade mineralisation in small, localised veins (Hilson & Maponga, 2004). Lateritic deposits,[3] enriched through tropical weathering, also provide easily minable ores, such as cobalt in the Democratic Republic of Congo (DRC) and bauxite in Madagascar (Wilson, Johnson & Thomas, 2017). Additionally, areas with high faulting and fracturing, such as the Andean and Rift Valley regions, often host hydrothermal mineralisation,[4] making them prime locations for ASM (Boni, Siegesmund & Gutzmer, 2020).

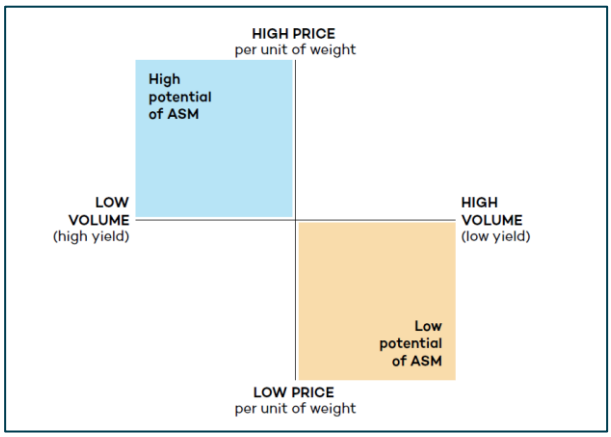

Figure 3 *Potential categorisation of ASM based on volume/yield and price per unit of weight (IGF, 2024)*

The potential for ASM mineral extraction could be classified based on economic viability and market dynamics as depicted in **figure 3** above. Minerals with low ASM potential are typically high-volume, low-yield, and low-value per unit weight, requiring large-scale, mechanised operations to achieve profitability. Such characteristics limit their suitability for ASM, as these minerals generally depend on economies of scale. Additionally, whether a mineral is extracted as a primary product, or a by-product influences its ASM potential. The price per unit weight is a critical factor in this assessment, as price fluctuations can shift a mineral's classification, making it more or less viable for ASM operations. In contrast, minerals with high ASM potential are characterised by low-volume, high-yield, and high-value per unit weight, offering significant opportunities for profitable small-scale extraction. Moderate-potential minerals fall between these two extremes, exhibiting attributes that allow for some ASM activity, depending on local conditions, market prices, and technological feasibility (IGF, 2024).

[2] A placer deposit is a concentration of valuable minerals that have been transported and deposited by water, wind, or gravity in sedimentary environments. These deposits form when weathering and erosion break down primary (hard rock) ore deposits, and natural forces move the heavy minerals, separating them from lighter material.

[3] A lateritic deposit is a type of mineral deposit formed by intense chemical weathering in tropical and subtropical regions.

[4] Hydrothermal mineralisation happens when hot, mineral-rich water moves through cracks in rocks deep underground. As this superheated water cools, it leaves behind valuable minerals, such as gold, silver, copper, and tin, forming ore deposits.

2.3 ASM policy & governance

WHAT ARE THE TYPICAL NATIONAL MINING POLICIES AND LEGAL FRAMEWORKS GOVERNING ASM ?

The **legalisation of ASM** has become a priority for many governments as they seek to regulate the sector, maximise economic benefits, and mitigate environmental and social risks. Legalisation efforts typically involve creating the regulatory framework through which ASM activities can be legally recognised and formalised. Consequently, many countries have **introduced specific legislation** to integrate ASM into the formal economy. These laws define **licensing processes**, **operational guidelines**, **taxation** and **environmental responsibilities**.

Most jurisdictions require ASM operators to obtain **mining permits or licences** in an **attempt to ensure regulatory compliance**, but the approach varies significantly across regions. In Francophone Africa (like the DRC), individuals typically receive miners' cards, granting them the right to mine only within designated ASM areas, such as *couloirs d'orpaillage* or *zones d'exploitation artisanale*. In contrast, in many Anglophone African jurisdictions (like Ghana), a licence holder applies for both customary and statutory rights to mine and can then organise labour as contractors within the enterprise. These differing regulatory frameworks reflect distinct legal traditions and governance structures, influencing how ASM is formalised and integrated into national economies.

Licensing frameworks may differentiate between individual miners, ASM organisations/cooperatives, and small-scale enterprises, with **varying requirements based on the size and scope of operations**. These permits or licences serve as official authorisation for individuals or groups to engage in mining activities within designated areas and under specified conditions. The licensing process typically involves submitting an application to the relevant mining authority, paying applicable fees, and fulfilling certain legal and environmental requirements. As part of formalisation, many governments have enforced **environmental and health regulations** to minimise the negative impacts of ASM. For example, Zimbabwe's Mines and Minerals Act mandates that artisanal and small-scale miners rehabilitate mined-out areas to minimise land degradation (Zimbabwe, Mines and Minerals Act No. 8 of 2018).

Furthermore, ASM is influenced by various **international standards and guidelines** aimed at improving governance, environmental sustainability, human rights, and economic development. For example, the OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas ("**OECD Minerals Guidance**") requires companies sourcing minerals (such as gold, tin, tantalum, tungsten) to conduct due diligence in their supply chains to ensure minerals are not linked to conflict financing, human rights abuses, or environmental harm. It recognises that ASM is a significant part of the supply chain, especially in developing countries, and encourages its formalisation rather than exclusion. The OECD Minerals Guidance also sets out due diligence requirements for companies buying ASM minerals (OECD, 2016). These standards and guidelines attempt to help shape national policies and encourage responsible mining practices while addressing challenges such as informality, environmental degradation, and social issues. Some of the key international standards and requirements that impact ASM are set out in **figure 4** below.

The landscape of responsible mining standards and voluntary sustainability initiatives is continually evolving. One major development is the **Consolidated Mining Standards Initiative ("CMSI")**, which integrates several existing frameworks that define sustainability and responsible practices in the sector. This initiative is led by: International Council on Mining and Metals ("ICMM"), The Copper Mark, Towards Sustainable Mining (TSM) and World Gold Council (WGC). However, it should be noted that Levin Sources has analysed the CMSI and provided extensive feedback on its ASM chapter, which we judge to be inadequate for either controlling risks to LSM or the ASM associated with ASM activities on / around LSM concessions and for achieving meaningful stakeholder engagement and collaboration as a foundation for driving sustainable development.

Supply chain due diligence standards	Focus on identifying and mitigating risks along the supply chain, ensuring minerals are sourced responsibly. **Examples**: Kimberley Process Certification Scheme (KPCS),[1] LBMA Global Precious Metals Code[2]
Performance/ compliance standards	Focus on measurable performance or benchmarks at the facility level, ensuring that mining operations meet specific targets related to environmental impact, worker safety, or social responsibility. **Examples**: Initiative for Responsible Mining Assurance (IRMA) Standard for Responsible Mining,[3] Aluminium Stewardship Initiative (ASI) Performance Standard[4]
Principle-based standards	Offer broad, flexible guidelines that companies can adopt to guide responsible behaviour. They are often sector-agnostic and focus on overarching ethical principles. **Examples**: UN Guiding Principles on Business and Human Rights,[5] International Council on Mining and Metals (ICMM) Performance Expectations[6]

Figure 4 *General categorisation of mining standards that directly and indirectly impact ASM*

HOW DO YOU CLASSIFY ASM AS LEGAL, LEGITIMATE, FORMAL, LICIT OR OTHERWISE?

The widespread perception of ASM as inherently '**illegal'** often leads to reluctance among stakeholders, such as industrial miners or mineral off-takers in highly regulated markets, to engage with ASM. When ASM is broadly labelled as 'illegal' - and at times (erroneously) even used synonymously with all ASM operations - it can **create significant barriers to meaningful engagement between ASM and potential business or development partners** from the outset. Supply chain actors often avoid sourcing from ASM to mitigate risks of reputational damage and legal repercussions, which often results in further marginalising ASM communities (Iqbal, 2019).

Term	Definition	Based on	Examples
Legal	Operating in full compliance with laws and regulations. In areas where no prohibition is in place	Law	A licensed gold cooperative with tax records
Legitimate	Viewed as socially acceptable or morally justified. Consistent with law, or 'good faith efforts'. ASM cannot be considered legitimate if it is linked to conflict or serious human rights abuses	Social norms & recognition that becoming fully formal may not be commercially viable	A long-standing mining community seen as vital to local economy
Formalising	Process of gradually fulfilling regulatory and customary requirements; Fully formal is having obtained all required permissions, i.e. legal	Process	Miners organising to apply for cooperative status; processing plant with all permissions save the environmental impact assessment
Informal	Not legally registered (operations that do not have an explicit written authorisation to extract the minerals, all permits obtained, and all required documents approved) but not necessarily harmful or criminal. An infraction of the law	Regulation status	A community mining site with no license but accepted locally
Illegal/criminal	Operation is (explicitly) prohibited by law. Involves intentional, harmful law-breaking	Law	Mining in a protected area; mining on an industrial mining concession. Use of forced labor, sexual extortion, financing armed groups, etc.

Figure 5 *Authors' view to understanding the difference between different types of ASM (Levin-Nally & Jorns, 2020).*

As depicted in **figure 5** above, legal frameworks do not simply classify activities as '**legal**' or '**illegal**' but recognise varying degrees of infractions, each with corresponding corrective measures or penalties. A business may violate regulations without being entirely illegal, as **illegality only applies to what is explicitly prohibited by law**. "Illegal" is too often used pejoratively and lacks nuance, failing to distinguish between harmless non-compliance and genuinely harmful or criminal acts. In the case of ASM, it is deemed **illegal** when conducted in prohibited areas, such as industrial mining concessions, protected areas, urban areas, or border zones. However, if ASM takes place outside such restricted zones, it is not necessarily illegal, even if miners fail to comply with specific legal requirements, such as lacking a permit or an environmental assessment. In these cases, ASM is considered '**informal**' rather than illegal. For example, ASM within an LSM concession with exclusive mineral rights is illegal, whereas ASM operating outside the concession but without a permit is informal.

Many artisanal mining operators fall into the category of informal due to **barriers to formalisation**, not bad intent. **Formalising** refers to the **process of becoming legal and compliant**. A miner, processor or trader might be "in the process" of formalisation, for example, organising into cooperatives, applying for licenses, or adopting better environmental practices. **Formal mining** means the operation is fully regulated, compliant, and recognised by law. Informality is often conflated with illegality, but it is better seen as a transitional phase or response to complex regulatory systems that do not fit ASM realities (Hruschka, 2013).

Additionally, terms like '**criminal**' and '**illicit**' are often used loosely in reference to ASM but should be distinguished. These labels apply to specific activities or actors who exploit ASM or mineral trade for explicitly illegal purposes, such as funding armed conflict, drug trafficking, or money laundering (Levin-Nally & Jorns, 2020). **Criminal** activities on the other hand are **deliberate violations of legal codes**, such as environmental destruction, child labour, or involvement in armed conflict financing. Criminality is a matter of **intent and harm**, whereas many "illegal" miners are operating out of necessity or lack of alternatives, not malicious intent. Lastly, **Legitimacy** reflects **social acceptance or moral justification**, regardless of legality. An artisanal miner may be considered *legitimate* by their community, even if their work is technically illegal. Legitimacy is often contextual as it depends on local perceptions, community support, and the miner's behaviour (e.g., being non-violent, environmentally cautious, and economically vital) (Hruschka, 2013).

Furthermore, the OECD Minerals Guidance defines legitimacy of ASM using a number of criteria, including that it **must be consistent and applicable with national laws** (OECD, 2016). However, in cases where legal frameworks are weakly enforced or absent, legitimacy is assessed based on the **good faith efforts** of ASM miners and enterprises to operate within legal parameters (where they exist) and to engage in formalisation processes as opportunities arise. It is important to recognise that most ASM operators have limited technical capacity, financial resources, and institutional support to fully formalise (Hinton & Levin, 2010). Nonetheless, ASM, like all mining activities, **cannot be considered legitimate if it is linked to conflict or serious human rights abuses** related to the extraction, transport, or trade of minerals (OECD FAQ).

Due to challenges in effective regulation, much of ASM activity around the globe remains informal, while in cases where mining takes place in protected areas such as national parks or conservation sites, it is considered illegal. Additionally, where ASM contributes to financing armed groups, it is classified as illicit mining (World Bank, 2024). Importantly, the World Bank has shifted its focus on ASM from mere formalisation to the **professionalisation** and **legitimisation** of ASM activities. As depicted in **figure 6** below, this transition recognises that while formalisation (integrating ASM into legal and regulatory frameworks) is important, it often does not address all the underlying challenges faced by ASM communities, i.e. it is inadequate to drive sustainable development. Professionalisation involves enhancing the technical skills, safety standards, and operational efficiencies of miners, enabling them to adopt more sustainable practices, improve productivity and conduct business responsibly. Legitimisation seeks to acknowledge and respect the rights of ASM operators, granting them legal recognition and access to resources and markets (World Bank, 2024).

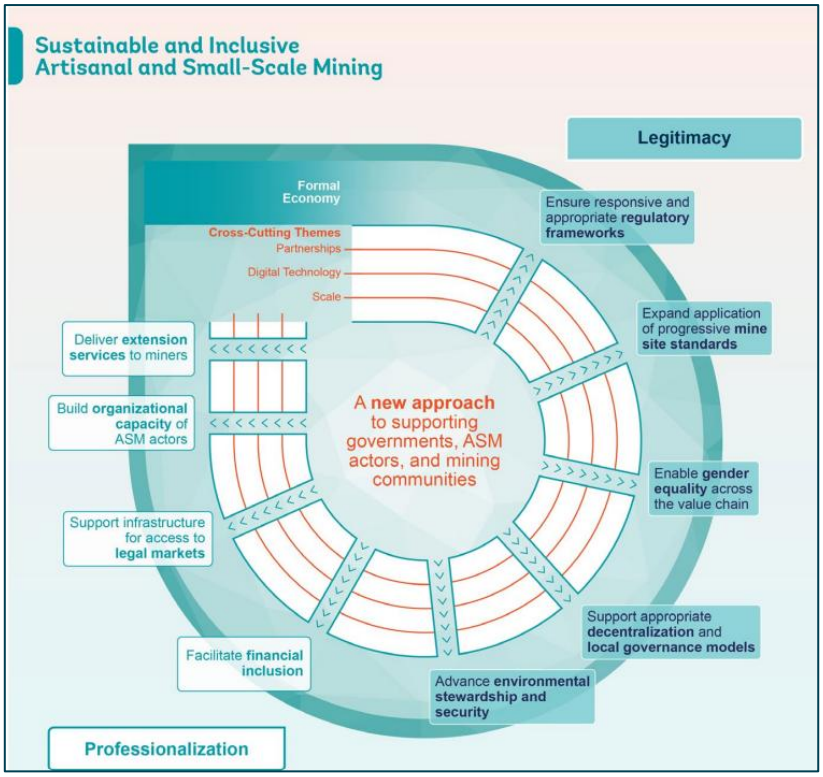

Figure 6 *World Bank Sustainable and Inclusive ASM Support Framework (World Bank, 2024)*

The **informal status of ASM** negatively impacts miners by exposing them to legal insecurity, economic marginalisation and exploitation, and political predation. Since most ASM activities are unlicensed and operate outside formal regulatory frameworks, miners face constant threats of eviction, legal penalties, and even criminalisation. This **lack of formal recognition** makes it difficult for them to access financing, technical support, and fair markets, forcing them to rely on informal lenders or intermediaries who often impose exhortative conditions. Additionally, the high costs and bureaucratic complexities of obtaining formal mining licenses discourage many from legalising their operations, perpetuating their informality. As a result, miners remain **economically vulnerable**, struggle with unsafe working conditions, and lack social protections, which further entrenches poverty and limits opportunities for sustainable development (Hilson, Hilson, Maconachie, McQuilken & Goumandakoye, 2017). By enhancing technical skills, safety standards, and operational efficiencies, and by granting legal recognition and market access, stakeholders are transforming ASM into a viable and responsible sector that supports local economies and aligns with broader development goals.

2.4 ASM trends

The framings of ASM change over time, which reflect changes in the definition of development.

Table 1
Shifts in framings around ASM and development.

Era		View of development	View of ASM	Approach to ASM	Result
Entrepreneurial	1970s-1990s	Structural adjustment policies (SAP) and globalization: economic growth comes from liberalization, export-driven economies and large-scale investment.	Opportunistic entrepreneurs.	ASM excluded from policies.	ASM becomes illegal because they are not considered in the law. ASM proliferates with increase of rural poverty.
Survival	2000 - 2010	Fixing increase in rural poverty resulting from SAP, lens of the sustainable livelihoods approach.	Poverty-driven risky activity to supplement rural incomes. Survival strategy in response to challenges in agricultural livelihoods.	Focus on specific problems with targeted interventions in pilot projects, including on child labour, women, and mercury.	Isolated success cases, but globally ASM expands in informality. Pushed into illegal markets and exploitative relations.
Formalization	2012 - 2020	SGDs. Through good governance (as government control) "sustainable development" can be achieved.	Key for rural economies, but with serious problems. Has the potential for "sustainable development", but *only* if governed from above (formalized or criminalized).	Focus on governing ASM through national laws around property rights. Formalization as the silver bullet. Formalize "good" ASM, criminalize "bad" ASM.	Limited success of formalization policies. Failure associated with policy gaps, linked to increased inequalities and elite capture.
Critical	2020 -	SDGs, just transitions, and climate change.Bottom-up lens, reduction of inequalities, focus on supply chain and climate change.	Heterogenous, complex and transforming. Potential for sustainable development, justice and decarbonization efforts, but only if inequalities are addressed (risk of elite capture).	Propose to close governance gaps with evaluations and case-specific legislation, address the multiple stakeholders involved. Include financiers, processing plants, collaboration with LSM in policies.	To be determined.

Figure 7 *Shifts in framings around ASM and development (Mckay, 2025).*

Figure 7 outlines shifting paradigms in ASM policy attention. The **Entrepreneurial Era** emerged alongside globalisation and Structural Adjustment Programs, which prioritised economic liberalisation in the Global South. Policies focused on large-scale transnational mining as a tool for poverty reduction, while ASM was largely ignored, reinforcing its informal status for decades. The **Survival Era** saw ASM become a vital coping mechanism for rural communities facing economic hardship due to these structural policies. With the rise of the Sustainable Livelihoods Approach, ASM was increasingly recognised as a means of subsistence, though efforts to support or regulate the sector remained fragmented, with only isolated projects addressing specific issues (Mckay, 2025).

The **Formalisation Era** marked a shift toward integrating ASM into governance frameworks, driven by the global focus on sustainable development and good governance. Policymakers sought to regulate ASM through formal property rights and stricter enforcement, believing this approach would enhance sustainability. However, these top-down regulations often overlooked the realities of informal miners, creating new barriers rather than solving existing challenges (Mckay, 2025).

The **Critical Era** reassesses past regulatory efforts, acknowledging their limitations and unintended consequences, such as growing inequalities and elite capture of resources. **There is now a stronger emphasis on formalisation** that prioritises inclusivity and environmental responsibility, particularly addressing issues like mercury pollution. Additionally, ASM is increasingly recognised as **crucial for supplying critical minerals needed in the transition to a low-carbon economy, reframing its role in sustainable development and climate action** (Mckay, 2025).

