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Can you dig it (responsibly)? A responsible mining framework for investors

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Executive Summary

As we rapidly shift towards a low-carbon economy, the mining sector looks set to play an increasingly important role. Despite mining's contribution to the development of renewable energy, climate-adaptive infrastructure, and job opportunities, the sector carries inherent environmental and social risks, with local communities shouldering a disproportionate share.

Over the last years, we have seen improved environmental and social performance across mining companies globally. The Responsible Mining Index of 2022 showed improvements particularly in adopting policies across sustainability issues, though, the challenge lies in the application of policies and protocols, particularly at the site-level. Companies continue to find meaningful engagement with local stakeholders challenging to implement.

Yet, with the advent of new international human rights norms and voluntary guidance for governments, businesses, and investors, the expectations of what responsible mining should look like is clear.

To help investors assess the performance of holding companies and identify practical actions and objectives on what "good" looks like to inform engagements, Greenwheel developed a **Responsible Mining Framework for Investors**. The Framework captures the key actions for businesses to adopt across the mining lifecycle, from exploration to closure and reclamation.

Drawing from the OECD Guidances, IFC Performance Standards, International Council for Mining and Metals, the Initiative for Responsible Mining Assurance, and other voluntary guidance, the Responsible Mining Framework for Investors covers key actions companies can take to responsibly manage 17 operational, social, and environmental issues:

- **Operational issues**: revenue and payments transparency, operating in high-risk or conflict contexts, emergency preparedness and response, planning and financing reclamation and closure
- **Social issues**: labour rights, community rights, community benefits, resettlement, security arrangements, artisanal and small-scale mining, cultural heritage
- **Environmental issues**: waste and materials management, water management, air quality, noise and vibration, greenhouse gas emissions, and biodiversity

What is responsible mining?

The inherently high social and environmental risks associated with mining are well documented. Yet, if managed responsibly, the sector has the potential to generate inclusive and equitable growth through social and economic development.[1]

The call for responsible mining is increasingly important in the context of the just transition, as the sector plays a critical role in the move towards a low-carbon economy. While mining contributes to the development of renewable energy, climate-adaptive infrastructure, and job opportunities in new downstream sectors, the adverse social and environmental impacts should not be disproportionately shouldered by communities hosting mining activities.

Expectations from stakeholders on what responsible mining entails have evolved rapidly in the advent of new international human rights norms and voluntary guidance for government, businesses, and investors. At the governmental level, the Intergovernmental Forum on MiningInt, Minerals, Metals, and Sustainable Development, which consists of extensive consultations across 81 members countries and other stakeholders, developed a Mining Policy Framework that **summarises practices that define good governance in mining**. While this Framework is intended for governments, it nonetheless sets a benchmark on what responsible mining looks like (Figure 1).[2]

Figure 1: An Intergovernmental definition of responsible mining for sustainable development

Source: IISD, 2023; created by Greenwheel.

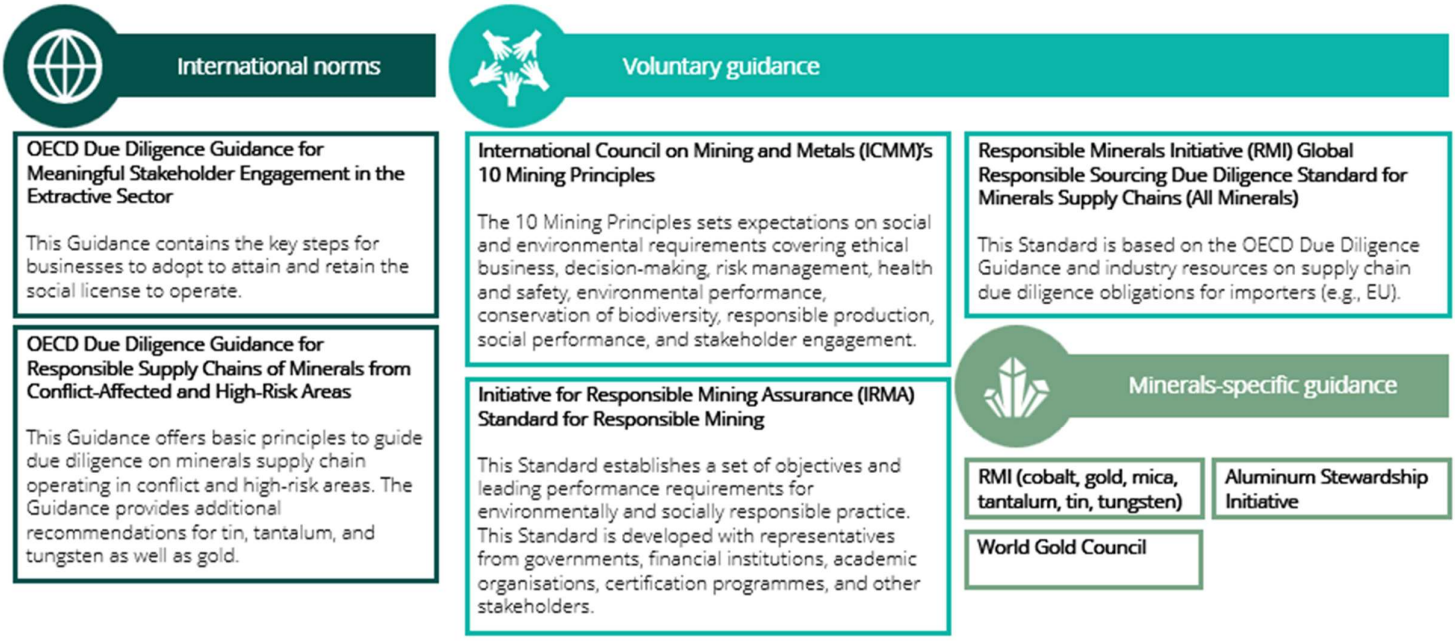
Governments supported by the Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development expect mining entities to **consult affected communities and other stakeholders at each stage of the mine lifecycle** where stakeholders can share their views and concerns. For indigenous peoples, businesses should obtain free, prior, and informed consent (FPIC) under global norms (for further guidance on the key principles, definitions, actions for investor, see Greenwheel's briefing on FPIC). Also, stakeholders should be actively involved in the development of mitigation measures.

