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Guidelines for implementation of a community-based ESG framework for ASSM and "Best in Africa" factsheet

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Summary

This deliverable aims at creating a set of guidelines for sustainable business models in mining in line with ESG and SDGs principles, ensuring a responsible extraction vision and traceable and trusted sources. Fair community development, social inclusion, and environmental sustainability will lead the formulation of such guidelines, with the inclusion of "Best in Africa" experiences when identified.

Approval

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Abbreviations and Acronyms

Acronym	Description
AMREC	African Minerals & Energy Resource Classification
AMV	African Mining Vision
ASSM	Artisanal and Small-Scale Mining
AU	African Union
AWIM	Association of Women In Mining
BP	Best Practice
BPMC	Batho Pele Mining Cooperative
CAM	Community Artisanal Mining
CRM	Critical Raw Materials
CSR	Corporate Social Responsibility
DMRE	Department of Mineral Resources and Energy
DRC	Democratic Republic of Congo
ECRM	Extended Critical Raw Materials
EIR	Extractive Industries Review
EITI	Extractive Industries Transparency Initiative
ESG	Environment, Societal, Governance
EU	European Union
EV	Electric Vehicles
GCO	Grande Côte Opérations
GDP	Gross Domestic Product

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IBGDH	Initiative pour la Bonne Gouvernance et les Droits Humains
ICMM	International Council on Mining and Metals
IWMT	Insiza Women in Mining Trust
LOR	Lower Orange River Diamonds
LSM	Large-Scale Mining
MPRDA	Mineral and Petroleum Resources Development Act
NAAM	National Association of Artisanal Miners
NGOs	Non-Governmental Organizations
NUA	Namibian Uranium Association
NUI	Namibian Uranium Institute
OEMs	Original Equipment Manufacturers
PAGE	Programme d'Appui à la Gestion de l'Environnement
PAR	Resettlement Action Plan
PGMs	Platinum-Group Metals
RMI	Responsible Mica Initiative
SADPO	South African Diamond Producers Organisation
SEMP	Strategic Environmental Management Plan
SLO	Social Licence to Operate
WP	Work Package

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Executive Summary

This document represents the deliverable 4.2 of the AfricaMaVal project, focused on the creation of guidelines for the implementation of a community-based environmental, social, and governance (ESG) framework for artisanal and small-scale mining (ASSM) and the development of 'Best in Africa' factsheets which highlight some of the best ESG practices in African Critical Raw Materials (CRMs) supply chains. The deliverable presents a comprehensive framework to address ESG challenges in the African mining sector, focusing particularly on artisanal and small-scale mining as part of the AfricaMaVal project. The methodology combined a systematic literature review, expert interviews, and content analysis, resulting in a robust ESG framework tailored to the ASSM context. This approach enabled classifying ESG issues into hierarchical layers—environmental, social, and governance—that capture the spectrum of challenges specific to African mining operations.

The report features ten country-specific factsheets—Best-in-Africa factsheets—highlighting effective ESG practices in ASSM and large-scale mining (LSM) sectors within Gabon, Madagascar, Senegal, South Africa, Zimbabwe, DRC, Morocco, Namibia, Mozambique, and Tanzania. These factsheets offer replicable models for sustainable practices, showcasing partnerships between mining companies, governments, and NGOs to address challenges such as community development, biodiversity conservation, and labour conditions.

For instance, in Gabon, Comilog's collaboration with the government emphasizes a balanced portfolio of environmental and social initiatives, though improvements in labour standards are necessary. Madagascar's Ambatovy project demonstrates successful biodiversity management through multi-stakeholder collaboration, albeit with community displacement concerns. In Senegal, GCO's skill-building programs set a precedent for legacy impact, but land expropriation remains a critical issue for social sustainability. Similarly, South Africa's recent policies allow artisanal miners to form cooperatives, enabling formalized operations, although broader implementation depends on national legislative adaptations.

The ESG framework and best-practice guidelines emphasize multi-stakeholder cooperation, regulatory support, and fair resource management. However, challenges persist in human rights, displacement, and environmental degradation, underscoring the need for robust policy frameworks. The guidelines aim to guide European investors in sustainable investments within African CRMs supply chains and inform African stakeholders on advancing mining practices aligned with ESG principles. The document concludes that continued dialogue among stakeholders, adaptable policies, and focus on resource management are essential for achieving sustainable, transferable mining practices across diverse African contexts.

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Keywords

Environmental, Social and Governance; Sustainability; Artisanal and Small-Scale Mining; Large-Scale Mining; Africa; Critical Raw Materials; Supply Chain

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1. Introduction

1.1. Objectives

One of the overarching policy-goals of the European Union (EU) is to ensure a fair, responsible, sustainable and sustained supply of (critical) raw materials (European Commission, 2023). It is acknowledged, that this goal still is far from being achieved for a wide variety of reasons.

While there is no universal agreement of what good environmental, societal, and governmental (ESG) standards could or should be, there is a certain broad understanding that environmental and societal impacts need to be reduced and that mining should not lead to undermining of certain minimum governance standards as expressed by indices, such as the World Bank Global Governance Indicators (Kaufmann & Kraay, 2023), or the Global Corruption Barometer – Africa (Transparency International, 2019).

The present report addresses the task of developing an ESG reference framework that could be used to inform future work, investments and research on sustainability of the mining sector in Africa, with particular reference to the EU-Africa Critical Raw Materials (CRM) supply chains. This would be conducive to achieving the EU policy-goals, creating at the same time a win-win situation for the African partners as the overarching goal is to promote the development of these supply relationships, fostering at the same time the sustainable development of the communities involved.

The report provides a set of Best-in-Africa guidelines, which are schematic and effective presentations of the leading examples of mining operations undertaken in different African countries from an ESG point of view. Although some of the best practices (BP) presented concern minerals that are not strictly indicated in the CRM list, it was decided to present these cases as representatives of good practices for the target countries and for the minerals indicated in the CRM list.

The final output is a set of guidelines on how to implement the most relevant ESG dimensions for the African Artisanal and Small-Scale mining (ASSM) sector, and a set of leading examples for ESG best practices that are already present in various African countries. It must be noted that at the moment of writing this report, there are very few examples of CRMs mined artisanally. ASSM indeed usually happens when there is a trade market for the minerals to be sold, and this is historically the case with gold and gemstones. Therefore, best practices are also included regarding non-CRMs mining as holding transferability potential to CRMs when they will be mined also artisanally.

The set-up and character of extractive operations can vary considerably, from large multi-national companies to small single-person operations. In consequence, their capabilities to embrace good governance aspirations, their societal impact, and their capabilities to minimise environmental impact also varies greatly.

This report will focus on small-scale and artisanal mining operations, assuming that large, multi-national operations will subscribe to international voluntary standards, such as those of the International Council on Mining and Metals (ICMM[1]), and have the capability to improve their performance through their own means.

This report will also inform the AfricaMaVal Work Package (WP) 7 with respect to ESG conditions that may influence investment decisions.

1.2. Report structure

The Task was broken down into a set of Actions that each addressed particular aspects:

1. **Action 4.2.1 (M1-M8) - Building an ESG framework that will guide the following primary data collection activities**: this action started with desk research on ESG challenges in the African mining sector from scientific, grey literature and past projects' reports from European and African repositories. Then, first contacts with mining case studies, communities and experts were made.
2. **Action 4.2.2 (M9-M12) - Refinement of the ESG framework**: the action featured interviews with relevant actors that operate in the African mining sector to comprehensively understand the challenges that most impact on African CRM value chains and with the specific aim to validate the outputs of Action 4.2.1.
3. **Action 4.2.3 (M13-M24) - Identification of ESG-compliant practices**: the action featured interviews with actors that operate in the African mining sector, and with intermediaries/companies that are involved in European-African raw materials supply chains in order to collect best practices implemented in the African mining sector addressing the dimensions of the ESG framework.
4. **Action 4.2.4 (M25-M30) - Development of Guidelines for the implementation of the ESG framework for ASSM and 'Best in Africa' factsheets.**

In the following sections of this report, Chapter 2 describes the methodology and results of the first two actions, 4.2.1 and 4.2.2, while Chapter 3 reports the methodology and results of action 4.2.3. Chapter 4 develops the guidelines for the implementation of a community-based ESG framework, based on the results of chapters 2 and 3. Finally, Chapter 5 draws the conclusions of the entire report.

[1] https://www.icmm.com

2. A framework for ESG challenges in the African mining sector

2.1. Introduction

The mining industry is well-known for the severe negative impacts they may pose on their surrounding environment, on the local communities and on the governments which they interact with (Hilson, 2002; Lodhia, 2018; Al Rawashdeh et al., 2016; Marimuthu et al., 2021). A significant feature of mining is that mining companies, whether they are local or multi-national businesses, must be where the ore is and must undertake heavy upfront investments in the local territory prior to the beginning of the extraction, to open the mine and build the necessary supporting infrastructure (Dashwood, 2007; Dashwood, 2012). This implies that mining companies are vulnerable to the local communities' opposition and must look for the so-called Social License to Operate (SLO), a practitioner term that refers to necessity of obtaining the local community's support besides the government's permit to mine (Prno and Slocombe, 2012). At the same time impacts on environmental, social and governance factors mainly arise at the local level and thus are borne by the local communities (Al Rawashdeh et al., 2016; Wilson, 2022). Scholars have studied many of the sustainability challenges of the mining sector, among which the most cited are release of pollutant emissions to the air, soil and water (e.g., Marimuthu et al., 2021; Nyakuwanika et al., 2021; Atay and Terpstra-Tong, 2020), generation of dust (e.g., Salom and Kivinen, 2020; Vintró et al., 2012; Wasylycia-Leis et al., 2014), land erosion and deforestation (e.g., Fayiah, 2020; Hennessy, 2015), generation of waste and hazardous waste (e.g., Guenther et al., 2006; Arthur et al., 2017; Ackers and Grobbelaar, 2022), displacement of local communities and indigenous people (e.g., Lindman et al., 2020; Nyakuwanika et al., 2021; Andrews and Essah, 2020), development and engagement of local communities (e.g., Saenz, 2019; Ventura and Saenz, 2015; Ranängen and Zobel, 2014), health & safety of workforce (e.g., Ranangen and Lindman, 2017; Saenz, 2019; Raufflet et al., 2014), violation of human rights considering both, workforce and local communities (e.g., example Demirkan et al., 2021; Agusdinata et al., 2022; Machanguana and Sardinha, 2021), informal working conditions and artisanal mining (e.g., Galli et al., 2022; Betancur-Corredor et al., 2018; Yakovleva and Vazquez-Brust, 2018), corruption and lack of transparency (e.g., Lindman et al., 2020; Mutti et al., 2012), responsibility along the mining supply chains (e.g., Lindman et al., 2020; Sauer and Seuring, 2017).

The African mining situation reflects the majority of these issues, but an important shift from the policy point of view is already in place, as testified by initiatives such as the African Mining Vision (AMV) that aim to provide a "transparent, equitable and optimal exploitation of mineral resources to underpin broad-based sustainable growth and socio-economic development" (AUC, 2009, p.1), or the African Minerals & Energy Resource Classification and Management System (AMREC), which is a comprehensive system for assessing, classifying and managing particular projects related to Africa's mineral and energy resources, aligned to the AMV and the UN Sustainable Development Goals.

As much of Africa remains unexplored, there may exist significant untapped potential for increased output of the CRM from Africa. Just as these raw materials are pivotal for EU progress, they hold even greater importance for Africa. Numerous African nations are now indicating their readiness to implement the necessary development strategies aimed at enhancing value addition and fostering downstream industries that would generate employment and broaden their production and export spectrum. However, Africa acknowledges the pivotal role of foreign investment in facilitating these development initiatives and advancing the continent's economic and social advancement (AUC, 2009).

Concurrently, both internal (local) and external (foreign investment) stakeholders are placing growing emphasis on ESG-related concerns and data. This, in particular, holds for ASSM, as big mining corporations usually comply with international sustainability standards in order to satisfy stakeholders' expectations regarding sustainability concerns. It is, therefore, of pivotal importance to develop an ESG framework that could assist the assessment of ASSM sustainability profiles and to provide guidelines on how to implement such a framework. Tasks 4.2.1 and 4.2.2 dealt with the identification of this ESG framework and with its validation through the involvement of African mining experts.

2.2. Methodology

A systematic review (Xiao & Watson, 2017) was employed to examine the extant knowledge regarding the ESG challenges in the mining sector. A content analysis was performed by systematically collecting scientific publications covering the Environmental, Social and Governance pillars in the African mining sector. We then classified the reported challenges using hierarchical criteria ranging from pillars to the specific impacts of the issue. Finally, we validated our results through a set of interviews with African mining experts.

2.2.1. Literature Review

Inclusion criterion. In the literature review, only studies were included that explicitly dealt with ESG challenges in the mining industry. Since this industry is considered at the forefront of corporate social responsibility (CSR) practices and disclosure (Yakovleva, 2005; Ranängen & Lindman, 2014), corporate sustainability reporting was included. In addition, studies that developed frameworks or reported indicators and metrics, or explicitly mentioned sustainability challenges in this field were included. As the analysis required an understanding of the strategic and operational aspects that lie beyond ESG reporting, a multidisciplinary perspective was adopted. Consequently, the majority of papers were from the fields of business, management and accounting, social science, and environmental science. Grey literature was preliminary inspected to extract the latest findings from the industry but then included only studies written in English and published in peer-reviewed journals from the Scopus and Web of Science databases. Books, contributions to edited volumes, conference papers, periodicals, and working papers were not included, as such research usually goes through a less rigorous peer-review process (Podsakoff et al., 2005).

Literature Search. The literature search was based on the keywords: "Environmental, Social and Governance", "Corporate Social Responsibility" or "Corporate Sustainability" as the population; "extractive" or "mining" as the context; "indicators", "metrics", "framework", or "challenges" as the outcome. An initial check on the resulting papers and their main themes led to deliberately exclude those on "text mining", which refers to a text analysis technique. The complete query is presented in Table 1.

Table 1: Search terms for the literature review

Search term categories	Search term used for the review
Population	"esg" OR "environmental, social and governance" OR "csr" OR "corporate social responsibility" OR "corporate sustainability"
Context	"extractive" OR "mining" AND NOT "text mining"
Outcome	indicator* OR metric* OR framework* OR challenge*

Methodological consistency, robustness, and transparency in the analytical process were ensured by the adoption of the PRISMA guidelines, which are commonly used in sustainability management literature (D'Eusanio et al., 2019; Alosi et al., 2022; López-Concepción et al., 2022). The PRISMA model provides a flow diagram to support the practitioner in the identification, screening, eligibility, and inclusion steps of a systematic literature review process. The search did not have specific time limits, and the query was launched several times between December 2022 and December 2023. In the end, we obtained a total of 1166 papers, 540 from Scopus, and 626 from Web of Science.

Screening procedure and eligibility assessment. The total number of 1166 documents were then downloaded and 256 duplicates were removed. The remaining 910 papers were organised on a spreadsheet, extracting the following information: authors, title, year, source title, and abstract. The screening procedure was collectively agreed upon by the team of authors. Then a fast scan of the titles excluded articles that were completely off-topic. If the title was ambiguous, the abstract was read quickly before opting for inclusion or exclusion. The inclusion criteria were:

- The publication deals with the mining/extractive industry;
- The publication deals with at least one of the ESG dimensions;
- The publication is empirical and discusses or reports ESG/CSR issues, challenges, metrics, indicators, or frameworks.

After screening the abstracts, 96 papers were deemed relevant and were retained for the full-text analysis. During the full-text analysis, 24 papers were identified as inadequate for the analysis in terms of quality or contents and thus were excluded for one of the following reasons: the paper was a book chapter; insufficient information was provided on mining ESG challenges; a

management perspective on ESG challenges was completely lacking. After the inclusion of six papers through a snowballing approach[2] based on the remaining 72 papers (Wohlin, 2014), the final sample consisted of 78 papers. Figure 1 shows the PRISMA flow diagram used (Liberati et al., 2009; Moher et al., 2009).

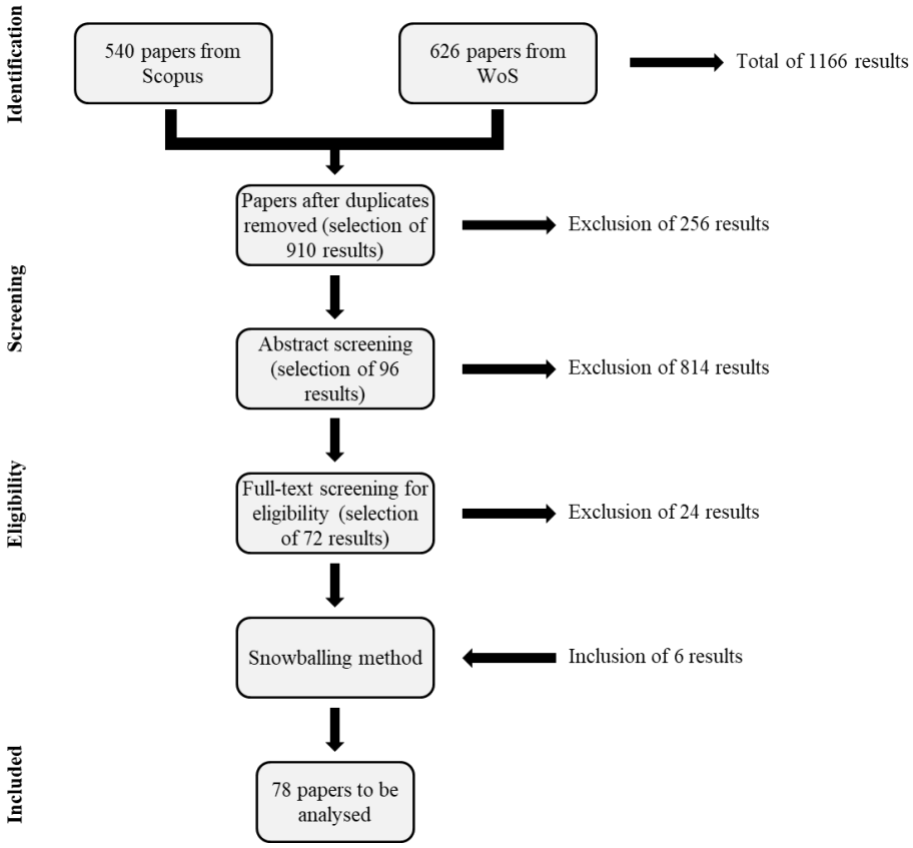


Figure 1: PRISMA diagram

Data extraction and analysis. Following the textual narrative synthesis methodology[3] (Popay et al., 2006; Lucas et al., 2007), a standard data extraction format was set to record the title, authors, year, journal, research question/aim, geographical context, sources of information employed, theories used, methodology, industry, metals/minerals (if available), organisational levels (strategic vs tactic vs operational), scale of the mining organisation/activity (multinational vs national vs artisanal), targeted companies (if available), environmental challenges, social challenges, governance challenges, and reference reporting frameworks (if present).

[2] Snowballing is an approach of inclusion of relevant literature through cross-referencing the articles already selected. See Wohlin (2014) for detailed information.

[3] The textual narrative approach entails providing a commentary that discusses the characteristics, context, quality, and findings of various studies. It uses the scope, as well as the differences and similarities between the studies, to draw conclusions across them (Lucas et al., 2007).

2.2.2. ESG Framework

The challenges extracted from the final selection of publications were organised into four hierarchical layers, which meant that the higher the layer, the more comprehensive it is. This logic informed the design of the ESG framework, a tool that maps mining ESG challenges based on the literature, in order to offer a better understanding for both scholars and practitioners.

The first layer of the framework refers to the distinction between the Environmental, Social, and Governance dimensions of sustainability, and was referred to as the **Pillars**. The other three layers were adjusted from the ISO 14001 (ISO, 2015) terminology and were called **Category**, **Aspect** and **Impact**, respectively. Categories represent the different areas of the 'organisation's surroundings' in terms of environment, social and governance spheres. Aspects are factors related to the "organisation's activities or products or services that interact or can interact" with the categories and can have impacts, which in turn are changes to the categories "whether adverse or beneficial, wholly or partially resulting from an organisation's (…) aspects" (ISO, 2015). For the scope of the report, the term 'ESG challenge' was used as a code that refers to one or more of the framework's layers.

2.2.3. Interviews with experts

After the desk research, an interview protocol for in-depth semi-structured interviews was formulated based on previous results. Ten experts in the African mining sector were selected to validate the regulatory framework contexts and the ESG challenges detected, drawing on a shared database of partners and stakeholders of the AfricaMaVal project. Selection criteria were: proven experience in the mining field dealing with environmental, social and/or governance issues; representation of different African countries, with particular emphasis on the ten case study countries of the project; representation of different backgrounds, including industry's, NGOs (non-governmental organizations), governments' and local communities' representatives; availability to be interviewed. Through a snow-balling approach, further informants were identified, based on the first sample. The validation step allowed us to identify, which were the crucial issues on the ground and the country-specific ones. In addition, the causes and effects of the issues were identified to a more precise degree. In fact, interviews allow us to go further in detail on specific issues compared to the indirect observation through desk research, and this was essential to validate the results and refine them in order to better reflect the real situation of the African ASSM sector.