PART 2: OPPORTUNITIES AND BARRIERS TO FORMALISING AND DEVELOPING THE ASM SECTOR

Over the past two decades, extensive research has highlighted the sector's significance for socio-economic development, its adverse social, environmental, and health impacts, and its complex connections to peace, security, and human rights. More recently, the global COVID-19 pandemic and its effects on mineral supply chains and the rural economies reliant on them have further underscored these intricate linkages and the consequences of an underdeveloped ASM sector (De Haan, Dales & Mcquilken, 2020). In addition to the below information, **Annex I** of this report maps ASM to the United Nations' ("UN") 17 Sustainable Development Goals ("SDGs").

2.5 Opportunities for the sustainable development of ASM actors, value chains and communities

ASM AS A FUNDAMENTAL LIVELIHOOD

Since ASM first became a subject of academic study in the 1980s, the sector has largely remained marginalised within international development agendas, primarily due to the absence of comprehensive, accurate, and reliable data (Hilson & McQuilken, 2014). Although it should be noted that a wide range of ASM stakeholders have stepped in to try and fill this void with initiatives such as the Delve Platform and The ASM Mining Knowledge Sharing Archive. Despite these efforts, much of the academic and media focus has been on ASM's negative aspects, including its environmental impact, poor working conditions, child labour, and adverse health and safety effects (World Bank, 2024). Consequently, much of the discussions surrounding ASM have predominantly highlighted its challenges and risks rather than its actual and potential contributions to sustainable development. Although one notable exception was the 'Mapping Artisanal and Small-scale Mining to the Sustainable Development Goals (ASM-SDG Policy Assessment)' report, which was published in 2020 and comprehensively analysed the relationships between ASM and each of the 17 UN SDGs (De Haan, Dales & Mcquilken, 2020).

Nevertheless, ASM has become increasingly significant in both national development and international trade, employing over **225 million people directly and indirectly** across Latin America, South America, Africa, and Asia as of 2024 (World Bank, 2024). The rise in involvement in the ASM sector can be attributed to a number of factors, such as increasing mineral prices; difficulty earning a livelihood from alternative activities, including due to climate change and environmental degradation impacts; corruption and/or economic crisis in the country; ease of accessibility of mineral deposits; and increasing reliance on the ASM sector to help escape poverty (Carter & Barrett, 2017).

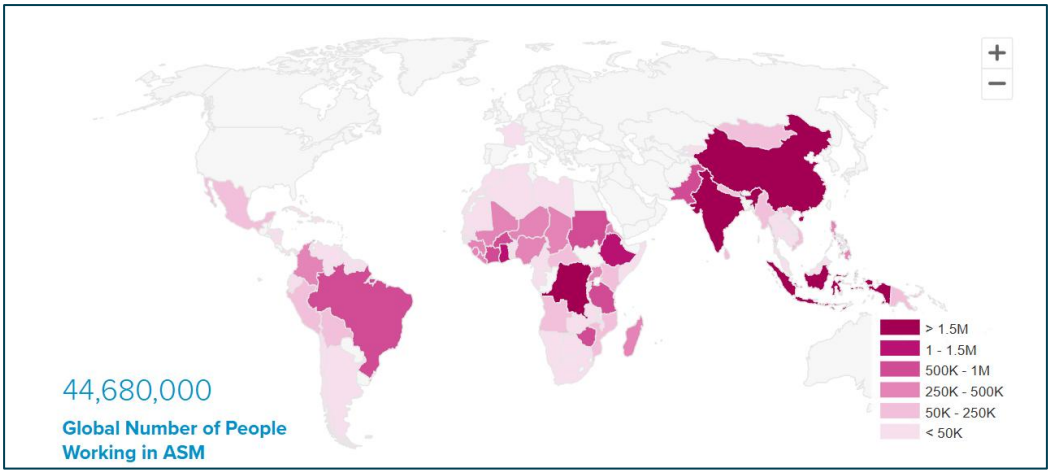

Figure 8 *Number of ASM miners per country (Delve, 2025).*

As depicted in **figure 8** above, ASM serves as the primary source of employment for at least **45 million people across 80 countries**. The regional distribution of ASM employment as a share of global estimates is as follows: South Asia (15.9 million; 36%), East Asia and the Pacific (13.9 million; 31%), Sub-Saharan Africa (13.2 million; 29%), and Latin America and the Caribbean (1.7 million; 4%) (World Bank, 2024). Women play a critical yet often under-recognised role in ASM, comprising an estimated **20% to 50% according of the global workforce** (World Bank, 2024). Many ASM activities take place in low-income counties where limited employment opportunities, especially in rural areas, compel individuals to turn to ASM as a primary or supplementary source of income. The sector provides livelihoods for millions who might otherwise lack viable economic alternatives (Barreto, Schein, Hinton & Hruschka, 2018). However, ASM is not exclusive to developing nations; it also exists in high-income countries such as Australia and Canada (Yukon region). This is because key defining characteristic of ASM is its **scale**, not its formality.

Climate change-related impacts on agriculture and other nature-based livelihoods have further accelerated migration towards non-agricultural economic activities. In many parts of the world, ASM has now become the primary source of non-agricultural rural income (IISD, 2017). In many developing countries, limited employment opportunities, especially in rural areas, compel individuals to turn to ASM as a primary or supplementary source of income (Barreto et al, 2018). ASM also serves as a vital economic activity for individuals who are unskilled, uneducated, or lack formal employment opportunities. In regions like Malawi, for example, subsistence farmers engage in gemstone mining during the dry season when agricultural work diminishes. Similarly, during economic downturns, individuals in countries such as Bolivia, Peru, Venezuela, and Zimbabwe have turned to small-scale mining as a last resort.

The discovery of new mineral reserves often triggers **'rushes**,' attracting thousands aiming to make their fortunes. A recent example of this is the village of Bantakokouta, located in southeastern Senegal near the Mali border, which has seen significant growth due to a recent gold rush. The population has more than doubled in size, attracting migrant workers from 19 different African countries (AFP, 2023). In emergency situations, such as environmental shocks or natural disasters, ASM can also provide a critical means of subsistence. Following events like the 1985 El Niño in Southern Ecuador, many turned to small-scale mining to sustain their livelihoods amidst the crisis (MMSD, 2002). The reality is that ASM activities will continue for at least as long as poverty drives them.

Many ASM miners are children. In 2019, the International Labour Organisation ("ILO") estimated that approximately one million children were engaged in child labour in mines and quarries globally, with particularly severe cases in certain regions. In countries like Burkina Faso and Niger, children make up an estimated 30–50%

of the workforce in gold mines, with most under the age of 15 and some working in conditions that amount to forced labour (ILO, 2019). Research further highlights that around 12% of child labour in sub-Saharan Africa is linked to global supply chains and is prevalent in nearly all ASM cobalt mining operations (Mora, Malik & Murray, 2024). However, this issue is not confined to Africa. In Peru, the Ministry of Labor reported approximately 48,000 cases of forced labour in the mining sector between 2007 and 2011 (TRACIT, 2021).

GLOBAL ECONOMY'S DEPENDANCY ON ASM

ASM contributes to a diverse range of high- and low-value mineral supply chains, including but not limited to **cobalt, copper, gemstones, gold, lithium, manganese, mica, nickel, tantalum, tin, tungsten, salt, gravel, quarry rock**. Over the past decades, the proportion of artisanal and small-scale mined materials has grown substantially and plays a significant role in the global supply of key minerals, particularly those essential for technology, energy, construction and jewellery (World Bank, 2024). ASM is a significant global economic activity, with gold extraction being the predominant focus within this sector. The allure of gold, combined with its relatively accessible extraction methods, has led to its dominance in ASM. **Approximately 20 million miners worldwide are involved in artisanal and small-scale gold mining ("ASGM")**, which accounts for about 20% of the world's annual gold production. This substantial contribution underscores gold's prominence in ASM operations (planetGOLD, 2019).

There is also increasing recognition of the role of ASM in supplying **critical minerals** essential for the **global energy transition** and **digital transformation (**Sewpershad & Tufo, 2024). The global shift towards clean energy technologies has led to a significant increase in demand for minerals such as lithium, cobalt, nickel, and copper, essential for manufacturing batteries, electric vehicles, and renewable energy infrastructure (Shannak, Cochrane & Bobarykina, 2024). Over the next two decades, the demand share for these materials is expected to grow substantially, exceeding **40% for copper and rare earth elements**, reaching **60-70% for nickel and cobalt**, and **nearing 90% for lithium**. Electric vehicles ("EVs") and battery storage have already surpassed consumer electronics as the primary consumers of lithium and are projected to replace stainless steel as the dominant end-use sector for nickel by 2040 (IEAM 2021).

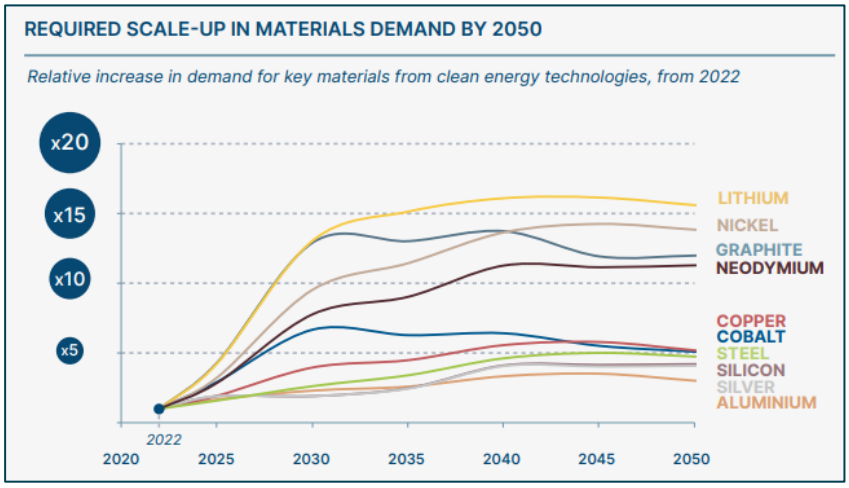

Figure 9 *Demand for key materials from clean energy technologies (Energy Transition Commission, 2023).*

This surge in demand is prompting countries to secure reliable sources of these minerals to support their energy transitions. Industrial mining, despite its advanced technology and efficiency, is increasingly unable to fully satisfy this demand. ASM plays a crucial role by supplementing industrial production and ensuring a steady supply of essential resources (IGF, 2024). It is also far more elastic than industrial mines (which may take 18

years to get to permit, whereas ASM can be productive within weeks of mineral discovery.[5] **ASM therefore provides an important 'supply surge' and elasticity when minerals markets are tight**.

As of 2024, the role of ASM as a source of these minerals is understudied, but relevant. For instance, cobalt is needed for rechargeable batteries, and estimates indicate that between 13 and 30 % of the world's cobalt supply comes from the DRC's ASM sector, whereas between 25 % and 50 % of the global supply of tantalum comes from ASM.

CONTRIBUTIONS TO SUSTAINABLE DEVELOPMENT

Artisanal and small-scale miners constitute the largest mining workforce globally, far surpassing industrial mining in terms of employment. While industrial mining provides jobs for approximately 7 million people worldwide, **ASM serves as the primary source of direct employment for at least 45 million people across 80 countries, with women making up between 18% and 50% according to** geography (World Bank, 2024). When factoring in indirect employment, including workers in service and downstream industries, ASM supports **between 134 million and 270 million additional livelihoods** (World Bank, 2019).

ASM acts as a **vital safety net during broader economic or political crises**, providing an alternative livelihood when farming is disrupted by extreme weather, economic downturns, or conflict that results in land loss and displacement (World Bank, 2024). For many, it acts as a survival mechanism, providing quick access to cash in times of crisis, whether due to crop failure, medical emergencies, or sudden loss of employment. Beyond crisis resilience, ASM plays a pivotal role in rural economies by generating employment, particularly in areas where **alternative job opportunities** are scarce (World Bank, 2024). ASM can also be an **emancipatory strategy**, particularly for individuals with limited education, skills, or social connections, who may face barriers to formal employment. It allows them to generate their own income, reducing dependence on exploitative labour conditions or unreliable seasonal work. Additionally, ASM serves as a stepping stone for financing other livelihoods, such as small-scale farming, trading, or education for family members. In some communities, involvement in ASM can also bring social status and respect, particularly for those who successfully establish independent mining operations or contribute to local economic activity.

When conducted professionally under the right conditions, ASM can be an **empowering livelihood**, offering greater financial stability than subsistence farming or informal labour. Despite its challenges, including environmental and health risks, it remains the preferred livelihood for millions due to higher earnings and self-employment opportunities. By offering a source of income for local populations, ASM helps to **reduce rural-urban migration**, as individuals who might otherwise leave in search of work in urban centers can sustain themselves within their communities. This is especially significant for young people, who often face high unemployment rates in rural areas. The sector not only retains youth within their communities but also fosters economic activity, supporting local businesses and services (World Bank, 2024).

As demand for lithium, cobalt, graphite, rare earth elements, and other strategic minerals continues to surge, ASM is playing a crucial role in scaling up supply, particularly in resource-rich developing countries (IGF, 2024). Unlike LSM, which requires extensive capital investment and long project lead times, ASM **can mobilise rapidly in response to market shifts, offering much-needed supply elasticity in industries where demand can be highly volatile**. This flexibility is particularly critical in markets for battery metals, solar panel components, and semiconductor materials, where supply bottlenecks can significantly impact global supply chains. As depicted in **figure 10** below, ASM is currently responsible for approximately **20% of the world's gold production, 15-**

[5] Average lead time almost 18 years for mines started in 2020–23 | S&P Global

30% of cobalt production, 80% of the world's sapphires, 20% of its diamonds, and around **25% of both tantalum and tin** (De Haan, Dales & Mcquilken, 2020).

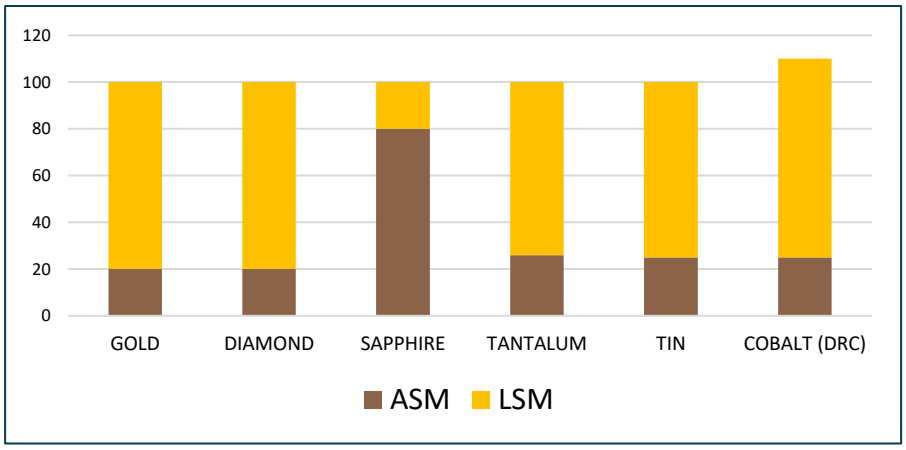

Figure 10 ASM contribution to global supply of mineral (Graph by Levin Sources. Data taken from: World Bank, 2024).

By operating outside rigid production schedules and long-term investment cycles, ASM provides a **stabilising effect on global mineral markets,** increasing production when prices rise and scaling back operations when demand falls. When demand and prices rise, ASM production often increases rapidly, helping to meet supply shortages. Conversely, when prices fall, ASM miners can scale back operations or shift to alternative livelihoods, preventing excessive market saturation (IGF, 2024). This **responsiveness helps temper extreme price volatility,** ensuring a more balanced and adaptive supply system. However, while ASM miners contribute to market stability, they remain highly vulnerable to **unpredictable income fluctuations and lack financial buffers** to withstand prolonged downturns, underscoring the need for policies that support both sustainability and economic resilience in the sector (IGF &IIED, 2017).

ASM is also able to **work more marginal deposits that would otherwise not be viable**. In many cases, ASM takes place in abandoned or previously mined sites, recovering residual minerals left behind by LSM. This secondary extraction not only maximises resource utilisation but also reduces waste and extends the productive lifespan of mining areas. Furthermore, ASM can contribute to **greater local retention of mineral wealth** compared to LSM, where profits are often concentrated in multinational corporations and central governments rather than benefiting local communities. ASM miners often directly reinvest earnings into local economies by supporting household income, small businesses, and local supply chains, including markets for tools, food, and transport. This stimulates rural economic development, providing livelihoods where alternative income sources are scarce (Fisher, 2007).

Lastly, ASM can also play a significant role in **peacebuilding** by providing economic stability, employment opportunities, and social cohesion in post-conflict communities. In many regions recovering from war or civil unrest, formal job opportunities remain scarce, and ASM emerges as a critical livelihood for displaced populations, former combatants, and vulnerable groups seeking to rebuild their lives. By creating economic opportunities, ASM can help reduce the risk of individuals resorting to illicit activities or re-engaging in conflict for financial survival (Crawford & Ledwell, 2017).

2.6 Barriers to the sustainable development of ASM actors, value chains and communities

Historically, ASM has been overlooked or marginalised by policymakers, and more recently, there has been a growing criminalisation of the sector under the broad classification of 'illegal mining.' Despite nearly five decades of research into the challenges faced by ASM individuals and entities, efforts to integrate ASM into

formal economies remain isolated and inconsistent with many pilots and not enough scaling (World Bank, 2024). While governments and international organisations have made efforts to integrate ASM into the formal economy, significant obstacles persist, making responsible operational practices difficult for many artisanal miners. Below is a list of some of the main barriers to the sustainable development of ASM actors and further prevent ASM from formalising.

LACK OF LEGAL RECOGNITION

Lack of legal recognition prevents ASM from accessing formal markets, financing, and technical support, leaving much of the sector to **operate outside legal frameworks**. This is largely due to **complex, costly, and bureaucratic licensing processes, restrictive regulations, burdensome taxation,** inadequate government capacity to administer, monitor and assist the sector, insufficient geological data to identify viable deposits **and deep-seated mistrust of authorities** (World Bank, 2024). Restrictive policies and overregulation can undermine ASM by making compliance too costly or bureaucratically complex. In many cases, **existing laws fail to reflect the realities of ASM**, making compliance difficult or impractical. Formalisation efforts often overlook the economic and logistical challenges faced by ASM operators, who typically rely on informal financing, cash-based transactions, and fluctuating production levels.

Throughout the value chain, ASM actors face **varying degrees of difficulty in fully formalising and meeting the standards expected by downstream partners**. Like any business, ASM operators must prioritise how they allocate their limited resources. However, many downstream companies impose compliance expectations without considering the challenges ASM miners face in meeting them. Many miners work seasonally or combine mining with other livelihood activities, making rigid regulatory structures unworkable. In some jurisdictions, securing a mining permit requires navigating multiple government agencies, conducting costly geological surveys, and obtaining legal consultations. These barriers are simply insurmountable for most ASM players throughout the value chain (extraction, processing, financing, business management, trading etc), many of whom have limited resources (IGF & IIED, 2017). Most ASM miners lack the financial and technical capacity to comply with strict due diligence requirements, further excluding them from responsible supply chains. This exclusion prevents them from professionalising and accessing higher-value markets, reinforcing barriers to their development (Levin-Nally & Smith, 2022).