As good practice, governments require businesses **to submit an environmental and social impact assessment** with baseline conditions, potential risks and impacts, and proposed mitigation and management plans. Before acquiring a permit, companies should develop plans for closure; companies are expected to demonstrate that they have the funding required to decommission and rehabilitate land and perform on-going monitoring of potential environmental and social impacts as required after closure.

In addition to addressing adverse impacts, businesses are encouraged to identify opportunities and programmes to **create sustainable, equitable, and inclusive benefits during and beyond the life of the mine**.

For businesses and investors, there are multiple industry standards that offer guidance on responsible mining (Figure 2).[3] The common definition for **responsible mining is the effective management of adverse environmental and social impact across the mining lifecycle in line with international norms and best practice and in consultation with affected stakeholders while promoting positive environmental and social outcomes**.

Figure 2: International norms and voluntary guidance on responsible mining for businesses and investors



Source: OECD, 2017, OECD, 2016, ICMM - Our Principles, IRMA, 2018, Responsible Business Alliance and Responsible Minerals Initiative, 2022; created by Greenwheel. The information shown above is for illustrative purposes only and is not intended to be, and should not be interpreted as recommendations of advice.

Responsible mining requires businesses to understand their risks and impacts and publicly communicate them. Mitigation plans and activities should reflect the specific risks arising from the cultural, economic, environmental, political, and social contexts. For businesses to gain credibility and trust from external stakeholders (i.e., communities, civil society), they are **expected to clearly document their processes and communicate to external stakeholders in a public and transparent way**.

A key observation across the evolving global standards is that **the industry is moving away from a siloed approach to treating environmental and social issues as separate, paving the way for a more nuanced and integrated approach to environmental and social issues management**.

For example, new guidelines on managing tailings dam highlight company responsibility to respect human rights, account for the social impact of waste manage practices on local communities, the right to provide affected communities access to information, and importance of consultation.[4] Similarly, the guidelines on water management have evolved into water stewardship centered around the principle that water-risks are fundamentally experienced by people; solutions under a water stewardship model are designed and managed by all affected parties – government, civil society, businesses, and local communities.[5]

What does responsible mining look like today?

While the international and voluntary guidances on responsible mining are well established, we believe **companies are falling short in meeting stakeholder expectations (i.e., international, industry, and/or voluntary standards on responsible mining best practice) in the move from policies to practices.**

In a review of the performance of 40 large mining companies, **the Responsible Mining Index of 2022 shows both progress and stagnation**.[6] The Index finds that the biggest improvements are found in poorer performing companies. Poorer performing companies are widely adopting policies across sustainability issues, particularly around human rights and the prevention of bribery and corruption; these companies are also increasing in transparency. Overall, mining companies are improving on their reporting on specific sustainability targets such as greenhouse gas (GHG) emissions or gender balance of boards.

Having sustainability commitments has become the new norm, but the challenge lies in consistently implementing and monitoring impact at the site-level. For instance, across companies, there are improvements in management systems around water and occupational health and safety, but companies offer little evidence to show that these policies and protocols are applied.

Some companies are showing promising practices in improving community relations, but **many companies fail to document how they are meaningfully engaging local stakeholders**. Companies are not communicating the social and environmental risks to workers and communities.

The Responsible Mining Index **attributes the progress to changing regulatory requirements and reporting frameworks**; however, they note that **voluntary measures are not impacting company practices**.

Furthermore, **voluntary measures are often not adopted to the fullest extent due to the tendency for companies defer to local requirements over international and voluntary guidances**. Many companies rely on host countries to set local minimum requirements on social and environmental performance but fail to account for variations in standard setting.

Responsible mining requires businesses to comply with environmental or social protections of the higher of the two standards, host country or international/voluntary guidelines, regardless of where they operate.[7]

It is unsurprising that mining companies continue to struggle building trust amongst host communities. Community consultation and obtaining free, prior and informed consent from indigenous peoples are often treated as one-off checklist exercises conducted after operations and plans are already finalised as opposed to an integral part of a participatory environmental social impact assessment and environmental and social management system.

However, there are promising practices in responsible mining that go beyond avoiding adverse impacts and show that it is possible to build positive community relations. Communities are becoming active participants in managing and monitoring the impacts of mining operations to advise on better mitigation measures – for instance, communities can play a role in helping monitor water management practices through collecting water samples to provide a richer dataset when they are given the adequate funding, training, and access to participate.[8] Similarly, communities are entering into fairer benefits sharing agreements from the promotion of local employment opportunities to receiving payments across the mining lifecycle (e.g., advance payments in the pre-production phases and royalties based on net sales revenue).[9]

The Greenwheel Responsible Mining Framework

To help investors navigate the different expectations on responsible mining, Greenwheel has developed a **Responsible Mining Framework for Investors** (Figure 3). This Responsible Mining Framework captures the key actions as part of the due diligence processes that businesses are expected to adopt across the mining lifecycle (Figure 4). The framework draws on the recommendations and expectations set out in international and voluntary standards.[10] In addition, the recommendations draw lessons from ground reality, particularly where there are gaps between policies and practices (e.g., non-governmental organisation (NGO) and industry reports on environmental and social performance, academic research, and experiences from practitioners).

Note that the Framework only addresses the most upstream mining activities (i.e., extraction of minerals) and does not include the transport and processing of minerals.