The selected interviewees were contacted by email through an engagement letter that presented the project and its main objectives. Confirmation of free and informed consent was requested from all the informants to ensure that they were fully aware of being contributing in a spontaneous way to the data collection of the AfricaMaVal project, agreeing with the scope of the collection itself. The consent form was reviewed by the Ethics advisor of the project and complies with the EU Regulation 2016/679 GDPR[4].

[4] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R0679.

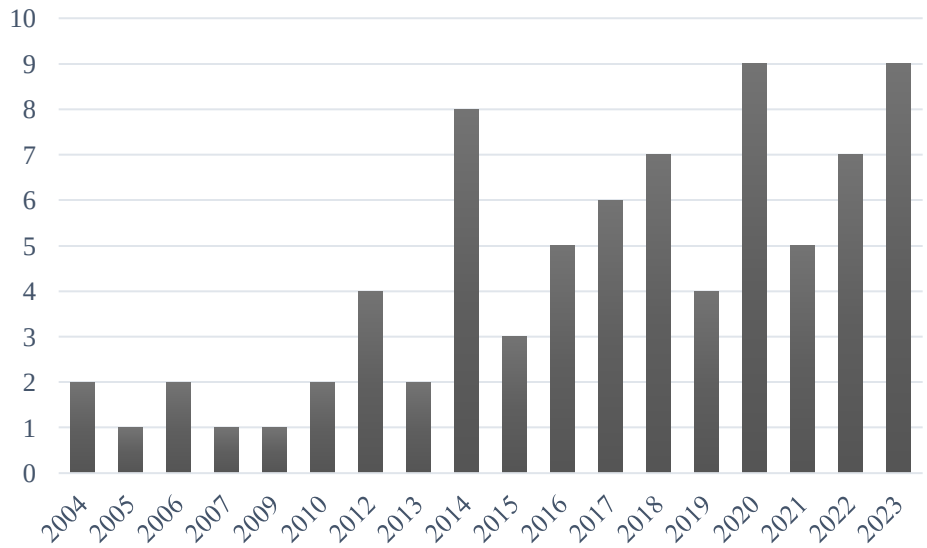
Interviews were held between May and August 2023. They were partly carried out online, via collaborative working platforms, and partly in person, taking advantage of conferences, working meetings, or other events where the experts could be met.
The interviews were conducted based on an interview protocol, which is provided in Appendix A. Using a semi-structured protocol allowed the interviews to be comparable with each other, but at the same time facilitated a frank dialogue between the interviewers and the informants, as this form of protocol enables a certain degree of freedom in conducting the interview. Interviews were recorded and transcribed to process the data afterward.
All the data in this report will be provided in a pseudonymised form to protect the personal identity of the respondents.

2.3. Results

2.3.1. Analysis of peer-reviewed literature

Of the 78 papers included in the review, the earliest articles were from 2004, while most papers were published between 2014 and 2023 (***Figure 2***).

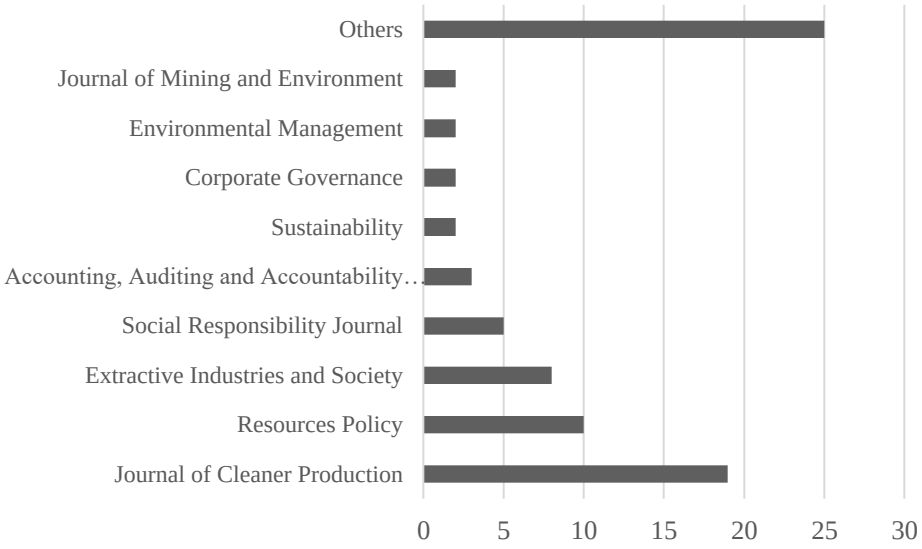
Figure 2: Yearly distribution of the papers



This temporal distribution mirrors the increasing importance of ESG issues in the mining industries. Among the journals that published the papers (***Figure 3***), the *Journal of Cleaner Production* was strongly prevalent. In 2014, it published a special issue on sustainability in the minerals and energy sector in 2014, which promoted significant interest in mining research. In addition, various other journals specifically addressed concerns of the extractive industries (*Resources Policy*, *Extractive Industries and Society*, *Journal of Mining and Environment*, etc.) together with more general-purpose journals addressing sustainability, such as the *Social Responsibility Journal*, *Sustainability*, *Corporate Governance*, etc. Lastly, some journals

specifically targeted reporting subjects (*Accounting, Auditing and Accountability Journa*l, *Meditari Accountancy Research*).

Figure 3: Sources of the papers included in the review



From a geographical perspective, countries in Africa and South America were the most frequent research objects, in line with the high economic importance of minerals and metals on these two continents. Australia was the most targeted high-income country, followed by Canada and Northern Europe (***Table 2***).

Table 2: Geographical distribution of the papers

Continent	***N***
Africa	26
South America	13
Oceania	8
Asia	5
Europe	5
North and Central America	5
Middle East	2
No specific geography	14

Among the papers, case studies were very common, thus enabling ESG mining challenges to be systematically analysed, including impacts, practices, actors, and key relationships. Typical settings of the case studies were the mine sites (in operations or after closure), towns and communities near mine sites, or firms' extraction facilities. Other studies reported content analyses of sustainability reports of one or more companies.

2.3.2. Challenges analysis

Table 3 provides the number of issues per pillar and their occurrences in the reviewed papers.

Table 3: Number of ESG issues and occurrences in the papers

Pillars	N° Challenges	Occurrences in the papers
Environmental	85	395
Social	118	453
Governance	68	177
Total	*271*	*1025*

The Environmental pillar covers the following categories: Air (85 occurrences; 22%), Biodiversity (36 occurrences; 9%), Energy (29 occurrences; 7%), Land (86 occurrences; 22%), Materials (17 occurrences; 4%), Noise (10 occurrences; 2%), Waste (42 occurrences; 11%), Water (90 occurrences; 23%). The Social pillar covers Autochthonous Peoples (28 occurrences; 6%), Local Community (215 occurrences; 48%), and Workforce (210 occurrences; 46%). The Governance pillar covers Business Ethics (57 occurrences; 32%), Corporate Structure (16 occurrences; 9%), Policies (42 occurrences; 24%), Stakeholders (49 occurrences; 28%), and Supply Chains (13 occurrences; 7%). The complete framework is provided in Appendix B.

Frequently, a strong focus on challenges was shown at the local level on all three pillars. From the environmental perspective, land impact was among the most frequently reported and often reported to be extremely severe for the local area (e.g., Essah & Andrews, 2016; Fayiah, 2020; Hennessy, 2015). From the social perspective, local communities suffered the most from the negative consequences of mining operations (Al Rawashdesh et al., 2016; Wilson, 2022), in terms of displacement and land loss, deterioration in living standards, and poor working conditions. Governance implications were also shown to be significant, since mining companies are a considerable sources of taxes or royalties for the local government (Mutti et al., 2012; Phiri et al., 2019), but at the same time these companies tend to get involved in political matters, leading to possible ethical issues, such as political interference (Duarte, 2010; Phiri et al., 2019), bribery for concessions (Lindman et al., 2020; Jenkins & Yakovleva, 2006), and conflict of interests (Lindman et al., 2020). This focus on local dynamics is closely related to the fact that mining companies are vulnerable to community opposition because they do not follow the ground rules for a respectful engagement with local communities with a view to establish trust. This is reinforced by the large up-front capital costs associated with the investments that precede the exploitation phase. Mining companies have to look for the social license to operate to prevent significant losses that can arise in the case of community opposition (Dashwood, 2007; Dashwood, 2012).

Artisanal Mining. Papers addressing artisanal mining were analysed separately in order to discuss the differences in issues reported, given the peculiarities of artisanal extraction. Artisanal mining is carried out without any formal structure by small groups of people, it is labour-intensive since it relies exclusively on manual-labour, the tools employed are basic, no environmental-control is exercised, and the activities are conducted outside of a legal recognition (Zvarivadza and Nhleko, 2018; Schwartz et al., 2021). A more comprehensive definition of ASSM can be found in D4.4 (Falck et al., 2024).

- Artisanal mining frequently results in significant environmental (E) and social (S) problems as described below:.**Environmental**: Release of of mercury in to the air andsoil, soil erosion caused by through dredging practices, contamination of local water sources;
- **Social**: increased violence and crime in the community, prevalence of drug abuse, poverty among local community, displacement of artisanal miners by larger mining companies, lack formal recognition and legal rights, leaving miners vulnerable to exploitation and displacement, child labour and forced labour practices

These findings are consistent with those of Zvarivadza and Nhleko (2018), who studied sustainability challenges of artisanal mining.

2.3.3. Analysis of the interviews

Gender, job positions, and expertise of the experts were chosen to ensure balance in the sample and a large coverage of African countries to ensure the validity of the findings. Interviews lasted approximately one hour each. Once transcribed, this resulted in nearly 200 pages of transcribed dialogues. *Appendix B* provides an overview of the interviews carried out and the features of the informants, whose identities are pseudonymized in this report.

In the interviews, the following most pressing issues raised by the sample of informants were identified:

Environmental

Water contamination

- Contamination of boreholes and water streams with mine wastes
- Mercury use (ASSM gold mining)
- Tailings reprocessing with cyanide (acid mine leaching)

Land contamination

- Uranium contamination
- Mercury and cyanide use
- Hazardous mine waste

Land use

- Lack of land rehabilitation after the mine closure
- Artisanal mining taking place after official closure
- Absence of control over land use when mining activities are informal

Social

Local community development

- Insufficient redistribution of taxes among communities

- Balance between environmental and societal needs, where poverty and ecological threats co-exist on the same land
- Short-termism of social investments
- Extreme levels of poverty and unemployment: all other sustainability problems come afterwards

Local community displacement

- Large influx of migrant workers
- Insufficient resettlement programmes
- Informal mining carried out on displaced land

Local community detriment

- Prostitution
- Health issues (HIV)
- Inflation
- Increased crime

Workforce education and development

- Generally poor education levels, especially among artisanal miners
- Lack of ability to use more sophisticated equipment
- Insufficient local training programs by mining companies

Workforce employment conditions

- Artisanal/informal conditions forced by poverty
- Absence of regulatory requirements for subcontractor workers
- Illegal migrants with no protection
- Poor salaries
- Criminality coming in with the informal mining
- Absence of job promotions

Workforce child labour (in some countries interviewed)

- School drop-out: children follow their parents into the working activities
- Children leaving school to engage in ASSM as a way to start earn money

Governance

Business ethics corruption

- Political interference
- Corruption at all stages of the mining cycle

- Corruption as normal commission to do things

Policies mine closure

- Poor policies forcing companies to restore abandoned mines
- Absence of governmental law enforcement on closure and responsibility after mine closure

Policies enforcement

- Absence of funds/government staff for enforcement
- Distance between central government and local enforcement
- Bribery of officers which compromises effective enforcement
- Absence of formalization among artisanal miners

2.3.4. ESG framework

Combining the results of the literature review and the interviews, it was possible to draw up a final ESG framework, validated based on the expert informants. Figure 4 provides a graphical representation of the framework.

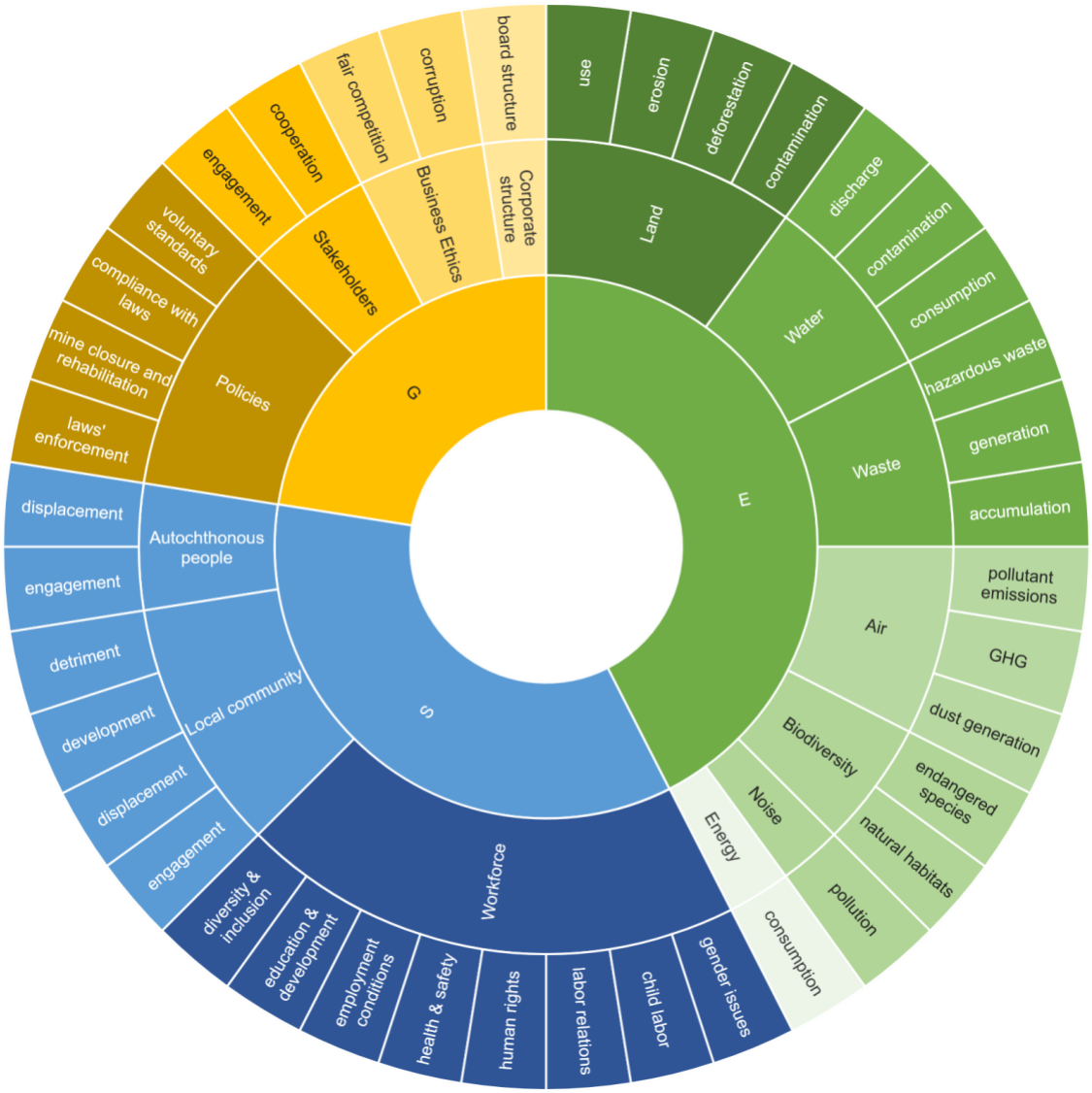


Figure 4: ESG framework

The framework assisted in the following phases of the project, namely in the identification of best practices (Best-in-Africa factsheets) and the development of guidelines for the implementation of a community based ESG framework. It proved to be a key tool in the identification of which mining project/site/organisation is working in a sustainable way, by addressing one or more of the aspects covered by the framework.

3. Best-in-Africa factsheets

3.1. Introduction

Identifying ESG-compliant practices in the African mining sector is a high priority objective of the AfricaMaVal project. Drawing directly on African mining practices, it allows to identify mining projects, extraction sites, formal and informal organisations and/or NGOs that lead by example in the reduction of negative ESG impacts of the African mining sector. This chapter deals with the assessment of ESG-compliant practices implemented in African mining sector by a variety of actors. The evaluation of best practices is based both on the regulatory frameworks as emerged in Awases et al. (2023)[5] and the mining ESG challenges mapped by desk research and interviews as detailed in Chapter 2.

As a first step, for the scope of the project and, particularly, for the correct understanding of the following pages, two key terms, i.e. community and best practice, are defined below.

- What is a *community*?

  For the purpose of this report, a community is a group of stakeholders who lives near the mine and is affected by or involved in its activities, even indirectly. Community members can relate to a mine in several ways, such as: direct workers, including informal miners; indirect workers (e.g., cooking for the miners, selling mining equipment, etc.); workers of public services around the mining town (e.g., health officers). We consider members of the community also people that do not work directly or indirectly for the mine, but are still related in some way to the mine: family members of mine workers, schoolteachers, NGOs representatives, etc.

- What is a *best practice*?

  For the purpose of this report, a best practice in the mining sector is a successful approach to the mining activities overcoming one or more of the mining-related issues mapped in the ESG framework (as shown in the above paragraph). Therefore, a practice can be defined as "best" if its goodness is recognised by several actors (e.g., the community, an NGO, the public authority, or a company). This approach is in line with the World Bank's extractive industries review (EIR) principles (EIR, 2003) and with a recent review of mining environmental best practices (Tuokuu et al., 2019), which cover the constituent elements of a sustainability best practice consisting of governance-related, stakeholder engagement-related, and environmental policy-related best practices. Thus, a candidate best practice could be:

    - a good regulation that is correctly implemented at a mining site and it is producing the expected results (e.g. the obligation to carry out a mine closure plan, which then is actually enforced);

[5] Awases Z., Georgette B., W. Falk, Musiyarira H. and Pillamarry M. (2023). Report on mining regimes with respect to ESG objectives, D4.1 AfricaMaVal project

- a management practice, implemented by a company, that is recognised by other parties as a good one (e.g. the adoption of a biodiversity conservation policy);
- a successful private agreement between two or more actors that regulates some mining activities (e.g. the implementation of a permanent dialogue with local communities);
- an informal practice recognised by experts as a good one (e.g. a successful revenue sharing scheme in artisanal mining).

The identification of mining best practices based on real implementation cases from different African countries, instead of drawing on international standards or guidelines, allows to:

- understand the real level of implementation of sustainable practices in the mining sector;
- analyse different mining contexts, ranging from large-scale mining (LSM) to ASSM in different countries and with different actors involved;
- portray the specificities of the different contexts, drawing on local and site-level factors that lead to sustainable operations, as well as recognise the commonalities among different examples;
- assess the transferability and generalisability of the best practices in order to promote wider adoption in the African mining sector, drawing from differences and commonalities observed;
- identify needs for capacity building in the communities;
- identify the role of national policies and the regulatory need where shortcomings in the legislative framework are found;
- identify the networks involved in the implementation of the best practices.

3.2. Methodology

The goal is to select candidate best practices across the whole African continent (with reference to the states identified in Awases et al., (2023)). Utmost importance was given to the AfricaMaVal case study countries, and countries with particularly promising ESG regulatory frameworks were added to the analysis. The methodology employed was the following:

1. Analysis of data already collected within AfricaMaVal: project factsheets from Christou (2022)[6], case study countries from Zammit (2024)[7], and regulatory frameworks (Awases et al., 2023).

[6] Christou N. (2022). Project fact sheets and flow analyses outlining African ECRM value chain projects-Template, D2.1 AfricaMaVal project
[7] Zammit C. (2024). Case studies report. D9.3 AfricaMaVal project

2. Targeted desk research to integrate the countries/ESG aspects not covered by Chapter 2. Conduction of online-search and identification of practices that are implemented at one or more mining sites and that are producing the expected results.
3. Collection of primary data through interviews with different actors working in the African mining sector who directly presented the sustainable practices they are implementing through their organisations. A total of 12 interviews with 11 different informants were carried out between December 2023 and July 2024, as presented in *Appendix B.*
4. From the three sources of information, the candidate best practices were selected, adopting a mainly data-driven criterion of selection.

3.3. Best-in-Africa factsheets

3.3.1. Gabon

National context:

Gabon's mining industry has been developing in recent years, and the country is the world's fourth-largest producer of manganese. Gabon also has significant reserves of iron ore, and a range of other base and rare-earth metals, including lead, zinc, copper, diamonds, niobium, titanium, and cerium. ASSM is, however, mainly concerned with gold extraction (Hollestelle, 2012), which is outside the ECRM (Extended Critical Raw Materials) list that the AfricaMaVal project targets. Good governance is a major pillar in the development of the Gabonese mining sector as outlined in Chapter II of the Mining Code. Gabon has subscribed to the majority of transparency initiatives, such as the EITI (Extractive Industries Transparency Initiative). It is well supervised at the administrative level and at the level of mining companies holding exploration permits (see Awases et al., 2023).