Moreover, access to the essential resources that make formalisation possible, such as land tenure, financing, and geological data, is often **monopolised by LSM companies**, making it even more difficult for ASM operators to justify the time and cost of formalisation. Even when formalisation programs exist, they frequently fail to provide realistic pathways for ASM. Government-led efforts are often top-down, focusing on legal frameworks rather than practical support. Many of these initiatives apply LSM-style regulatory standards to ASM operations, despite the sector's lack of capital, technology, and expertise to comply. When formalisation frameworks do not guarantee better market access or legal protections, **miners see little incentive to endure the costly and time-consuming process of obtaining legal status**.

To make formalisation viable and allow for ASM to be legally recognised, policies must be tailored to the realities of ASM, offering simplified registration processes, accessible financing, and meaningful incentives. Without reforms that consider the commercial constraints of small-scale mining enterprises, formalisation remains an unrealistic aspiration rather than a practical solution. It is this reality that led the OECD to develop its FAQ on Artisanal and Small-Scale Mining, in which they set out the concept of *legitimacy* as a valid basis for doing business with ASM in the face of the infeasibility of full formality for most operators (OECD FAQ, 2024).

LIMITED ACCESS TO FORMAL AND AFFORDABLE FINANCE

ASM operators require access to financial services, as any other business, to fund mineral production, improvements in the efficiency of mineral extraction (e.g., through mechanisation), but also to meet

environmental and social requirements (e.g., investment into safer working conditions). However, in most cases **ASM operators lack access to the formal banking sector**, (sometimes even when they are fully formalised[6]). Whilst many countries officially recognise ASM and support it as a viable way to alleviate poverty and contribute to the country's economy, the primary development objective in most of these countries continues to be **focused on creating an investment climate for LSM operations** (Siegel & Veiga, 2009). The banking sector has rarely considered ASM operators as a commercially viable market. Where this has happened, ASM operators may not be able to open bank accounts at all and where they do take on debt, they typically face high interest rates and inflexible repayment schedules, following from the commercial banks' adjudication that the ASM sector is non-transparent, unreliable and highly risky (planetGOLD, 2020).

There are a few domestic banks that actively engage with ASM enterprises, especially in countries where ASM plays a significant role in the local economy. These banks usually start with onboarding miners as banking clients, before offering them credit facilities, concessional loans, or government-backed financing schemes tailored to ASM operators. Those banks that have forayed into the ASM market typically had a background in servicing informal agricultural businesses; in one case they found that servicing ASM was lower risk than other natural resources based sectors, like forestry and they were able to leverage the risk management approach developed with ASM in mind to venture into other high risk sectors.[7] **Global banks** are typically more cautious due to perceived risk and regulatory barriers, but could still support ASM indirectly - particularly through impact- or ESG-aligned funds or bonds, or partnerships with DFIs and NGOs working to formalise the sector or with domestic banks or processing plants driving financial inclusion for ASM. A couple of global banks are already engaging with ASM inclusion initiatives, and have been more able to do this where a donor or industry association is involved.[8]

A fundamental barrier to accessing finance is **the informal, or at times illegal, nature of many ASM activities**. Most formal financial institutions are unable to engage in lending or enter into financial agreements with operations that are not fully formalised. Many ASM are from rural communities in countries where getting basic identity documents like a birth certificate or identity card is extremely challenging, so it is not possible for banks to run basic due diligence checks. Traditional financial institutions view ASM businesses as high-risk due to its **informality, unprofessionalism** and **lack of collateral**, making miners ineligible for loans or credit facilities (IGF & IIED, 2017). Another significant obstacle is the **reputational risk linked to the sector**, along with concerns about ESG impacts. Even when investors recognise potential alignment, ASM is often excluded because it is widely viewed as a high-risk investment (planetGOLD, 2020). ASM supply chains are widely regarded as high risk by downstream companies due to the prevalence of risks such as **gross human rights violations**, the **financing of armed groups**, the **misuse of public or private security forces**, as well as **bribery**, **corruption**, and **money laundering**. Additional concerns related to **fraudulent misrepresentation of mineral origin**, **tax evasion and smuggling**, **poor health and safety conditions** further undermine the sector's credibility. As these issues related to ASM escalate, remediation becomes costly, and governments resort to crackdowns that temporarily curb illegality but fail to address the structural challenges that keep ASM in the informal sector (World Bank, 2024). Another challenge is that ASM is still a **relatively new investment sector**, and the necessary infrastructure to support investment is not yet in place. Additionally, investment decisions are typically weighed in terms of risk versus reward, and **ASM is often seen as failing to deliver sufficient returns** - whether financial or in terms of positive social or environmental outcomes - to justify the associated risks

[6] Gregory Mthembu Salter and Alan Martin, interview with personal communication to Estelle Levin-Nally, 31st March 2025. There is a perception by some banks that all ASM is high-risk, which commentators perceive to be unreasonable because *all* mining is ostensibly high risk and what matters is building adequate information to 'mitigate down' the risk.

[7] David Sturmes Verbeek, interview with Estelle Levin-Nally and Rebecca Lee Pein, 24th March 2025.

[8] Gregory Mthembu Salter and Alan Martin, interview with Estelle Levin-Nally, 31st March 2025, and David McEvoy, interview with Estelle Levin-Nally, 31st March 2025.

(planetGOLD, 2020). Banks face several barriers to supporting ASM. These include the complexity of complying with anti-money laundering ("AML") and FATF regulations in high-volume, low-documentation environments; the sheer number of potential clients and the operational capacity required to onboard and monitor them; the miners' lack of traditional collateral; limited access to reliable data to assess creditworthiness; and the overall higher risk profile, which limits how much of a bank's balance sheet can be prudently allocated to the sector. Many banks are also unfamiliar with ASM, which adds to their hesitancy.[9]

As a result, ASM rely on **informal sponsors or illicit funds** (planetGOLD, 2020) or fraudulently seek loans for other household activities (e.g., agriculture) and then use that money for their mining business instead[10]. Most miners rely on **cash-based financing and payment advances** from other supply chain actors, which limits their ability to invest in machinery, technology, and site improvements, ultimately restricting productivity and responsible mining (World Bank, 2024). Small payment advances are for instance exchanged between miners and traders, where traders function as *sponsors* or *supporters,* pre-financing excavation activities until artisanal miners actually find mineralised soil or providing assistance for social issues in the face of miners not having social insurance or adequate savings (e.g., urgent healthcare needs, school fees, etc.) (Iguma, 2017). These same traders are then typically pre-financed by the larger buyers or exporters (sometimes in a formalised capacity as agents). Other typical financiers are local elites, for example tribal chiefs, politicians, business people looking to diversify their economic activities (or, in the case of gold, manage currency risk), or the landowner whose land is being mined.

Although such financial structures certainly allow for production and mineral trade to continue, additional larger-scale investments are often needed to obtain mining licenses or to transform artisanal (rudimentary) mining or processing into semi-mechanised and eventually mechanised small-scale mining or processing and increase production as a result. At the same time, the use of **informal financing** is often a red flag for formal financial institutions and market actors, preventing them from entering relationships with artisanal miners. These red flags mostly relate to **compliance risks** regarding money laundering or connections to politically exposed persons or criminal activities like non-state armed groups or extremist organisations, as well as reputational negative impacts stemming from the risk of forced labour (e.g., through debt bondage) amongst indebted ASM miners. This creates a **vicious cycle** for artisanal miners, as their use of **informal lenders plays a significant role in further locking them out of formal markets and financing, which in turn leaves them reliant on those very same informal lending sources**. (Seguin, Reichel & Deberdt, 2023).

Processing plants ("PPs") in the ASGM sector play a dual role in the financial ecosystem. On one hand, they often act as critical pre-financiers to miners, providing advance payments or credit against future gold deliveries. This arrangement allows miners (who typically lack access to formal finance) to continue production, thereby positioning PPs as essential intermediaries and helping them to secure mineral supply. **However, the PPs themselves face considerable challenges in accessing affordable and formal financial services**. Their own informality or semi-formality often precludes them from receiving bank loans or investment capital, hindering their ability to scale operations, invest in more efficient technologies, and improve their service offerings. This lack of formalisation creates a bottleneck, as under-capitalised PPs are less able to offer competitive payment terms or achieve higher recovery rates, reducing their attractiveness to both formal and informal gold producers. One processing plant, Mwamba in Tanzania, has been able to break this cycle, thanks to their social capital and ability to secure loans and equity finance internationally, through friends and family

[9] Susan Keane, personal communication to Estelle Levin-Nally and Rebecca Lee Pein, 10th April 2025 and David McEvoy, interview with Estelle Levin-Nally, 31st March 2025.

[10] Marcena Hunter and Sophia Pickles, interview with Estelle Levin-Nally, 26th March 2025.

in the US and eventually a private equity firm and through a $1.5 million loan for working capital from a bank.[11] Another, Dynacor, is Canadian-owned and publicly listed.

Without access to finance, **ASM cannot invest in equipment, upskilling, upscaling, legal compliance or mitigation of ESG risks** (Fisher, 2007). The cost, opportunity-cost and risks associated with transporting products results in artisanal and small-scale miners selling to the nearest broker or dealer, often at below-market prices. Additionally, without bank accounts, **miners struggle to save, reinvest earnings, or engage in formal business transactions**, further isolating them from responsible supply chains and from developing their activities. A lack of professional business structures, such as ASM organisations or micro-businesses, and the perceived financial risks associated with ASM exacerbates their exclusion from basic financial services, reinforcing cycles of informality and economic vulnerability. This is an issue for all entities in the ASM mining and product life cycle, whether exporters who struggle with working capital, miners who need debt in order to mechanise, or processing plants that don't have the funds to achieve the environmental permits required under law (Brass & Tufo, 2020).

LACK OF ACCESS TO RESPONSIBLE MARKETS

As a result of the prior two barriers, artisanal and small-scale miners **struggle to access legal and responsible markets, limiting their ability to integrate into ethical global supply chains** (Brass & Tufo, 2020). Numerous obstacles hinder artisanal and small-scale miners from accessing responsible and formal markets. Some stem from **international market requirements**, particularly those related to 'conflict minerals', while others arise from inadequate **domestic infrastructure** to support commercialisation for export. The significance of these barriers varies depending on the mineral in question. Over the past two decades, various pilot initiatives have sought to bring responsibly sourced materials to international markets, but these efforts are expensive, heavily reliant on international donor subsidies, and often require a minimum participation threshold, excluding many smaller ASM operators (IGF & IIED, 2017).

Sustainability certification serves as a market-driven tool to improve social and environmental conditions by leveraging consumer demand. It can allow producers to access premium prices, secure better returns, gain opportunities for learning and drive professional and community development. Achieving certification requires compliance with strict social, environmental, and economic standards, verified through rigorous auditing (World Bank, 2024). However, consumer demand for certified products **remains limited due to higher costs, and few business off-takers are willing to pay a premium**. In particular, ASM operations often **struggle to meet these stringent requirements** without significant upfront investment for technical support. The financial burden of certification is disproportionately high for ASM, which cannot easily leverage economies of scale, making certification unattainable for many and limiting their access to responsible markets (Backmore, Holzman & Buxton, 2013). To achieve a sustainable ASM sector, it is essential to develop cost-effective solutions that enable miners to access formal markets, which is why the World Gold Council (see below) is focusing its efforts on developing processing plants and central bank buying schemes as aggregation centralises points of control and influence over multiple suppliers, making sectoral development and supply chain and financial due diligence more feasible.

In addition, the introduction of **supply chain due diligence regulations** has led many buyers to disengage from ASM sources, perceiving the associated risks as unmanageable. This disengagement not only isolates ASM miners but also inadvertently pushes them towards informal markets where oversight is minimal, exacerbating issues such as environmental degradation and human rights abuses (Monroy, 2024). For example, these regulations have significantly reduced the sourcing of ASM gold into responsible markets where compliance

[11] Eduard Cornew, interview with Estelle Levin-Nally, 31st March 2025 and personal communication to Estelle Levin-Nally and Rebecca Lee Pein, 11th April 2025.

controls are enforced, particularly in jurisdictions mandating conformance with the OECD Minerals Guidance. Rather than using this Guidance as intended (to support greater sourcing from high-risk regions and help ASM producers improve their risk profile), many downstream actors have opted to derisk by disengaging entirely from ASM provenances rather than working with them to manage mutual risk. This 'as long as we are compliant' mindset has dramatically reconfigured the geography of markets for ASM gold, forcing many miners into informal or unregulated supply chains. Fortunately, a shift in attitude from valuing high performance to valuing transformation towards high performance that has led many ASM standards to adopt an 'escalator' or 'progressive improvement approach, exemplified by the Alliance for Responsible Mining's ("ARM") and Resolve's Code of Risk-mitigation for Artisanal and Small-Scale Mining engaging in Formal Trade ("CRAFT"), which enables ASM to demonstrate their graduation towards sustainable production in partnership with responsible buyers (as well as bankers and investors), for those that are willing to participate.

LIMITED GEOLOGICAL KNOWLEDGE AND ACCESS TO MINERAL-RICH LAND

The inability of ASM to access finance and responsible markets is further exacerbated by **lack of geological knowledge and awareness within the ASM community**. ASM often operate with limited geological knowledge and restricted access to mineral-rich land, which significantly impacts their productivity and ability to professionalise and drive local development. Lacking access to geological data, ASM operators frequently rely on guesswork or trial-and-error methods to guide their mining activities. This inefficiency often leads to low mineral recovery, financial losses, and greater environmental damage due to unregulated and repeated excavation in search of viable deposits (Corneau, 2018).

The challenge of lack of geological knowledge and access to mineral-rich land is rooted in several factors, including **weak policies**, **ineffective regulatory frameworks**, and **inadequate government support** for geological exploration in areas suitable for ASM operations. In many cases, efforts to establish designated ASM zones have either been poorly implemented or entirely unsuccessful, leaving miners without secure access to legal mining sites or stranded on unproductive land. The lack of formally tenured ASM areas has led to growing tensions between ASM and LSM operators, particularly in resource-rich regions across Africa, Asia, and Latin America. These conflicts often arise when ASM miners, unable to access legal concessions, encroach on LSM concessions, resulting in disputes over land rights, resource control, regulatory enforcement and environmental and social liabilities (World Bank, 2024).

In spite of this general trend, there are numerous situations where people who have served as geologists for international exploration companies (who then do not proceed with a reserve) or who have been retrenched from mining companies take the initiative to acquire ASM licences and seek to develop a mine from the bottom up. The authors have met such people in Sierra Leone, DRC, Zambia, Tanzania, amongst others. They too may struggle to access finance, in spite of having solid geological information and professional credentials, though some succeed (e.g., Mwamba in Tanzania[12]). Thus, there is not an entire absence of geological knowledge within ASM communities. These experts provide an exciting opportunity for supporting the broader professionalisation of ASM in their local communities, where they can be adequately supported by the state, the finance sector and larger mining entities to unlock that potential.

The lack of geological information is a barrier to accessing finance for ASM, since financiers want to be sure there is enough potential for future gold production to support loan repayment and/or return on investment. The planetGOLD programme recognised this issue and so, as a pilot activity, commissioned geologists to develop technical reports that describe the likelihood of future gold production in given small-scale mining areas, using whatever information was available, including production data from existing small-scale operations, old reports from previous exploration by industrial mines or other data. The goal of these reports

[12] Eduard Cornew, interview with Estelle Levin-Nally, 31st March 2025.

was to render a judgment about whether future gold production could be reasonably assumed to support repayment of the finance sought by local miners.[13]

planetGOLD also supported the development of the accompanying business plans, to createoverall investment 'packages'. Notably, the business plans developed by miners aimed to raise finance between $50,000 - $150,000 to support the transition to mercury-free mining. This amount is a much lower investment than that required for full mine development; because the financial risk is relatively lower, the assumption was that financiers could tolerate less formal geological assessment. In an effort to get feedback on these investment packages, the materials were presented and reviewed in a workshop with a panel of volunteer investors, who provided advice on further honing the information in the packages. As of the end of the program's first phase, this had not yet lead to any equity investment but initial relationships and dialogue between miners and investors were forged.[14]

WEAK GOVERNANCE, CORRUPTION AND LOW POLITICAL WILL

The widespread informality and lack of transparency in the ASM sector create opportunities for individuals and groups to **manipulate it for political or economic gain**. The absence of formal regulation **facilitates criminal activities**, such as money laundering linked to illicit enterprises like drug cartels, while also exposing miners to exploitation, including extortion by government officials demanding bribes (Hunter, Smith & Levin-Nally, 2017). In many contexts, particularly in fragile or resource-rich states, ASM operations have been **co-opted or outright controlled** by local strongmen, political elites, criminal networks, or non-state armed groups. While data on the exact scale of such appropriation is limited, studies and field reports from regions like the eastern DRC, parts of West Africa, and the Amazon suggest that **a significant portion** (possibly the majority) of high-value ASM sites are **under the influence of coercive actors** who extract rents, enforce control, and operate outside the rule of law (World Gold Council, 2024) .

This is especially a risk for gold. The scale of ASGM associated with criminal or illicit activities is significant, with estimates suggesting that 80% of ASGM operates within the shadow economy to a value of between $50 and $60 billion.[15] This illicit ASGM activity is heavily exploited by criminal gangs, armed groups, and corrupt officials, leading to extensive smuggling, environmental degradation, and human rights violations. Illicit ASGM funds terrorism, conflict, and organised crime, with groups like the Wagner Group, Al-Qaeda affiliates, and Colombian paramilitaries profiting from illegal gold trade. The Wagner Group has reportedly earned over $2.5 billion from illicit gold mining to finance Russia's war efforts. In Peru, illegal gold extraction has become tightly linked with transnational organised crime and drug trafficking syndicates, with some groups reportedly laundering gold through processing plants and violently enforcing territorial control in areas like La Libertad. In Sudan, the illicit gold trade has cost the country nearly $2 billion in lost revenue annually. Smuggled ASGM gold is funnelled through international gold hubs, including Dubai, Switzerland, India, Turkey, and the United States. Peru and Colombia have seen gold surpass cocaine as the main illicit export, with 35 tons of contraband gold (worth over $1 billion) smuggled out of Peru in one year (World Gold Council, 2024).

In many resource-rich countries, **corruption** at local and national levels increases vulnerability to unfair licensing processes, bribery, illegal ASM on LSM concessions and in protected areas, the generation of shadow 'protection economies' that support access to protected lands, sexual extortion, and exploitation of ASM miners by authorities and middlemen. And, in spite of the scale of corruption endured by ASM communities

[13] Susan Keane, personal communication to Estelle Levin-Nally, 25th March 2025 and personal communication to Estelle Levin-Nally and Rebecca Lee Pein, 11th April 2025.

[14] Susan Keane, personal communication to Estelle Levin-Nally, 25th March 2025 and personal communication to Estelle Levin-Nally and Rebecca Lee Pein, 11th April 2025.

[15] Edward Bickham, personal communication to Estelle Levin-Nally, 25th March 2025 and personal communication to Estelle Levin-Nally and Rebecca Lee Pein, 14th April 2025.

and value chain operators, and the harms this generates, the authors are not aware of any UNCAC-aligned sector assessment of corruption in ASM value chains. There have been, however, attempts to address corruption in some ASM sectors (e.g., in post-conflict Sierra Leone, in 3TG supply chain initiatives in DRC, etc.) but this issue is commonly, and unfortunately, tolerated and under-addressed.