Figure 3: Snapshot of the Greenwheel Responsible Mining Framework for Investors

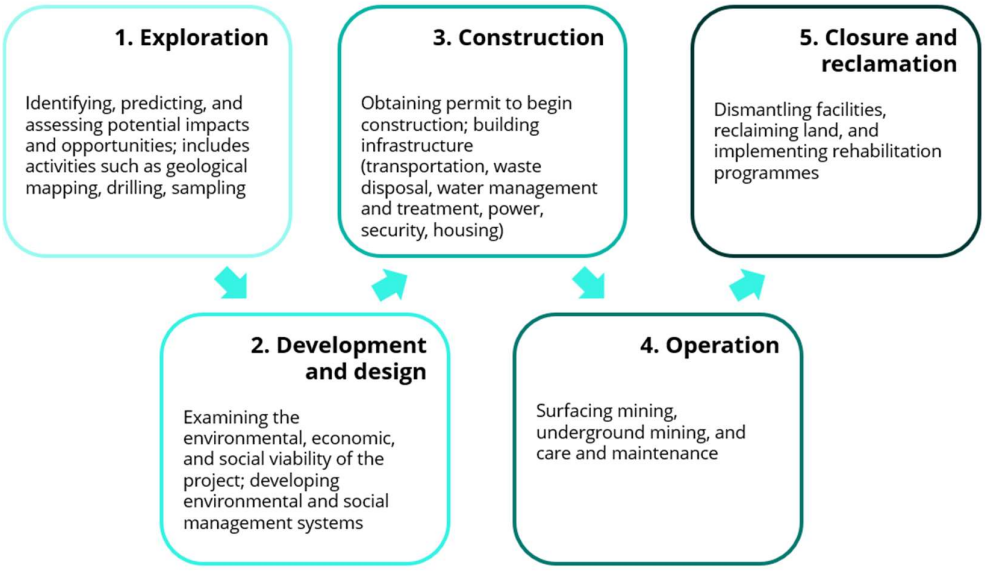
Greenwheel Responsible Mining Framework for Investors

Phase 1: Exploration

Due diligence process	Priority issues	Questions for investors	Company actions
1. Adopt comprehensive management systems (policies and processes)	Reclamation and closure, community rights	1. Has the company adopted any policies and protocols to address the environmental and social impacts of exploration? If so, what are they? 2. Has the company considered policies around the reclamation of land after exploration activities?	1. Adopt relevant policies and protocols to minimise environmental and social impact of exploration 2. Adopt policies or protocols on reclamation in the exploration stage
2. Identify all potential and actual risks and impacts	Reclamation and closure, community rights, cultural heritage, biodiversity	1. What types of activities and technologies will the company employ as part or the exploration processes? 2. Has the company conducted an assessment of how the intended exploration processes may pose potential environmental and social risks, including: - Reclamation - Community rights - Cultural heritage - Biodiversity and ecosystem services	1. Identify the environmental and social impact of exploration and the impact of the technology used 2. Identify any risks to: - Reclamation - Cultural rights - Cultural heritage - Biodiversity and ecosystem services
3. Develop and implement a management plan	Community rights, community benefits, biodiversity	1. What are the considerations taken into account in choosing the exploration technology? 2. What are the steps taken to address the identified environmental and social risks:	1. Evidence how the company chose technologies and methods that are the least invasive 2. Develop mitigation plans around the key social and environmental risks:

Source: Greenwheel. The information shown above is for illustrative purposes only and is not intended to be, and should not be interpreted as recommendations of advice.

Figure 4: Mining lifecycle



Source: Newmont, 2023 and Mining Digital, 2020; created by Greenwheel.

Greenwheel has mapped the key actions to the due diligence framework on the six steps highlighted in the OECD Guidance on Responsible Business Conduct, where companies are expected to carry out the following across the mining lifecycle:

1. Adopt comprehensive management systems (policies and processes);
2. Identify all potential and actual environmental and social risks and impact that are directly and indirectly linked to mining operations (i.e., Environmental and Social Impact Assessment);
3. Develop and implement a management plan to address all risks and impacts (Environmental and Social Management System);
4. Monitor environmental and social performance;
5. Openl and transparentl reporting on environmental and social performance to stakeholders; and,
6. Provide access to remedy to stakeholders affected.

The granular breakdown of the steps is intended to help investors identify gaps in policies and/or practices both at the corporate and site-levels.

In addition to general guidance on due diligence actions for companies to take across each stage of the mining lifecycle, **specific actions are recommended to address the operational, social, and environmental issues that are commonly found in mining operations** (Figure 5).

Figure 5: Operational, social, and environmental issues in mining

Source: IRMA, 2018 and ICMM - Our Principles; created by Greenwheel.

Understanding the operational, social, and environmental considerations for businesses and investors

Key issue	Key objectives	Good practices
Revenue and payments transparency	• Meet the demand for transparency on payments and government revenues to address corruption and bribery	• Align with the Extractives Industries Transparency Initiative Global Standard • Report on country and project-level payments related to entitlements, revenues, taxes or tariffs, payments to political campaigns, parties, or organisations, fines and penalties
Operating in high-risk or conflict contexts	• Avoid causing or contributing to severe human rights violations in high-risk or conflict-affected areas	• Align with the OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas • Avoid providing royalties and/or economic benefits to non-state armed groups and their affiliates • Enhance due diligence processes particularly in understanding risks and transparent disclosure
Emergency preparedness and response	• Minimising emergencies related to failed operations, environmental circumstances, and social upheaval	• Adopt the principles and practices set out in the United Nations Awareness and Preparedness for Emergencies at Local Level, ILO Convention 174 (Prevention of Industrial Accidents), and ILO Convention 176 (Safety and Health in Mines)