Gabon's ESG framework is in its nascent phase, yet the government and stakeholders are actively working to enhance the sustainability of the nation's economic practices. They are establishing legal and regulatory frameworks to foster sustainable development and tackle ESG concerns within the mining sector. The "Green Gabon" vision is the regulatory framework that aims at greening the mining sector in the country, also with respect to ASSM (The World Bank, 2012). The government has implemented regulations that require mining companies to conduct environmental impact assessments and mitigate the impacts of mining operations to protect natural resources. Moreover, regulations oversee the engagement of local communities in mining, also through the expression of consent to conduct mining in a specific area.

For the reasons stated, in Gabon there are initiatives and projects that illustrate good ESG practices in the mining sector mainly coming from the LSM sector, where large multinational companies work in compliance with the national ESG regulatory framework.

Best practices overview

Table 4: Overview of ESG best practices in Gabon

#BP	Factsheet	Mining	Pillar	ESG issue	Type of BP
BP1.1	Comilog	LSM	Environment	Land use	Management practice
BP1.2	Comilog	LSM	Environment	Water consumption and contamination	Management practice
BP1.3	Comilog	LSM	Environment	Energy consumption	Management practice
BP1.4	Comilog	LSM	Environment	Biodiversity: threat to endangered species	Private agreement
BP1.5	Comilog	LSM	Social	Local community development	Private agreement
BP1.6	Comilog	LSM	Social	Local community engagement	Private agreement
BP1.7	Comilog	LSM	Social	Workforce health&safety	Private agreement
BP1.8	Comilog	LSM	Social	Workforce education&development	Private agreement

1. Factsheet: Comilog, Moanda

Description: Comilog[8] is a Gabonese company and subsidiary of the Eramet group, a French multinational mining corporate, specialising in the extraction and processing of manganese ore. The Moanda manganese mine, located in eastern Gabon and operated by Comilog since 1962, has risen to second place in the world in terms of volumes of high-grade manganese ore. As the largest private company producing this metal, the company is at the forefront of the international scene, thus it must comply with international ESG standards to maintain its social licence to operate. This leads to the company's commitment to being a responsible and sustainable player, respecting mining and metallurgical best practice and engaging in dialogue and collaboration with its host communities and local authorities.

Figure 5: Location of the Comilog site in Gabon

Type of mining: Large Scale Mining (Open-pit)

CRMs mined: Manganese

Key figures:

[8] https://comilog.eramet.com

- Volumes of production: around 100’000 t/y of manganese oxide (2022)
- Stripping ratio: 1:1

Best practices:

1. BP1.1
    a. *Pillar:* Environment
    b. *ESG framework:* Land use
    c. *Type of BP:* Management practice
    d. *Description:* Once the ore extraction phase has been completed in a given area, the environmental team intervenes to reshape the landscape with topsoil previously set aside and the planting of plant species to restore the site to a state close to its original appearance. Part of ISO 14001 certification scheme
2. BP1.2
    a. *Pillar:* Environment
    b. *ESG framework:* Water resources use and protection
    c. *Type of BP:* Management practice
    d. *Description:* Retention structures (11 basins) have been installed to settle run-off water. Samples are taken regularly to prevent water pollution. Manganese fines, formerly discharged into the Moulili River, have been recovered and recycled at the Complexe Industriel de Moanda since 2010. The process developed enables the river to be rehabilitated. Part of ISO 14001 certification scheme
3. BP1.3
    a. *Pillar:* Environment
    b. *ESG framework:* Energy consumption
    c. *Type of BP:* Management practice
    d. *Description:* The electricity mix at Comilog's plants is to more than 80% decarbonised - Comilog has embarked on ISO 50001 energy certification to ensure that it meets its ambitious objective of developing the company's energy performance.
4. BP1.4
    a. *Pillar:* Environment
    b. *ESG framework:* Biodiversity: threat to endangered species
    c. *Type of BP:* Private agreement
    d. *Description:* Comilog has set self-imposed expansion limits on its mining operations and contributes to the preservation of local biodiversity through the Lékédi park, managed by its subsidiary Sodepal. Contribution from actors with a

worldwide reputation in biodiversity (Golder, Biotope, Missouri Botanical Garden) and external audit carried out by an environmental specialist (Ramboll, https://www.ramboll.com). The aim is to find solutions to preserve the habitat and food of the great apes present in these areas, the diversity of the flora, the forest area, etc. and to optimise the exploitation of the deposit considering these constraints.

5. BP1.5
    a. *Pillar:* Social
    b. *ESG framework:* Local community development
    c. *Type of BP:* Private agreement
    d. *Description:* Contribution to local development through salaries paid, local purchases (subcontracting), taxes, royalties, and dividends (the Gabon state is holding 28,9% of the company). Comilog invests into the societal development of local populations by creating two dedicated funds, in partnership with the Gabonese government, which finance social and training projects.
6. BP1.6
    a. *Pillar:* Social
    b. *ESG framework:* Local community engagement
    c. *Type of BP:* Private agreement
    d. *Description:* Dialogue and listening to communities: information and consultation meetings have been held regularly for a decade. Since 2018, these meetings have been stepped up as part of the Moanda mine expansion project on the Okouma plateau. They have also helped to identify the priorities and expectations of these populations in terms of health, education and economic diversification, particularly for young people. A local complaints management mechanism has also been set up so that everyone can alert the company to any concerns or incidents and put forward their suggestions.
7. BP1.7
    a. *Pillar:* Social
    b. *ESG framework:* Workforce health & safety
    c. *Type of BP:* Private agreement
    d. *Description:* Easier access to healthcare: Thanks to Comilog funding, the Marcel Abéké hospital in Moanda provides free healthcare to company employees and their dependents, as well as to the local population at moderate cost. Other measures have been taken to facilitate access to healthcare for the local population.
8. BP1.8

a. *Pillar:* Social
b. *ESG framework:* Workforce education & development
c. *Type of BP:* Private agreement
d. *Description:* Facilitated access to education through partnerships, subsidies and support for the construction of education sites.

Stakeholders involved and networking: cross-sector collaborations (McDonald & Young, 2012) seem to be carried out especially in relation to biodiversity conservation, which is a key priority in Gabon for the richness of its equatorial ecosystems:

- Collaboration with authorities, several local NGOs, environmental-specialist organisations and the populations concerned about biodiversity issues.
- Partnership with the Gabonese state to create a CSR fund to finance new development programmes for the benefit of the populations in Gabon.
- Consultation meetings reported with workers and the general local community.

Policy making: Comilog is a strong partner of the Gabonese state, having carried out mining operations for 70 years in Moanda and having a participation close to 30% of the state in its ownership structure. The Gabonese ESG regulatory framework is therefore the main source of the sustainability best practices described, given the strict compliance requirements by Comilog.

Capacity building: there seems to be a strategic integration of capacity building activities for young students of the Moanda region to educate and train a new workforce of the company and in general the management class of the country.

- Funding of the School of Mines and Metallurgy in Moanda, which opened in 2016 and aims to train young Gabonese people in careers such as geosciences, process engineering, or mining research and engineering. The school delivered its first and second batch of graduates in 2018 and 2019 respectively. Of these new graduates, more than 60% have joined Comilog's workforce.
- Qualifying vocational training offers in the construction and civil engineering trades have been developed in partnership with the Moanda technical high school for 250 young people.
- Comilog has fully subsidised the Henri Sylvoz school group in Moanda (for over 50 years), which has 1,450 students, from pre-primary to high school. A good part of the current Gabonese elite comes from this school group.

Controversies: In 2022, Comilog was accused by its employees to perpetrate discriminatory practices in payment of bonuses, by granting bonuses only to some executives. The situation followed a breakdown in dialogue between the employees and the company's general management. The employees accused their hierarchy of dragging out negotiations (for 2 years) without result.

Takeaways for Replicability & Transferability

Comilog's example in Gabon shows a successful model of LSM integration with the national government. The company and the Gabonese state have partnered for many years, and leveraging on the ESG framework of the country Comilog has stepped up a balanced portfolio of sustainability initiatives, ranging from environmental protection to responsible natural resource management, and from local community development to various forms of educational support and training. This has created a lasting legacy from Comilog to Gabon, particularly in terms of jobs created and capacity building. To replicate and transfer such practices, the model of engagement between the company and the state should be taken into consideration, as well as the fundamental support of the national regulatory framework. However, controversies regarding working conditions at Comilog site must be overcome with an ever-reinforced legislative action.

3.3.2. Madagascar

National context:

Mining in Madagascar has an important role in the economy, and it is carried out at a significant level through both, large-scale operations and through artisanal and small-scale extraction. Madagascar possesses substantial deposits of minerals such as ilmenite, chromite, coal, nickel, zircon, and graphite. The Ambatovy nickel mine, situated in the eastern part of the country, represents the largest foreign investment in Madagascar's mining sector. This mine produces nickel and cobalt, primarily exported to China, Japan, and Europe. Besides these minerals, Madagascar is also rich in gemstones, including sapphires, rubies, and emeralds. The gemstones are predominantly mined using traditional methods by local communities and are exported to various countries globally.

The ASSM sector is one of the largest employment providers in Madagascar, with an estimated 500,000 full-time and seasonal artisanal miners involved in extracting gold and precious stones, recycling sterile beryl waste to collect low-grade beryls for beryllium extraction, and recovering other substances such as mica and coltan from the waste (Awases et al. 2023). Some minerals, such as lepidolite, spodumene, coltan, bauxite, galena, and manganese, are exclusively mined by ASSM (Awases et al. 2023). Despite its significant contributions to Madagascar's economy and local livelihoods, artisanal mining has been linked to serious negative impacts on health, safety, social harmony, the environment, tax revenue, as well as issues of corruption and illicit trade.

Madagascar is one of the most fragile countries in the world, with socio-economic indicators akin to those of regions experiencing prolonged conflicts. Despite being rich in natural resources that could drive sustainable growth and development, if managed responsibly, the country faces challenges such as lack of transparency, high levels of corruption, land disputes, and human rights violations in the extractive sector. Moreover, according to Awases et al. (2023), even if the laws concerning the mining sector are generally adequate, there are often shortcomings in their

application because of insufficient human and financial resources to monitor and evaluate the activities in the field.

Mining ESG practices were of both the LSM sector and the ASSM sector as detailed below, as observed.

Best practices overview

Table 5: Overview of ESG best practices in Madagascar

#BP	Factsheet	Mining	Pillar	ESG issue	Type of BP
BP1.1	Ambatovy	LSM	Environment	Biodiversity: natural habitats	Management practice
BP1.2	Ambatovy	LSM	Social	Local community development	Management practice
BP1.3	Ambatovy	LSM	Social	Workforce education & development	Management practice
BP1.4	Ambatovy	LSM	Social	Workforce health & safety	Private agreement
BP1.5	Ambatovy	LSM	Governance	Policies: compliance with laws and voluntary standards	Regulation enforcement
BP1.6	Ambatovy	LSM	Governance	Business ethics: transparency	Regulation enforcement
BP2.1	RMI	ASSM	Governance	Stakeholders cooperation	Private agreement
BP2.2	RMI	ASSM	Social	Workforce employment conditions	Private agreement
BP2.3	RMI	ASSM	Social	Local community development	Private agreement
BP2.4	RMI	ASSM	Social	Workforce child labour	Private agreement
BP3.1	PAGE/GIZ	ASSM	Social	Local community development	Private agreement
BP3.2	PAGE/GIZ	ASSM	Environment	Land deforestation	Management practice
BP4.1	AWIM Mad	ASSM	Social	Workforce gender issues	Private agreement

1. Factsheet: Ambatovy

Description: The Ambatovy project is a nickel and cobalt mining project in the east of the country, in the Moramanga region. It is the biggest project in Madagascar's history and one of the largest foreign direct investments in the country. The project is owned by two shareholders, Sumitomo Corporation[9] and KOMIR. The site is located near the town of Moramanga. The Ambatovy project is committed to complying with international ESG standards, particularly those of the World Bank, the European Investment Bank and the Extractive Industries Transparency Initiative.

[9] https://www.sumitomocorp.com/en/global

Figure 6: Location of the Ambatovy site in Madagascar

Type of mining: Large Scale Mining (Open-pit)

CRMs mined: Nickel and Cobalt

Key figures:

- Volumes of production: 40,000 t/y of refined nickel and 4,000 t/y of refined cobalt
- Around 9'000 jobs created, directly and indirectly (90% Malagasy)
- Stripping ratio: 1.3:1

Best practices:

1. BP1.1
    a. *Pillar:* Environment
    b. *ESG framework:* Biodiversity: natural habitats
    c. *Type of BP:* Management practice
    d. *Description:* Ambatovy's biodiversity offset-strategy is based on preventing biodiversity loss. The goal is to compensate for the biodiversity losses at the mine site by preventing an equivalent amount of biodiversity loss at four offset sites, which are threatened by high deforestation rates due to shifting agriculture. To achieve this, the company, along with its NGOs partners, has implemented conservation activities aimed at reducing forest clearance at the offset sites. These activities include ecological monitoring, establishing and supporting community forest management associations with resource-use monitoring and enforcement, environmental education programmes, and promoting alternative income-generating activities in the surrounding communities. A paper published in *Nature Sustainability* suggests that, by January 2020, the mine had offset 79% (33–151%)

of the forest loss incurred at the mine site and is on track to achieve no net loss by the end of 2021 (Devenish et al., 2022).

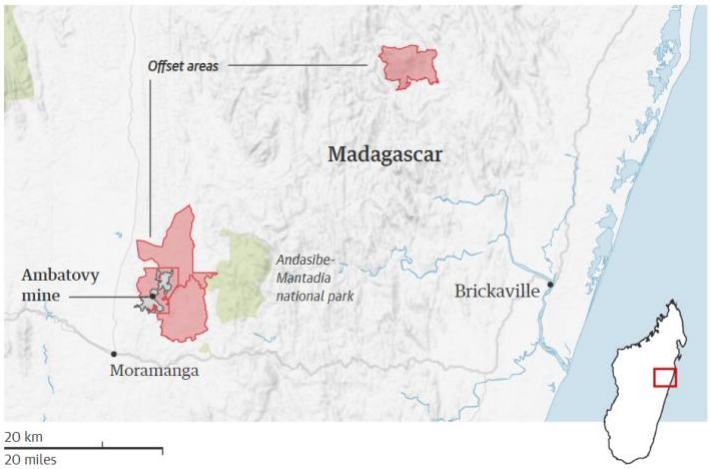


Figure 7: Ambatovy's offset areas. Source: The Guardian[10]

2. BP1.2
    a. *Pillar:* Social
    b. *ESG framework:* Local community development
    c. *Type of BP:* Management practice
    d. *Description:* Ambatovy aims to create economic and societal opportunities for local communities by promoting local employment, vocational training, infrastructure development, social services, and capacity building for civil society organisations. The Ambatovy Local Business Initiative collaborates with the Purchasing, Supply, and Contracts Services of Ambatovy to identify local companies capable of meeting the needs of the company and the market. By maximising local procurement, Ambatovy stimulates the Malagasy economy and supports entrepreneurs. To enhance the competitiveness and capacity of local enterprises, the initiative has implemented a Supplier Audit Programme and established a Supplier database, making Ambatovy one of the largest consumers of goods and services in Madagascar. This includes local manufacturing of uniforms, packaging, pallet production, and the development of local businesses to recycle Ambatovy's waste wood, industrial and cooking oils, and plastic waste.
3. BP1.3
    a. *Pillar:* Social
    b. *ESG framework:* Workforce education & development

[10] https://www.theguardian.com/environment/2022/mar/09/ambatovy-the-madagascan-mine-that-might-prove-carbon-offsetting-works-aoe

c. *Type of BP:* Management practice

d. *Description:* Ambatovy is dedicated to maximising local and national employment and developing a highly skilled local workforce. To achieve this, it offers training programmes in safety, mining and processing operations, maintenance trades, management, and leadership. These programmes ensure that Malagasy employees acquire the necessary skills for their current roles and for positions with greater technical and leadership responsibilities. Thousands of Malagasy employees and contractors have benefitted from training in construction, technical skills, health and safety, and administrative functions.

4. BP1.4
    a. *Pillar:* Social
    b. *ESG framework:* Workforce health & safety
    c. *Type of BP:* Private agreement
    d. *Description:* In line with international standards for industrial risk management, Ambatovy collaborates with regional authorities to enhance local capacity for emergency preparedness and response. This includes working with the National Office of Disaster Risk Management and supporting the establishment of Regional Committees for Industrial Risk Management in the Atsinanana and Alaotra Mangoro Regions. Additionally, they assist in the creation of Intervention Preparedness Plans (Plans de Préparation d'Intervention).
5. BP1.5
    a. *Pillar:* Governance
    b. *ESG framework:* Policies: compliance with laws and voluntary standards
    c. *Type of BP:* Regulation enforcement
    d. *Description:* Ambatovy complies with national and international laws and regulations relating to the mining sector, particularly in terms of tax, customs, environmental and social matters. In 2022, this resulted in the company to pay 44 million US$ in mining taxes & fees to the Malagasy government, accounting for 27 per cent of the country's tax revenues (Mandimbisoa, 2021).
6. BP1.6
    a. *Pillar*: Governance
    b. *ESG framework*: Business ethics: transparency
    c. *Type of BP*: Regulation enforcement
    d. *Description*: Ambatovy regularly publishes reports on its ESG performance, its economic contributions to the country, and its payments to the Malagasy government.

Stakeholders involved and networking: Ambatovy became a key asset for the Malagasy state, providing an important share of annual tax income and exports of Madagascar. Ambatovy is thus playing the typical role of the LSM project in a developing country by providing a substantial economic contribution. However, the commitment undertaken by the company is taking a highly collaborative track where the involvement of the local community is significant. The company created nearly 4'000 direct jobs, with 90% taken by Malagasy employees. Also, business collaborations seem well-rooted in the local context, with the Ambatovy Local Business Initiative exemplifying this trend.

Policy making: Ambatovy's influence on the Malagasy state cannot be denied, given the economic importance of the company. However, the state does not own any shares in the company. The 2002 Large Mining Investment Act provided legal stability to enforce an exploration permit at the site and commence the process towards extraction, which began 10 years later. Evidence of influence by Ambatovy on policy making activities is quite clear in relation to working standards, for example, in workplace health & safety matters.

Capacity building: Capacity building in Madagascar is a key feature of Ambatovy's commitment. Considering the absence of substantial LSM projects in Madagascar prior to this one, the project is actually training a local workforce in order to be able to operate with Malagasy people. However, the absence of specific skills in the country forced the company to import 10% of the workforce, which most probably occupy upper-level positions. The future capacity building challenge for Ambatovy is to provide also executive training for local employees.

Controversies: In 2017, the company was highly criticised for its local negative impacts, comprising loss of biodiversity, deforestation, poor compensation for community displacement, workplace accidents, pollution, and waste dumps affecting human health and contaminating the soil and the water (The ecologist, 2017).

2. Factsheet: Responsible Mica Initiative

Description: The Responsible Mica Initiative[11] (RMI) is an NGO that works for establishing a responsible and sustainable mica supply chain in Madagascar. In Madagascar, mica is mined in the Southern provinces of Anosy, Ihorombe and Androy, which are among the poorest on the island, in conditions of isolation, insecurity, illiteracy and extreme poverty. The combination of the socio-economic conditions and the lack of clarity of the ASSM legal framework creates an unstable environment for the mica sector, which leads to child labour, poor working conditions, poor education and healthcare, but at the same time dependence on the artisanal extraction of mica as the only source of income. In this context, RMI launched in 2022 its initiative in Madagascar with a stakeholder-involvement approach, to contribute and actively participate in the better coordination of all actors involved in the mica supply chain (local and global businesses, etc.) and with mica artisanal and small-scale mining communities (NGOs, local representatives, etc.).

[11] https://responsible-mica-initiative.com

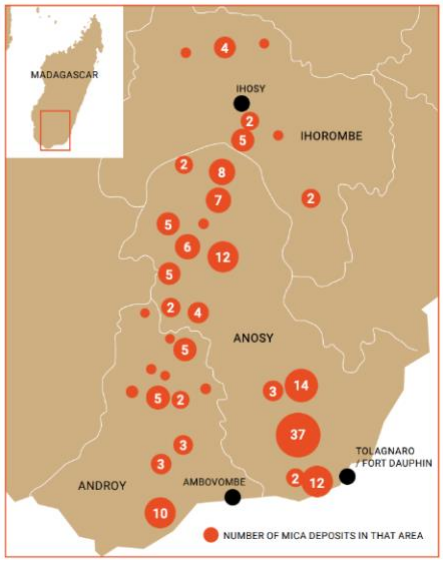


Figure 8: Location of mica artisanal mining sites in the South of Madagascar

Type of mining: Artisanal and Small Scale Mining

CRMs mined: Mica

Key figures:

- 28'500 people working in the mica ASSM sector (Anosy, Ihorombe and Androy provinces)
- 11'000 children working as artisanal miners

Best practices:

1. BP2.1
    a. *Pillar:* Governance
    b. *ESG framework:* Stakeholders cooperation
    c. *Type of BP:* Private agreement
    d. *Description:* RMI operates through a **collective approach**. This is a supply-chain wide approach that involves all the stakeholders of the value chain in the development of the standards of the mica sector. RMI facilitates this process through a traceability platform that is blockchain-based and is helping downstream members in understanding and monitoring the progresses that are made upstream of the value chain. In order to develop such an approach, the key elements are: involvement and cooperation of the two extreme actors of the chain, the manufacturers of the final products (downstream) and the miners (upstream), and leverage on international and national regulations. In the Malagasy mica case, there are some factors that facilitate it: on one hand, mica is a cheap material and this lessens downstream speculation; on the other hand, international regulation helps RMI in getting downstream members' support in changing what happens upstream,

while the Malagasy mining code explicitly recognises ASSM, facilitating the chance to formalise and get governmental support for miners. However, the key factor in miners' engagement is to work at a very local level with simple, but focused interventions, which target the real needs of the local miners.