Additionally, some **governments lack the institutional capacity** to effectively regulate ASM, resulting in inconsistent enforcement of mining laws and policies (Geenen, 2012). Furthermore, it is not uncommon for local and national political leaders and civil servants to have personal stakes in ASM enterprises, whether to build a political powerbase or amass greater economic wealth and so generating a conflict of interest that undermines independence and good governance.

PRIORITISATION OF LSM OVER ASM IN NATIONAL MINING STRATEGIES

National mining strategies typically **prioritise LSM over ASM**, leading to challenges for the formalisation and development of the ASM sector (Buxton, 2013). LSM projects typically generate higher tax revenues (to the state), attract foreign direct investment ("FDI"), and contribute to fiscal revenue and infrastructure development, making them more appealing to policymakers (Hilson, 2019). This preference is evident in policies that allocate substantial land concessions to LSM companies, limiting the areas accessible for ASM operations. Many governments design legal and fiscal frameworks that prioritise LSM, granting it easier access to mining rights, financial incentives, and tax breaks while imposing complex and costly permitting requirements that effectively exclude ASM operators (IGF & IIED, 2017). By contrast, ASM's benefits tend to accrue to local and international actors, rather than the national state. As a result, ASM policy efforts have been largely ineffective in legitimising and formalising the sector because they often seek to grow the sector's contribution to national tax coffers through direct taxation, rather than leveraging the fact that ASM drives the development of other local economic sectors (e.g., housing, retail, power, etc.) which can be separately (and perhaps alternatively) taxed to stimulate greater profit and reinvestment from ASM into local communities.

LOW PRODUCTIVITY

ASM frequently use **locally made or imported equipment that may not be fit-for-purpose** or may be inexpertly maintained or optimised to the mineralogical, climatological conditions or knowledge and capacity of ASM actors. One well-documented example is mercury-based gold extraction, widely used in ASM operations across Africa, South America, and Asia. Studies have shown that ASM operations using traditional mercury amalgamation techniques often recover only 30–40% of the gold present in the ore, while modern industrial methods, such as cyanidation and gravity concentration, can achieve over 90% recovery (Veiga, Maxson & Hylander, 2006). In Mongolia, research conducted by the United Nations Industrial Development Organisation ("UNIDO") found that ASM miners using rudimentary mercury-based processing techniques lost up to 70% of the gold content due to inefficient grinding and poor amalgamation practices (UNIDO, 2018). Similarly, in Peru's Madre de Dios region, where thousands of small-scale miners operate, 20–50% of gold is lost due to inefficient processing, with much of it ending up in tailings and river sediments (Fraser, 2017).

Moreover, many ASM gold producers are **unaware of the potential value present in co-products or waste materials, resulting in missed economic opportunities**. Addressing these challenges necessitates targeted education and capacity-building initiatives, alongside the introduction of cleaner and more efficient technologies. For example, in northeastern Sudan's Abu Hamad region, studies have revealed that tailings from artisanal gold mining contain an average of 5.5 grams of gold per ton, alongside other valuable metals like mercury, silver, and copper. Despite this, these tailings are frequently discarded without further processing, resulting in substantial loss of potential revenue (Youpoungam, Kantarcı & Alp, 2024).

LACK OF INCENTIVE TO FORMALISE

While many artisanal and small-scale miners cannot formalise because of the aforementioned regulatory and administrative hurdles, there are also those miners who **do not want to formalise because of the multiple financial burdens that make informal operations more commercially viable or appealing** (IGF & IIED, 2017). Many resist formalisation for complex political, economic, and historical reasons, often rooted in deep mistrust of the state and its institutions. In many resource-rich regions, miners perceive that formalisation primarily benefits governments and LSM companies while offering little tangible advantage to local communities. A key grievance is the inadequate repatriation of mineral revenues to producer territories, where mining activities generate substantial wealth, yet local populations see minimal improvements in infrastructure, education, or healthcare. This disconnect fosters resentment, reinforcing the belief that formalisation serves external interests rather than those of the communities extracting the resources (Buxton, 2013).

Additionally, **historical tensions** between the state and mining communities further discourage participation in legal frameworks. Many artisanal miners operate in regions where state intervention has been seen as exploitative or oppressive, often influenced by colonial-era land dispossession and continued marginalisation. For some, rejecting formalisation is an act of protest against a government they view as unrepresentative, corrupt, or aligned with foreign corporate interests. This sentiment is particularly strong where LSM companies are granted concessions on land historically used by local miners, displacing ASM operations and pushing miners into illegal status. In cases where national parks or conservation areas are created without community consultation, miners may feel further alienated, viewing these initiatives as imposed territorial claims that ignore their livelihoods (Zondo, 2022).

Moreover, **weak state-society contracts** exacerbate this resistance. In many ASM-dominated regions, the state has historically provided little social benefit or support, only intervening through law enforcement crackdowns rather than offering meaningful incentives for formalisation or investments in community development. As a result, miners see little reason to comply with regulations that impose additional bureaucratic burdens without delivering benefits such as fair market access, financing opportunities, or legal protection. Addressing this reluctance requires trust-building measures, inclusive policy development, and ensuring that formalisation delivers real socio-economic improvements for ASM communities rather than merely serving as a tool for state control and revenue collection.

2.7 Key actors leading the sector to address these barriers

CATEGORY	ORGANISATIONS	FOCUS AREA
DEVELOPMENT FINANCE INSTITUTIONS	World Bank (EGPS / Delve), African Development Bank (AfDB)	Policy and licensing reform, data sharing and analytics initiatives, support for ASM financial inclusion, support for ASM geodata access, mapping of ASM zones, policy reform for land access, multi-stakeholder engagement for improved oversight and solutioneering, peer-to-peer learning and solidarity networks for ASM, etc.
GOVERNMENT & BILATERAL AGENCIES	Swiss Agency for Development and Cooperation (SDC), German Federal Institute for Geosciences and Natural Resources (BGR), previously USAID.	Pre-finance via cooperatives, formalisation, capacity building, geological mapping, ASM support in identifying viable areas for mining, environmental remediation, supply chain solutions, institutional strengthening for ASM associations/federations/cooperatives, human rights promotion, private sector development, market linkages development, etc.
UNITED NATIONS & MULTILATERAL ORGS	UNDP, planetGOLD (UN Environment-led global initiative)	Inclusive finance, cooperative support, technical assistance, private sector development, supply chain solutions, etc.
NGOS	Pact, IMPACT (Just Gold Project), Solidaridad Network, RESOLVE, IIED (International Institute for Environment and Development), Global Initiative Against Transnational Organized Crime (GI-TOC)	Responsible sourcing, market linkages and development, formalisation to meet market standards, facilitating access to fair markets, pre-finance (equipment/capital), traceable supply chains, ethical sourcing, community-based monitoring, engagement with local authorities, trainings and technical assistance, promoting gender inclusivity, research on finance models, stakeholder dialogues, policy dialogues & advocacy.
ASM-FOCUSED SOLUTION PROVIDERS	Alliance for Responsible Mining (ARM), Artisanal Gold Council (AGC), BetterChain / FairChain, Better Sourcing Program (BSP), Fair Cobalt Alliance (FCA), Delve, Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IGF), Levin Sources	Certification, formalisation, capacity-building, trainings, policy development, facilitating access to sustainable markets and finance, providing real-time data on ASM supply chains, addressing ESG issues, supporting access to finance, conflict resolution, policy advocacy, research, LSM-ASM relations, market development, supply chain solutions, environmental and human rights due diligence, etc.
STANDARD SETTERS / CERTIFICATION BODIES	OECD, IRMA (Initiative for Responsible Mining Assurance), Responsible Jewellery Council (RJC), Fairtrade International, ARM, planetGOLD, Gemfair	Guidelines and standards on responsible business practices and sourcing, certification either oriented for use by ASM, or for use by others that engage with ASM (e.g., the downstream, LSM).
INDUSTRY ASSOCIATIONS	World Gold Council (WGC), London Bullion Market Association (LBMA), International Tin Association (ITA), Swiss Better Gold Association (SBGA)	Promoting responsible and sustainable practices, co-financing social and environmental projects within mining communities, technical assistance, helping to integrate ASM gold into the formal supply chains, driving multistakeholder initiatives
IMPACT/BLENDED FINANCE FACILITATORS	The Blended Capital Group (TBCG), The Impact Facility	Enhancing access to finance, promoting formalisation, driving sustainable development.

PART 3: MAJOR LEVERS FOR DRIVING GREATER SUSTAINABLE DEVELOPMENT THROUGH THE ASM SECTOR

Overcoming the barriers to sustainable development in ASM requires a coordinated and inclusive approach involving governments, international organisations, and ASM communities to balance the economic and political benefits that ASM brings to individuals, with environmental and social sustainability for ASM communities more broadly.

As detailed in Part 2 of this report, it is essential to recognise ASM's crucial role in driving sustainable development. The sector supports the livelihoods of millions while supplying the critical minerals vital for the global energy transition and digital transformation, demand that industrial-scale operations alone cannot fully meet. However, ASM's potential contribution to sustainable development is hindered by numerous aforementioned barriers. To enable ASM to operate responsibly and contribute to long-term sustainability, targeted interventions and structural reforms are necessary. This section outlines the major levers required to overcome these barriers and integrate ASM into responsible mineral supply chains. It further examines various avenues through which institutional investors can engage, emphasising their pivotal role in promoting sustainable and ethical practices within the sector.

Figure 11 *Author's understanding of the major domains of intervention along minerals value chains that are available for driving sustainable development of the ASM sector*

2.1 Expanding Financial Access and Inclusion

A critical challenge for ASM operators is the **lack of access to credit and formal financial services, which hinders investment in equipment, technology, and compliance with responsible sourcing standards**. As discussed above, the informal nature of most ASM operations discourages financial institutions from providing loans or banking services, viewing the sector as high risk. (This challenge is often compounded for women miners, who can face discrimination and be excluded from owning property which prevents them raising

collateral.[16]) The lack of formal financing does represent one of the important barriers for improved practices by ASM operators, who often find themselves constrained in informal, and at times exploitative, financing arrangements. Expanding financial access and inclusion for ASM is critical to ensuring the sector's ability to grow and drive the sustainable development of local communities. Various financial models exist to enable artisanal miners to secure funding. However, each financial model presents distinct benefits and challenges, influencing the extent to which miners can leverage them effectively.

ZAHABU SAFI[17]

There are examples of successful collaboration with regional commercial banks in local ASM areas that have provided financial products to ASM organisations and individuals. For example, USAID Zahabu Safi (Clean Gold) Project partnered with Equity BCDC and Trust Merchant Bank (TMB) to reduce the barriers for the ASM sector to access formal financing services in eastern DRC (USAID, 2022). This was done as part of the second funding phase of the project's Responsible Gold Innovation Fund (RGIF), which was intended to blend donor and philanthropic finance to support the allocation of first grants, then loans and eventually investments into private sector development through and around the ASM sector.

The first $50-75,000 grants went as matched funding to local organisations IFAD and Justice Process in order to develop services in data gathering for due diligence on ASM cooperatives and value chains, as well as to an ASM cooperative to build its financial resilience and a local organization that was developing cleaner production systems to support the elimination of use of mercury as an alternative to miners having to use expensive imports.[18]

The second tranche of funding was earmarked for development of the banking sector, but only Kenyan Equity Bank used the money, committing double the grant they received from their own balance sheet. TMB allocated its own resources as part of a deliberate strategy to co-develop a sustainable financial inclusion model for ASM. This built on initial work supported by the US-led Public Private Alliance for Responsible Minerals Trade ("PPA"). For them, working with a USAID-backed programme helped to reduce the reputational risk of developing the ASM market for its financial services, as well as minimize risk through joint learning with the programme. [19]

These experiences, that very well balance ASM related risks with ASM operators' wish to gain access to commercial banking services, bear key lessons and encouragement for other financial institutions as well as development agencies. Despite the significant challenges associated with their replication and upscaling, efforts involving TMB and Equity BCDC show that, even in highly complex markets such as the ASM gold sector in eastern DRC, private sector engagement approaches can help connect ASM operators into the local banking sector, who become partners in their professionalisation and formalisation (Levin Sources, 2019).

The final tranche of funding for equity investment did not get used, in spite of having a philanthropic commitment of $100,000 from a US tech company. [20]

[16] Marcena Hunter and Sophia Pickles, interview with Estelle Levin-Nally, 26th March 2025.

[17] Levin Sources was a junior partner in the Zahabu Safe consortium.

[18] Rachel Brass, interview with Estelle Levin-Nally 24th March 2025.

[19] Rachel Brass, interview with Estelle Levin-Nally 24th March 2025, and David McEvoy, interview with Estelle Levin-Nally, 31st March 2025 and personal communication to Estelle Levin-Nally and Rebecca Lee Pein, 10th April 2025.

[20] Rachel Brass, interview with Estelle Levin-Nally 24th March 2025 and personal communication to Estelle Levin-Nally and Rebecca Lee Pein, 16th April 2025.

Below is a list of existing financial models that can be used to expand financial access for ASM:

1. Equity-based models

Equity financing refers to when an investor provides capital in return for partial or full ownership of a business or project. A defining aspect of this type of financing is that it often gives the investor a role in decision-making, allowing them to take part in the governance of the entity. Equity-based arrangements are a key financing model in ASM, providing miners with capital, equipment, operational resources and oftentimes technical or business expertise in exchange for a share of production or profits. These arrangements are essential for miners who lack access to formal financial services but often result in power imbalances that leave miners with minimal financial benefits while investors secure the majority share of earnings.

One of the most common equity-based models in ASM is **investor-financed pre-funding**, also known as **production-sharing agreements**. In this arrangement, an investor provides upfront capital for mining activities and receives a predetermined share of the extracted minerals. For example, in Sierra Leone's artisanal diamond mining sector, **pre-financing arrangements** are common. A notable example is the **Integrated Diamond Management Program ("IDMP")** initiated by USAID in 2005. This program experimented with forming diamond mining cooperatives to formalise and rationalise the artisanal mining sector, with the goal of increasing local benefits. Two American investors contributed $55,000 and $20,000, respectively, into this scheme. However, the returns were minimal, with only $4,400 recovered between them. This outcome highlighted the challenges and risks associated with pre-financing in the artisanal mining context, especially for foreign nationals who are not socially embedded (Levin & Turay, 2008). Although, while this model ensures access to immediate funding and essential mining equipment, it often results in low financial returns for miners, reinforcing economic disparities and dependency on external investors.

WORLD GOLD COUNCIL

The **World Gold Council ("WGC")** is the leading market development organisation for the gold industry, comprising major gold mining companies worldwide. It aims to sustain the demand for gold, provide industry leadership, and be the global authority on the gold market. In supporting ASGM, the WGC has undertaken several initiatives to promote responsible and sustainable practices within the sector. One such initiative is the introduction of the **Central Banks Domestic Purchase Programme, which encourages central banks in nations with significant ASGM activities to engage directly with this sector**. By purchasing gold produced by local ASGM communities, central banks can provide these miners with access to responsible markets, ensuring fair compensation and fostering economic development. Central Banks also have the opportunity to "*use their regulatory powers over the commercial banking system to ensure that controls are effective against money laundering, but not excessively complicated so that no-one puts any money anywhere near ASM.*" [21] This initiative also empowers central banks to influence and improve sustainability practices and enforce Environmental, Human Rights, and Due Diligence ("EHRDD") standards within the ASGM sector. By setting and upholding rigorous operational principles, central banks can play a pivotal role in formalising ASGM activities, reducing illicit trading, and promoting ethical mining practices. This collaborative approach not only strengthens national gold reserves but also contributes to the broader goal of sustainable and responsible resource management (World Gold Council, 2021).

In parallel with their Domestic Purchase Programmes, some central banks and government agencies have also launched initiatives to support the development of **centralised gold processing plants ("PPs")** tailored to the needs of the ASGM sector (see above). These facilities aim to provide artisanal and small-scale miners

[21] Edward Bickham, interview with Estelle Levin-Nally, 25th March 2025.

with access to **formal, mercury-free, and environmentally compliant processing services**, addressing one of the key barriers to responsible gold production. By investing in or facilitating the establishment of central processing hubs, central banks can ensure that gold destined for national reserves or formal markets is processed under **controlled and traceable conditions**, enhancing the integrity of the supply chain. For example, the **Bank of Ghana**, as part of its Domestic Gold Purchase Programme, has supported the establishment of centralised gold processing hubs in collaboration with government and private sector actors to facilitate transparent and traceable refining of gold from ASGM sources (Bank of Ghana, 2021).These plants often operate under stringent EHRDD guidelines and may serve as collection points for gold acquired through domestic purchasing schemes. In doing so, they help to promote the adoption of safer technologies, reduce environmental degradation, and support the formalisation of mining operations. Furthermore, centralised processing infrastructure enables governments and central banks to implement standardised pricing, quality control, and taxation mechanisms - ensuring greater transparency and increased revenue from the ASGM sector. This integrated approach strengthens both the economic and regulatory foundations of domestic gold markets while advancing national sustainability and development objectives (World Gold Council 2022).

In interview, the World Gold Council's lead for ASM noted that its gold mining members, in spite of having been approached, have not seen the need to brief their institutional investors on the WGC's ASM programme, which has been growing in scale and sophistication in recent years. [22] The implication is that institutional investors are not prioritising ASM as a material issue for their gold mining investees, in spite of evidence that a large set of gold miners are dealing with ASM issues on and around their concessions.

PROCESSING PLANTS

Processing plants play a critical financial role within ASGM ecosystems. They often act as pre-financiers by providing miners with advances or loans, thereby reducing miners' dependence on informal traders and helping to stabilise supply relationships. This financial support also enables miners to overcome logistical and operational challenges, such as poor infrastructure and lack of access to banking services. In doing so, processing plants become more than just technical service providers, they act as key financial intermediaries that can foster greater inclusion of ASM gold in responsible supply chains. However, access to finance is also a major constraint for the plants themselves. Many remain informal or under-capitalised due to difficulties in obtaining loans or investment. This lack of formal status and financial backing prevents them from scaling operations, investing in improved technologies, and offering competitive terms to miners (such as higher yields or faster payment cycles) which in turn weakens their ability to attract gold from both formal and informal sources.

planetGOLD has begun to address these issues through experimental financial partnerships with processing plants, aimed at enhancing commercial viability and promoting responsible business practices. These collaborations include innovative models such as online due diligence tools and debt instruments, and also seek to bridge the trust gap between miners and processors by supporting transparency in pricing and better social and environmental performance. Such approaches are seen as vital to unlocking the potential of PPs as drivers of formalisation and sustainability within the ASGM sector.[23]

The **World Gold Council** is also investigating "the potential role of processing plants in driving the sustainable formalisation, legitimisation and professionalisation of artisanal and small-scale gold mining (ASGM) value chains" by "improving environmental and social performance, incentivising formalisation and

[22] Edward Bickham, interview with Estelle Levin-Nally, 25th March 2025.