Key issue	Key objectives	Good practices
		• Promote an emergency response plan based on multi-stakeholder and community engagement built on continuous learning
Planning and financing reclamation and closure	• Promote long-term social and environmental value through a commitment to closure and reclamation • Avoid passing on the costs of reclamation and rehabilitation to the public	• Prepare and plan for mine closures and land reclamation in the earliest stages of a mining lifecycle, including financial assurance • Conduct on-going engagement with communities and other stakeholders
Labour rights	• Respect the Fundamental Rights and Principles at Work for all workers, including contractors	• Adopt the appropriate policies and processes related to social dialogue and collective bargaining, forced labour, child labour, discrimination, and health and safety • Implement additional policies on key labour risks including working time and wages • Ensure that all workers have access to an effective grievance mechanism
Community rights	• Promote the social and economic development of host communities • Minimise the adverse environmental and social impact on host communities	• Obtain the free, prior and informed consent (FPIC) from indigenous peoples and document community consent before construction and operations • Inform communities of all risks and impacts, including any changes and future plans related to mining operations • Actively consult local communities in the identification and mitigation of risks and impacts of mining activities across the lifecycle • Ensure that all community members have access to an effective grievance mechanism
Community benefits	• Maintain community support through maximising long-term community benefits	• Consult communities and collectively agree on a benefits-sharing mechanism (e.g., employment opportunities, payments and royalties, access to infrastructure or services)
Resettlement	• Avoid resettlement of local communities • Avoid forced evictions • Where resettlement cannot be avoided, resettle communities in line with international human rights norms	• Align with international and voluntary standards related to resettlement (e.g., IFC Performance Standard, IRMA, development banks) • Negotiate resettlement regardless of the legal status of local communities (i.e., adopt special considerations for informal land users)
Security arrangements	• Manage security of mining operations and assets without infringing on human rights	• Adopt the Voluntary Principles on Security and Human Rights • Ensure that all security providers, both private and public, manage security without violating human rights

Key issue	Key objectives	Good practices
Artisanal and small-scale mining	• Promote positive relationships with local ASM operators	• Understand local dynamics with ASM operators in and surrounding their concessions • Where possible, engage with ASM associations or representatives
Cultural heritage	• Protect and respect the cultural heritage of communities, including indigenous communities	• Assume potential impact on cultural heritage and integrate risks to cultural heritage into environmental and social impact assessments • Consult local communities particularly indigenous communities on cultural heritage and value (in addition to internal and external experts)
Waste and materials management	• Manage waste to minimise impact on health and safety, land, and water	• Align with international or industry standards (e.g., Global Industry Standard on Tailings Management) • Integrate a human rights lens into understanding the risks of waste management
Waste management	• Manage water sources to protect current and future use for water users, safeguarding both quality and quantity	• Baseline water quality, quantity and current and potential water uses through stakeholder consultation • Adopt a catchment based approach to understanding the needs, concerns, and priorities of water users in a catchment area in line with the ICMM Water Stewardship Maturity Framework • Assess water quality based on voluntary standards (i.e., IRMA)
Air quality	• Protect communities from airborne contaminants and maintain safe and healthy air quality	• Baseline air quality against EU Air Quality Standards around the boundaries of the mining operations • Adopt a management plan to promote incremental reductions in emissions
Noise and vibration	• Protect the health and safety of workers and communities related to noise and vibration • Protect community properties from vibration impacts	• Adopt guidance from the IFC's General Environmental, Health, and Safety Guidelines on noise management • Manage noises in a way that is consistent with local, cultural, or social norms
GHG emissions	• Accurately calculate emissions and adopt a policy to identify opportunities for reduction	• Calculate Scope 1 and 2 emissions • Calculate Scope 3 emissions in line with ICMM standards • Adopt reduction strategies and actions including the move to low-carbon haulage vehicles or renewable energy supply
Biodiversity	• Maintain and leave a structurally safe and functioning ecosystem through the mining lifecycle by preventing temporary or permanent loss of biodiversity	• Adopt guidance from industry standards such as the IUCN and ICMM Good Practice Guidance for Mining and Biodiversity • Conduct a baseline on biodiversity and ecosystem services • Adopt a mitigation hierarchy to address biodiversity concerns (i.e., avoidance, minimisation, restoration, and offsetting)

1. Operational issues

Revenue and payments transparency

There is **increasing demand and expectation by the public for transparency in company payments and government revenues from extractive industries as a wider effort to address the issues of corruption and bribery**.[11] Organisation such as the Extractives Industries Transparency Initiative (EITI) set a global standard that has now been enacted into law in the European Union and other jurisdictions.[12]

At a minimum, mining companies are expected to disclose information on payments at the country and project-levels:

- **Country-level**: host country's production entitlement, national-owned enterprise production entitlement, profit taxes, royalties, dividends, bonuses (signature, discovery, production bonuses), fees (licenses, rental, entry, concessions), payments for infrastructure improvements, and other significant or in-kind payments.

- **Project-level**: mine production (product type and volume), revenues from sales (by product), material payments or other payments (and recipient government entity), social expenditures, taxes or tariffs related to the transportation of minerals, payments to political campaigns, parties, or organisations, and fines or penalties issued related to the project.

Regardless of the host country, stakeholders expect mining companies to conform to the best practices in line EITI recommendations.

Operating in high-risk or conflict contexts

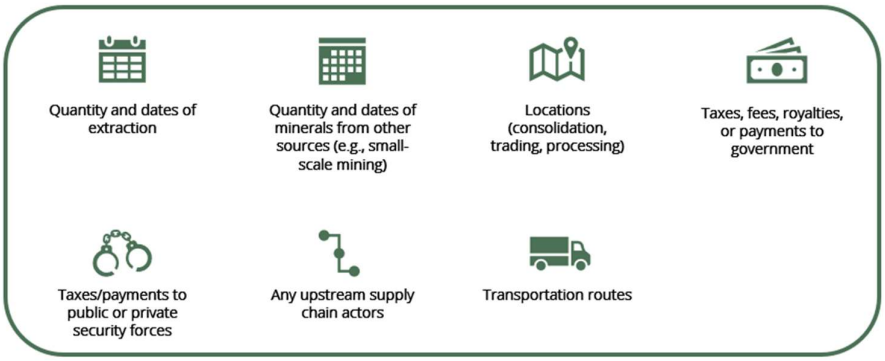
Companies operating in high-risk or conflict areas are at risk of causing or contributing to significant adverse impacts including serious human rights violations.[13] Even if the mining operations are not situated in a conflict-affected area, operations may exacerbate existing conflict due to increased socioeconomic activities in the region. In some cases, the royalties and other economic benefits may unknowingly support non-state armed groups and their affiliates.[14]

Despite the challenges in a high-risk or conflict area, **the guidance for businesses and investors is not to avoid all mining activities in these locations**. The OECD launched guidance for operations in such contexts, recognising the positive contributions mining can have in promoting social and economic development. Compared to a non-conflict setting, the guidance sets additional measures as part of due diligence when operating in or near areas of conflict or high-risk for businesses and investors through more robust risk identification, risk management, and transparency.[15]

Minimally, companies should demonstrate that they are not knowingly or intentionally causing, contributing to, or directly linked to conflict. Companies should not knowingly support non-state armed groups and their affiliates. To demonstrate this, businesses should show that they are aware of the risks involved in operating in these contexts through a conflict risk assessment. This assessment should include an analysis of the root causes of conflict and potential triggers of conflict including the impact of the planned mining operations (e.g., extraction, transport, processing). The assessment should be conducted with credibility through the support of experts such as human rights experts, civil society, and academics.