2. BP2.2
    a. *Pillar:* Social
    b. *ESG framework:* Workforce employment conditions
    c. *Type of BP:* Private agreement
    d. *Description:* RMI is leveraging on the supply-chain wide stakeholder network in order to raise the mica price to ensure fair compensation of the artisanal miners, where fair compensation is the necessary income to have a decent life. RMI calculated that the actual average earning of a mica miner in Madagascar should be raised by a factor of five. To reach this goal, RMI is operating in two ways: on one hand, it collects the support of all actors in the supply chain such that each of the supply chain step is increasing the price up to the final products. And finally, all actors are supporting it by paying more, either for the mica that they are buying or for the component that contains mica, that they are buying. In this way, the different actors are more likely to become engaged because they are not paying directly nor losing competitiveness towards other actors not involved. The added value as a result of such an initiative finally goes to the miners, at the expense of a small increase in the price of mica components in end markets, where consumers hardly notice it.
3. BP2.3
    a. *Pillar:* Social
    b. *ESG framework:* Local community development
    c. *Type of BP:* Private agreement
    d. *Description:* RMI implements a Community Empowerment programme that helps supporting the communities in other aspects of their lives than mining itself, such as getting access to quality education, getting access to water, getting access to the public services as healthcare, getting access to proper food and nutrition. The key factor in successfully implementing such a programme is to focus on the real needs of the local population. To this end, RMI has a direct “communication channel” with the communities it works with, which is a Malagasy employee that is 100% dedicated to the dialogue with the community, equipped with a radio device that enable verbal communication with other members of the NGOs. One example of activities carried out to support the local community is helping them to do paperwork for being recognised as miners, obtaining the permits, and supporting them in revising contracts with exporters and processers. Also, RMI organises

transportation of ASM operators to the city where they can hand in the paperwork to the authorities, and transportation of government representatives to the mining sites for them to get to know the situation on the ground.

4. BP2.4
    a. *Pillar:* Social
    b. *ESG framework:* Workforce child labour
    c. *Type of BP:* Private agreement
    d. *Description:* RMI is committed to eradicate child labour from the Malagasy ASSM context. Eradicating a problem such as child labour is about the socio-economic context behind it that is causing it: it's about addressing questions of income, quality of education, food and nutrition, level of healthcare.

Stakeholders involved and networking: The collective approach of RMI is based on a stakeholder involvement that aims to include the whole mica supply chain. Particularly, RMI has developed a strong local presence in order to understand the real and most urgent needs of the artisanal miners and the communities around them. Networking activity at the community level is ensured by the presence of a Malagasy employee, who is the communication channel to gauge the needs of the miners.

Policy making: The collective approach of RMI contributes also to policy making objectives: the involvement of the whole supply chain leads to the development of the standard practices of the chain, including for example how much the upstream supply chain is remunerated.

Capacity building: RMI implements a Community Empowerment programme that is based on supporting the local communities in the complementary aspects of the mining activity. RMI does not directly provide money and financial resources to miners, but instead facilitates complementary activities such as vetting the stipulations of contracts, aiding in obtaining permits, or support in completing paperwork, as well as general activities of education. This approach is intended to build capacity inside the community rather than providing one-time financial aid.

Controversies: N/A

3. Factsheet: PAGE/GIZ and ROAM

Description: Following a series of gemology training sessions financed by the PAGE/GIZ (Programme d'Appui à la Gestion de l'Environnement) programme[12], 15 women artisanal miners in the Sakaraha district, Atsimo Andrefana region, created an association called ROAM "Roakemba Mahavelom-po", which has received its registration at the Sakaraha District level. In terms of activity, the ROAM association produces costume jewelry and cut colored and precious stones. They also sell samples of raw minerals, such as Agate, Jasper, Chalcedony, Carnelian, and Labradorite. This initiative takes place in the Sakaraha district, where gemstones are mined

[12] https://www.giz.de/en/downloads/giz2020_fr_page_madagascar.pdf

artisanally, and represents a way to create an additional income for artisanal miners to reach self-sufficiency.

Figure 9: Location of the Sakaraha district in Madagascar

Type of mining: Artisanal and Small Scale Mining

CRMs mined: Gemstones (**not CRM**)

Key figures:

- 325 miners trained in gemology
- 15 women artisanal miners became self-sufficient by creating an independent organisation

Best practices:

1. BP3.1
    a. *Pillar:* Social
    b. *ESG framework*: Local community development
    c. *Type of BP*: Private agreement
    d. *Description*: a group of 15 women artisanal miners was funded by PAGE/GIZ to create an independent organisation called ROAM, which trains women in value addition activities in order to create alternative revenue streams from the crafting of jewelry from the gemstones extracted at the mining level. This represent a best practice in terms of value creation at the local level, given that gemstones are artisanally mined in the Sakaraha District and these women carry out a processing activity from the mined output.
2. BP3.2
    a. *Pillar:* Environmental

b. *ESG framework*: Land deforestation

c. *Type of BP*: Management practice

d. *Description*: The ROAM association also carries out a reforestation programme, by refilling mine shafts and planting a tree in each refilled shaft, and is building connection with other associations for a stronger local structure.

Stakeholders involved and networking: The PAGE/GIZ project directly involves artisanal miners of the Sakaraha district to provide training.

Policy making: N/A

Capacity building: The PAGE/GIZ training sessions represented a best-in-class example of capacity building activities, which led to the creation of an organisation of women artisanal miners which, by creating value addition opportunities in the gemstones value chain, are now self-sufficient and emancipated.

Controversies: N/A

4. Factsheet: AWIM Madagascar

Description: The association of women in mining (AWIM) in Madagascar takes part in various development projects with a focus on the conditions of women and girls. AWIM is part of the Malagasy civil society movement and is deeply involved in awareness programmes, education, environmental protection and health and safety of artisanal and small scale mining. The vision of the association is to use education as a main instrument to effect a positive change in the mining sector impacting especially concerning women and girls.

Type of mining: Artisanal and Small Scale Mining

CRMs mined: Various

Best practices:

1. BP4.1

a. *Pillar:* Social

b. *ESG framework*: Workforce gender issues

c. *Type of BP*: Private agreement

d. *Description*: AWIM Madagascar is deeply involved in education and support of women in mining. The association's work plan is to deliver supportive programmes, trying to find technical partners and financial partners to fund the activities on education and training of women and girls on environmental protection, health and safety (especially silicosis), but also to provide practical aids such as menstruation kits to girls in the mining sector to reduce sexual and health issues. This is primarily performed through shareholder and stakeholder engagement, participating in public events, public consultation in order to influence

the drafting of laws and regulations for the incorporation of the voice of women in mining.

Stakeholders involved and networking: Stakeholder involvement is the first tool of AWIM Madagascar, and the stakeholder network the main asset of the association. The engagement process on the association's themes starts by raising awareness, sharing facts and figures, and then proposing good practices. Usually, the stakeholders' engagement process results in a compromise between the stakeholders' requirements and the issues the association wants to address.

Policy making: The activities of AWIM Madagascar primarily address governmental stakeholders with a view to influence the development of regulations with a view to improve the conditions of women in the mining sector and involving women at the decision-making level.

Capacity building: The first goal of the association is education and awareness-raising of women in mining, creating lasting positive benefits on the local communities in which they operate.

Controversies: N/A

Takeaways for Replicability & Transferability

Madagascar shows a handful of best practices concerning both LSM and ASSM sectors. Ambatovy's best practices demonstrate a close and successful interaction between the company, the state, and several NGOs. This has led to a best-in-class biodiversity management plan, which should be used as reference for other LSM companies operating in Africa, but critics regarding community displacement should be addressed in replicating such a model. Regarding ASSM best practices, the key takeaway regards initiatives to create added value and fair remuneration for miners. This has been reached through a supply chain-wide approach for fair remuneration by RMI and though the creation of a side income for miners by ROAM. These practices hold high transferability potential to other ASSM contexts.

3.3.3. Senegal

National context:

Senegal is rich in diverse mineral resources that have largely remained unexploited until recently. Historically, the country's mining industry focused on phosphates, industrial limestone, and attapulgite, with phosphates being a crucial part of the economy since independence in the 1960s. However, the adoption of new mining codes in 2003 and then in 2016, coupled with substantial investment promotion by the Senegalese government and its development partners, has spurred the diversification of mining activities. This includes the exploration and exploitation of gold, iron ore, uranium, and copper in the southeast, as well as the development of zircon and titanium resources along the coast (SIM, 2012). Therefore, Senegal is an example of an emerging African

mining country that leverages its political stability and a new mining code to attract foreign investments.

ASSM is legal with the possibility of obtaining permits to carry it out, but it is not permitted on land for which a mining concession has been given. However, only a few artisanal miners have obtained permits, with most operating informally. Since 2014, the Senegalese government has intensified efforts to formalize the ASSM sector, shutting down all ASSM sites that year. In early 2015, the government introduced restricted corridors for ASSM, reopening the sites within these corridors while keeping the others closed (Prause, 2016). However, ASSM activities in Senegal concern mainly gold, which not being on the ECRM list, is out of the scope of AfricaMaVal.

For the reasons stated above, we focused on initiatives and projects that illustrate good ESG practices in the LSM sector. The respective practices, in line with the new mining code, are putting efforts into reducing the negative impacts of mining operations.

Best practices overview

Table 6: Overview of ESG best practices in Senegal

#BP	Factsheet	Mining	Pillar	ESG issue	Type of BP
BP1.1	GCO	LSM	Social	Workforce education & development	Private agreement
BP1.2	GCO	LSM	Social	Local community development	Private agreement
BP1.3	GCO	LSM	Social	Local community engagement	Private agreement
BP1.4	GCO	LSM	Social	Local community displacement	Private agreement
BP1.5	GCO	LSM	Environment	Biodiversity: natural habitats	Management practice
BP1.6	GCO	LSM	Environment	Land use	Management practice
BP1.7	GCO	LSM	Environment	Water consumption	Management practice

1. Factsheet: Grand Côte Opérations

Description: The Senegalese company Grande Côte Opérations (GCO), a subsidiary of the French multinational group Eramet, specialises in the extraction and recovery of ilmenite, rutile, leucoxene, and zircon. The main commodities processed from these ores are titanium and zircon. GCO's mineral sands concession stretches 106 kilometers along the Atlantic coast and 4 km inland. The two processing plants are located in Diogo, while the mined deposit is located in the dunes in the regions of Thiès and Louga. The mine and both processing plants have been in operation since 2014. The project has succeeded in overcoming a succession of human, technical, and societal challenges that have made it possible to develop the natural resources in partnership with the country's authorities and local communities.

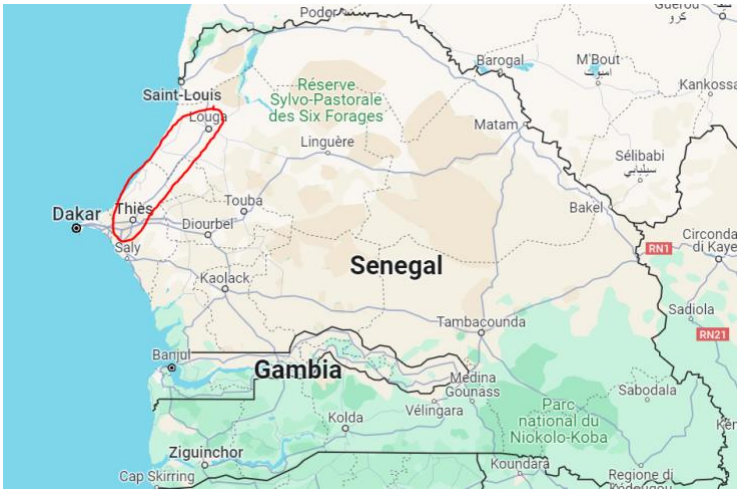


Figure 10: Location of the GCO site in Senegal

Type of mining: Large Scale Mining (dredging placer mine)

CRMs mined: Titanium (ilmenite)

Key figures:

- Volume of production: 600’000 t/y of ilmenite (2023), with a low percentage of mineral in the sand

Best practices:

1. BP1.1
    a. *Pillar:* Social
    b. *ESG framework:* Workforce education & development
    c. *Type of BP:* Private agreement
    d. *Description:* GCO has initiated training programmes to develop local skills. GCO partnered with the Ministry of Vocational Training, Learning, and Trades to train young people for future operations. Under this agreement, the National Office of Vocational Training conducted a qualification course for 300 local youths. At the same time, the Higher Institute for Vocational Learning in Thiès provided training for senior technicians. Upon completion, GCO directly hired 84 young people, with others finding employment with companies established through the project.
2. BP1.2
    a. *Pillar:* Social
    b. *ESG framework:* Local community development
    c. *Type of BP:* Private agreement
    d. *Description:* The company funds the construction and renovation of infrastructure, such as roads, railways, wells, and schools, and works to improve access to drinking

water, education, health, and agriculture as part of its Corporate Social Responsibility policy, in collaboration with local authorities and communities.

3. BP1.3
    a. *Pillar:* Social
    b. *ESG framework:* Local community engagement
    c. *Type of BP:* Private agreement
    d. *Description:* The company has ensured, that it respects the wishes of its host communities by developing a shared model that leverages the abilities and skills of all parties, working closely with the local population and local and national authorities. As part of these efforts, the company supports the development of market gardens, aligning with the region's agricultural traditions. Additionally, a new trail has been constructed in Niayes, in the northwest of the country, allowing farmers from surrounding villages easier access to their fields, enabling them to create new fields and reach markets more easily.
4. BP1.4
    a. *Pillar:* Social
    b. *ESG framework:* Local community displacement
    c. *Type of BP:* Private agreement
    d. *Description:* A Resettlement Action Plan (PAR) was created in 2011 to address the relocation of villages due to mining operations and was revised in 2016 under the authority of the Departmental Resettlement Commission, led by the Prefect of Tivaouane, the Sub-Prefect of Meouane, and the Mayor of Darou Khoudoss. The PAR has a clear objective: to ensure fair compensation for all those affected by the project. This means supporting local people by helping them to improve or at least maintain their income levels and living conditions. In order to develop a consensus-based resettlement plan, communities were actively involved in defining the resettlement process, and respectful dialogue was conducted with all stakeholders
5. BP1.5
    a. *Pillar:* Environment
    b. *ESG framework:* Biodiversity: natural habitats
    c. *Type of BP:* Management practice
    d. *Description:* GCO has committed to gradually restoring its mining sites. To achieve this, the initial studies characterised the baseline biodiversity of the area. The firm’s Environment Department’s plant nursery prioritised local species for reproduction and reintroduction. Before starting the project, a participatory approach was taken with local communities and authorities to decide which species to include in the restoration efforts. They chose filaos, cashew trees, and eucalyptus, which help

protect the dunes and produce fruit for the local communities. The sites will eventually be handed back to the Water and Forests Department.

6. BP1.6
    a. *Pillar:* Environment
    b. *ESG framework:* Land use
    c. *Type of BP:* Management practice
    d. *Description:* In collaboration with a consulting company, GCO developed an application which uses drone imaging to map GCO's mining area. The drones fly over the path the dredger is expected to follow, as well as areas already under rehabilitation, eventually covering the entire region over several flights. The captured images are transmitted almost in real time to Eramet's Azure Cloud, where deep-learning algorithms process them to identify key elements such as trees, bushes, fields, and specific buildings. This technology improves the management of vegetation surveys and monitoring of mined land, supporting rehabilitation efforts. GCO uses this tool to reduce the environmental impact of its mining activities and aid in re-vegetating the land. Moreover, the solution helps identify areas ideal for crop introduction, benefiting both the company and local communities in revitalizing the region.

7. BP1.7
    a. *Pillar:* Environment
    b. *ESG framework:* Water consumption
    c. *Type of BP:* Management practice
    d. *Description:* Recognizing that water is as vital to local communities as it is to the company, GCO places water preservation at the forefront of its environmental commitments, especially since Niayes is a key agricultural region in Senegal. During the exploration phase, GCO conducted studies on the site's aquifer systems. Since 2006, over 300 piezometers have been installed in the Quaternary shallow aquifer, and 14 wells have been drilled into the Maastrichtian deep aquifer. These observation points were designed with the local context in mind, acknowledging that the confined Maastrichtian aquifer is separated from the Quaternary aquifer by impermeable strata. The piezometers provide data on both aquifer systems, which supply water to the project. Continuous monitoring of the aquifers is conducted through these wells under the close supervision of officials. This information allows for effective groundwater management in alignment with GCO's environmental policy. Additionally, GCO employs drainage recovery units and water recycling wells to minimise the use of deep wells. These measures are part of the company's sustainable water management plan and environmental policy.

Stakeholders involved and networking: Cross-sector collaborations (McDonald & Young, 2012) are carried out both with local authorities and communities regarding social issues and with consulting companies regarding technological innovation to improve environmental management. Generally, GCO involvement with local communities and the Senegalese state's representatives seems to be priority of all CSR activities undertaken by the company.

Policy making: GCO is a strong partner of the Senegalese state, representing an important source of income for the State that owns close to 10% of its shares. Sustainability projects are carried out taking into consideration the strategic role that the social licence to operate has for GCO.

Capacity building: GCO is committed to train young people for future operations. The company's workforce is 97% Senegalese, in compliance with the traditional mining business model that directly relies on the local workforce. This also ensures a lasting legacy in terms of skills building resulting from the mining activities.

Controversies: Land expropriation from local communities was required at the beginning of the project to exploit the mineral sands, as declared by the company[13]. However, members of the Diogo community denounce that compensation has been inadequate or non-existent for those who have been forced to abandon their land. Moreover, community members affirm that GCO has restored a part of the land destroyed but given it to the Water and Forest Service, and not to the previous landowners, i.e. the Diogo community.

Takeaways for Replicability & Transferability

GCO's project in Senegal has succeeded in overcoming a succession of human, technical, and societal challenges that have made it possible to develop natural resources in partnership with the country's authorities and local communities. Moreover, this LSM case represents in Senegal a lasting legacy in terms of skills building resulting from the mining activities, which could benefit the management class of the whole country. To transfer these best practices to other contexts, however, the management of land expropriation from local communities should be addressed with proper policies that could ensure proper restoration to community members, as a critical component of social sustainability for the whole mining industry.

3.3.4. South Africa

National context:

The mining industry in South Africa traditionally plays an important role for the country and it is a key contributor to its economy, accounting for around 8% of the national GDP. The most important minerals mined are: Platinum-group metals (PGMs), manganese, chromite, and gold,

[13] https://gco.eramet.com/en/gco/our-commitments/village-resettlement/

among others. South Africa has a well-established mining and minerals policy framework that seeks to balance economic development with social and environmental considerations (Awases et al., 2023). The mining industry in South Africa is regulated by various laws and regulations, including the Mineral and Petroleum Resources Development Act (MPRDA) of 2002, which is the primary legislation governing the mining and minerals sector in South Africa.

Mining operations in South Africa are predominantly operated by large mining companies, both local and international, across various regions. Major mining companies in South Africa include Anglo American, Exxaro Resources, Sasol, Sibanye-Stillwater, Gold Fields, and Glencore, among others. However, the mining industry in South Africa has encountered challenges such as labour unrest, low commodity prices, and declining reserves. Despite these issues, the South African government remains committed to sustaining and growing the mining sector.

In South Africa, most artisanal mining occurs on mine tailings, surface areas, or at shallow depths (up to 50 meters). Critical minerals mined by ASM include chromium, bauxite, manganese, and PGMs. ASSM activities in South Africa is often not integrated into the regular economy and might not be subject to taxation or regulation like larger-scale mining operations. Nonetheless, the South African government has taken measures to formalize and regulate ASSM activities (Awases et al., 2023). Under the MPRDA, the government issues permits and licenses for small-scale mining operations, which must comply with specific regulations and requirements. Artisanal miners can form cooperatives to be registered and legalize their position, and the cooperatives act as companies by preparing and sending a business plan to the Department of Mineral Resources and Energy. However, ASSM activities conducted without a mining permit are illegal and criminalized. Illegal miners, known as “Zama zamas”, are often heavily armed and set ambushes and booby traps for employees and security panel of mining companies as well as rival groups when trespassing on operating mines. The current ASSM Policy 110 of 2022 recognizes legitimate artisanal mining, but not Zamazama activities.