[23] Susan Keane, personal communication to Estelle Levin-Nally, 10th March 2025.

facilitating more effective due diligence as the basis for growing the inclusion of responsible ASGM into responsible value chains."[24] This research, carried out by Levin Sources, has highlighted key success factors for commercially viable and responsible processing plants, including potential roles for investors, domestic banks and central banks. Some of the relevant findings include: national governments need to adopt strategies for developing their processing plants sector; regulatory frameworks should be adjusted to be proportionate, fit-for-purpose; governments should enable and reward gradual transformation towards formality for processing plants and their business partners; scale matters because there is a sweet spot (which changes in accordance with the particularities of the operating environment) where it becomes possible for processing plants to be both commercially viable *and* responsible, but there are many barriers to businesses scaling to this necessary threshold; processing plants need access to upfront capital and working capital in order to scale and there are opportunities for cooperations between investors, central banks, commercial banks, industrial miners and processing plants to achieve this; and more. This work will be published at the end of April 2025. The World Gold Council is considering how it might develop a programme and public-private fund to drive the consolidation and development of gold processing plants in a set of countries, with backing from donors and institutional investors.[25]

The **London Bullion Market Association** has considered developing a preferred supplier list for processing plants because their refiners need scale in order to engage. They are initiating this in Peru, where they are adapting their generic ASM sourcing toolkit for refiners into something specific for Peruvian processing plants as the basis for driving greater ASM inclusion in GDL value chains.[26]

Another form of equity-based financing is **joint venture ("JV") agreements**, where **miners and investors share ownership of the mining operation**. Investors provide funding, technical expertise, and access to markets, while miners contribute labour and local knowledge. For example, Mineros S.A., a Colombian mining company, operates a notable JV model in Nicaragua that integrates artisanal miners into its operations. In this arrangement, artisanal miners extract gold and deliver it to Mineros for processing. The company then shares the profits from the refined gold with the artisanal miners. This model not only provides artisanal miners with access to better resources and markets but also ensures that mining activities adhere to environmental and safety standards. By formalising the role of artisanal miners within its operations, Mineros has created a sustainable partnership that benefits both parties (Cruz Investor, 2024). However, it often leads to miners losing control over decision-making and profit distribution favouring those investors related to prospection and mine development.

A further model used in ASM is **forward sale agreements**, where a trader or middleman provides cash or equipment upfront in exchange for an exclusive right to purchase all mined minerals at a fixed or discounted price. This model is widely used in gold and diamond mining across Africa. For example, In the DRC, local gold traders or middlemen (often referred to as *'négociants*) provide **cash advances, tools, or equipment** to artisanal miners. In return, they **secure exclusive rights** to purchase all gold produced by those miners at a **discounted or fixed price**, regardless of the current market value. This arrangement is effectively a **forward sale agreement** and is widespread in conflict-affected and high-risk areas (OECD, 2018). While this type of agreement guarantees artisanal miners a steady buyer, it frequently leads to exploitative pricing and financial dependency, as traders often dictate mineral prices below market value.

[24] Levin Sources (2025) The Role of Gold Processing Plants in Artisanal and Small-scale Mining, for the World Gold Council, forthcoming.

[25] Edward Bickham, interview with Estelle Levin-Nally, 25th March 2025.

[26] Gregory Mthembu Salter and Alan Martin, interview with Estelle Levin-Nally, 31st March 2025 and personal communication to Estelle Levin-Nally and Rebecca Lee Pein, 10th April 2025.

Some investors offer **equipment leasing agreements**, which allow miners to rent machinery and tools in exchange for either a share of their production or repayment over time. This model provides access to modern technology and efficiency improvements but often comes with high repayment terms that make it difficult for miners to break even. In Zimbabwe, for example, some small-scale gold miners lease equipment from larger mining companies, which helps improve productivity but can lead to financial strain if production targets are not met. See also The Impact Facility below.

One final innovative equity-based financing model for ASM involves the **shared ownership of a vertically integrated gold trading and export entity**. In this model, artisanal cooperatives become co-owners or shareholders in the very company that purchases, processes, and exports their gold. This not only secures a stable and transparent buyer for their product but also allows the miners to directly benefit from profits generated downstream in the value chain, such as margins from refined gold sales, jewellery partnerships, or international offtake agreements. The model enables reinvestment into cooperative development, community infrastructure, education, and peace building, conflict resolution, creating a closed-loop system (circular economy) where artisanal miners are both producers and shareholders, with a stake in ethical supply chains and long-term economic returns.

The pioneer of this approach is PeaceGold, a UK Community Interest Company ("CIC"), that is establishing a Congolese partner company to manage its operations in Ituri, DRC. PeaceGold is dedicated to transforming gold mining into a force for peace, upholding human rights and community development. In DRC, one of its key activities is facilitating legal market access for artisanal miners in Ituri who struggle to sell their gold through legitimate channels due to administrative barriers, excessive taxation, and limited knowledge of formal procedures. The initiative has unified 11 Congolese cooperatives that are presently producing 52 kg of mercury-free gold per month, are formalised under the CRAFT Code and have legally agreed to sell their gold through PeaceGold's certified channels, while also participating in the governance and financial benefits of the enterprise. PeaceGold is presently raising minimum $1.6 million (ideally $2million USD) in startup equity to build its operations, which include a mining concession, a processing centre, smelter/refiner establishing the Congolese entity and UK-based CIC. Many of the members of the gold mining cooperatives are ex-combatants.

The PeaceGold Community Interest Company (CIC)

The Peace Gold CIC is a UK-registered social enterprise designed to ensure that artisanal miners are not just suppliers of gold but also **co-owners and beneficiaries** of the value chain. As a CIC, PeaceGold is legally required to operate for the benefit of its community — in this case, Congolese ASM cooperatives — and to reinvest its profits into social and environmental impact. Through a **subscription-based ownership model**, member cooperatives subscribe to the entity and commit to responsible mining practices under the CRAFT Code. In return, they gain a stake in the PeaceGold CIC, allowing them to participate in governance decisions and share in the profits generated from the processing, certification, and export of their gold. This structure ensures that miners are not excluded from downstream value creation and instead receive fairer compensation, community reinvestment, and long-term benefits as the enterprise grows. The CIC's commitment to transparency, ethical trading, and community ownership makes it a powerful vehicle for aligning financial returns with social impact in the ASM sector.

To create fairer equity-based arrangements, several strategies should be implemented. Contractual transparency and capacity is essential to ensure that miners understand the terms of agreements and can negotiate for fairer revenue-sharing models. Forming ASM organisations such as associations or cooperatives can also help miners pool resources, strengthen bargaining power, and negotiate better financing deals. Encouraging ethical investment models, such as Fairmined and Fairtrade Gold initiatives, can ensure that miners receive better market prices and improved working conditions. Governments and NGOs should also

step in to offer alternative financing models, such as low-interest loans, grants for equipment purchases, and technical support.

SWISS BETTER GOLD

Swiss Better Gold **("SBG")** is a public-private partnership between the Swiss private sector and the Swiss government (SECO) dedicated to promoting the responsible sourcing of gold, particularly from ASGM. Founded in 2013, the SBG connects Swiss gold refiners, watchmakers, jewelers, and financial institutions with responsibly sourced gold from ASGM communities worldwide. **SBG supports continuous improvement of ASGM practices** through responsible supply chains, on-the-ground technical assistance and monitoring as well as co-funding social and environmental impact projects for the mines and their communities. SBG has so far focused the activities of its on-the-ground teams to Latin American miners but is actively exploring the extension of its activities into Africa and Asia.[27]

SBG operates on a Continuous Improvement Escalator model, incentivising ASGM producers to progressively enhance their practices. This approach encourages ongoing development in environmental, social, and technical aspects of mining operations. SBG has established the **Swiss Better Gold Fund ("SBGF")** to support this continuous improvement in ASGM operations. **This fund aims to deliver positive impacts by co-financing social and environmental projects within mining communities**. SBG members contribute to the SBGF as well as on-the-ground technical assistance and monitoring through a premium of USD 1.35 per gram of gold purchased from eligible ASGM producers.[28]

SBG is exploring how it might leverage its proven reputation and metal flows to **fund the accelerated development and scale up toward responsible ASGM**, including project finance for technical support and development, working capital for operating expenditures and cash flow. The fund would sit outside SBG, who would provide the technical assistance on the ground and in due time establish responsible supply chains. **They are also considering how to build a marketplace to trade SBG premium gold to increase investors' offtake**. There is scope for institutional investors to engage with both initiatives through SBG's banking partners.[29]

2. Debt financing for investments

Debt financing involves a lender providing a loan to an entity, typically with interest. The interest is usually repaid in regular instalments, while the principal amount (the original sum borrowed) is repaid either gradually through instalments or in a single lump sum at the end of the loan term. Debt financing serves as another crucial avenue for ASM operators seeking to develop their activities. This form of financing allows miners to invest in upscaling operations, securing necessary permits, onboarding technical expertise, developing new assets or simply to cover working capital. It also enables miners and processors to acquire appropriate equipment and technologies to enhance efficiency and sustainability. However, given the informal nature of ASM and the lack of formal collateral, many financial institutions remain reluctant to extend credit to miners.

Tailored financial products, such as **microloans with flexible repayment terms**, can improve access to debt financing while mitigating risks for lenders. Microfinance institutions and banks can offer **tailored credit and**

[27] Olivier Demierre, interview with Estelle Levin-Nally, 24th March 2025 and personal communication to Estelle Levin-Nally and Rebecca Lee Pein, 11th April 2025.

[28] Olivier Demierre, interview with Estelle Levin-Nally, 24th March 2025 and personal communication to Estelle Levin-Nally and Rebecca Lee Pein, 11th April 2025.

[29] Olivier Demierre, interview with Estelle Levin-Nally, 24th March 2025 and personal communication to Estelle Levin-Nally and Rebecca Lee Pein, 11th April 2025.

loan products with flexible repayment terms for ASM operators. These loans can be used to scale up production, invest in cleaner processing technologies, and onboard skilled personnel to improve mining yields. One such institution is **Los Andes**, a microfinance institution based in Peru. Recognising the barriers ASM operators face in accessing traditional financial services, Los Andes launched the **Artisanal Mining Entrepreneurial Loan**, a tailored financial product designed to help small-scale miners **acquire modern equipment, adopt safer and more sustainable practices**, and **formalise their operations**. This loan offering considers the unique characteristics of ASM, such as irregular income flows, lack of collateral, and limited financial literacy, by incorporating **flexible repayment terms**, **capacity-building components**, and **on-the-ground engagement** with mining communities. Through this initiative, miners are not only able to upgrade their operations with cleaner technologies and improve environmental compliance but also gain a foothold in formal markets by demonstrating their commitment to responsible mining (Solidaridad Network, 2023). See also the Trust Merchant Bank example, below.

In countries such as Tanzania and Ghana, government-backed schemes and partnerships with financial institutions have provided low-interest loans and flexible repayment terms to ASM organisations and licensed small-scale miners. A well-documented example of how microloans have improved access to debt financing for ASM is found in Tanzania through the **Sustainable Management of Mineral Resources Project ("SMMRP")**, implemented by the Tanzanian government with support from the **World Bank**. As part of the project, tailored microcredit schemes were developed in partnership with microfinance institutions to extend small loans, ranging from $300 to $5,000, to ASM operators, particularly in the Geita and Shinyanga regions. These loans featured flexible repayment terms that aligned with mining production cycles and included grace periods to account for seasonal income variability. The funds were primarily used for purchasing equipment, improving processing technologies, and acquiring safety gear. Crucially, borrowers also received training in business management, environmental protection, and health and safety practices. The program enabled over 3,000 miners to access finance, leading to increased production yields, reduced mercury usage, and in many cases, formalisation of mining operations. As miners became more creditworthy, some transitioned into larger, licensed enterprises, illustrating the transformative potential of well-structured, inclusive financial products (World Bank, 2015).

Additionally, some impact investors and donor organisations offer **debt financing with longer grace periods and technical support** to help miners transition towards more sustainable and profitable mining practices. Expanding access to debt financing, particularly through **alternative credit assessment models** and innovative collateral mechanisms, can significantly contribute to the formalisation and economic empowerment of ASM communities while ensuring responsible resource extraction. Furthermore, **organising miners into micro-enterprises** like ASM organisations can enhance their bargaining power, improve creditworthiness, and facilitate access to financial resources. Encouraging downstream buyers to provide pre-financing and long-term purchasing agreements can stabilise ASM operations and promote formalisation. The World Gold Council's Central Bank Domestic Purchase Programme is supporting banks to put place guaranteed purchase programmes to provide greater security to their suppliers that are seeking to access finance and investment.[30]

Trust Merchant Bank

Trust Merchant Bank ("TMB"), a commercial bank headquartered in the DRC, has taken significant steps to integrate the ASM sector into the formal financial system. Recognising the sector's substantial contribution to the national economy and the challenges miners face due to informality, TMB has sought to extend its financial services to ASM in order to address these issues. TMB's initiative aims to bridge the gap

[30] Edward Bickham, personal communication to Estelle Levin-Nally, 3rd April 2025.

by offering products and services that cater to the unique needs of artisanal miners, including debt finance, overdrafts, term loans, money transfer services, credit cards, electronic payments, life insurance for individuals or groups can include pension plans, accident and disability coverage.[31] By doing so, TMB not only enhances financial inclusion but also promotes the formalisation of ASM operations, leading to better working conditions, and increased economic stability for those involved. Through these efforts, TMB is playing a pivotal role in transforming ASM economies in the DRC, fostering a more inclusive financial environment that supports sustainable development and economic growth within mining communities.

The bank has implemented a risk rating system specifically designed for the ASM sector and its clients. A miner or ASM entity's risk rating influences their financing options, with higher ratings granting access to more favourable financial terms. To track progress, clients undergo an annual evaluation and receive support to improve their rating over time. While ASM is widely perceived as a higher-risk sector, TMB applies interest rates that are non-penalising relative to other productive sectors such as agriculture. The bank is also leveraging the transaction history and digital financial behaviour of its ASM clients to build credit profiles over time, enabling it to extend credit without requiring traditional asset-backed collateral. This data-driven approach allows TMB to gradually reduce risk ratings and scale the proportion of its balance sheet that can be allocated to the ASM market.[32] To further enhance miners' access to financial services, the bank is actively promoting its **mobile banking platform**, People Mobile, which is specifically designed to be more accessible for users in remote areas. This digital platform enables the bank to monitor financial activities and importantly gather and accumulate data in order to assess the creditworthiness of ASM clients, allowing for more tailored lending decisions.

TMB also proactively extend banking services to other economic sectors within ASM communities, such as solar energy adoption, education and health. In this way it can support cross-selling between its customers, and build more diverse and resilient local economies generally, as a foundation for growing its own customer base, and thereby driving greater resilience of the bank into the longer term too. [33]

TMB is majority-owned by KCB Group, a Kenyan-headquartered banking group listed on the Nairobi Securities Exchange. That being said, TMB operates with a high degree of autonomy in its local strategy, including its initiatives to support the ASM sector. Strategic investment opportunities directly aligned with TMB's ASM-focused work could be explored in partnership with the bank or through targeted engagement with KCB Group. If an institutional investor—such as a sovereign wealth fund—were to take a meaningful stake in TMB (e.g. 1% or more) and publicly link this move to support for the bank's ASM initiative, it would send a powerful signal. This would demonstrate that capital is available for banks engaging with ASM, while also reinforcing the view that ASM is a viable, investable, and legitimate market. Such a move could influence other commercial banks and financial institutions to follow suit.[34]

In interview, David McEvoy noted, "*Having worked with Levin Sources, the PPA, and others, it is clear that the main blockages to providing banking services to ASM lie within the correspondent and international banking sector.. Other stakeholders understand the risks and want to see a more nuanced approach, e.g. US treasury, EU, and regulators. They appreciate derisking is the issue but it is the international banking community that hasn't engaged..... [But] the reality is that with many commodities they're engaging whether they like it or*

[31] David McEvoy, interview with Estelle Levin-Nally, 31st March 2025.

[32] David McEvoy, interview with Estelle Levin-Nally, 31st March 2025 and personal communication to Estelle Levin-Nally and Rebecca Lee Pein, 10th April 2025.

[33] David McEvoy, interview with Estelle Levin-Nally, 31st March 2025 and personal communication to Estelle Levin-Nally and Rebecca Lee Pein, 10th April 2025.

[34] David McEvoy, interview with Estelle Levin-Nally, 31st March 2025 and personal communication to Estelle Levin-Nally and Rebecca Lee Pein, 10th April 2025.

not."[35] He also noted that banks will respond to the demands of institutional investors (as well as major OEM / retail brands in electronics and automotive), because they want to secure the larger mandates with these investors. "*The banks have done it for other sectors, notably the agricultural sector. Right now they just look at ASM as a compliance cost. But if proactively engaging with ASM becomes a prerequisite for participating in certain RFPs, banks will respond. That shifts the dynamic—from treating ASM as a compliance burden to seeing it as a strategic requirement.*" [36]

Besides having correspondent banks supporting scaling, growing the pipeline of new ASM customers is key as well as mechanisms for sharing risk and first loss. To that end, donor-funded programmes that are driving the organization and professionalization of ASM in DRC, such as planetGOLD and Zahabu Safi (see above), are key to growing the number of eligible entry-level customers, and ensuring the profitability and commercial viability of TMB providing banking services to ASM. [37]

3. Community-based savings and loans:

Community-based financial solutions play a vital role in supporting ASM by providing access to credit, savings, and investment opportunities that are otherwise unavailable through formal banking systems. These solutions are vital in providing artisanal miners with greater financial stability. For example, Savings and Credit Cooperative Organisations ("SACCOs") in Tanzania are member-owned financial cooperatives that provide savings, credit, and other financial services to their members, particularly those who may not have access to traditional banking services. SACCOs play a crucial role in financial inclusion by offering accessible and community-driven financial solutions, including for ASM. Another example are Osusu schemes in Sierra Leone, which are traditional rotating savings and credit associations that serve as informal financial systems for individuals and small businesses, including ASM.

Additionally, **village savings and loan associations ("VSLAs")** and **rotating savings and credit associations ("ROSCAs")** provide an alternative to high-interest moneylenders by pooling community resources and offering low-cost loans with flexible repayment terms. Some initiatives, such as cooperative mining groups, not only enhance financial access but also help miners negotiate better market prices and improve social security for members. These types of schemes provide a means for people without access to formal banking services to save money, access credit, and improve financial resilience. By pooling resources, community-based schemes not only facilitate short-term financial support but also promote collective resilience against economic shocks. Strengthening these initiatives through digital financial platforms and mobile banking services could enhance their reach and efficiency. Connecting them to banks that are using alternative credit assessment models and innovative collateral mechanisms (e.g., production track record; VSLA repayments records, etc.) could help scale the capital available and/or their reach.

4. Non-financial support and benefits through participation in NGO and donor subsidisation

Access to financial support and benefits through NGO and donor subsidisation plays a critical role in enhancing the sustainability and profitability of ASM. Many NGOs, development finance institutions ("DFIs"), and international donors provide **subsidised funding, grants, and technical assistance to ASM operators**, helping them overcome financial barriers and improve operational efficiency. This support often takes the form of

[35] David McEvoy, interview with Estelle Levin-Nally, 31st March 2025 and personal communication to Estelle Levin-Nally and Rebecca Lee Pein, 10th April 2025.