To demonstrate that minerals are not contributing to conflict, businesses can document the key information to promote traceability (Figure 6).

Figure 6: Recommended disclosure on minerals in high-risk or conflict regions



Source: IRMA, 2018 and OECD, 2017; created by Greenwheel.

Emergency preparedness and response

Even with the most stringent controls and mitigation measures, **mining is not risk free due to the handling, making, transport, and use of chemical substances and fuels**. Mining operations can face emergencies due to failing operations (leaking pipelines, transportation failures, ventilation failures), environmental circumstances (natural disasters, heavy rainfall), and social upheaval (political conflict, civil unrest).[16] The United Nations Awareness and Preparedness for Emergencies at Local Level (APELL) provides a clear methodology on understanding hazards and risks, identify appropriate risks reduction and mitigation measures, and coordinate a response with local industry, authorities and communities. The key success factor to emergency preparedness and response is multi-stakeholder and community engagement.[17]

Greenwheel adds that **an important consideration is an evaluation of how a company responds to accidents and whether they draw from the experiences as part of continuous learning.** After an accident, companies may consider getting feedback from local communities and other stakeholders on the implementation of the emergency response plans and identify potential gaps in practice. As well, companies should provide access to remedy for rightsholder that may be adversely impacted as a result of the accident.

Planning and financing reclamation and closure

While reclamation and closure happen at the end of the mining lifecycle, **as a good practice, mine closures should be considered in the earliest stages of a mining lifecycle during the exploration and design and development stages**. It is crucial for companies to have financial assurance that there are funds dedicated to complete closure works even in case of unexpected mine closures.

Planning for closure is an iterative process and grounded in on-going engagement with communities and other stakeholders. As the International Council on Mining and Metals (ICMM) notes, the most successful closure planning is where land use is clearly defined with local stakeholders; however, it is noted that stakeholders may change their viewpoint across a lifecycle of a mine, particularly with mines that span across generations.[18] As such, reclamation and closure

plans should be updated especially towards the end of the mining lifecycle to respond to the changing needs of local communities.

According to voluntary standards such as the Initiative for Responsible Mining Assurance (IRMA), a company's reclamation and closure plans are evaluated based on:

- The final use of the reclaimed lands;
- How the land is stabilised, revegetated, and how ecosystem functionality is restored;
- The timelines of the process;
- Backfilling of pits; and,
- Financial assurance to implement closure plans.

2. Social issues

Labour rights

In line with international norms, **mining operation are expected to respect the Fundamental Principles and Rights at work for all workers (employees, contractors)**, which encompasses the right to social dialogue and collective bargaining, the abolition of forced labour, the eradication of child labour, the elimination of discrimination, and the right to a healthy and safe working environment. In addition, companies in the sector should address common labour rights issues including working hours and wages.[19]

There are many policies and processes that companies can employ to respect workers' rights. A high-level policy, for instance a human rights policy or human resources policies, can set out the company's minimum safeguards for labour rights. A good practice is to promote international and/or national standards, with preference for the higher requirement.

Maintaining international standards is important, as deferring to national requirements may lead to the infringement of fundamental labour rights as workers' rights are not protected consistently across countries. For example, the freedom of association and right to collective bargaining may be restricted; even in such circumstances, companies can play a role to provide alternate avenues for workers to provide feedback and maintain dialogue with management.

Community rights

One of the biggest challenges to mining operations is respecting the rights of host communities that may be directly or indirectly impacted by their activities. Communities are exposed to a wide range of risks from the mine ecosystem due to physical (e.g., new infrastructure, exposure to hazardous materials and pollution) and non-physical changes (e.g., changing socioeconomic demographics and the increase in prevalence of infectious diseases and gender-based violence).

Given the high risks facing communities, **mining companies have an obligation to carry out due diligence. Companies are encouraged to identify all potentially affected stakeholders and conduct an Environmental and Social Impact Assessment**, focusing on the disproportionate impact on community members in vulnerable positions (e.g., women, elderly, youth, indigenous peoples, rural rightsholders) – ideally, this process should be conducted with the support of an expert or expert organisation. The risk assessment process should be carried out during the development and design phase and before operations start. Based on the risks identified, companies should identify mitigation measures for each risk in consultation with community members as part of an Environmental Social Management System.[20] Investors can

refer to the Greenwheel briefing on free, prior, and informed consent for further guidance on these processes.

Expectations for mining companies have evolved beyond avoiding adverse impact to demonstrating broad community support. For indigenous communities, this can be demonstrated through obtaining free, prior, and informed consent. For non-indigenous communities, support can be defined by documenting democratic processes or community governance mechanisms to show local support for mining operations.