Because of the recent regulatory push towards ASSM formalization, the following mining ESG practices are focused in the ASSM sector, giving particular relevance to the initiatives towards formalization for artisanal miners.

Best practices overview

Table 7: Overview of ESG best practices in South Africa

#BP	Factsheet	Mining	Pillar	ESG issue	Type of BP
BP1.1	NAAM	ASSM	Governance	Policy: compliance with laws	Regulation
BP1.2	NAAM	ASSM	Social	Workforce employment conditions	Regulation
BP1.3	NAAM	ASSM	Social	Workforce education & development	Private agreement
BP2.1	BPMC	ASSM	Governance	Stakeholders cooperation	Private agreement
BP2.2	BPMC	ASSM	Social	Workforce employment conditions	Private agreement
BP3.1	LOR	LSM/ASSM	Governance	Stakeholders cooperation	Private agreement

BP3.2	LOR	LSM/ASSM	Social	Workforce health&safety	Management practice

1. Factsheet: National Association of Artisanal Miners

Description: The National Association of Artisanal Miners (NAAM) is a South African association where artisanal miners are coming together under one banner to be formalised, as provided for the ASSM policy of 2022. This organised national body provides various benefits for artisanal miners, such as directives for cleaner production and workplace health & safety, access to fundings, legal recognition and protection against illegal miners. The association laments that artisanal miners are being brutally exploited in South Africa because of lack of recognition, while instead the ASSM sector could grow formally and becomes a key source of employment and value creation in a country that is facing an unemployment crisis. NAAM is thus a national body that provides a voice to marginalised and poor miners and that advocates and represents the historically disadvantaged African women and men from distressed mining communities.

Type of mining: Artisanal and Small-Scale Mining

CRMs mined: All present in South Africa

Key figures: The number of members of NAAM is not known, but potentially the association could reach and serve the interests of tens of thousands artisanal miners living in South Africa.

Best practices:

1. BP1.1
    a. *Pillar:* Governance
    b. *ESG framework:* Policy: compliance with laws
    c. *Type of BP:* Regulation
    d. *Description:* NAAM represents the only association of artisanal miners that currently stands in South Africa. It is a national-level organisation that artisanal miners can consult for guidance on technical, legal, financial, and ESG matters. It is, therefore, one of the few best practices found in Africa that works towards regulatory compliance in artisanal mining, as it attempts to facilitate miners to become formalized in a sector where absence of transparency and exploitation are the normal way of doing the work.
2. BP1.2
    a. *Pillar:* Social
    b. *ESG framework:* Workforce employment conditions
    c. *Type of BP:* Regulation

d. *Description:* NAAM builds on South African laws of 2002 and 2022[14] to provide a framework for artisanal miners' formalization through the formation of cooperatives. In this way, the cooperatives were created to train and educate miners who then lead other cooperatives comprising less well-educated individuals who are thus part of the cooperative, working with a permit and, hence, under legal protection, which they would not have otherwise. Moreover, cooperatives have business plans.

3. BP1.3
    a. *Pillar:* Social
    b. *ESG framework:* Workforce education & development
    c. *Type of BP:* Private agreement
    d. *Description:* NAAM, through partnerships with other organisations such as Imbokodo mining services (an ASSM consultancy operating in South Africa), provides national workshops for the miners where they are taught advocacy and awareness of the new ASSM policy of 2022. These workshops are also occasions for artisanal miners to engage with academics and NGOs, and obtain a global perspective of the ASSM phenomenon.

Stakeholders involved and networking: NAAM is an association with several stakeholders ranging from mining-affected communities to civil societies, artisanal forums, and interested and affected parties, that calls for a formalisation and decriminalisation of artisanal mining. It adopts a collaborative approach involving all possible actors: government, civil society, and large-scale mining companies.

Policymaking: NAAM's objectives include inter alia fostering public participation of artisanal miners in topics such as local economic development planning of work related to abandoned mines and tailings, rehabilitation, and land reform for improved livelihoods in rural and mining communities of South Africa. NAAM played a role in consulting the government for the enactment of the 2022 policy on ASSM, acting as a lobbyist for a traditionally poor and marginalized group of society such as the artisanal miners.

Capacity building: Education and development of artisanal miners are key objectives of NAAM, particularly in relation to governance aspects, such forming cooperatives and correctly complying with the South African national policy framework that regulates ASSM sector.

Controversies: N/A

2. Factsheet: Batho Pele Mining Cooperative

[14] RSA Department of Mineral Resources and Energy, 2002, 2022

Description: Batho Pele Mining Cooperative (BPMC)[15] is the first and biggest ASSM cooperative of South Africa. It was established in 2018 in the Northern Cape region, in the town of Kimberley. The cooperative was founded to recognise and legalise the work of the women and men extracting diamonds artisanally in Kimberley. BPMC represents also a great case of integration between ASSM and large-scale mining as the permits acquired by the cooperative since 2018 cover an area predominantly owned by the company Ekapa Mining. Right now, the cooperative has grown and obtained new mining permits outside of this area.

Figure 11: Location of the Ekapa mining sites where BPMC operates

Type of mining: Artisanal and Small-Scale Mining (shallow mine)

CRMs mined: Diamonds (**not CRM**)

Key figures:

- 800 card-carrying members and about 1,200 non-card-carrying ones

Best practices:

1. BP2.1
    a. *Pillar:* Governance
    b. *ESG framework:* Stakeholders cooperation
    c. *Type of BP:* Private agreement
    d. *Description:* BPMC managed to create a joint venture between them and a large-scale mining company, Ekapa Mining, to find a formalised mining space for its members. Ekapa was formed by 836 miners and granted more than 800 unlicensed,

[15] https://ncnn.live/gem-finds-worth-millions-in-turnover-for-kimberley-artisanal-miners/; https://www.reuters.com/article/business/in-kimberley-the-worlds-diamond-capital-illicit-mining-fight-flounders-idUSKBN1XL0J1/

or informal, small-scale miners the right to legally mine about 600 ha of diamond-rich waste fields from a 19th-century diamond rush.

2. BP2.2
    a. *Pillar:* Social
    b. *ESG framework:* Workforce employment conditions
    c. *Type of BP:* Private agreement
    d. *Description:* Members of the cooperative have access to fair sale prices for their outputs. They bring the diamonds to a tender house in Kimberley, CS Diamonds, which assures that they obtain a fair share in the sale of the stones.

Stakeholders involved and networking: BPMC was born from a cooperation between the ASSM and the LSM sector. This is a best practice in South Africa, which has been and continues to be characterised by violent conflicts between these two realities, as demonstrated by the prosecution of the violence on the Ekapa site by *zama zama* miners (see *Controversies*), even after the creation of cooperative. The violence is attributed to the inadequacy and lack of enforcement of national legislation, leading to widespread criminality as simplest way of engaging in mining activities.

Policy making: BPMC presents an important example for other South African cooperatives, as the first and biggest of the country, but also for the government, which as a leading example certainly played a role in drafting the ASSM act of 2022.

Capacity building: As member of the cooperative, each miner receives training by Ekapa aimed at skills development in the mining activity.

Controversies: Since the initiation of the Ekapa-Batho-Pele collaboration, violence on the mining ground has not stopped. Illegal miners, not part of the cooperative, have stolen fences, petrol-bombed Ekapa trucks, regularly blocked access roads with rocks and burning tires, and sabotaged a waste pipeline, leading to the shutdown of the mine processing plant. According to Ekapa, company security teams and cooperative members have faced attacks with knives, slingshots, rocks, petrol bombs, and, in one instance, a hunting rifle.

3. Factsheet: Lower Orange River Diamonds

Description: Lower Orange River Diamonds[16] (LOR) is a large-scale mining company operating in an area along the banks of the South African side of the Lower Orange River, where it holds a mining permit for a total combined area of 41,334 hectares. The company found and implemented a solution to combat illegal mining, the Community Artisanal Mining (CAM) project, with the help of and input from the Department of Mineral Resources and Energy (DMRE) and the South African Diamond Producers Organisation (SADPO[17]). The project's inception also followed numerous meetings and consultations with the surrounding villages.

[16] https://lor.co.za
[17] https://sadpo.co.za

Figure 12: Location of Orange River mining sites at the border of South Africa and Namibia

Type of mining: Large Scale Mining and Artisanal and Small-Scale Mining

CRMs mined: Diamonds (**not CRM**)

Key figures:

- 27 communal artisanal miner teams created

Best practices:

1. BP3.1
    a. *Pillar:* Governance
    b. *ESG framework*: Stakeholders cooperation
    c. *Type of BP*: Private agreement
    d. *Description*: The LOR model is based on forming joint venture partnerships with large and independent alluvial miners. The CAM teams are allocated mining areas within previously mined regions, as well as within areas contractually assigned to LOR joint venture partners. LOR Diamonds, with the support of the DMRE, legitimised the CAM bedrock-sweeping operations by establishing mining contracts with each CAM team. With community artisanal mine-workers currently active, these bedrock-sweeping operations have enabled LOR to pay market-related prices to the artisanal mine-workers, effectively eliminating illegal diamond buyers from the process. Under the previous illegal regime, diamonds were sold to intermediaries, resulting in limited financial benefits to the community, as intermediaries received the true value. The CAM project also fosters a sense of community, which is now regarded as joint venture partner. This partnership brings them under the protection and regulatory environment of LOR, including the identification of individuals who are not genuine local residents.
2. BP3.2

a. *Pillar:* Social
b. *ESG framework*: Health&safety
c. *Type of BP*: Management practice
d. *Description*: By reinvesting their profits, most CAMs have purchased motorised drills to break up the hard rock and other equipment to ease their workload. Some miners have even acquired a small lorry to navigate the difficult gravel roads they travel daily to the site. Through the profits made in the CAMs, the project supports four communities in the surrounding area.

Stakeholders involved and networking: LOR believes its CAM project can serve as a model for collaboration between mine owners and the communities in which they operate, offering employment, skills development, and sustenance opportunities in areas where such prospects are limited.

Policy making:

Capacity building: The miners which participate in the CAMs become educated in responsible mining practice, as the CAMs have a safety meeting at the beginning of each day, among the others.

Controversies: N/A

Takeaways for Replicability & Transferability

South Africa's case is of particular interest for the 2022 ASSM policy that has formalized the informal sector. Artisanal miners can form cooperatives to be registered and legalize their position, and the cooperatives act as companies by preparing and sending a business plan to the authorities. NAAM is the national association that represents artisanal miners, while BPMC is the largest cooperative that has been formed and represents diamond miners. These best practices could be extended to the case of CRMs mining as they represent a management solution to help formalize the ASSM sector: when a market for CRMs will exist, cooperatives could also start spreading regarding cobalt or other CRMs extraction. Moreover, their replicability in other African nations depends on the national legislation: countries that will opt for ASSM formalization could benefit from such existing practices.

3.3.5. Zimbabwe

National context:

Mining is a crucial part of Zimbabwe's economy, making up over 60% of annual foreign currency receipts and 13% of the gross domestic product (GDP). Zimbabwe's main commodities are gold, nickel, iron ore, lithium, tantalite, tin, wolframite, precious stones, diamonds, platinum group metals, chromium, coal, and uranium.

However, the 2022 Fraser Institute survey, considering both mineral and policy factors, ranked Zimbabwe as one of the least attractive jurisdictions in the world for mining investment. According to the Zimbabwe Economic Policy and Research Unit, companies and authorities in Zimbabwe face challenges due to inadequate infrastructure, low revenue collection, weak governance, and regulatory frameworks, as well as limited capacity to manage and maintain services. These issues hinder the provision of essential public goods such as water, sanitation, waste management, and roads, which are crucial for growth and sustainability. Zimbabwe lacks a clear mineral policy document that outlines its vision, objectives, and strategies for the mining sector. The Mines and Minerals Act of 1961 is still being revised to address the sector's current realities and challenges. While the Environmental Management Act of 2002 includes provisions for environmental protection, it is poorly enforced and monitored. The mining fiscal regime is complex and opaque, with multiple taxes, fees, and royalties creating uncertainty and inefficiency (Meck et al., 2023). Socio-economic benefits from mining are not equitably distributed, particularly among local communities affected by mining activities. Mine closure and post-mining transition are inadequately planned and funded, resulting in environmental liabilities and social issues. The Artisanal and Small-scale Mining sector, although employing around 0.5 million people, remains largely informal and unregulated, posing significant risks to the environment and the health and safety of miners and communities. ASSM is largely focused on gold production (representing 70% of the sector), while the increased market demand and prices of lithium led to a rise of artisanal extraction of this mineral (Meck et al., 2023).

For the reasons mentioned above, identifying good ESG practices in mining has been particularly challenging. In the LSM sector, there is no legal requirement to commit to sustainability, and the ASSM sector remains unregulated. However, this country offers an example of an association dedicated to training women miners in environmental, health, and safety practices.

Best practices overview

Table 8: Overview of ESG best practices in Zimbabwe

#BP	Factsheet	Mining	Pillar	ESG issue	Type of BP
BP1.1	IWMT	ASSM	Social	Workforce employment conditions	Management practice
BP1.2	IWMT	ASSM	Social	Workforce health&safety	Private agreement
BP1.3	IWMT	ASSM	Social	Workforce education&development	Private agreement

1. Factsheet: Insiza Women in Mining Trust

Description: Established in March 2020, the aim of the Insiza Women in Mining Trust[18] (IWMT) is to increase knowledge on and skills for safe mining and processing techniques that contribute to reduce the ever-increasing cases of health and safety problems of women. Particularly, IWMT

[18] https://internationalwim.org/wp-content/uploads/2022/12/kundai-research-on-ASM-zimbabwe.pdf

worked with the ASSM Amazon Community in the Filabusi area, Zimbabwe, in designing a community-led development plan.

Figure 13: Location of the Amazon Community in Zimbabwe

Type of mining: Artisanal and Small-Scale Mining (open pit)

CRMs mined: Gold (not CRM), lithium

Key figures:

- 1,908 people participating in the Amazon Community

Best practices:

1. BP1.1
    a. *Pillar:* Social
    b. *ESG framework:* Workforce employment conditions
    c. *Type of BP:* Management practice
    d. *Description:* The IWMT worked in the Amazon Community towards achieving formalisation of the miners, as only formalisation can help efforts towards introducing environmental, health, and safety measures. In order to formalise a small-scale mining site, the Zimbabwean government does not require any more an environmental impact assessment, a burden impossible to carry for artisanal miners, but only an environmental management plan, which is far cheaper. This allowed members of IWMT to help the artisanal miners in the formalisation of an artisanal extraction site in the Amazon community. The site became a small-scale mine site through the provision of mechanised tools and the 13 miners that were working artisanally have been re-skilled, operating machineries and becoming employees.
2. BP1.2
    a. *Pillar:* Social
    b. *ESG framework:* Workforce health & safety
    c. *Type of BP:* Private agreement

d. *Description:* IWMT carries out projects on health and safety in the four provinces of Zimbabwe, looking at the issues of reproductive health of women that have been affected by unsafe handling of processing chemicals on mine sites. In addition, together with the Zimbabwe School of Mines, IWMT offers short courses on first aid and on mine rescue to improve the health & safety profile of ASSM.

3. BP1.3
    a. *Pillar:* Social
    b. *ESG framework:* Workforce education & development
    c. *Type of BP:* Private agreement
    d. *Description:* IWMT rolls out training programmes to teach and capacitate women miners with skills and knowledge to promote safety, increase production and formalise their operations.

Stakeholders involved and networking: IWMT works closely not only with the miners of the Amazon Community, but also with various national and international institutions: the Zimbabwe School of Mines[19], financial institutions (the Central Bank of Zimbabwe), and the Global Advocacy Team, a global collective initiative convened by the International Accountability Project[20]. All these connections allow IWMT to have an important voice in the Zimbabwean mining sector.

Policy making: The involvement of the Zimbabwean government to improve the sustainability of the mining sector is fundamental. The room for improvement is considerable, and particularly a clear regulatory framework for ASSM formalisation could bring about real change in the working conditions of artisanal miners, consequently positively impacting also on the environment and the artisanal communities overall.

Capacity building: The IWMT activity is primarily based on providing training to the women in the Insiza district who want to be in business and to other people within the mining communities to train them in safer mining methods.

Controversies: The conditions of the Amazon Community remain critical with profound environmental and societal sustainability issues characterising the area where the community is mining, such as land degradation (including open pits all over the community), child labour, childhood pregnancies, gender-based violence, exclusion of women from mining activities, and exposure to hazardous substances.

Takeaways for Replicability & Transferability

IWMT represents a best practice from Zimbabwe that works in a very poor regulatory environment, particularly on ASSM, to increase knowledge on and skills for safe mining and

[19] https://www.zsm.ac.zw
[20] https://accountabilityproject.org

processing techniques that contribute to reducing the ever-increasing cases of health and safety problems of women. The role of IWMT is to be the intermediary between miners and institutional stakeholders, ranging from the government to the financial world. Its transferability potential is high, as the organization is based on its network rather than national frameworks. Associations such as IWMT could provide training and support all over Africa, transitioning the ASSM sector towards a more recognized status even without specific regulations.

3.3.6. Democratic Republic of Congo

National context:

"No country in the world has been as fortunate as Congo when it comes to natural wealth. Over the past 150 years, whenever there has been a pressing demand for a particular raw material on the international market – ivory in the Victorian era, rubber after the invention of the inflatable tire, copper in the midst of military and economic expansion, uranium during the Cold War, alternative energy during the oil crisis, coltan in the era of mobile telephony – Congo has demonstrated that it possesses gigantic reserves of the coveted commodity and that it can satisfy the demand without any problem. The economic history of Congo unfolds through an incredible series of strokes of luck but also of trouble. Of all those fabulous profits, usually not even a crumb reached the bulk of the population." (Van Reybrouck, 2014).

There is no more perfect description of the importance of the Congo mining industry and its consequences on the country history and the inequalities and injustices for the Congolese population, than that given in this recent book.

The Democratic Republic of the Congo's mining industry plays a crucial role in its economy, with minerals and petroleum accounting for over 90% of the country's export value (OEC, 2022). DRC is one of the countries that has enormous natural resources, like diamonds, gold and critical minerals, including copper, cobalt, lithium, tantalum, tin (OEC, 2022). DRC is responsible for more than 70% of global cobalt production (UNEP, 2022). Despite having mineral reserves valued at over tens of trillions of US dollars (US ITA, 2024), the industry faces challenges such as mass scale, unfair distribution and environmental injustices.

Mining significantly contributes to the funding of armed groups (UN Security Council, 2019), putting immense pressure on the country's biodiversity. The Virunga Park guardians, home of the mountain Gorillas, faced daily violence and high threats and risks. 170 rangers died across the last two decades[21]. The extraction of resources leads to various issues and impacts, such as poaching, pollution, deforestation, and soil erosion, all of which pose a threat to biodiversity (UNEP, 2022).

[21] https://www.nationalgeographic.com/adventure/article/wildlife-watch-virunga-rangers-deaths-poaching-militia-gorillas

In Katanga, where most of the cobalt comes from, a recent study in the town of Kolwezi showed that people living in a neighbourhood that had been transformed into an artisanal cobalt mine had much higher levels of cobalt in their urine and blood than people living in a nearby control area (Banza Lubaba Nkulu et al., 2018).

While large industrial mines dominate the sector, they heavily rely on ASSM for extracting resources. In the case of cobalt, the SSM generates about 15 to 30 per cent of DRC's supply[22]. The mining industry in the DRC has a long history dating back to the 14th century, but ongoing issues such as child labour, exploitation of labourers, and environmental impacts continue to plague the sector (Kara, 2022). As the DRC becomes a more desirable source for valuable minerals, the industry, along with non-profit organisations, is constantly evolving to address these challenges.

However, local communities often complain of displacement, lack of information, and other negative impacts. A recent report found that while there are sometimes positive cascading impacts from the installation of a mine, there are just as many. if not more negative impacts, such as the occupation of large areas of arable land, which prevents communities from practicing their normal agro-pastoral activities. This can cause food crises in the chiefdoms, environmental pollution, unemployment in the agricultural sector, job insecurity/instability for members of the agrarian local communities, and loss of cultural values (M.M.Ki, 2015). Hence, identifying some best practices in sustainable mining is difficult in DRC. Nevertheless, in the following, there is a set of best practices cases for Local Community Development. The set of best practices is located within the Ivanhoe Mines activity in DRC. This best practice has been confirmed by an informant interviewed.