[36] David McEvoy, interview with Estelle Levin-Nally, 31st March 2025 and personal communication to Estelle Levin-Nally and Rebecca Lee Pein, 10th April 2025.

[37] David McEvoy, interview with Estelle Levin-Nally, 31st March 2025.

funding for centralised mineral processing plants, provision of cleaner and more efficient mining technologies, and assistance in obtaining legal permits. Initiatives that focus on financial literacy, professionalisation, and technical training can empower miners to manage resources more effectively and increase productivity. For example, financial management training equips miners with the skills to budget, track expenses, and plan for future investments, while mineral processing training enhances yields and profitability. These capacity-building efforts contribute to the overall sustainability and formalisation of the sector, positioning miners for improved access to finance in the long term.

planetGOLD

The **planetGOLD Programme**, an initiative supported by the Global Environment Facility (GEF), and led by the United Nations Environment Program ("UNEP"), collaborates with governments, the private sector, and ASGM communities to promote responsible mining practices and improve access to formal finance, with the ultimate aim to reduce mercury use in the sector.[38] By addressing financial barriers, aiding formalisation, raising awareness, and linking miners to mercury-free technologies and formal markets, the program aims to establish cleaner, more efficient small-scale gold mining methods that benefit all stakeholders, from extraction to end-users. It establishes specific criteria governing ASGM operations engaged with the programme, aligning with the CRAFT Code and the OECD Minerals Guidance, and includes additional requirements such as eliminating mercury use, respecting Indigenous Peoples' rights, and minimising biodiversity impacts.

Recognising the sector's limited access to formal financial services, planetGOLD has developed resources and strategies to bridge this gap. At the global coordination level, the programme developed reports and training materials related to access to finance. For example, planetGOLD's "Access to Finance — Options for Artisanal and Small-Scale Mining" report reviews past experiences with delivering financial and allied services to artisanal and small-scale mining and makes recommendations regarding best practices and potential ways forward in improving access to finance based on this experience. The country projects participating in the programme, which are implemented by programme partners such as the United Nations Development Programme, United Nations Industrial Development Organization and Conservation International, all actively have sought to develop mechanisms for increasing access to finance for miners.[39]

For example, some planetGOLD country projects have sought support from public funders to provide capital for such mechanisms. For example, planetGOLD Burkina Faso leveraged a government green fund which, in combination with a loan guarantee fund, allowed them to lower the interest rates of its financial solutions for ASM. Similarly, planetGOLD Colombia leveraged a mining fund set aside by the government and coupled this with a loan guarantee funded by the project to support a financial mechanism with a local financial cooperative.[40]

In 2024, planetGOLD surveyed socially responsible investors to identify avenues for engagement and future investment with the ASGM sector (planetGOLD, 2024). The program worked with a community of investors to grow their knowledge of ASGM and build their appetite to engage with the sector. Its key findings included that:

[38] Susan Keane, personal communication to Estelle Levin-Nally and Rebecca Lee Pein, 11th April 2025.

[39] Susan Keane, personal communication to Estelle Levin-Nally, 25th March 2025 and personal communication to Estelle Levin-Nally and Rebecca Lee Pein, 11th April 2025.

[40] Susan Keane, interview with Estelle Levin-Nally, 25th March 2025 and personal communication to Estelle Levin-Nally and Rebecca Lee Pein, 11th April 2025.

- In order for ASGM to be more attractive to socially responsible investment projects should: "*demonstrate nonlinear impact; de-risk to mitigate value destruction; include waste management planning; include rehabilitation and remediation planning; provide transparency on operational risk as well as risk management planning; and present technology/equipment financing opportunities*." Other considerations included, "*demonstrating the presence of a strong, trusted team with good record keeping, facilitating site visits, articulating investment needs and what has been invested to date. Being able to demonstrate alignment with mechanisms such as OECD and CRAFT and, alignment with a prospective investors impact interests were also highlighted as useful.*"
- Barriers to investment by SRIs include a predisposition to avoid all mining (not just ASM), investment envelopes for ASM projects are typically too small (such that microfinance and philanthropic finance may be better options), and ASGM's environmental impacts, competition for capital that is lower risk and higher impact.
- Greater attention should be given to raising investment along the mining and product lifecycle (to include prospection, exploration and metallurgy), rather than just in extraction.
- More awareness raising is needed with socially responsible investors to grow their appetite to invest in ASM. At this point in time, the most likely partners are high net worth individuals, family offices and early adopters who have a higher risk tolerance. [41]
- Patient capital is preferable for ASM investments, potentially in combination with philanthropic or donor grant funding to support capacity building and training of the ASM enterprises in order to derisk the primary investment.

The planetGOLD programme has also introduced an **Investor Introductory Course** that is designed to acquaint potential financiers and investors with the ASGM sector. Developed by the Artisanal Gold Council for planetGOLD, this curriculum offers foundational teaching and learning materials that can be tailored to suit diverse investor audiences. The course encompasses a comprehensive **PowerPoint slide deck** and an accompanying **teacher's guide**, facilitating a structured exploration of key topics such as the dynamics of the ASGM sector, investment opportunities, risk assessment, and strategies for responsible engagement. By providing these resources, the course aims to bridge the knowledge gap, encouraging informed investment decisions that support the formalisation and sustainable development of ASGM communities (planetGOLD, 2023).

5. Blended finance

Blended finance combines public or philanthropic funds with private capital to make investments more attractive to commercial lenders. It helps reduce risk for private financiers, encouraging them to support sectors they might otherwise avoid like ASGM. For example, a government might guarantee bank loans to ASGM operators, or a donor might fund training to improve business practices. The goal is to build viable, socially and environmentally responsible enterprises that can eventually access private finance without ongoing public support. For ASM operations that remain excluded from traditional financial mechanisms, **blended finance** can offer a viable solution. Development banks, advisory firms, and NGOs are exploring this actively at the moment.

An Alternative Digital Financial Marketplace (ADFM)

The **Blended Capital Group (TBCG)** is seeking to assist ASM communities by employing **blended capital strategies** to enhance access to finance, promote formalisation, and drive sustainable development. In collaboration with partners such as Capitals Hub Canada, the Capitals Coalition, and the Alliance for Responsible Mining, they are developing a **digital marketplace** designed to connect artisanal miners with a

[41] Susan Keane, interview with Estelle Levin-Nally, 25th March 2025.

diverse range of investors, leveraging a partner's prior experience of doing the same in agriculture.[42] This platform aims to democratise access to capital by providing a transparent mechanism for miners to secure funding for equipment, training, and governance improvements. "*This digital ecosystem will leverage blockchain technology, smart contracts, and digital identity solutions to create a transparent, efficient, and accessible marketplace that connects ASM operators with investors, buyers, and service providers. The platform will serve as an end-to-end solution for documenting and verifying ASM operations, facilitating transactions, and managing supply chain traceability, thereby addressing many of the fundamental barriers to formalisation* (The Blended Capital Group, 2025)."

By offering detailed insights into the social, environmental, economic, and financial aspects of mining projects, the marketplace enables the creation of blended capital stacks, combining various types of investments to meet the unique needs of ASM operations. For example, its Digital Outcome Bonds "will be structured to attract different types of investors: development finance institutions providing first-loss capital, impact investors seeking both social and financial returns, and commercial investors interested in exposure to critical minerals" [43]

This solution is at conceptual stage and actively seeking multi-million dollar funding for development. Interested investors include family offices, impact investors, climate investors, institutional investors and industry associations. [44] "*Nominal design funding will support the design, testing and delivery of this digital marketplace, which will be extended across the sector after a pilot phase that validates and refines the methodology across a series of ground-breaking projects.*" Based on their concept note, "*A number of organisations have committed to partner on designing and delivering a digital marketplace that supports at-scale capital. Investors with varying characteristics will be leveraged in capital stacks that target specific opportunities for value and impact, resulting in at-scale outcome shifts through formalisation. The digital marketplace will leverage existing, and where appropriate, emerging technologies and the access of partner organisations in connecting miners with investors.*"[45]

Other examples of successful blended finance initiatives are the Public Private Alliance for Responsible Minerals Trade ("PPA"), which has a working group dedicated to financial inclusion of ASM, and the European Partnership for Responsible Minerals ("EPRM"). Both organisations support ASM value chain projects through co-funding mechanisms involving both public and private stakeholders. In Kenya, The Impact Facility ("TIF"), a UK-registered social enterprise, has been piloting an **equipment lease-to-purchase model for ASGM** since 2021, using a combination of grant funding from the **EPRM and UK-based GenEM Foundation** alongside impact investment from a private investor. This initiative serves as a bridge between traditional finance and small-scale mineral operators in Western Kenya, enabling structured investment in production and processing equipment. To date, the pilot has supported **10 ASGM sites with investments totalling $171,596**, including the establishment of a leaching facility. Following the success of the pilot and a strong repayment performance, TIF has secured **an additional $1 million in blended finance in 2024** to expand the model into Tanzania, with the funding divided between grants for technical assistance (40%) and returnable capital for further equipment financing (60%) (planetGOLD, 2024). This time the model is different, as they are using a deposit-backed guarantee to finance six $30,000 loans instead of assets through a $200,000 grant for three years from an impact investor. TIF has provided these funds to a local bank which does its own due diligence and services the

[42] Rob Karpati, interview with Estelle Levin-Nally, 24th March 2025.

[43] Concept Note – Marketplace for the Mining Sector, shared by Rob Karpati with the authors, 11th March 2025.

[44] Rob Karpati, interview with Estelle Levin-Nally, 24th March 2025.

[45] Concept Note – Marketplace for the Mining Sector, shared by Rob Karpati with the authors, 11th March 2025.

miners directly and is able to offer interest rates that are lower than normal commercial rates due to the impact investor contribution. The equipment purchased by the miners becomes the collateral.[46]

The Impact Facility (TIF)

TIF is actively working to promote the financial inclusion of ASM operations, particularly in the DRC, Kenya and Tanzania. Recognising the sector's potential to contribute to responsible supply chains, TIF mobilises blended finance and impact investments to help ASM operators formalise their practices and improve working conditions. By providing access to affordable financing for equipment, safety improvements, and technical training, the initiative enables miners to increase productivity and meet environmental and social standards. This approach not only supports the livelihoods of mining communities but also aligns with the growing demand for ethically sourced gold, cobalt and copper in global supply chains.

One initiative of TIF is the The Fair Cobalt Alliance ("FCA"), which is a multi-stakeholder initiative established in 2020 to transform the ASM sector in the DRC. Its mission is to mobilise resources across the cobalt supply chain, delivering technical assistance and investment to create a formal, fair, and safe ASM copper-cobalt industry. The FCA works to enhance miners' safety and working conditions through training and better equipment while addressing child labour by removing children from mining sites and supporting their education through long-term remediation. It also fosters economic empowerment by helping miners formalise their operations and providing alternative livelihood opportunities to reduce dependence on mining. Additionally, the FCA promotes supply chain transparency by collaborating with buyers, cooperatives, and regulatory bodies to ensure ethical cobalt sourcing. Environmental sustainability is another priority, with initiatives aimed at reducing pollution and rehabilitating mined-out areas. Backed by major industry players like Tesla, Fairphone, and Glencore, the FCA aims to transform ASM cobalt mining into a more ethical, sustainable, and economically viable sector while benefiting local communities and ensuring long-term stability in the supply chain.

In collaboration with Fairphone, the FCA introduced the **Cobalt Credits** ("CC") mechanism in August 2023. As shown in **figure 12** below, this blended financing model merges public development funds with corporate investments from FCA members. Operating on a 'book and claim' system, it enables downstream companies to financially support mine improvement activities at artisanal mine sites that are committed to professionalisation. Buyers do this either to remedy or mitigate risk in a sector to which they are connected but over which they have low direct influence.[47] Buyers pay a $5,000 per tonne premium (10% of cobalt's average price over three years) for cobalt sourced from the Kamilombe mine and sold to traders or processors. These credits verify that cobalt has been produced in alignment with a certain ESG standard enabling and incentivising continuous improvement. Managed by TIF, FCA's permanent secretariat, the funds are allocated by a dedicated democratically elected worker committee, including FCA, CMDS, and the Women Washer's Association, to support mine and miner development. This system allows companies to align their credit purchases with cobalt usage, contributing to ongoing improvements that facilitate compliance with responsible production standards. Through TIF, the FCA collaborates with a local Fund Allocation Committee ("FAC"), comprising representatives of different groups of workers active at the mine site, to invest the funds generated from CC purchases. These funds are directed towards projects addressing critical improvement areas, including Health and Safety, Child Rights Protection, Cooperative Governance, and Environmental Protection (FCA, 2023).

[46] David Sturmes Verbeek, interview with Estelle Levin-Nally and Rebecca Lee Pein, 25th March 2025.

[47] David Sturmes Verbeek, interview with Estelle Levin-Nally and Rebecca Lee Pein, 25th March 2025.

TIF is exploring how to scale this successful programme through multi-million dollar impact bonds.[48] Based on FCA's methodology for valuing the remediation of child labour, "there would be an opportunity for investors to risk capital upfront and get 25-30% ROI if project implementation is successful." [49]

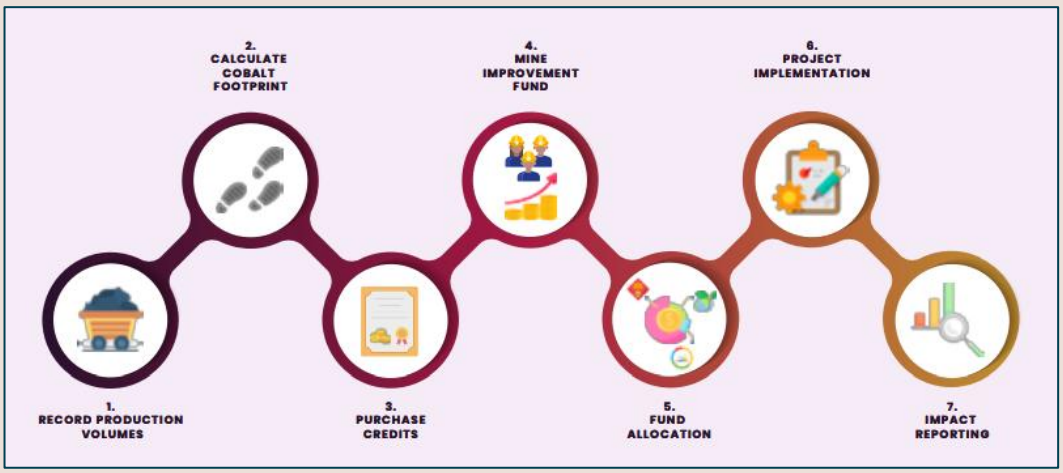

Figure 12 FCA Cobalt Credit Mechanism (FCA, 2023)

These initiatives help ASM enterprises professionalise their operations and meet the requirements of responsible supply chains.

THE WORLD BANK

The World Bank's new position paper outlines the development of a program titled ***Mining.Better.Together,*** which signals a strategic shift toward more integrated and collaborative support for the ASM sector. As part of this initiative, the Bank (together with WGC and IGF) is exploring the creation of a **dedicated facility to fund ASM-focused programs** that aim to scale up existing efforts in financial inclusion, professionalisation, and legitimisation. This proposed facility is envisioned as a **blended finance vehicle,** which would allow for the strategic combination of concessional capital (e.g., public, donor, or philanthropic funding) with private investment. The structure is designed to de-risk investments and attract institutional capital into the ASM sector - long perceived as too risky or informal for traditional financing. By leveraging public and philanthropic funds to catalyse private investment, the World Bank aims to build a more resilient, transparent, and sustainable ASM ecosystem (World Gold Council, 2024).

6. Other financial inclusion initiatives

Fintech innovations have played a transformative role in advancing the financial inclusion of ASM, enabling them to participate more fully in formal financial markets. The adoption of mobile banking and digital payment systems has significantly reduced ASM's reliance on cash transactions, which are often opaque and vulnerable to corruption. By shifting toward traceable, digital financial tools, miners can begin to build verifiable financial histories - an essential step toward accessing credit, savings products, and insurance services. These digital footprints not only support more responsible business conduct but also position miners as credible participants within the broader financial ecosystem. As part of a broader investment strategy into ASM-adjacent sectors,

[48] David Sturmes Verbeek, interview with Estelle Levin-Nally and Rebecca Lee Pein, 25th March 2025.

[49] David Sturmes Verbeek, interview with Estelle Levin-Nally and Rebecca Lee Pein, 25th March 2025.

fintech acts as a critical enabler, facilitating the professionalisation of ASM operations and improving transparency, profitability, and long-term economic sustainability.

GEMFAIR

In 2018, De Beers Group introduced **GemFair to help formalise the ASM sector by offering a secure market pathway and promoting responsible working standards**. The GemFair Responsible ASM Assurance Program, developed in collaboration with mining stakeholders and civil society, supports miners in their journey towards formalisation. This program aims to include as many artisanal diamond miners as possible who align with internationally recognised responsible sourcing standards and provide a framework to work with artisanal miners to progressively develop these standards over time. Operating primarily in Sierra Leone, GemFair partners with government-licensed ASM sites that are willing to commit to a rigorous set of operational, environmental, and human rights standards based on the OECD Minerals Guidance and De Beers' Best Practice Principles. GemFair provides **access to equipment, training, and financial literacy support**, and works with miners to enable fair pricing and transparent sales through digital trading platforms. Utilising tailored technological solutions, GemFair traces diamonds from mine to market, providing miners with support from an expert local team. While currently focused on diamonds, there are plans to expand the program to encompass other materials, such as gold and coloured gemstones, in future iterations (GemFair, 2025).

GemFair recognises that many ASM operators struggle to access the capital needed to invest in safer equipment, comply with regulatory requirements, and adopt better mining techniques. To respond to this, **GemFair has been working with third-party partners to design and implement financing solutions tailored to the realities of ASM miners**. These solutions focus on **pre-financing mechanisms that enable miners to access funds upfront**, without falling into the exploitative debt arrangements often imposed by informal buyers. By combining this financial support with comprehensive training in health and safety, human rights, and business practices, GemFair empowers miners to operate more professionally and responsibly. Additionally, by purchasing diamonds at fair market value through a transparent pricing system, GemFair helps ASM participants reinvest earnings into their operations, gradually strengthening their financial independence and ability to grow. This integrated model demonstrates how targeted financial interventions, coupled with technical and market support, can play a transformative role in ASM communities. By combining traceability technology, financial access, and capacity-building, GemFair offers a replicable model for integrating ASM into responsible global supply chains while enabling long-term economic empowerment (Allan, 2022).

PATHWAYS FOR ENGAGEMENT BY INSITITUTIONAL INVESTORS

THROUGH ADVOCACY AND MUTUAL KNOWLEDGE TRANSFER

1. **Participate in DFI-, donor- and industry-association- led multi-stakeholder platforms** in order to stay informed, engage in policy dialogue, and align investors' strategies with globally recognised development goals. Through these partnerships, institutional investors not only help unlock the full potential of ASM but also contribute to inclusive growth, conflict-free supply chains, and climate-resilient development.

2. **Support DFIs to create impact funds** and social or environmental bonds focused on ASM, targeting ESG-aligned returns while advancing social and environmental objectives. Leverage networks to bring the right financial partners to the table to brings these funds to life.