Community benefits

Given the potential and severe adverse impact of mining operations, **stakeholders expect companies to provide additional benefits to communities**. There are many benefits-sharing mechanisms at a mining company's disposal including local employment opportunities, programmes for traditionally marginalised groups, payments and royalties, contracting for local suppliers, building infrastructure, and promoting local social services (medical centres, schools). However, as a best practice, benefits should be discussed and planned in a participatory manner so communities can guide company contributions to develop initiatives and benefits that address community needs.[21]

Resettlement

Mining operations can lead to the resettlement of local communities when a new mine or expansion of mine operations require land acquisition. There are many international and voluntary standards that guide resettlement processes (e.g., IFC Performance Standards, IRMA, development banks). Most international and voluntary guidances converge on a set of key principles.[22]

Resettlement should be avoided; if it is not possible to avoid, companies should consult and negotiate with communities as part of a resettlement risks and impact assessment at the earliest stages to form the basis of a mitigation plan. Even in contexts where there are legal means to remove people without negotiations, best practices would encourage businesses to always use negotiated settlements to avoid relying on government authorities to move people forcibly.[23]

The objective of resettlement should be to offer equivalent or improved living conditions. Affected stakeholders should always be given a choice of compensation, for instance, replacement property or assets of equal value or replacement of lost land and assets at full replacement cost within local markets.[24]

Some voluntary standards such as IRMA make a distinction between communities with legal right to land versus communities without; as Greenwheel addressed in its land rights series, given the challenges to recognising customary lands, this distinction can lead to the inadequate compensation for communities that are vulnerable and lack legal protection, for instance, indigenous peoples and other rural rightsholders. Consequently, **Greenwheel would advise businesses and investors to follow the recommendations from the ICMM wherein mining operators are encouraged to adopt specific measures to support informal land users that do not have formal proof of assets or land.**[25]

Greenwheel would like to highlight two additional considerations that reiterates the importance of on-going community consultation. First, it should be noted that compensation may not be

sufficient in creating sustainable outcomes for resettled communities, as they fail to consider the long-term needs of the communities and their livelihoods.[26] Companies should account for longer-term monitoring of how resettlement impacts community livelihoods and provide support beyond cash compensation, especially in contexts with low financial literacy. Secondly, to provide "improved" living conditions, companies may fail to adopt a culturally sensitive lens to what communities want as opposed to what they are perceived to want. As a result, mining operators may waste valuable resources in efforts that may not meet the needs of local communities.

Security arrangements

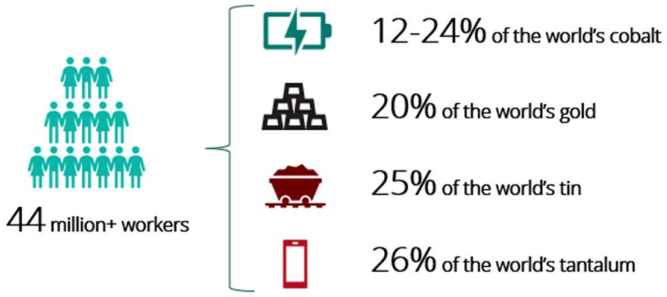
Mining operators may use either public or private security forces to maintain the rule of law and provide security to the mining ecosystem (e.g., operations and transport links). The common voluntary standard adopted by mining companies is the Voluntary Principles on Security and Human Rights.[27] Companies are expected to accurately assess the security risks to mining personnel, local communities, and their assets in relation to the wider political, economic, civil, or social factors including the potential for violence. Businesses are also to conduct research on the human rights records of both public and private security to identify potential abuses of human rights; these factors should be considered before the employment of security forces.[28]

Regardless of whether companies rely on public or private security, mining operators are expected to manage security without infringing on human rights, where all reasonable steps are taken to exercise restraint and use non-violent means; force should only be used if it is proportionate to the threat. As such, in cases where public security forces infringe upon the human rights of rightsholders by using excessive force, companies are open to scrutiny. To address the potential human rights challenges related to security, companies may consider human rights training to security forces and be open to investigate any cases of abuse to prevent recurrence.

Artisanal and small-scale mining

Artisanal and small-scale mining (ASM) is a source of employment for employment for workers in 80 countries of the world and is a key producer in the global minerals value chain (Figure 7).[49] ASM can operate around large-scale mining concessions for multiple reasons, for instance, concessions were given to mining operators on traditional ASM land, ASM miners arrived during or after exploration, or in some cases, miners are mining directly on the concessions as large-scale mines operate. Confrontations between ASM miners and large-scale operators can sometimes lead to violent confrontation.[29]

Figure 7: ASM in numbers



Source: World Bank, 2021 and Delve, 2020; created by Greenwheel.

ASM is often characterised as lacking in health and safety measures, where poor handling of equipment and chemicals can lead to the pollution of waterways and land. ASM can also employ child labour and workers under forced labour conditions. However, ASM offers employment opportunities in rural and impoverished settings and with the proper mechanisms in place, it can be a vehicle for decent work.[30]

Mining operators have an obligation to understand the legal, social, environmental, and cultural landscape in which ASM miners operate in and surrounding their concessions. Businesses are expected to make a good faith effort to engage with ASM miners or their associations to minimise risks including security risks as well as maximising community development opportunities.[31]

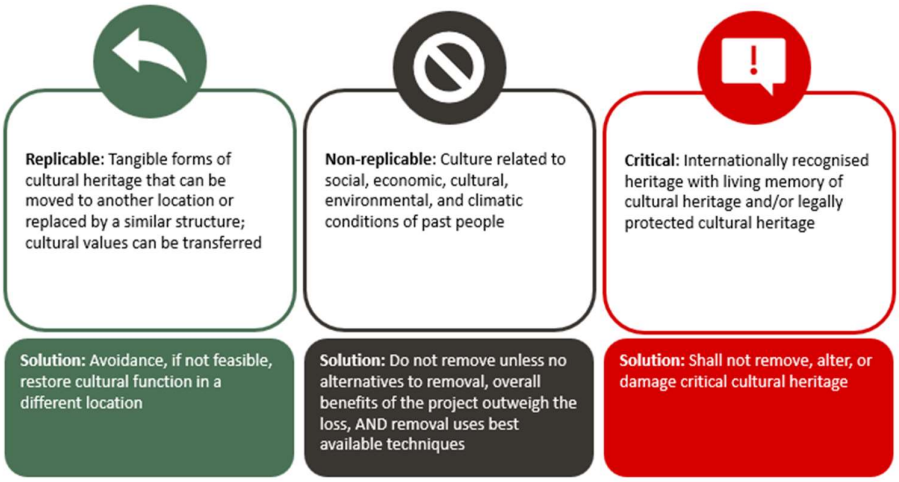
Cultural heritage

Mining operations and infrastructure can impact cultural heritage, which encompasses physical structures, landscapes, artifacts, and other intangible cultural attributes that have scientific, spiritual, or religious value (e.g., traditional knowledge). Cultural heritage can be categorised as replicable, non-replicable, and critical; each category is prescribed a set of mitigation measures according to international and voluntary guidances (Figure 8).