Best practices overview

Table 9: Overview of ESG best practices in DRC

#BP	Factsheet	Pillar	ESG issue	Type of BP
BP1.1	Ivanhoe Mines	Social	Local community development	Management practice
BP1.2	Ivanhoe Mines	Social	Local community development	Management practice
BP1.3	Ivanhoe Mines	Social	Local community development	Management practice
BP1.4	Ivanhoe Mines	Social	Local community development	Management practice

1. **Factsheet: Ivanhoe Mines**

Description: Ivanhoe Mines[23] is a Canadian mining company focused on advancing its two principal projects in DRC, both of which are located in the south-eastern part of the country, close to the border with Zambia: the expansion of the Kamoa-Kakula Copper Complex (close to Kolwezi, Lualaba province) and the restart of the historic ultra-high-grade Kipushi zinc-copper-germanium-silver mine (Haut-Katanga province). Ivanhoe Mines is investing a considerable

[22] https://www.ft.com/cobalt1
[23] https://www.ivanhoemines.com

number of resources in projects for community development (Ivanhoe Sustainability Report 2023). Nevertheless, there are some controversies (see below).

Figure 14: Location of the sites of Kolwezi and Kipushi in DRC

Type of mining: Large Scale Mining (Kamoa-Kalula open cast; Kipushi underground)

CRMs mined: Copper (Kamoa-Kalula); Zinc-copper-germanium-silver (Kipushi).

Key figures:

- Economic Value: Kamoa-Kakula's contribution to the DRC was equivalent to approximately 6% of the country's GDP.

Best practices:

1. BP1.1
    a. *Pillar:* Social
    b. *ESG framework:* Local community development
    c. *Type of BP:* Management practice
    d. *Description:* Ivanhoe Mines has created a center for local students, the Kamoa Centre of Excellence. The higher education facility, built by Kamoa Copper, aims to produce the next generation of leaders at Kamoa-Kakula, as well as leaders for the mining industry in the DRC and beyond.
2. BP1.2
    a. *Pillar:* Social
    b. *ESG framework:* Local community development
    c. *Type of BP:* Management practice
    d. *Description:* Kamoa Copper hosted a Breast Cancer Awareness event at the Kamoa Centre of Excellence. Employees participated in educational workshops, including inspirational speeches from cancer survivors.
3. BP1.3
    a. *Pillar:* Social
    b. *ESG framework:* Local community development
    c. *Type of BP:* Management practice

   d. *Description:* Ivanhoe Mines has invested a considerable amount of resources over the past years to provide clean water through a water infrastructure across Kipushi town and through the installation and maintenance of solar-powered water wells that provide the local community with access to abundant potable water.

4. BP1.4
   a. *Pillar:* Social
   b. *ESG framework:* Local community development
   c. *Type of BP:* Management practice
   d. *Description:* Community members participate in an adult literacy programme, an initiative launched by the Kipushi project. 646 community members have benefitted from adult literacy programmes in 2023.

Stakeholders involved and networking: Ivanhoe Mines is partnering with private and public actors in carrying out its business activities. Both in Kamoa-Kakula and in Kipushi, Ivanhoe Mines is collaborating with:

- other private companies, in ordinary activities, both Chinese and Japanese, such as Zijin Mining Group, Crystal River Global, Gecamines and B-BBEE Partners, a Japanese Consortium led by Itochu.
- the Government of DRC, with a direct shareholding of 20% in Kamoa-Kakula. Parts of the revenues go directly to public authorities.
- the local communities: for instance, 91% of employees are Congolese (full-time) and Ivanhoe Mines funded community health clinics, to ensure access to free health care for near-mine communities. Moreover, Ivanhoe Mines has a specific policy for promoting local suppliers.

Policy making: the Government of DRC is directly involved in the Kamoa-Kakula mine by direct shareholding of 20% of the capital, therefore benefiting directly from the revenues. Moreover, the Revised Mining Code of 2018 imposes holders of mining rights to contribute to community development projects affected by mines with at least 0.3% of the revenue. The funds are managed by a separate legal entity held by the title holder and representatives of local communities. Holders of a mining license are also required to contribute to projects to promote socio-economic and industrial development within affected communities. Ivanhoe Mines seems to go beyond the 0.3% target.

Capacity building: the establishment of the Kamoa Centre of Excellence is a great opportunity for the community, as explained in BP1 and BP2. In addition, Ivanhoe Mines is committed to recognising training and education of employees as a material concern for internal and external stakeholders and therefore prioritising opportunities in this space. Skills transfer programmes aim to progress the local employees into managerial roles. Ivanhoe Mines is also actively expanding

the female workforce, focusing especially on gender inclusion, where traditional barriers to entry must be overcome.

Controversies: Amnesty International Canada and Initiative pour la Bonne Gouvernance et les Droits Humains (IBGDH) have spotlighted Ivanhoe Mines's activity. Amnesty International Canada claimed that Ivanhoe Mines violated human rights in the DRC by evicting hundreds of people for a copper-mining complex expansion in Kamoa, leading to abuses such as sexual assault and arson. Amnesty International and IBGDH are urging a moratorium on forced evictions in the mining sector. In addition, a group of women resettled in Muvunda told researchers they experienced skin rashes and vaginal infections after using nearby water streams.

Takeaways for Replicability & Transferability

The initiatives by Ivanhoe Mines, such as the Kamoa Centre of Excellence, clean water projects, and adult literacy programs, demonstrate effective community investment, skill-building, and support for health and education, essential strengths for mining sector best practices. However, replicability in other regions must consider potential controversies, such as the reported human rights violations and health impacts associated with resettlement. Ensuring transparent, fair relocation practices, involving communities in decision-making, and establishing independent oversight are crucial for successful transferability, allowing similar initiatives to foster positive, sustainable local impacts in diverse mining contexts.

3.3.7. Morocco

National context:

Morocco boasts a rich mineral endowment, making its mining sector a cornerstone of the national economy. The industry contributes significantly to GDP, exports, and employment. The sector's contribution to the national economy is substantial, with mining exports accounting for a significant portion of Morocco's overall export revenue, about 18% of the total value of exports in 2017, approximately $25.6 billion (USGS, 2022).

Morocco is renowned globally for its phosphate reserves, holding 75% of world's reserves (OBG, 2021). Morocco was the world's second-ranked producer of phosphate rock after China and accounted for about 11.2% of the world's phosphate rock output in 2017 (USGS, 2022). Beyond phosphates, Morocco possesses substantial reserves of other critical minerals such as cobalt, copper, lead, zinc, silver, manganese, and barite.

The Moroccan mining landscape is characterised by the coexistence of LSM and ASSM operations. LSM, dominated by state-owned and multinational companies, focuses on large-scale

extraction of minerals, particularly phosphates. OCP[24], a state-owned monopoly, dominates phosphate mining and processing, contributing significantly to the nation's wealth. Managem[25], a publicly traded company, is a key player in metal mining, operating both domestically and across Africa. Complementarily, artisanal mining thrives in the Figuig and Tafilalet regions, producing barite, coal, lead, and zinc. The government established CADETAF[26] to oversee this sector, ensuring its contribution to the economy while regulating activities. These diverse mining operations collectively represented a substantial pillar of Morocco's economic landscape. (USGS, 2022).

On the other hand, ASSM, involving individual or small groups of miners, is prevalent in extracting minerals such as lead, zinc, and barite. While ASSM contributes to the livelihoods of many, it often operates informally, with limited adherence to safety and environmental regulations (Perks, 2019).

Recognising the sector's potential environmental and social impacts, Morocco has implemented various policies to promote sustainable mining practices (Semlali et al., 2023). The government has introduced regulations to address issues, such as land degradation, water pollution, and occupational health and safety (Onhym, 2024). Efforts are underway to formalise ASSM operations and integrate them into the mainstream economy, while ensuring compliance with environmental and social standards, also strengthening the professionalisation of mining operators (Ministry of Energy, 2024).

Furthermore, the Moroccan government has prioritised the development of a value-added mining industry through beneficiation and processing of minerals domestically. This strategy aims to increase the sector's contribution to the economy and reduce reliance on raw material exports (The Africa Report, 2023; Industry Europe, 2022). The following Best Practice presented is linked to the domestically processing of minerals and based entirely on desk research data.

Best practices overview

Table 10: Overview of ESG best practices in Morocco

#BP	Factsheet	Pillar	ESG issue	Type of BP
BP1	Managem-Renault	Environmental	Local community development	Private Agreement

1. **Factsheet: Managem-Renault**

[24] https://www.ocpgroup.ma
[25] https://www.managemgroup.com
[26] https://cadetaf.com

Description: Managem, a Moroccan mining conglomerate backed by Al Mada[27], is set to construct a cobalt processing facility to meet the surging demand for electric vehicle batteries, partnering with Renault. This strategic partnership underscores Morocco's ambition to become a key player in the global electric vehicles (EV) battery supply chain. The deal can also be seen as a move by Renault and Managem to try and forge a new, more sustainable and ethical path away from the world's current dependence on the cobalt produced in the DRC (see Section 3.3.6).

Figure 15: Location of the sites of Guemassa in Morocco

Type of mining: Large Scale Mining (Processing site)

CRMs mined: Cobalt sulfate.

Key figures:

- Dimension: Potential supply of 5,000 tons of cobalt sulfate annually

Best practices:

1. BP1
    a. *Pillar(s):* Environmental, Social
    b. *ESG framework:* Land, Water (Env); Workforce, Human Rights (Soc).
    c. *Type of BP:* Management practice
    d. *Description:* Managem has secured a pivotal seven-year deal with Renault, guaranteeing a steady supply of 5,000 tons of cobalt sulfate annually. Construction of the plant is planned to commence in 2025, with the Guemassa industrial zone near Marrakech earmarked as a potential site.

Stakeholders involved and networking: The partnership is a good example of bringing more elements of the value chain to Africa, ensuring both the economic development and keeping and sharing added value in the community, where minerals are extracted, while ensuring environmental and societal sustainability.

Policy making: The agreement addressed a high interest of the national government. Morocco's Industry Minister, Ryad Mezzour, hailed the Renault agreement as a pivotal step in boosting the nation's electric vehicle sector. He emphasised Morocco's role in supplying sustainable cobalt for

[27] https://www.almada.ma

EV batteries and its ambition to become a leading EV battery producer and a global mobility player (Globenewswire, 2022).

Capacity building: The establishment of the Guemassa plant can bring training and education for the local employees. The partnership with Renault can enhance sustainability standards and expand the female workforce, favouring gender inclusion, where traditional barriers to entry must be overcome.

Controversies: Some reports have denounced the non-sustainable conditions of Managem, a supplier of cobalt to BMW and Renault, and the conditions of its workers. An investigation found high levels of arsenic in water samples and other violations of environmental and labour laws (Business Human Rights Resource Center, 2023; Reporterre, 2023).

Takeaways for Replicability & Transferability

Managem's cobalt processing facility exemplifies strong best practices in aligning mining with global sustainability goals and establishing reliable supply chains for electric vehicle production. The focus on ethical sourcing is particularly valuable for replicability in regions aiming to reduce dependency on cobalt from the DRC. However, concerns about environmental and labour standards present risks. For successful transferability, initiatives should ensure transparent environmental monitoring, enforce strict labour practices, and engage local communities, which can help maintain ethical standards and sustainable operations across diverse mining regions.

3.3.8. Namibia

National context:

Namibia's mining sector is a cornerstone of its economy, contributing significantly to GDP, export earnings, and government revenue. The economy grew by 4.2% in 2023, driven by the mining sector, including investments in oil exploration (World Bank, 2023). The country possesses a rich mineral endowment, with diamonds, uranium, and base metals being the primary drivers of the sector (US ITA, 2024).

Diamonds have historically been the backbone of Namibia's mining industry, with approximately 14% contribution of GDP between 1990 and 2018 (Republic of Namibia, 2021), with the country being a major global producer. Namibia's diamond industry is divided between Namdeb, focusing on land-based mining, and Debmarine Namibia, specializing in offshore extraction. Both are joint ventures equally owned by the Namibian government and De Beers (US ITA, 2024).

Uranium is another key mineral, with Namibia ranking among the world's top producers (US ITA, 2024). In fact, Namibia is hosting two of the world's largest uranium mines. Husab, owned by a Chinese company, was the third-largest producer in 2018 (3,028 ton), while Rössing, holding the

world's largest uranium deposit in igneous rock and primarily owned by another Chinese company, ranks fifth. Base metals, including zinc, lead, and copper, also contribute significantly to the mining sector's output.

As appears from what has been described above, Namibia's mining landscape is dominated by LSM operations, characterised by significant capital investment and advanced technology. ASM is also present, particularly in the gemstone and semi-precious stone sectors. While ASM contributes to the livelihoods of many, it often operates informally, with limited adherence to safety and environmental regulations (Musiyarira et al., 2017).

The small-scale mining sector has significant potential, but it is hindered by several obstacles. These include a shortage of funds, insufficient and outdated equipment, a lack of skilled workers, harsh working conditions, and limited rights to land (Musiyarira et al., 2017). To overcome these challenges, it is crucial to formalise the sector and include it into broader economic policies and development initiatives. This would allow the sector to access the support it needs to thrive (World Resource Forum, 2023).

Namibia recognises the importance of sustainable mining practices and has implemented various policies to address environmental and social impacts (Chamber of Mines of Namibia, 2024). The government has introduced regulations governing mining operations, including environmental impact assessments, rehabilitation plans, and community development initiatives (Republic of Namibia, 2021).

In this factsheet, the case posed as an example by the best practice guide released by a joint consortium of authority and other actors, including the Chamber of Mines, the Namibian Chamber of Environment, the Namibian Government, and members of the Namibian mining industry (Best Practice Guide, 2020) is highlighted as a best practice. Apart from this case, the Best Practice Guide itself is a good example for how to communicate to a larger audience approaches to more sustainable mining in a single country.

Best practices overview

Table 11: Overview of ESG best practices in Namibia

#BP	Factsheet	Pillar	ESG issue	Type of BP
BP1	Namibian Uranium Institute (NUI)	Environmental	Land, Water, Waste, Biodiversity, Air	Private agreement

1. **Factsheet: Namibian Uranium Institute (NUI)**

Description of the case: The Namibian Uranium Association (NUA) has implemented a strategic approach to environmental assessment and management, establishing the Namibian Uranium Institute (NUI) to promote sustainable uranium mining practices in Namibia.

Figure 16: the location of the NUI in Namibia

Type of mining: Large Scale Mining (open cast)

CRMs mined: Uranium.

Key figures:

- Economic Value: Namibia is hosting two of the world's largest uranium mines.

Best practices:

1. BP1
    a. *Pillar:* Environmental
    b. *ESG framework:* Land, Water, Waste, Biodiversity, Air
    c. *Type of BP:* Private agreement
    d. *Description:* Namibia's uranium sector, represented by the NUA, is committed to sustainable development. By embracing product stewardship, the industry aims to balance economic growth with environmental protection in the delicate Namibian desert ecosystem. This approach fosters long-term socio-economic benefits for Namibia while minimising the industry's impact.

Stakeholders involved and networking: Stakeholders include NUA members, Namibian uranium mining operations, exploration companies, contractors, government ministries, regional and local authorities, utilities, NGOs, and the International Institute for Environment and Development. Collaboration between industry and government through various activities (i.e., training, lobbying, raising awareness, etc) has been crucial in ensuring adherence to environmental standards.

Policy making implications: The case highlights the importance of voluntary industry-led initiatives for environmental protection, influencing policy development and implementation in the mining sector.

Capacity building implications: The NUI focuses on continuous development of health, environmental, and radiation safety best practices through research, training, and social responsibility, emphasizing the need for capacity building within the industry.

Controversies: While the Uranium Strategic Environmental Management Plan (SEMP) from NUI has been successful in promoting sustainable practices, challenges remain in effectively promoting the relevance of SEMP to government decision-makers.

Takeaways for Replicability & Transferability

The Namibian Uranium Association's sustainable development approach and the establishment of the Namibian Uranium Institute highlight a balanced model of economic growth and environmental stewardship. This practice showcases effective product stewardship, yielding long-term socio-economic benefits and reducing ecological impacts—especially valuable for replication in sensitive ecosystems. However, challenges in conveying the SEMP importance to decision-makers pose risks. Ensuring replicability elsewhere requires clear communication strategies and collaboration with policymakers to strengthen commitment to sustainable practices in diverse mining contexts.

3.3.9. Mozambique

National context:

Mozambique is emerging as a significant player in the global mining industry. The industry's share in the GDP jumped from 1.2 percent in 2010 to roughly 10 percent in 2020 (Statista, 2024). The government's projection of a robust 18.6% growth in the extractive industry for 2024 underscores the nation's immense potential (Chambers and Partners, 2024). While coal has been a long-standing cornerstone of the economy, the focus is increasingly shifting to other valuable resources. Graphite has now emerged as a promising resource for Mozambique, capturing world attention. Its northern provinces harbour abundant deposits essential for the burgeoning electric vehicle and energy storage sectors. Other mineral resources include bauxite, gold, tantalite, Diamonds and precious stones.

The recent admission of Mozambique to the Kimberley Process[28] is expected to stimulate further exploration and investment in the diamond sector. Overall, Mozambique's diverse mineral wealth, coupled with a favourable investment climate, positions the country as an attractive destination for global mining companies seeking to capitalise on the growing demand for critical minerals (Chambers and Partners, 2024).

[28] https://www.kimberleyprocess.com

Like many African countries, Mozambique's mining sector comprises both, LSM and ASSM. LSM, characterised by substantial investments and advanced technology, has gained traction in recent years, with multinational companies establishing operations to exploit the country's mineral riches. This sector contributes significantly to government revenue, foreign direct investment, and employment generation, especially regarding coal extraction (KMPG, 2013).

On the other hand, ASSM, involving informal and often unregulated mining activities, is widespread across the country. While providing livelihoods for many, ASSM poses challenges in terms of environmental protection, worker safety, and tax revenue collection. (IGC, 2021). In particular, the growth of the gold and gemstone sectors in Mozambique is creating tension between LSM companies and artisanal and small-scale miners. The mining law criminalises illegal mining but national policies do not offer miners training or resources to comply with the law. This lack of training fuels illegal activity, particularly in remote areas like Niassa, Cabo Delgado, and Manica, where smuggling out of products to neighbouring countries is common. The Mozambican government aims to provide specialised services to artisanal and small-scale miners, but challenges remain in allocating mining areas and enforcing regulations (Mozambique Mining Journal, 2023).

Mozambique is at a critical juncture in balancing economic growth derived from mining with environmental sustainability and social development. The government has recognised the importance of responsible mining and has enacted legislation to regulate the sector and promote sustainable practices. However, enforcement remains a challenge, particularly in ASM areas (Chambers and Partners, 2024). Key sustainability issues include land degradation, deforestation, water pollution, and the potential for conflicts over resources. Additionally, the sector's potential to exacerbate existing social inequalities is a concern. To address these challenges, the government is promoting initiatives to enhance local communities' livelihoods, invest in education and skills development, and strengthen environmental monitoring and enforcement (Chambers and Partners, 2024).

Best practices overview

Table 12: Overview of ESG best practices in Mozambique

#BP	Factsheet	Pillar	ESG issue	Type of BP
BP1	Community development agreements	Social	Local community development	Regulatory framework

1. **Factsheet: Community development agreements**

Description: In Mozambique, the government emphasises the importance of protecting local communities and promoting their socio-economic development in areas where mining activities are authorised. This includes provisions for resettlement, compensation, and job creation for

residents. Community Development Agreements for Mining Projects are foreseen by the law as part of corporate social responsibility activities of mining companies and holders of mineral rights (Chambers and Partners, 2024).

Type of mining: Large Scale Mining

CRMs mined: all minerals

Key figures:

- Economic Value: The mining industry in Mozambique grew 10 times between 2010 and 2020.

Best practices:

1. BP1
    a. *Pillar:* Social
    b. *ESG framework:* Local community development
    c. *Type of BP:* Regulatory framework
    d. *Description:* Community development agreements are foreseen under the Guide on the Implementation of the Corporate Social Responsibility Policy for the Extractive Mineral Resources Industry (Chambers and Partners, 2024). This policy mandates mining companies to implement robust CSR programmes. A core component of this is social investment, designed to drive local economic growth and sustainability. Mining companies must develop tailored social investment plans, formalised through either a Memorandum of Understanding or a Local Development Agreement. These plans will vary based on the project's stage and scale. Essentially, this policy ensures that mining operations contribute positively to the communities in which they operate, going beyond profit generation to foster sustainable development (Chambers and Partners, 2024).

Stakeholders and networking: Stakeholders involved in the regulatory framework for community development agreements for mining projects in Mozambique include the government, mining companies, local communities, and local entrepreneurs. Cooperation between these stakeholders is important to ensure compliance with regulations and promote the sustainable development of local communities.
Policy Making: The implications of the Community development agreements include the need for strict adherence to regulations to protect local communities' rights, ensure proper consultation before mining activities, and promote local economic development through preferential treatment for local businesses.
Capacity Building: The regulatory framework has implications for capacity building, as mining companies are incentivised to hire and transfer knowledge to local Mozambican workers. This can help build local capabilities and contribute to the long-term sustainable development of communities surrounding mining projects.

Controversies: One controversy surrounding the regulatory framework in Mozambique is the lack of specific legislation for vulnerable or specially protected communities. This raises concerns about the protection and rights of these communities in the context of mining projects.