3. **Advise the creators of ASM-related marketplaces (whether for product trading, impact premium trading, or direct investments into ASM enterprises),** in order to make ASM-linked investments more attractive and available to mainstream capital. Consider investing in such marketplaces too (see next).

4. **Collaborate with the banking sector on the development of financial products that reward responsible practices,** such as green or social bonds or impact-linked loans tied to ASM performance metrics and consider investing in the vehicles that offer these.

THROUGH INVESTMENT

5. **Co-invest in blended finance partnerships and their vehicles**, where institutional capital is layered with concessional financing, guarantees, or first-loss capital from DFIs like the World Bank, IFC, or AfDB. This structure reduces investment risk and makes ASM-focused projects more attractive to private investors. For instance, institutional investors could align with IDA-funded projects or IFC-backed microfinance schemes to expand access to credit for ASM operators, enabling investments in equipment, safety measures, and sustainable practices. There is opportunity to invest in existing blended finance initiatives, such as the TBCG digital marketplace, TIF, SBGA, or to participate in public-private partnerships and funding facilities, such as the EPRM, PPA and the emerging World Bank, IGF and World Gold Council initiative (still to be named!), as well as the World Bank's Mining.Better.Together Facility (under development).

6. **Support local banking and processing infrastructure through tailored and structured finance models**. Institutional investors can play a catalytic role in scaling responsible ASM by providing liquidity or equity to commercial banks, impact-oriented lenders, and processing plants engaged in the sector. This support can facilitate the development of tailored financial instruments, such as equipment leasing, revenue-based lending, or blended finance structures, that align with ASM production cycles and ESG-linked performance targets. In countries where central banks are backing the establishment of centralised processing facilities, investors can further amplify impact by funding the construction, expansion, or modernisation of certified processing plants. Through collaboration with local banks, structured financing arrangements can be established, such as pre-financing models tied to offtake agreements with responsible processors, to reduce informality and incentivise compliance. Additionally, institutional investors or the funds they back can take equity stakes in processing plants committed to upholding Environmental, Human Rights, and Due Diligence (EHRDD) standards. These interventions not only strengthen the financial sustainability and scalability of PPs, but also contribute to building transparent, high-integrity processing hubs, reinforcing ethical supply chains, and enhancing the overall investability and bankability of ASM-linked gold production—while delivering both impact and financial returns in an underserved, high-potential sector.

7. **Invest in fintechs and digital infrastructure providers** (such as Appropriate Process Technologies – APT, BetterChain, iTrace, Wazi by Mwamba, etc.) that enable traceability, alternative credit scoring, or mobile banking systems in ASM regions. Platforms that collect verified production data and track ESG compliance - such as DataStake or similar tools - can underpin responsible sourcing and creditworthiness. While these investments remain early-stage, institutional capital may be deployed through impact funds or venture arms focused on financial inclusion, supply chain transparency, or ESG innovation.

8. Co-finance results-based or outcome-linked programs with development partners. Contribute to **outcome-based financing mechanisms** where disbursements or returns are linked to measurable achievements, such as mercury reduction, legal formalisation, or increased gold recovery rates. These may be structured through **development bonds**, **impact-linked loans**, or **results-based grants** managed by multilateral institutions or NGOs. Investors can co-finance alongside DFIs and commercial banks, ensuring that capital is deployed in a performance-driven, transparent manner.

2.2 Ensuring Responsive and Appropriate Regulatory Frameworks

ASM cannot significantly contribute to sustainable development **without legal recognition** due to its inherent informality, lack of accountability, and exclusion from responsible financial and supply chain systems (World Bank, 2024). **Legal recognition is essential for regulating the environmental, social, and economic aspects of ASM to ensure its operations align with sustainability goals** (IIED, 2028). Informality and lack of legal status is often as a result of restrictive and poorly designed regulatory environments. Many countries have outdated or restrictive mining laws that do not adequately consider the realities of ASM operations. Well-designed policies can encourage responsible mining practices, while restrictive or poorly implemented regulations can drive ASM into informality, exacerbating environmental and social challenges.

Addressing this requires 'light touch' mining code reviews (and other supporting legislation) to look again at licensing categories and criteria and ensure they are sufficiently favourable for small-scale miners and that they are gender sensitive. Legal frameworks should be tailored to reflect the realities of ASM operations, incorporating flexible permitting systems that recognise and support the development (up-scaling, institutional strengthening and professionalisation) of both subsistence and commercial mining activities. A critical barrier to legal recognition is the complexity and cost of obtaining mining licenses. Simplifying licensing procedures and reducing bureaucratic hurdles can incentivise miners to formalise their operations.

Additionally, ensuring that ASM legislation aligns with environmental, labour, and human rights standards can facilitate integration into formal markets while promoting sustainable practices (IGF, 2017). However, it is essential for mining and environmental ministries to adopt progressive standards for ASM operations that align with environmental and social principles similar to those in industrial mining, while being adapted to the scale and capacity of ASM (IGF, 2017). Pilot initiatives have explored the development and implementation of Environmental and Social Impact Assessments ("ESIAs") tailored to ASM, which could be incorporated into regulatory frameworks for broader application (UNECA, 2017). Notably, where such ESG requirements are too ambitious or costly and are a condition of receiving an extraction or processing permit, they may become a barrier to formalisation (World Bank, 2024). Adopting a progressive improvement approach requires governments, civil society, and private sector actors to collaborate to develop policies that align with the realities of ASM communities and promote their integration into responsible markets, and the technical support to make this a reality. Financial partners are crucial to provide the project finance and working capital needed for the investments that can move ASM towards responsible production (e.g., acquisition of PPE, training in safe mining and processing methods, adoption of cleaner production methods and related machinery, development of policies and procedures, financial literacy and business training, etc.)

In areas where mineral deposits are scarce, flexible, participatory, and collaborative governance models could help resolve land-access disputes, particularly between ASM and LSM operations. While ASM-related conflicts vary, many stem from land tenure and access issues, and such tensions are likely to intensify as the green energy transition drives mining booms and associated land pressures (UNECA, 2024) and as the gold price continues to rocket in the face of growing geopolitical tensions compounded by an increasingly unstable environment

and dynamic global economy. In recent years, increasing efforts have been made to secure the formal legal recognition of customary land rights, particularly for Indigenous peoples and local communities.

Mining operators often lack the necessary expertise to navigate the complexities of licensing paperwork and procedures. Capacity-building support has proven particularly beneficial for women's mining groups, though such assistance should not be exclusive to them (Pact, 2024). Additionally, some miners require financial aid to cover travel costs to distant mining offices. To address these challenges, several countries are adopting online licensing systems, either through decentralised mining offices in key mining regions, as seen in Tanzania, or via mobile-friendly web-based applications, as implemented in Peru. The successful integration of ASM into legislative frameworks in certain countries is not solely due to specific definitions but rather stems from a deep understanding of the sector's evolving needs, the timely implementation of relevant policies, and the continuous refinement of regulations and mining classifications to support its development (IGF, 2017).

Governments should also implement decentralised licensing offices in mining regions to streamline the process and make it more accessible. Creating tiered licensing systems based on the scale of mining activities can provide a gradual pathway to formalisation, allowing small operators to comply with basic requirements before advancing to more stringent regulatory frameworks as they grow.

PATHWAYS FOR ENGAGEMENT BY INSITITUTIONAL INVESTORS

THROUGH ADVOCACY AND KNOWLEDGE TRANSFER

1. **Engage with national governments, donor agencies, and multi-stakeholder platforms** (e.g., the IGF, World Bank and WGC platform for ASGM) **to advocate for regulatory frameworks that support a staged or "escalator" approach to formalisation**. This model allows ASM operators to initially enter the formal system through a highly simplified, low-barrier process, acknowledging the realities of informal economies. Once formal status is granted, operators would be expected to demonstrate progressive improvements in environmental, social, and operational performance over time, in line with national development goals and international good practice. Continued access to formal markets, licensing, and financial services would be contingent on meeting these incremental milestones, creating a clear, incentivised pathway for professionalisation. Institutional investors, through policy dialogue and partnerships, can support the adoption of this scalable, pragmatic approach and to back the domestic banks that step up to embrace the opportunity. Such regulatory reform reduces investment risk by expanding the pipeline of formal, bankable ASM enterprises and aligns sector governance with global expectations for due diligence, responsible sourcing, and long-term sustainability. It would also make it easier (though not easy) for the international banking community to engage because a greater proportion of the ASM sector would be able to formalise.

2. **Incentivise banking partners to provide liquidity or credit lines to domestic commercial banks and microfinance institutions that already serve rural or mining communities**. These institutions may be working with formalised cooperatives, traders, or equipment leasing firms. Institutional investors can participate by funding senior tranches of structured facilities, where concessional capital is used to reduce exposure to default risk. This allows banks to offer affordable and scalable finance options across the ASM value chain without requiring investors to engage directly with small miners.

3. **Support DFI-led initiatives aimed at formalisation and regulatory reform** by advising technical assistance and capacity-building programs. This could include participating in DFI-driven advisory projects that strengthen ASM governance, licensing systems, or land tenure security, which are essential for de-risking the sector and encouraging long-term private sector involvement. This could be especially attractive in territories where investors are exposed in other sectors (e.g., forestry, agriculture, industrial mining) but where the presence of ASM is creating risks for those sectors.

2.3 Enhancing Market Access and Responsible Sourcing

Gaining access to legal and fair financial markets benefits both ASM participants and governments. For ASM operators, it provides the opportunity to sell their minerals at a just price, while for governments, it ensures that revenue from local production is properly collected and allocated toward national development goals (World Bank, 2024).

World Gold Council, the World Bank and IGF

The **WGC, the World Bank and IGF** are actively collaborating to promote the responsible integration of ASGM into formal supply chains. This tripartite initiative will be launched in May 2025 and is framed around the belief that responsibly-produced ASM gold (aligned with ESG and international business standards) can and should contribute to global gold markets and sustainable development and there is increasing urgency in combatting illegal mining and the infiltration of ASGM by armed groups and organised crime . See WGC above. Other organisations involved in this multi-stakeholder initiative include the OECD, the UN planetGOLD Programme, the London Bullion Market Association, a group of central banks and the Brazilian National Mining Agency.[50]

Consumer and market demand for transparency, ethical sourcing, and responsible mining practices are intensifying, driven by increasing regulatory pressures and sustainability standards. Voluntary sustainability standards ("VSS") play a crucial role in encouraging ethical ASM practices by establishing guidelines that promote environmental responsibility, social equity, and economic viability (IISD, 2018). These standards provide a framework for ASM operators to adopt responsible mining practices, enhancing their credibility and market access. VSS encourage environmental sustainability by mandating responsible mining and processing practices. By adhering to recognised standards, ASM entities can demonstrate compliance with rigorous environmental, social, and labour practices. This compliance not only assures buyers of the ethical provenance of minerals but also fosters transparent and traceable supply chains, thereby increasing consumer confidence and demand (IISD, 2018). It also sets the stage for greater engagement by responsible investors.

Responsible sourcing initiatives also provide frameworks that enable ASM operations to meet international standards, thereby facilitating access to formal markets. The implementation of robust certification and traceability frameworks is instrumental in integrating ASM into global value chains, enhancing their economic viability and contribution to sustainable development. Traceability mechanisms, which track minerals from extraction to end-use, help to control the risks associated with illicit trade and conflict minerals, which could help to make ASM operations more appealing to responsible financiers, investors and mineral off-takers.

The Alliance for Responsible Mining ("ARM") is a development organisation dedicated to promoting the sustainable development of ASM. Established in 2004, ARM works to formalise ASM operations, ensuring they meet social, environmental, and economic standards that benefit miners and their communities. They offer continuous support and training to ASM communities to help them achieve certification and invest in community development. ARM also collaborates with governments, industrial mines, and private sector stakeholders to improve working conditions, eliminate child labor, and reduce the use of toxic substances like mercury in ASM. Through capacity-building programs and policy advocacy, ARM aims to empower ASM miners, integrate them into legal supply chains, and ensure they receive fair prices for their minerals while promoting responsible sourcing in the global gold market.

[50] Edward Bickham, personal communication to Estelle Levin-Nally, 3rd April 2025.

ARM INITIATIVES

CRAFT

The Code of Risk-mitigation for Artisanal and Small-Scale Mining engaging in Formal Trade ("CRAFT") is an open-source standard developed collaboratively by ARM and Resolve. Introduced in 2018, CRAFT serves as a tool to facilitate the integration of ASM operations into formal supply chains by enabling buyers to conduct due diligence in line with international standards. It provides a framework for identifying, assessing, and mitigating risks associated with ASM, thereby promoting responsible sourcing and improving the livelihoods of mining communities. The standard is designed to be globally applicable and adaptable to various minerals beyond gold, aiming to enhance transparency and sustainability in the ASM sector.

CRAFT helps ASM miners meet the minimum due diligence requirements needed to sell their gold legally in international markets. By identifying, assessing, and addressing risks, ASM miners can build trust with refiners, jewelers, and international buyers, improving their ability to sell at fair prices instead of relying on illegal smuggling networks

FAIRMINED

Fairmined **Certification** guarantees that gold is responsibly produced and sourced, with strict criteria on labour rights, environmental protection, and ethical business practices. The scheme has demonstrated that ethical production in ASM is achievable by implementing formalised, traceable, and responsible mining practices. This initiative ensures legal compliance, requiring certified miners to operate within national regulations and adhere to strict labour and safety standards, helping ASM organisations ("ASMOs") transition from informality into recognised businesses. They also enforce improved environmental practices, including reduced (and eventually elimination of) mercury use, ecological restoration, and responsible water management, with miners having the option to achieve an additional 'eco' accreditation for best-in-class efforts. It also promotes better working conditions, ensuring safer mining practices, protective equipment, and fair wages, while addressing social security, gender equality, and child labour issues. By providing fair market access and premium pricing, Fairmined empowers ASM miners to avoid exploitative middlemen, allowing greater community investment in education, healthcare, and infrastructure.

Perhaps the main criticism of Fairmined is that only a few producers are able to achieve its high standards. At the same time, some certified mines are unable to sell all of their product into ethical markets because many brands are unwilling to pay the level of premium that Fairmined requires. ARM is exploring how to build a volume model for large buyers and would benefit from engagement by investors in guiding this new product line.[51]

SUSTAINABLE MINES PROGRAM

The Sustainable Mines Program, an initiative of the **ARM**, is a collaborative platform designed to support the transformation of ASM into a responsible, profitable, and sustainable activity. The program engages miners, industry actors, governments, donors, and civil society through a flexible sourcing and improvement model that promotes continuous advancement in environmental, social, and business practices. It supports ASM organisations through tailored sustainability plans, technical and business assistance, and progressive alignment with recognised standards such as the **Fairmined Standard** and **CRAFT Code**. Miners progress through defined stages (from informal beginnings to certified sustainability leaders) while being supported

[51] Marcin Piersiack, interview with Estelle Levin-Nally, 27th March 2025.

with tools for due diligence, market access, traceability, and formalisation. Through this model, the program contributes to ethical supply chains, compliance with international ESG and OECD standards, and the achievement of the UN SDGs, offering a credible route for ASM to integrate into global responsible sourcing frameworks.

While VSS are valuable in promoting ethical ASM practices, challenges remain. Many ASM operators struggle with the financial and technical requirements needed to achieve certification. The costs associated with audits, compliance, and training can be prohibitive, due to artisanal and small-scale miners' limited resources and education. To address this, some initiatives advocate for capacity-building programs and financial support to facilitate participation in assurance schemes. Collaboration between governments, the private sector, and NGOs can foster investment in responsible ASM initiatives.

PATHWAY FOR ENGAGEMENT BY INSITITUTIONAL INVESTORS

THROUGH ADVOCACY AND KNOWLEDGE TRANSFER

Institutional investors can contribute their knowledge to VSSs that are relevant to ASM and deepen their own understanding of the opportunities by joining by joining their boards or standard committees or by participating in standard consultation processes.

THROUGH INVESTMENT

1. **Support supply chain transparency initiatives**, such as those promoted through EITI or the OECD, by investing in the traceability technologies, certification schemes, or data infrastructure that enable responsible sourcing. Priority should be given to solutions that are equitable and not extractive in where they accrue value (i.e., they should seek to empower the bottom end of the supply chain that contribute the data for use by the downstream, and they should seek to reciprocate access to data by the upstream on what happens to their minerals in the downstream.)

2. **Work alongside supply chain actors and DFIs** to jointly invest in the infrastructure, training, and traceability systems that scale responsible sourcing from and ESG compliance in ASM value chains.

2.4 Technological innovation

ASM communities are being empowered by improving **access to market information, legal support, and technical assistance** through digital tools that support transparency, traceability and the accumulation of data as the basis for controlling risk for the downstream. . Mobile applications and digital platforms provide miners with real-time commodity pricing, regulatory updates, and training materials on responsible mining practices, but these are not yet being used at scale. This access to knowledge enhances ASM operators' ability to negotiate fair prices, comply with legal requirements, and implement safer and more sustainable mining techniques. **Blockchain technology** has emerged as a powerful tool in **ensuring transparency and traceability within ASM mineral supply chains**. By providing a decentralised and immutable ledger, blockchain allows for the secure recording of transactions, ensuring that mineral origins are verifiable and that ethical sourcing standards are upheld. Platforms like MineSpider, Datastake and iTraceiT use blockchain to trace minerals from sites to end-users, reducing the risk of fraud, misrepresentation, and the integration of conflict minerals into global supply chains. These technologies can enable ASM producers to provide verifiable evidence of their compliance with ESG standards, which can also make them more investable and bankable. By leveraging such traceability tools, ASM operations can differentiate their products from unregulated sources and meet the

requirements of responsible sourcing frameworks, such as the OECD Minerals Guidance. This compliance not only strengthens their position within formal markets but also facilitates engagement with downstream buyers seeking ethically sourced materials.

Mobile banking solutions and digital financial platforms are increasingly addressing the financing gap by providing miners with access to secure payment systems, credit, and savings mechanisms. Mobile money services such as M-Pesa in Kenya and People's Mobile in Mongolia enable ASM workers to receive payments electronically, reducing reliance on cash transactions that can be prone to theft and corruption. By integrating digital payments with traceability platforms, ASM operations can demonstrate the legitimacy of their earnings and attract financial institutions that are willing to support responsible mining initiatives.

Such responsible finance initiatives are also benefitting from digital tools that enhance risk assessment and compliance monitoring. Integrating blockchain-based traceability systems with financial services presents a promising pathway for lenders to verify the legitimacy of ASM-sourced minerals and assess the financial health of mining operations. Lenders are also pursuing longer-term relationships with ASM actors in order to gain more data which allows them to refine their approach and better manage credit and compliance risk, as well as expand the products and services they can make available to the miners.[52] These data-driven approaches reduce investment risks and encourage financial institutions to offer credit and investment opportunities tailored to ASM enterprises that meet responsible sourcing criteria.