While these are standards that are applied globally, this approach fails to account for indigenous or local cultures that fall outside the protection of legal frameworks – and hence, are not considered critical culture. Moreover, in practice, mining projects tend to conduct a risk assessment on cultural heritage if it is seen as necessary by the companies and their experts as opposed to being informed by communities and local experts.[32] Consequently, cultural sites are damaged or displaced during mining operations and are only brought to the attention of mining companies through their operational grievance mechanisms.

To avoid adversely impacting cultural heritage, **Greenwheel would advise businesses and investors to engage with local communities to understand their perceptions of what constitutes cultural value or deemed culturally significant.** Otherwise, companies can encounter situations where there are no compensations, for instance, the loss of burial grounds or sacred sites.

Figure 8: Categorisation of cultural heritage and appropriate mitigation measures



Source: IFC, 2012; created by Greenwheel.

3. Environmental issues

Waste and materials management

There are many ways in which mining activities can generate waste. Mining operations can produce three broad classes of waste: tailings, spent heap leach materials, and waste rock. Where water treatment is used to remove metals and other chemicals from mine-impacted waters, the processes may create by-products such as waste sludges. In addition, mining can create waste from spillage of onsite sewage treatment, fuels, and other chemicals. Poor management of waste materials from mining operations can pose serious environmental and health risks due to the potential to contaminate air, soil, and water.

Despite the environmental risks related to waste, **companies can develop robust management systems in handling, storage, transport, and disposal of hazardous materials**. Companies are advised to carry out risks assessments related to understanding the potential chemical and physical risks related to a mine's waste facilities on health, safety, environment, and communities in the design and development stage of the mine lifecycle. It is considered good practice for mining operators to develop an Operation, Maintenance, and Surveillance manual or equivalent detailing risk management strategies, critical controls, and key performance objectives.[33]

In recent years, the industry is aiming for a zero-harm approach when it comes to tailings management, with the longer term goal of preventing and reducing the generation of tailings.[34] An interesting evolution as part of this process is the **integration of a human rights lens into global industry standards on tailings management**; in addition to the technical guidance on managing tailings, the standards highlights the importance of transparency and accountability to people and the obligation of companies to meaningfully engage project-affected people by informing them on management decisions regarding tailings facilities, any decisions or changes that may affect public safety, and access to remedy.[35]

Water management

Mining operations can affect both water quality and quantity. Water quality can be affected by the discharge of mine water into the environment, failures in tailings or water storage facilities, chemical spills, or seepage through mine wastes into ground and surface water. Water quantity can be affected by the water usage by mining operators, as operations can compete with local communities for water, including the diversion of water from local use to support mining activities. In some cases, the depletion in ground and surface water can take decades to replenish.[36]

Given the significant impact mining has on local water systems, **companies should consider collecting water baseline data to track the impact of mining on water quality, quantity, and current and potential future water uses.** Minimally, companies are to develop a water management plan to mitigate the predicted adverse impact from the operations. Some voluntary standards such as the IRMA would advise companies to adopt its minimum standard based on international standards (WHO) and recognised national standards (e.g., Canada, European Union, United States) for different types of water quality (irrigation, human drinking water, aquatic organisms, etc.)[37] Greenwheel advises that **adopting an international and/or voluntary standard for water quality can help companies account for variances** in the acceptable levels of metals/metalloids and non-metals.

In 2023, the ICMM launched a Water Stewardship Maturity Framework that **relies on a catchment-based approach based on a holistic understanding of the needs, concerns, and priorities of water users across an entire catchment area**. This approach is an evolution from the more traditional siloed approach to understanding water management as an operational risk to seeing water as part of a fragile ecosystem with social, cultural, and ecological dimensions. Managing water through stewardship (as opposed to water management) allows local stakeholders including businesses to have inputs into the risk identification and management of water use.[38]

Air quality

To adequately protect human health and the environment from airborne contaminants from mining activities, a **management system should account for the contaminants emitted from various sources including but not limited to blasting, traffic, ore crushing, and windblown from exposed surfaces** (e.g., waste piles, tailings).

Mine operators are to conduct a baseline assessment of air quality and identify potential impact to formulate a management plan to promote incremental reductions in emissions. Throughout the construction and operation phases, companies should monitor and document ambient air quality and dust with representative sampling to include transport routes.[39]

Noise and vibration

Open pit and underground mines can create significant noise and vibration. In addition, other mining operations such as traffic can also contribute to noise levels in host communities. While noise can pose physical and mental health risks to people living in surrounding communities, vibrations from blasting can potentially cause damage to buildings and their contents.[40]

Both existing and new mines can address noise and vibration issues by screening for noise and vibration levels. There is **clear international guidance from the IFC's General Environmental, Health, and Safety Guidelines[41] on noise management that sets specific levels in hours that are appropriate according to local, cultural, or social norms**.

One thing to note is that noise and vibration may be less obvious to local communities during the exploration and development and design phases in the mining lifecycle in contrast to other environmental issues such as waste and water. As such, operators should consult and inform communities of the potential impact and ensure that operational grievance mechanisms or other channels are open for complaints.