Takeaways for Replicability & Transferability

Mozambique's Community Development Agreements showcase a best practice for integrating local socio-economic growth with mining operations, underscoring robust CSR through tailored social investment plans. This model supports sustainable development and fosters positive community relations, a valuable approach for mining sectors globally. However, the lack of specific protections for vulnerable communities introduces risks, highlighting the need for inclusive legislation. For replicability, other regions should adopt adaptable CSR frameworks while prioritizing strong legal protections for at-risk communities to ensure balanced, ethical mining practices across diverse contexts.

3.3.10. Tanzania

National context:

Tanzania's mining sector is a significant contributor to the national economy, providing employment, revenue, and foreign exchange earnings. Mining and quarrying accounted for roughly 7% of the Tanzanian GDP in 2020 (Statista, 2024). The country is endowed with a diverse range of mineral resources, making it an attractive destination for mining investment.

Tanzania's mineral wealth is substantial, with gold being the most prominent and valuable export. Tanzania is the 4th largest gold producer in Africa after South Africa, Ghana and Mali and is the world's sole producer of the precious stone Tanzanite (US ITA, 2024). The country is also rich in diamonds, and other minerals, such as copper, nickel, coal, and natural gas. As of 2021, nearly 500 active licensees explored over 40 types of minerals in the country (Statista, 2024).

The Tanzanian mining landscape is characterised by the coexistence of large-scale and small-scale mining operations. Large-scale mining, dominated by international mining companies, focuses on the extraction of gold, diamonds, and other high-value minerals. These operations require significant capital investment and advanced technology.

Tanzania has recognised the potential environmental and social impacts of mining and has implemented policies to promote sustainable development. Since July 2017, the Government of Tanzania has introduced significant regulatory reforms to the mining industry[29]. The government has introduced regulations governing mining operations, including environmental impact assessments, rehabilitation plans, and community development programmes. The country is also

[29] https://www.herbertsmithfreehills.com/insights/2018-09/tanzanias-new-integrity-pledge-for-mining-companies-does-it-meet-international-best

focused on increasing the value addition of its mineral resources through beneficiation and processing. This strategy aims to create jobs and generate higher revenues (Mining review Africa, 2024). The goodness of the Tanzanian regulatory framework has been recognized by the interviewees and desk research results.

However, challenges persist. Balancing the economic benefits of mining with environmental protection and social equity is an ongoing process. The sector's long-term sustainability depends on effective governance, investment in capacity building, and collaboration between the government, mining companies, and local communities. In the factsheets two regulatory framework initiatives are presented as examples of effective governance, and collaboration between government mining companies and local communities.

Best practices overview

Table 13: Overview of ESG best practices in Tanzania

#BP	Factsheet	Pillar	ESG issue	Type of BP
BP1	Promotion of Local ownership	Governance	Policies, compliance with laws	Regulatory framework
BP2	Equitable Taxation of the mining sector	Governance	Policies, compliance with laws	Regulatory framework
BP3	Fair Cobalt Alliance	Environment /Social	Local community development	No profit initiative

1. Factsheet: Promotion of Local ownership

Description: The Local Content Regulations were amended in February 2019 to include four key changes. One of the most significant changes is *that the mandatory ownership in mining companies by Tanzanian citizens was reduced* from 51% to 20%. This aims to promote local participation and ownership in the sector (Mining review Africa, 2020).

Type of mining: Large Scale Mining

CRMs mined: all minerals

Best practices:

1. BP1
    a. *Pillar:* Governance
    b. *ESG framework:* Policies, compliance with laws
    c. *Type of BP:* Regulatory Framework

d. *Description:* Tanzania has relaxed ownership requirements for foreign mining companies. In a bid to encourage greater local participation in the mining sector, the government amended its Local Content Regulations in 2019. A key change was the reduction of the mandatory Tanzanian ownership stake in mining companies from 51% to 20%. This policy shift aims to attract more foreign investment while simultaneously providing opportunities for Tanzanians to participate in the industry.

Stakeholders involved and networking: The regulatory framework of the Tanzanian mining sector concerns mining companies, Tanzanian citizens, the Mining Commission, the Local Content Committee, and Tanzanian financial institutions. Collaboration between these stakeholders is crucial for ensuring compliance with the new regulations and promoting local content in the sector.

Policy making: The policy making implications of the amended Local Content Regulations in Tanzania's mining sector include the need for increased transparency and accountability in the industry. Policy makers must work closely with stakeholders to ensure effective implementation of the new regulations and address any challenges that may arise. Additionally, there is a need for continuous monitoring and evaluation of the impact of these changes on the sector.

Capacity building: Capacity building implications of the amended Local Content Regulations in Tanzania's mining sector include the need for training programmes and skills development for Tanzanian citizens to take on executive and senior management positions in mining companies. Building the capacity of local talent will not only ensure compliance with the new regulations but also promote sustainable growth and development in the sector.

Controversies: There are some concerns about the potential impact on foreign investment and the overall competitiveness of the industry. There are debates about the effectiveness of the regulations in achieving their intended goals of promoting local participation and ownership in the mining industry.

2. Factsheet: Equitable taxation of the mining sector

Description: Tanzania has adopted an innovative approach to mining taxation based on an "equitable sharing principle". This approach involves negotiated deals between the government and mining companies to share economic benefits based on an agreed split.

Type of mining: Large Scale Mining

CRMs mined: all minerals

Best practices:

1. BP1
    a. *Pillar:* Governance
    b. *ESG framework:* Policies, compliance with laws
    c. *Type of BP:* Regulatory Framework
    d. *Description:* The sharing arrangement in Tanzania involves a 50-50 split of economic benefits between the government and mining companies once the company has recouped its initial investment. This represents a significant shift from the traditional fiscal regime outlined in Tanzanian legislation. Additionally, the arrangement includes a ceiling that limits the government's share of profit to 50 percent, which can lead to adjustments and rebalancing between the parties.

Stakeholders involved and networking: Besides actors mentioned in BP1.1, we should add mining companies, such as Barrick Gold, and industry members. The collaboration between these stakeholders is crucial for negotiating and implementing the sharing arrangements, as well as ensuring compliance with the new tax regime.

Policy Making: The sharing mechanism in mining taxation has regulatory implications for the Tanzanian government, as it requires a careful balance between attracting investment from mining companies and ensuring that the government receives its fair share of economic benefits. This may involve repeated negotiations, monitoring, and potential adjustments to the sharing arrangements to optimise government revenue in function of the performance of the mining company.

Capacity Building: Implementing the sharing mechanism in mining taxation also has capacity building implications for the Tanzanian state, particularly with a view to capabilities for effectively assessing profits and ensuring compliance with the new tax regime. This may require investment in training, technology, and appropriate regulations to enhance the government's ability to enforce tax policies and prevent tax avoidance practices.

Controversies: One of the main controversies surrounding the sharing arrangement in mining taxation is the potential impact on government revenue and lack of transparency. The ceiling on the government's share of profits could lead to adjustments and payments to rebalance between the government and mining companies, raising concerns about fluctuations in revenue and potential tax avoidance practices by companies. Finally, public information about these deals is limited, leading to questions about transparency and accountability in the sector (Thomas Scurfield, 2023).

3. Factsheet: The Impact Facility

Description: Tanzania is one of the targeted countries (e.g., DRC, Kenya, Uganda and Tanzania) by the Impact Facility[30], a social enterprise with the mission of improving the operating conditions of the artisanal and small-scale mining communities in East Africa.

Type of mining: ASSM

CRMs mined: All minerals – in particular Cobalt through the Fair Cobal Alliance.

Best practices:

1. BP1

    a. *Pillar:* Environment and Social
    b. *ESG framework:* Local community development
    c. *Type of BP:* no profit initiative
    d. *Description:* The Impact Facility is a social enterprise aimed at aiding ASSM communities in East Africa. It provides capital, equipment, and training, primarily for gold and cobalt projects in regions such as the Lake Victoria Gold Program in Kenya, Tanzania, and Uganda. By improving operational standards, The Impact Facility aims to enhance productivity and environmental practices, aligning with international standards such as the Minamata Convention on mercury reduction to support fairer and greener mining practices.

Stakeholders involved and networking: The Impact Facility collaborates with various stakeholders, including the GenEM Foundation[31], TDI Sustainability[32], and members of the Fair Cobalt Alliance[33]. These partnerships foster a broad network of support from NGOs, industry leaders, and local communities, enabling responsible investment in ASSM. Stakeholder collaboration spans training, equipment supply, and market access, benefiting miners and fostering cross-industry support for sustainable mining practices. This extensive network amplifies impact and fosters sectoral alignment on environmental and social standards across regions.

Policy Making: The Impact Facility's initiatives align with international and local policy frameworks. Through its work on the Minamata Convention on Mercury, the Facility collaborates to reduce hazardous mercury usage in ASSM. By aligning with the Fair Cobalt Alliance's governance structures, the organization contributes to safer mining and fair labour practices. These policy-driven initiatives enhance compliance with sustainability benchmarks, addressing critical environmental and labour issues in artisanal mining while advocating for regulatory improvements in the sector.

[30] https://www.theimpactfacility.com/
[31] https://genemfoundation.org/
[32] https://www.tdi-sustainability.com/
[33] https://www.faircobaltalliance.org/

Capacity Building: capacity-building efforts by The Impact Facility are central to improving livelihoods in ASSM communities. Programs deliver training on mining practices, environmental stewardship, and safety protocols, aiming to increase productivity and income for miners. Equipment financing and technical support enable artisanal miners to adopt safer and more efficient methods, aligning with sustainable resource use goals. These capacity-building initiatives are instrumental in professionalizing ASSM operations, thereby enhancing local economic stability and fostering community resilience.

Controversies: not found.

Takeaways for Replicability & Transferability

Tanzania's amendments to the Local Content Regulations and adoption of equitable sharing in mining taxation demonstrate a strong commitment to balancing foreign investment with local participation. These policies aim to boost local ownership and share economic benefits fairly between the government and mining companies. However, concerns about the effectiveness of these measures and the potential for reduced foreign investment, alongside challenges of transparency in taxation agreements, highlight risks. For replicability, other regions should tailor such policies to local needs, ensuring clear communication, public accountability, and legal frameworks to protect local communities while encouraging foreign investment. The Impact Facility's support for small-scale mining communities provides a model for sustainable, inclusive growth by improving practices in artisanal mining.

4. Guidance for the implementation of a community-based ESG framework

4.1. Goals and scope

This section aims to provide a set of guidelines for implementing an ESG framework tailored specifically to the artisanal mining sector in Africa. Based on the results of the activities conducted in WP2, both the scientific literature review, the grey desk research, and the collection of Best Practices, these guidelines aim to promote the integration of ESG principles in the mining sector in Africa, with the ultimate purpose of a sustainable development involving mining companies, governments, and local communities, improve their living conditions, and ensure the long-term viability. By leveraging existing experience collected (including the best practices exposed in section 3) and focusing on the unique contexts and challenges of African artisanal miners, these guidelines seek to foster a more sustainable and equitable mining industry. Examining the sample of best practices from various African countries reveals a diverse approach to addressing ESG challenges in the artisanal mining sector. From the analysis carried out in this specific project, no cases of best practices were found in Gabon, Senegal, while three cases were detected in Madagascar and South Africa, one each in Zimbabwe, DRC, Morocco, Mozambique, Namibia and two in Namibia.

4.2. Target stakeholders

The guidelines are primarily intended to bring benefits to the communities of artisanal miners across Africa. These communities are diverse and encompass various stakeholders, including direct workers, indirect workers, family members, local service providers, and representatives from NGOs and local authorities. Therefore, we argue that the guidelines target and might be useful for a wider population of stakeholders in the African mining sector, including:

- **Direct Workers:** This group includes individuals directly engaged in mining activities, from extracting minerals to processing and trading them. They face direct exposure to occupational hazards and environmental risks.
- **Indirect Workers:** These individuals support mining activities through ancillary services such as providing equipment, transportation, food, and other supplies necessary for mining operations.
- **Family Members:** Families of miners often rely on the income generated from mining and are affected by the working conditions, health risks, and economic fluctuations associated with the sector.
- **Local Service Providers:** Traders, shops, restaurants, bars, equipment suppliers (for sale or rent), health officers, teachers, and other public service workers who live and work in mining towns play a critical role in supporting the community's well-being.

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- **NGOs:** These entities work towards improving the mining sector's sustainability by advocating for better practices providing education and resources.
- **Local Authorities:** The main task of (local) authorities is to ensure essential infrastructure services, security, and compliance with regulations.

4.3. Guidelines for Implementing an ESG Framework in the Artisanal Mining Sector in Africa

Based on the comparative analysis of the best practices, the following guidelines are proposed for contributing to the implementation of an effective ESG framework in the artisanal mining sector in Africa:

1. **Promote multi-stakeholder collaboration for oversight of ASM and common standards and metrics (collective approach):** Effective ESG implementation requires the involvement of various stakeholders, including mining companies, local communities, NGOs, and government agencies. Collaborative efforts ensure that different perspectives and expertise contribute to sustainable practices. A practical example is the supply chain-wide cooperation promoted by RMI for the mica chain in Madagascar, which could be extended to other mineral chains through the joint work of NGOs and the various supply chain actors. Another example of a multi-stakeholder approach is represented by AWIM Madagascar, which leverages its network to deliver supportive programmes, fund the activities on education and training of women and girls on environmental protection, health, and safety (especially silicosis), and provide practical aids to mining communities.
2. **Cross-sectoral collaborations:** cross-sectoral collaborations can aid large-scale mining companies in effectively managing ESG issues that fall outside the range of their core competences. A common example is biodiversity management. Biodiversity conservation and restoration is such a complex topic from a scientific point of view that for LSM companies the involvement of specialized organizations is key in effectively addressing the issue. The collaboration can involve environmental specialized organizations, NGOs, consulting companies, and government involvement is also important for the supporting policies. A successful example is the biodiversity restoration plan of Ambatovy in Madagascar which independent researchers demonstrated as effectively able to restore biodiversity.
3. **Focus on Community Empowerment and Ownership (community development agreements):** Initiatives should prioritise community needs by providing education, healthcare, and economic opportunities. Empowering local communities ensures they can actively participate in and benefit from mining activities. An example is the Community development agreements in Mozambique, where all the parties should be involved to maximize the synergies to benefit local communities. This ranges from the government, which is responsible for promoting and enforcing the necessary regulations for the

community development agreements, to the mining companies, which should set up social investments towards local communities and entrepreneurs, receiving feedback from the affected parties on the social plans.

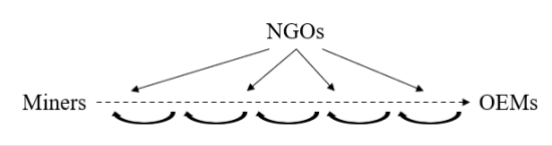
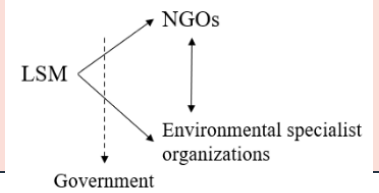
4. **Ensure Fair Compensation and Working Conditions:** Artisanal and small-scale miners should receive fair compensation that reflects their contribution and ensures a decent living standard. Improving working conditions, eradicating child labour, and ensuring occupational health & safety are crucial for sustainable development. An example from the LSM context is the Ivanhoe mining sites in DRC, where different activities have been made to enhance the working conditions of the local miners, including health facilities for the communities. An example in the ASSM context is RMI, which advocates for a supply-chain wide collective approach in which collaboration among actors guarantees that a fair remuneration of the upstream artisanal miners is passed on to the other members of the mica chain, finally resulting in a modest price increase for the final consumers.
5. **Retaining added value activities close to mining sites**: a widespread issue in the African mining sector is that the extracted minerals do not undergo any transformation processes—except for those strictly necessary on-site but are instead immediately exported to other countries for processing such as China, India, or Western countries. A good way to retain added value would be to have processing, refining, and production facilities. A notable example is the plant that will be built in Guemassa, Morocco, for electric vehicle batteries. This has been made possible by an LSM-OEMs (Original Equipment Manufacturers) partnership. Another solution is represented by the mining clusters as a strategy to build up value webs that promote the creation of skilled labour pools and facilitate knowledge spill-overs and collaboration (see Falck et al., 2024, for further details).
6. **Setting up an effective regulatory framework:** Strengthening the regulatory framework to support artisanal and small-scale mining is essential. Policies should facilitate formalisation, provide legal protections, and promote sustainable practices. Advocacy by NGOs and community organisations can drive policy changes that benefit the artisanal mining sector. A good example of an effective regulatory framework is Tanzania, recognized at the continent level, but also Senegal, where several efforts have been made in the last decade.
7. **Capacity Building for ASM operators:** It refers to providing training and development programmes to enhance the skills and knowledge of artisanal miners, and to support educational initiatives to empower the next generation of miners and community leaders. Capacity-building efforts should focus on technical skills, business management, and sustainable mining practices, ensuring miners can operate safely and efficiently while maximising economic benefits. Capacity building efforts by mining companies frequently result in setting up schools or other training facilities, which increase the level of knowledge and skills in the local population, creating, on the one hand, the needed workforce of the companies themselves, but also contributing to the management class of the entire country in which they operate. Examples are Comilog in Gabon, Ambatovy in Madagascar, Gran-Cote Operations in Senegal, and Ivanhoe in DRC. Another example of raising awareness of

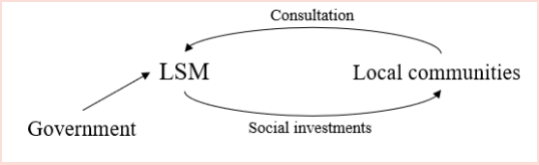
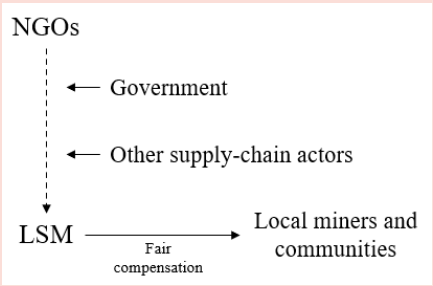
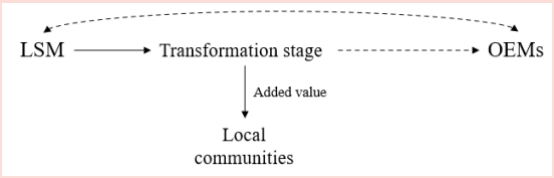
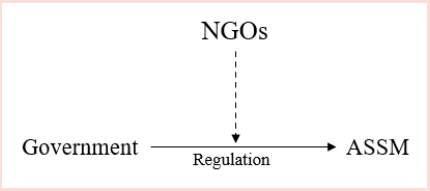
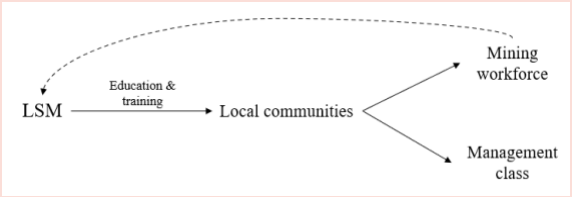
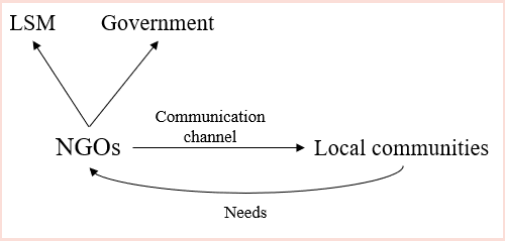
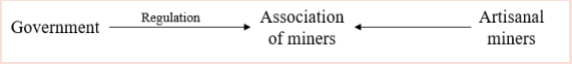
the ASM communities is represented by the activity carried on the by the Impact Facility, across East African countries.

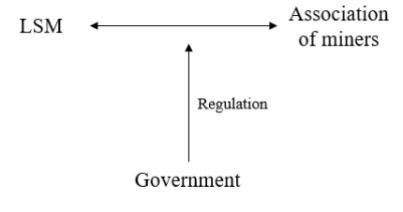
8. **Creation of local communication channels:** creating local channels of communication is a best practice to improve the chance of effectively understanding the needs and requirements of the local communities affected by mining operations. The appointment of physical persons can achieve this as message carriers between an NGO and the local communities to make the NGO communicate further the community needs to mining companies and the government, such as in the case of RMI in Madagascar, or IWMT in Zimbabwe.
9. **National-level association of artisanal miners:** this guideline is based on the bargaining power that a national-level association can enforce vis-à-vis mining companies and institutions by representing a considerable mass of associated artisanal miners and carrying forward their needs and rights, acting as a syndicate. It requires national legislation contemplating the possibility for artisanal miners to form unions, as has been the case in South Africa since 2022. This has led to the appointment of NAAM, the National Association of Artisanal Miners in South Africa, but holds great potential for replication in other African countries by following the legislative steps of the South African government.
10. **Formalized cooperations between LSM companies and ASSM associations:** the possibility of creating associations of artisanal miners in South Africa has led to the phenomenon of formalized cooperations between them and LSM companies, formalizing a relationship that exists throughout Africa where artisanal mining happens alongside large-scale concessions, and it is tolerated since the two activities can be seen as complementary (frequently artisanal miners reprocess LSM tailings). In the examples of BPMC and LOR in South Africa, these collaborations have been formalized as joint ventures.