Emerging **product marketplaces** for ASM aim to create transparent, traceable platforms where responsibly sourced artisanal gold, gemstones and other minerals can be bought and sold under fair, verifiable conditions. These digital or physical marketplaces are designed to bridge the gap between ASM producers (often working in informal or isolated conditions) and international buyers seeking ethically sourced materials. By offering **verified origin, ESG compliance data, and impact premiums**, such platforms incentivise better practices at the mine site level, while giving buyers confidence in the integrity of the supply. Some initiatives, such as those under consideration by the SBGA, are exploring mechanisms for **trading premium products**, whereby buyers pay a higher price for minerals linked to demonstrable social or environmental improvements. These premiums can then be reinvested into community development, mercury reduction, or formalisation support. Over time, product marketplaces have the potential to **improve ASM incomes, reduce reliance on predatory intermediaries**, and provide an on-ramp for ASM actors into the formal economy, especially when paired with traceability tools, certification schemes, and digital payment infrastructure. Such platforms also create more **liquid and visible supply chains**, making ASM-linked minerals more attractive to ESG-focused institutional investors and downstream brands.

PATHWAY FOR ENGAGEMENT BY INSITITUTIONAL INVESTORS

THROUGH INVESTMENT

1. Finance the development and deployment of **blockchain-based traceability solutions and digital platforms** (such as MineSpider, Datastake, and iTraceiT) that enhance transparency, accountability, and market access. Additionally, investors can support blended finance models that pair traceability investments with technical assistance and training, ensuring miners understand and use the systems effectively. Institutional investors can engage through **impact funds, Series A investment rounds, or infrastructure vehicles** targeting traceability technologies within mineral supply chains.

[52] David McEvoy, interview with Estelle Levin-Nally, 31st March 2025 and personal communication to Estelle Levin-Nally and Rebecca Lee Pein, 10th April 2025.

2. Invest in **mobile banking solutions and digital financial platforms** that offer secure, transparent, and accessible financial services to mining communities. By funding the expansion of mobile money services, such as **M-Pesa in Kenya**, **People's Mobile in Mongolia**, or **People Mobile** by **Trust Merchant Bank (TMB)** in the DRC (via their parent company, which is listed), investors can help scale infrastructure that enables miners to receive electronic payments, access savings accounts, and build transaction histories necessary for credit assessments.

3. Investors can **co-fund pilot programs** that integrate **mobile banking with blockchain-based traceability systems**, enabling secure digital payments to miners directly linked to verified mineral production. An example of such integration is **DataStake**, a digital compliance and traceability platform that collaborates with the **PeaceGold** initiative in the DRC, and which allows cooperatives to document production volumes and ESG data in real time. Pairing this with mobile money platforms can create a **closed-loop financial ecosystem** where traceable production data supports payment flows, credit scoring, and responsible sourcing compliance.

4. Investors can support the **development of alternative credit scoring** systems tailored to ASM, using mobile money transactions, production logs, traceability data, and payment histories to allow for the collateralisation of data as the basis for assessing risk and credit-worthiness. This can be done through equity investment in fintechs that are building these algorithms, or partnerships with banks or microfinance institutions in ASM-intensive regions that are seeking to pilot and scale digital credit assessments. Mwamba's Wazi solution and TMB are two opportunities.[53]

2.5 Capacity Building

Training programs play a crucial role in building ASM's commercial, technical, human rights, environmental and responsible business conduct capacity, enabling the sector to operate more sustainably and efficiently. Training initiatives introduced by governments, NGOs, and industry stakeholders focus on various aspects, including ore extraction techniques, mineral processing, safety procedures, and the use of appropriate equipment. By incorporating practical and theoretical instruction, these programs help ASM workers reduce material wastage, increase mineral recovery rates, and enhance workplace safety. Additionally, training on financial management and business development empowers miners to formalise their operations, access markets more effectively, and improve their economic stability.

Knowledge-sharing initiatives, such as peer-to-peer learning networks, community-based workshops, and digital knowledge platforms, are instrumental in disseminating best practices across ASM communities. For example, through the Delve Exchange, miners have utilised WhatsApp to create six regional peer-to-peer knowledge networks, engaging over 1,000 participants. Led by experienced regional coordinators, including miners, these groups have fostered sustained engagement and increased demand for capacity-building. In response, the exchange is developing open-access learning modules to support site-based improvements (World Bank, 2024). These initiatives facilitate the exchange of experiences between miners, researchers, policymakers, and industry experts, fostering collaboration and innovation.

DELVE

Delve is a global knowledge platform dedicated to ASM. It was launched by the **World Bank** and partners to improve data collection, analysis, and knowledge-sharing in the ASM sector. Delve aims to provide a central repository for reliable ASM data, supporting policymakers, researchers, and industry stakeholders in making

[53] Eduard Cornew, interview with Estelle Levin-Nally, 31st March 2025; David McEvoy, interview with Estelle Levin-Nally, 31st March 2025.

informed decisions. Delve has significantly contributed to technological innovation and capacity building within the ASM sector through several key initiatives:

1. **Data Collection and Analysis**: Delve's comprehensive reports, such as the 2023 State of the Artisanal and Small-Scale Mining Sector, gather and analyse extensive data on ASM practices. This information is crucial for identifying technological needs and opportunities for innovation within the sector.
2. **Knowledge Sharing Platforms**: By establishing platforms like the Delve Exchange, Delve facilitates the dissemination of best practices, technological advancements, and capacity-building resources among ASM communities. This fosters collaboration and the adoption of innovative solutions.
3. **Partnerships for Sustainable Mining**: Delve collaborates with organisations such as the World Bank and the World Gold Council to promote sustainable and responsible ASM practices. These partnerships often involve introducing new technologies and providing training to enhance miners' technical skills and operational efficiency.

The World Bank's nascent Mining.Better.Together initiative envisages an important role for the Delve platform in helping to scale solutions for legitimate and professional ASM. Furthermore, the authors envisage that Delve could potentially evolve into a marketplace for businesses seeking to service the ASM community, e.g., to promote cleaner production, autonomous renewable power and water filtration solutions, fintech and traceability solutions, and so on. However, the World Bank would need to see and be willing to facilitate this shift in purpose, and would most probably be guided by the views of the ASM participants in the platform.

International organisations, such as the World Bank, United Nations Development Program ("UNDP") and the Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development ("IGF") actively support ASM capacity-building through research, policy recommendations, and funding for training initiatives.

Partnerships between ASM entities and large-scale mining companies can further accelerate knowledge transfer, in cases where industrial mines are incentivised to provide small-scale miners with access to advanced technologies, regulatory guidance, mentorship, geological information as well as ongoing technical assistance and training in managing environmental and social liabilities, such as safety or pollution risks. Unfortunately, many LSM are reluctant to deepen their relationship with local ASM to this extent because of the perceived and actual risks.. There is also an opportunity to evolve industrial miners' community development funds into becoming evergreen funds that don't just hand out grants to community organisations and individuals, but which invest in the diversification and development of the local economy – including the professionalisation and formalisation of ASM value chains – as the basis for stimulating longer-term sustainable development.

With the vast number of individuals in the ASM value chain and limited government capacity for oversight, many governments have shifted from monitoring individuals to regulating entities, making ASM organisations like cooperatives and processing plants the primary vehicle for legal registration. However, since cooperative formation is a recent enforcement push, capacity-building support is essential to ensure compliance as well as the political and commercial viability of these enterprises. Technical and financial assistance through regional associations or national federations can strengthen this model. Rwanda exemplifies this approach by granting permits to ASM organisations instead of individuals, requiring adherence to labour laws and regulations. These ASM organisations benefit from a federal structure that provides financial and technical support while also acting as an exporter, ensuring a stable domestic sales market. Revenue from exports is reinvested into ASM organisations services, reinforcing the system's sustainability. This highlights the need for a structured approach to ASM development. While semi-mechanised operations typically function as small businesses

rather than ASM organisations, they still require financial and technical resources for long-term viability (World Bank, 2024).

PATHWAY FOR ENGAGEMENT BY INSITITUTIONAL INVESTORS

THROUGH COMPANY ENGAGEMENT

1. Recognise that where there is ASM on or near an LSM concession, there will always be ASM risks. Investors must accept some level of ASM risk or risk penalising projects that are ASM exposed.
2. Wherever an LSM investee is exposed to ASM risk, investors can carry out due diligence on the quality of their investee LSM's ASM management practices, motivating them to implement ASM management plans that take a double materiality and human rights-based approach to controlling risk and invest in capacity building and education in ASM communities as the basis for driving local economic development.

THROUGH INVESTMENT

1. Ensure that **blended finance vehicles** or **impact funds** include capacity-building elements (such as training in business development, health and safety, or environmental compliance). Rather than funding training providers directly, investors and these platforms can **partner with NGOs or DFIs** that manage the technical assistance components alongside the capital deployment. Some investors may see investments into capacity building as a derisking act that can maximise returns on the principal investment.

2. Direct capital to **intermediaries (**such as **the Fair Cobalt Alliance**, **PeaceGold**, or the **TBCG Investment Marketplace)** that offer shared services, technical assistance, fiduciary controls, and access to responsible markets on behalf of ASM cooperatives and semi-mechanised operators. These entities are well positioned to absorb investment and scale impact across multiple ASM actors, offering a more efficient and de-risked investment route.

3. institutional investors can co-invest in **shared infrastructure** such as **processing centres** or **export hubs** that also offer training services to ASM operators. For example, investors could support the replication of **planetGOLD's Mongolia model**, where technical assistance is bundled with environmental upgrades, or **Rwanda's exporter-service provider model**, where export revenues fund traceability, training, and community development.

4. Participate in **public-private partnerships** that scale up proven ASM training programs by providing capital for **training centre expansion**, **mobile training units**, or **digital training platforms**. Rather than owning or operating training programs, investors can provide **de-risked capital** to trusted implementing partners with a track record in ASM technical capacity-building.

Conclusion: key entry points for the finance sector to help drive sustainable development through the ASM sector

Institutional investors, such as investment banks, pension funds, sovereign wealth funds and investment funds, do not directly invest in ASM. Their funding envelopes are too large to be compatible with the immediate funding needs of ASM, and they typically have risk appetites that are incompatible with ASM. Institutional investors are nonetheless connected to ASM in so far as they may have gold holdings, which may have come from ASM provenances, or direct or indirect (e.g., through funds) investments in businesses that are either a.) sourcing materials from ASM (e.g., automotive, electronics, defence), b.) co-habiting, engaging with or competing with ASM on the ground (e.g., industrial mining, forestry, agribusiness), or c.) are simply operating in the same jurisdictions or territories as ASM and are affected by the sector's enormous influence on migration patterns, conflict dynamics, environmental quality, population health, culture and ultimately economic stability, opportunity and risk. Institutional investors also have the expertise and relationships to help shape ASM through their relations to banking and insurance, who may be more closely exposed than investors.

The ASM sector holds huge opportunity, generates significant returns to many actors involved in it and is undercapitalised. Furthermore, formalising ASM that is linked to illicit and criminal networks will support their transition away from such activities. Without this, these actors may be perpetually excluded and exploited and their economies may continue to be perceived as high-risk and unattractive for investment.

There is a missing middle. Institutional investors are connected to ASM through their intermediary business partners and investees, but the nature of these connections remain obscure. There is an opportunity to explore what the most impactful and feasible levers may be for institutional investors to take action through and potentially with these business partners.

Below, we set out the **three main pathways** through which financial institutions generally (including banking, insurance, and all scales of investor, and not just institutional investors) can shape the ASM sector. We consider the set of specific opportunities set out above and propose a typology of types of action that could be taken.

1. RISK MANAGEMENT

Support constructive ASM engagement by promoting inclusive policies, improving industrial miners' ASM practices, shifting risk perceptions through informed partnerships, and enhancing ASM creditworthiness via data-driven financial solutions.

a. **Map exposure to ASM.** Institutional investors often do not know the extent to which their investees are affected by ASM and, as a result, too often do not engage with investees on the issue of ASM. *Financial institutions should map their exposure to ASM to determine how material it may be to their business partners, including those that may have a direct stake in ASM or ASM-adjacent industries, or have investments in economies where the presence of ASM affects the risk environment.*
b. **Push for corporate policies that promote ASM engagement.** *Financial institutions should work with their business partners to identify opportunities for greater and more meaningful engagement with ASM and ASM-adjacent enterprises and should also work with and support stakeholders that are contributing to the sustainable development of the sector.*
c. **Conduct due diligence and set expectations**: At present, most financial institutions are not conducting due diligence on how industrial miners engage with ASM . Financial institutions should *set expectations of and work closely with industrial mining business partners that either impact on and are impacted by ASM activities on or around their concessions. They should encourage these partners to implement ASM management plans that take a human rights-based approach and are aligned with the*

UNGPs, the OECD RBC Guidance, and the OECD Guidance for Meaningful Stakeholder Engagement in the Extractives Sector. In addition, financial institutions should encourage these partners to implement a voluntary sustainability standard that demonstrates leading practice on ASM management/engagement, such as IRMA.

d. **Grow risk tolerance through learning**. There is frequently a chasm between how (potential) business partners perceive risk in ASM engagement vs. what the actual risk could be with the right mitigations in place. Levin Sources' experience with the Zahabu Safi project has demonstrated how building separate communities of practice of interested refiners and jewellers can gradually grow mutual understanding as well as confidence and appetite for engagement. By deepening these actors' knowledge and experience, their perception of where ASM stands vis-à-vis their risk appetite adjusted, which eventually led to commitments to do business with ASM in one of the most challenging conflict-affected environments, eastern DRC.[54] Financial institutions should *work to build their knowledge and understanding of ASM in order to address biases in their investment and lending decisions and should adjust risk judgements to be based on evidence and experience rather than perception. This can be done by building communities of practice and participating in multistakeholder initiatives.*[55]

e. **Pursue solutions that grow the creditworthiness of ASM**. Financial institutions should work with their banking partners (e.g. TMB, EquityBank), data providers (e.g., Wazi by Mwamba) and Central Banks (potentially through the WGC) to support and scale solutions that collateralise ASM data as a pathway to improving the creditworthiness of ASM owners and operators.

2. INVESTMENT STRATEGIES

Support the financial inclusion and formalisation of ASM by investing across the value chain (from processing plants and scalable tech solutions to intermediary markets and responsible bullion) while leveraging public-private partnerships, development finance, and innovative instruments like ETFs and Community Development Funds to unlock sustainable, responsible growth. Investors investing in other parts of the economy in an ASM producer nation are also affected by how ASM may destabilise economies and polities.[56]

a. **Back financial inclusion of ASM.** Financial institutions should explore avenues for engagement with the WGC's Central Banks' Domestic Purchasing Programme to see what additional capital or expertise may be needed to scale ASM inclusion. Financial institutions should also consider (a) developing and/or supporting domestic public-private partnerships that can help processing plants and domestic banks scale their efforts on financial inclusion for ASM, (b) incentivising commercial banking clients with operations in ASM producer nations to partner with development banks, like the AFDB and World Bank, to provide working capital to revolving loan funds, and (c) investing in country-specific existing revolving loan funds (e.g. Kenya, Mongolia, Tanzania) to scale their reach and drive greater returns.

b. **Invest or drive others to invest in specific parts of the ASGM value chain, i.e. processing plants and scalable responsible ASM solutions.** Financial institutions should invest in social enterprises (directly or indirectly through VCs) that are experimenting with new ASM business models that can unlock scaling for responsible production systems, or those that support the gradual improvements towards responsible production (e.g. PeaceGold in DRC, Mwamba in Tanzania). They should also invest in Social Impact Bonds to scale TIF's successes in Kenya, Tanzania and DRC, and should encourage their mining company business partners to evolve from traditional community development fund models towards impact bond models.[57]

c. **Invest or drive others to invest in formalisation- and development-enabling adjacent industries,** such as but not limited to digital (e.g. traceability, ESG data management, mobile banking & digital

[54] Rachel Brass, interview with Estelle Levin-Nally, 25th March 2025.

[55] Gregory Mthembu Salter and Alan Martin, interview with Estelle Levin-Nally, 31st March 2025. Also Rob Karpati, 25th March 2025.

[57] David Sturmes Verbeek, interview with Estelle Levin-Nally, 24th March 2025.

payments, digital cooperation and training platforms like Delve, remote sensing and earth observation for ASM monitoring, etc.), logistics (e.g., vaulting, warehousing, transportation, energy) and engineering (e.g., Processing Technologies – APT's lease-to-purchase equipment scheme) solutions. By growing the commercial viability and scalability of such solutions, financial institutions can accelerate their adoption by ASM helping them get to scale and to transform ASM sectors.

d. **Invest or drive others to invest in ASM intermediary markets**: DFI's, VCs, impact investors, banks should fund the development of marketplaces for trading in ASM assets and project finance, such as the TBCG/ARM digital investment marketplace. They should also work with ASM book and claim and product markets (e.g. those by ARM, FCA, Fairphone, SBGA, that generate funding to drive formalisation on the ground) and help them build corporate structures that can effectively scale these solutions.
e. **Explore the feasibility of developing an ASM ETF,** leveraging the experience of Single Mine of Origin's successful ETF for one form of ethical gold.
f. **Incentivise industrial mining funds or investees to be more adventurous with their Community Development Funds**. Financial institutions should explore whether miners and their local communities see a business and development case for adding an ASM investment dimension to their community development funds. Financial institutions should also consider evolving community development funds to be able to receive investments from actors who have a connection to a specific territory and are looking to stimulate private sector development rather than or alongside philanthropic contributions.
g. **For gold holdings, consider investment in responsibly sourced ASM bullion**, such as that that will be available through either an ASM ETF, the SBGA impact premium fund, the ARM Fairmined volume initiative, or Mwamba in Tanzania. For example, Swiss canton banks are beginning to show an interest in ASM gold holdings. [58]
h. **Work with financial partners in UAE and India,** two jurisdictions that are already heavily involved in ASM and where there may be a higher appetite for innovation.[59]

3. KNOWLEDGE TRANSFER AND ADVOCACY

Actively shape ASM's future by engaging in standard-setting bodies, supporting guidance for industrial miners on ASM coexistence, participating in initiatives mobilising capital for formalisation, and backing grassroots finance providers to scale services for ASM and adjacent industries.

a. **Support the development of guidance** to industrial miners on how to manage ASM that is operating on and around their concessions.
b. **Engage with the LBMA and its refiners** to learn about how they are growing their inclusion of ASM product in their value chains, and to replicate the lessons learned (e.g. on derisking, on doing business with ASM, on identifying investment/funding vehicles.
c. **Participate and help form the new initiatives** that are seeking to mobilise capital and drive professionalisation and formalisation of ASM, e.g., the IGF-World Bank–World Gold Council Global Coalition for Action on Artisanal and Small-scale Gold Mining, the World Bank's Mining.Better.Together initiative, LBMA's ASM Task Force, SBGA, EPRM, etc.
d. **Identify and support grassroots finance providers** to formalise and scale their services to ASM operators and adjacent industries (e.g., DFIs, domestic banks, central banks).
e. **Engage Central Banks and Commercial Banks** on how they are working with or supporting the ASM sector, and how they might incentivise their banking partners (whether as investees or financial managers) to develop or back ASM lending services.

[58] Gregory Mthembu Salter and Alan Martin, interview with Estelle Levin-Nally, 31st March 2025.

[59] David Sturmes Verbeek, interview with Estelle Levin-Nally, 24th March 2025.

f. **Signal to the capital and product market that ASM is a valid investment and business arena.** For example, support domestic banks and processing plants that are promoting ASM inclusion in responsible capital and product markets.

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