GHG emissions

The two main categories of emissions from mining operations come from direct (Scope 1) emissions (i.e., processing operations, transportation of ores, on-site electricity generation, fugitive emissions) and indirect (Scope 2) emissions (i.e., electricity use).[42] On the average mine site, around half of energy consumption is electricity, with the rest direct use of fossil fuels.[43]

Not only are mining companies expected to calculate their Scope 1 and 2 emissions, increasingly, **industry-led organisations such as the ICMM are pushing for a standardised framework for mining companies to calculate and disclose their supply chain (Scope 3) emissions**.[44]

As part of good practice, mining operators are expected to develop a GHG policy to measure emissions, identify opportunities for reduction across the mining project and wider supply chain,

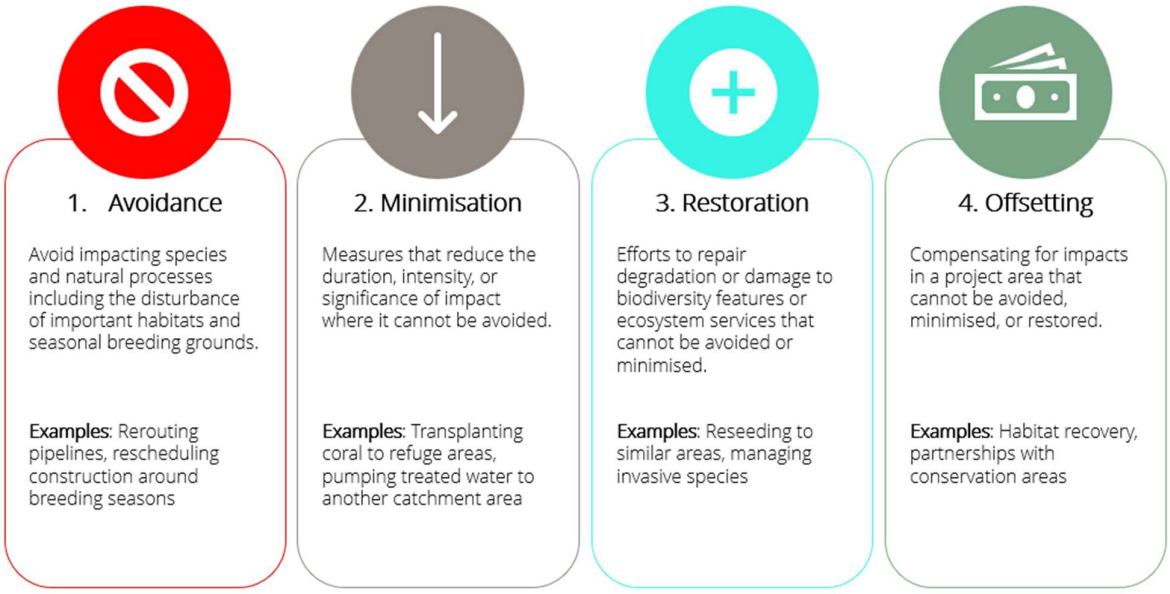
and set achievable targets to reach at the site and corporate-levels.[45] Key actions to reduce Scope 1 and 2 emissions are to move toward low-carbon haulage vehicles, and develop on-site or procure external renewable energy supply.[46]

Biodiversity

Because mining can lead to the temporary or permanent loss of biodiversity and ecosystem services across its lifecycle, mining operators have an onus to maintain ecosystem services that local communities need and leave behind a structurally safe and functioning ecosystem upon closure.[47] Greenwheel encourages investors to view biodiversity from the lens of human rights (see Greenwheel briefing on biodiversity and human rights).

To meet this commitment, mining companies can **conduct baseline studies in the earliest stages of the mining lifecycle to understand the potential impact of their activities on biodiversity** – the baseline can be conducted as part of a wider environmental and social impact assessment. Minimally, companies should shoulder their impacts at an ecosystem-level (i.e., if long-term functions or services is changed), species-level (i.e., population numbers, significance to local stakeholders), and genetic-level (i.e., diversity within an ecosystem,). Based on the potential risks identified, **voluntary guidances would advise companies to apply a mitigation hierarchy to address biodiversity concerns** (Figure 9).[48]

Figure 9: Mitigation hierarchy



Source: ICMM, 2015; created by Greenwheel.

[1] OECD, 2017. and International Association for Promoting Geoethics, 2017.
[2] IISD, 2023
[3] Note that many guidances draw from international standards that are not specific to mining operations including the International Finance Corporation Performance Standards on Environmental and Social Sustainability.
[4] ICMM et al., 2020
[5] ICMM, 2023
[6] RMI, 2023.

[7] The only exception is if following international and/or voluntary guidance will lead to the violation of local laws. In this instance, the company should openly report on this discrepancy.
[8] Ruppen et al., 2021.
[9] Adebayo and Werker, 2021.
[10] The Greenwheel Responsible Mining Framework for Investors draws primarily on the Initiative for Responsible Mining Assurance Standard for Responsible Mining (IRMA) due to the high standard it holds. This Standard was developed with over 10 years of consultation with more than 100 companies and is intended to cover all materials except energy fuels.
[11] EITI, 2019 and EITI, 2023.
[12] IRMA, 2018.
[13] OECD, 2017.
[14] IRMA, 2018.
[15] OECD, 2017.
[16] ICMM, 2024
[17] UNEP
[18] ICMM, 2019
[19] IRMA, 2018.
[20] IRMA, 2018.
[21] IRMA, 2018.
[22] ICMM, 2015.
[23] IRMA, 2018.
[24] IRMA, 2018.
[25] ICMM, 2015.
[26] ICMM, 2015.
[27] Voluntary Principles, 2023.
[28] The Voluntary Principles on Security and Human Rights : Voluntary Principles on Security and Human Rights
[29] ICMM, 2024.
[30] Delve, 2020[31] ICMM, 2024.
[32] Mason and Martindale, 2023
[33] IRMA, 2018.
[34] ICMM, 2021
[35] ICMM et al. 2020
[36] IRMA, 2018.
[37] IRMA, 2018.
[38] ICMM, 2023
[39] It is noted that under the IRMA guidance, mining operators should align with EU Air Quality Standards. IRMA, 2018.
[40] IRMA, 2018
[41] IFC, 2007
[42] IRMA, 2018
[43] ICMM, 2024.
[44] ICMM, 2023
[45] IRMA, 2018
[46] ICMM, 2024.
[47] IRMA, 2018 and IUCN and ICMM, 2022
[48] ICMM, 2024
[49] Delve-2023-State-of-the-Sector-Report-042324-Compressed.pdf (delvedatabase.org)

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