Table 14 presents the actors required to implement the above guidelines, their beneficiaries, and the model of interaction between responsible actors and beneficiaries.

Table 14: Overview of actors involved in the guidelines and their interactions

# Guideline	Responsible actors	Beneficiaries	Model of interaction	Ref. Factsheets
1. Multi-stakeholder Collaboration	NGOs Whole value chain actors, from miners to OEMs	Whole value chain actors, from miners to OEMs		AWIM RMI
2. Cross-sectoral Collaboration	LSM, NGOs, Environmental org., Government	Local communities Environment		GCO Ambatovy Comilog

3. Community Development Agreements	LSM, Government	Local Communities		Mozambique
4. Fair compensation	LSM, Government, NGOs, other supply chain actors	Local miners Local communities		RMI Ivanhoe
5. Retaining added value	LSM, OEMs, other supply chain actors	Local communities LSM, OEMs, other supply chain actors		Managem
6. Regulatory framework for ASSM	Government, NGOs	Artisanal miners		Tanzania Senegal
7. Capacity Building	LSM	Local communities Society at large LSM		GCO Ambatovy Comilog Ivanhoe The Impact Facility
8. Communication channels	NGOs	Local communities LSM Government		RMI IWMT
9. National association of miners	Government Artisanal miners	Associations of miners Artisanal miners		NAAM

10. Formalized cooperations LSM-ASSM	LSM, ASSM Government	LSM Associations of miners		BPMC LOR

5. Conclusions

This report represents the output of the deliverable 4.2 of the AfricaMaVal project and has focused on the development of Environmental, Social, and Governance best-in-Africa factsheets and the creation of guidelines for the implementation of a community-based ESG framework for the artisanal and small-scale mining sector in Africa. The factsheets and the guidelines, in addition, aim at helping European investors to find criteria for sustainable investments and best-in-class cases of sustainability in the African mining industry.

After an initial investigation of the main ESG issues of the sector, carried out through a systematic literature review of scientific papers, an ESG framework was constructed to guide the following analysis and identification of the best-in-Africa factsheets. Particularly, each case analysed was deemed appropriate to report if addressing one of the issues of the ESG framework. Upon this methodological basis, 10 best-in-Africa factsheets were made regarding the following target African countries: Gabon, Madagascar, Senegal, South Africa, Zimbabwe, Democratic Republic of Congo, Morocco, Namibia, Mozambique and Tanzania. The main findings are briefly reported below.

Comilog's long-standing partnership with the Gabonese government has created a balanced portfolio of environmental and social initiatives; however, controversies surrounding working conditions suggest that stronger legislative support and oversight are needed to protect labour rights fully. Similarly, Madagascar's Ambatovy project demonstrates a successful collaboration between the company, government, and NGOs, particularly through a leading biodiversity management plan. Yet, critiques regarding community displacement call for careful consideration of local impacts in replicating this model to avoid negative social consequences.

In Senegal, GCO's partnership with authorities has facilitated skill development and capacity-building, leaving a lasting legacy, though issues of land expropriation for mining activities remain problematic. Proper policies to ensure fair compensation and restoration for affected communities are critical for achieving social sustainability. South Africa's recent policy formalizing ASSM has enabled artisanal miners to legalize their operations through cooperatives, a model with potential for scaling to critical raw materials mining. Yet, its replicability is contingent upon other nations' willingness to formalize the informal sector and provide supportive regulatory frameworks.

Zimbabwe's IWMT operates within a challenging regulatory environment to enhance safety and skills for artisanal miners, notably women, by acting as an intermediary between miners and stakeholders. While the model's reliance on networks rather than national frameworks grants it transferability across Africa, it also underscores the need for consistent regulatory support to ensure lasting improvements.

In the DRC, Ivanhoe Mines' investments in education, clean water, and literacy emphasize the importance of community-centered approaches in mining. However, challenges around human rights underscore the need for fair relocation practices and robust community engagement to ensure sustainable, replicable outcomes. Similarly, Morocco's Managem has shown that ethical

sourcing can build responsible supply chains, though replicability demands vigilant environmental monitoring and labour protections to ensure sustainability across diverse regions.

Namibia's approach to uranium mining, led by the Namibian Uranium Association, combines economic growth with environmental stewardship, offering a model for mining in ecologically sensitive areas. Successful replication of this model requires ongoing collaboration with decision-makers to secure commitment to environmental strategies, even where awareness may be limited. In Mozambique, Community Development Agreements facilitate socio-economic growth through CSR initiatives. However, the absence of specific protections for vulnerable communities indicates the need for inclusive legislation to make these agreements universally applicable.

Policies promoting local ownership and equitable profit-sharing in Tanzania set a precedent for blending foreign investment with local benefit. To replicate these gains, other regions should prioritize transparency, clear legal frameworks, and mechanisms to prevent potential tax evasion. Additionally, Tanzania's Impact Facility provides an innovative template for supporting small-scale miners, offering training and resources that improve productivity and align with international environmental standards, which can be adapted for artisanal mining communities elsewhere.

Collectively, these examples emphasize that while multi-stakeholder collaboration, adaptable policies, and fair resource management offer significant benefits, addressing labour, displacement, and regulatory gaps remains essential for genuinely sustainable and transferable mining practices across the continent.

5.1. Limitations

The present report acknowledges some limitations due to the nature of the methodology employed. Firstly, the selection of the best practice cases was mainly informed by the words of the interviewees who were asked for cases of mining best practices known by them, thus potentially exposing the analysis to selection biases. Secondly, the LSM cases included in this report were drawn from desk research, thus relying on available secondary data. The information was extracted from companies' sustainability reports, NGOs' reports, news agencies, and media reports. It should be acknowledged that these data sources can be biased by impression management tactics, lack of transparency, and uncertainty with respect to informants' representativeness.

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Appendices

A.Interviews' Protocol

A	Introduction
1	Introduction to AfricaMaVal project, consent for recording, etc
2	The interviewee introduces himself and his background
3	Presentation of the organization which the interviewee work in. What is the position/role of your organization in the Mining supply chain?
4	Presentation of our activity
B	**ESG challenges**
5	Based on your past experiences, and considering the framework that we exposed, which were the major (**E/S/G**) challenges you dealt with working in the mining sector?
6	What are the causes of the overmentioned challenges?
7	Who are the actors that can manage and solve the challenges?
8	What are the possible solutions you envisage as the best for the challenges?
9	What is the evolution in the last decade of the challenges mentioned in the mining sector?
10	Regarding the countries you worked in, which are the major and more impacting challenges you experienced?
11	Do you think these challenges are specific of the country XY or they can be attributed to other countries as well?
C	**Best practices**
12	Based on your experience, what are the existing best practices regarding the overmentioned challenges?
D	**Closure**
13	Are there any colleagues or expert you think we need to interview?
14	Is there something more that you think could be helpful to us?

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B. Interviews' Informants

Interviews' informants (first phase)

Informant	Gender	Job position	Countries of expertise	Fields of expertise
1	Female	Public officer	Namibia, Ghana	Mining exploration environmental issues
2	Male	Consutant	Kenya, Uganda, Tanzania, DRC	ASSM
3	Female	Consultant	South Africa, Ghana, Senegal, Guinea, DRC	ES impact assessment, environmental regulation, waste and water management
4	Male	Professor	Malawi, Zambia, South Africa	Policy issues and regulation of the mining sector
5	Female	Consultant	South Africa, Tanzania, DRC, Zimbabwe	ASSM
6	Female	Public officer	Ethiopia, Rwanda, Mozambique	Policy and Technical Advisory Services, Minerals, International Development
7	Male	Public officer	Uganda	Policy, African strategy for minerals and green manufacturing
8	Female	Professor	South Africa, Mali, DRC	ASSM and land issues
9	Male	Public officer	Ghana, Nigeria, Liberia, Sierra Leone, Chad	Policy analysis and mineral sector regulation
10	Female	Consultant	South Africa, Tanzania, Zimbabwe	Mining exploration environmental issues

Interviews' informants (second phase)

Informant	Gender	Job position	Countries of expertise	Fields of expertise
1	Female	NGO representative	Namibia	Environmental & Social issues, ASSM
2	Male	NGO representative	Madagascar	Mica industry, supply chain sustainability
3	Female	NGO representative	Tanzania	Environmental & Social issues, ASSM
4	Female	NGO representative	Tanzania	Environmental & Social issues, ASSM
5	Female	Consultant	South Africa	ASSM
6	Female	NGO representative	Zimbabwe	Environmental & Social issues, ASSM regulation
7	Female	NGO representative	Mozambique	Environmental & Social issues, ASSM, gender issues in mining
8	Female	NGO representative	Madagascar	Environmental & Social issues, ASSM
9	Female	NGO representative	Madagascar	Environmental & Social issues, ASSM, gender issues in mining

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10	Male	NGO director	DRC	Cobal industry, human rights in extractive sectors
11	Female	Artisanal miner	Mozambique	ASSM

C.ESG framework from the literature review

Environment.

Category	Aspect	Impact	References
Land			Labuschagne et al. (2005)
	Contamination		
		Heavy metals	Salom and Kivinen (2020)
		Nitrogen	Essah and Andrews (2016)
		Potassium	Essah and Andrews (2016)
		Calcium	Essah and Andrews (2016)
		Mercury	Essah and Andrews (2016), Yakovleva and Vazquez-Brust (2018), Kamga et al. (2018)
		Cyanide	Essah and Andrews (2016), Kamga et al. (2018)
		Toxic releases	Nyakuwanika et al. (2021)
		Tailings dam	Nyakuwanika et al. (2021)
		Reduced Fertility	Wilson (2022), Fayiah (2020),
		Loss of structure	Fayiah (2020), Babi et al. (2016), Kamga et al. (2018)
		Altered composition	Fayiah (2020)
		Pollution	Babi et al. (2016), Mària et al. (2012),
		Salinization	Babi et al. (2016)
		Acidification	Babi et al. (2016), ,
	Use		Nyakuwanika et al. (2021)
		Visual pollution	Salom and Kivinen (2020),
		Loss of biodiversity	Arthur et al. (2017), Fayiah (2020)
		Alteration of landscape	Fayiah (2020), Moomen (2017), Kamga et al. (2018),
	Deforestation	Loss of agricultural land	Fayiah (2020) Nyakuwanika et al. (2021), Fayiah (2020), Moomen (2017), Andrews and Essah (2020), , Galli et al. (2022)
		Vegetation clearance	Babi et al. (2016), Kamga et al. (2018),
	Erosion		
		Rocks removal	Fayiah (2020)
		Open pits	Fayiah (2020), Kamga et al. (2018)
		Sinkholes	Fayiah (2020),
		Mining sediments	Fayiah (2020)
Water			Fuisz-Kerhbach (2015), , Labuschagne et al. (2005)
	Consumption		Nyakuwanika et al. (2021) Wilson (2022), Andrews and Essah (2020), , Galli et al. (2022)
		Withdrawals	Arthur et al. (2017), Ackers and Grobbelaar (2022)
		Water scarcity	Ackers and Grobbelaar (2022)
	Contamination		Nyakuwanika et al. (2021), , , Fayiah (2020),
		Heavy metals	Salom and Kivinen (2020), Babi et al. (2016)
		Arsenic	Andrews and Essah (2020)
		Mercury	Andrews and Essah (2020),
		Cyanide	Andrews and Essah (2020)
		Acid drainages	Salom and Kivinen (2020), Babi et al. (2016), Andrews and Essah (2020),
		Alteration of water sources quality	Ololade and Annegarn (2013), ,
		Pollution of local water sources	Wilson (2022), , , Moomen (2017), Kamga et al. (2018), Mària et al. (2012), Galli et al. (2022)
	Discharge		Arthur et al. (2017), Ackers and Grobbelaar (2022)
		Processing water	Lauwo et al. (2016)
	Accumulation	Loss of biodiversity	Arthur et al. (2017
		Dredging pond	Fayiah (2020)
		Flooding of surrounding villages	Fayiah (2020)
Air			Labuschagne et al. (2005)
	Pollutant emissions		Nyakuwanika et al. (2021),
		Particulates	Lauwo et al. (2016), ,
		Sulphur oxides	Lauwo et al. (2016), Arthur et al. (2017), Ackers and Grobbelaar (2022)

		Ozone-depleting substances	Arthur et al. (2017), Ackers and Grobbelaar (2022)
		Mercury	Lauwo et al. (2016), , Yakovleva and Vazquez-Brust (2018), Andrews and Essah (2020)
		Nitrogen oxides	Arthur et al. (2017), Ackers and Grobbelaar (2022)
		Arsenic	Andrews and Essah (2020)
		Cyanide	Andrews and Essah (2020)
		Carbon monoxide	Lauwo et al. (2016)
		Alteration of air quality	Ololade and Annegarn (2013)
		Local pollution	Machanguana and Sardinha (2021), Wilson (2022), Fayiah (2020), Babi et al. (2016), Kamga et al. (2018), Mària et al. (2012),
	GHG emissions		Arthur et al. (2017), Ackers and Grobbelaar (2022), ,
	Dust generation		Salom and Kivinen (2020), , , Babi et al. (2016), Kamga et al. (2018), Andrews and Essah (2020)
Biodiversity			Fuisz-Kerhbach (2015)
	Natural habitats destruction		Nyakuwanika et al. (2021),Arthur et al. (2017), Fayiah (2020), , Kamga et al. (2018)
		Acid drainages	Babi et al. (2016)
		Loss of biodiversity	Salom and Kivinen (2020),
	Threat to endangered species		Arthur et al. (2017)
Energy			Fuisz-Kerhbach (2015), , Labuschagne et al. (2005),
	Consumption		Arthur et al. (2017), Ackers and Grobbelaar (2022),
Materials			Fuisz-Kerhbach (2015), Labuschagne et al. (2005)
	Consumption		
		Non-renewable	Arthur et al. (2017)
		Recycled	Arthur et al. (2017)
Waste			Fuisz-Kerhbach (2015)
	Accumulation		Arthur et al. (2017)
		Dumps	Nyakuwanika et al. (2021)
		Waste rock piles	Ackers and Grobbelaar (2022)
		Tailings dam	Ackers and Grobbelaar (2022)
		Sludges	Ackers and Grobbelaar (2022)
	Generation		
		Acid drainages	Nyakuwanika et al. (2021)
		Waste spills	Arthur et al. (2017), Ackers and Grobbelaar (2022)
	Generation of hazardous waste		Arthur et al. (2017), Ackers and Grobbelaar (2022)
		Toxic releases	Salom and Kivinen (2020), Lauwo et al. (2016),
Noise			
	Pollution		Fayiah (2020), , Kamga et al. (2018), Andrews and Essah (2020),
		Vibrations	Nyakuwanika et al. (2021)

Social.

Category	Aspect	Impact	References
Autochthonous people			
	Engagement		
		Violation of native rights	Arthur et al. (2017), Ackers and Grobbelaar (2022)
		Social conflicts	
	Displacement		
		Operations taking place in or near to native land	Ackers and Grobbelaar (2022)
Local community			
	Detriment		
		Health impacts of operations	Ololade and Annegarn (2013), Ackers and Grobbelaar (2022),

		Militarization	Fayiah (2020)
		Prostitution increase	Fayiah (2020)
		Social conflicts	Yakovleva and Vazquez-Brust (2018)
		Violence and crimes	Fayiah (2020),
	Development		Arthur et al. (2017)
		Artisanal miners employment	Mària et al. (2012)
		Basic services: education, healthcare, housing, sanitation, sport, water	Buddu and Scheepers (2022), Cortes et al. (2014), Essah and Andrews (2016), Wilson (2022), Mària et al. (2012)
		Childhood education	Cortes et al. (2014), ,
		Economic development	Essah and Andrews (2016), Mària et al. (2012)
		Investment in agriculture	Cortes et al. (2014), Wilson (2022)
		Local business development	Mària et al. (2012),
		Local employment	Essah and Andrews (2016), Wilson (2022), Yakovleva and Vazquez-Brust (2018), , , , ,
		Local infrastructures: airport, electricity plant, roads	Buddu and Scheepers (2022), Cortes et al. (2014), , Wilson (2022),
		Profit sharing	Machanguana and Sardinha (2021)
		Women mining in residual areas	Wilson (2022)
		Increased cost of living	
		Poverty	Yakovleva and Vazquez-Brust (2018)
		Quality of life	Phiri et al. (2019)
		Violation of livelihood rights	Machanguana and Sardinha (2021), Fayiah (2020), Phiri et al. (2019)
	Displacement		Nyakuwanika et al. (2021),Lauwo et al. (2016), Fayiah (2020),
		Absence of resettlement plans	Machanguana and Sardinha (2021), Andrews and Essah (2020)
		Dislocation of villages	Fayiah (2020), Andrews and Essah (2020)
		Displacement of agricoltural land	Moomen (2017),
		Displacement of artisanal miners	Yakovleva and Vazquez-Brust (2018), Mària et al. (2012)
		Land expropriation	Fayiah (2020),
		Poor compensation for displacement	Lauwo et al. (2016), Machanguana and Sardinha (2021)
		Food insecurity	Kamga et al. (2018),
		Housing insecurity	Machanguana and Sardinha (2021)
		Territorial disputes	Ackers and Grobbelaar (2022),
		Violation of livelihood rights	Machanguana and Sardinha (2021), Mària et al. (2012), Ackers and Grobbelaar (2022), Andrews and Essah (2020)
	Engagement		Arthur et al. (2017), Ackers and Grobbelaar (2022),
		Communication with community groups	Andrews and Essah (2020),
		Discrimination of vulnerable groups	Machanguana and Sardinha (2021),
		Disruption of local values and customs	Machanguana and Sardinha (2021)
		Ignorance of community needs	Andrews and Essah (2020)
		Loss of sacred sites	Machanguana and Sardinha (2021)
Workforce			
	Diversity&Inclusion		
		Gender gap in salary	Arthur et al. (2017)
		Incidents of discrimination	Lauwo et al. (2016), Arthur et al. (2017), Ackers and Grobbelaar (2022),
		Violation of women's rights	Mària et al. (2012),
	Education& Development		
		Counselling	Arthur et al. (2017)

		Formal training	Lauwo et al. (2016), Arthur et al. (2017)
	Employment conditions	Skills development	Buddu and Scheepers (2022), Arthur et al. (2017)
		Benefits	Lauwo et al. (2016),
		Fair remuneration	Lauwo et al. (2016)
		Informal work	Galli et al. (2022)
		Recruitment practices	Labuschagne et al. (2015), Lauwo et al. (2016)
		Work security	Labuschagne et al. (2015)
		Absenteeism	Arthur et al. (2017)
		Turnover	Arthur et al. (2017)
	Health&Safety		Nyakuwanika et al. (2021),Labuschagne et al. (2015), Yakovleva and Vazquez-Brust (2018)
		Dust	Babi et al. (2016)
		Mining ventilation system	Lauwo et al. (2016)
		Safety equipment	Mària et al. (2012)
		Smoky air	Lauwo et al. (2016)
		Unhealthy working conditions	Lauwo et al. (2016), Galli et al. (2022)
		Allergies	Babi et al. (2016)
		Fatalities	Babi et al. (2016), Mària et al. (2012), Ackers and Grobbelaar (2022)
		Industrial accidents	Nyakuwanika et al. (2021), Babi et al. (2016)
		Injuries	Arthur et al. (2017), Ackers and Grobbelaar (2022)
		Occupational diseases	Arthur et al. (2017), Babi et al. (2016), Kamga et al. (2018), Ackers and Grobbelaar (2022)
	Human rights		Nyakuwanika et al. (2021)
		Child labour	Arthur et al. (2017), Yakovleva and Vazquez-Brust (2018), Kamga et al. (2018), Mària et al. (2012)
		Forced labour	Arthur et al. (2017), Mària et al. (2012)
		Training on human rights	Arthur et al. (2017), Ackers and Grobbelaar (2022)
	Labour relations		Lauwo et al. (2016)
		Collective bargaining agreements	Arthur et al. (2017), Ackers and Grobbelaar (2022)
		Employees associations	
		Freedom of association	Arthur et al. (2017), Ackers and Grobbelaar (2022)
		Lock-outs	Ackers and Grobbelaar (2022)
		Strikes	Ackers and Grobbelaar (2022)

Governance.

Category	Aspect	Impact	References
Business ethics			
	Corruption		
		Political interference	Phiri et al. (2019)
		Incidents of corruption	Arthur et al. (2017)
	Fair competition		
		Anti-competitive behavior	Arthur et al. (2017),
		Anti-trust practices	Arthur et al. (2017)
		Monopoly practices	Arthur et al. (2017)
	Transparency		Buddu and Scheepers (2022), Machanguana and Sardinha (2021)
		Sustainability disclosures	Phiri et al. (2019)
		Transparent mining programs	Wilson (2022)
		Transparent political involvement	Arthur et al. (2017)
		Bad image	Buddu and Scheepers (2022)
Corporate structure			

	Board structure	Diversity in board composition	Arthur et al. (2017)
Policies			
	Adoption of voluntary standards		
		Anti-corruption policy	Arthur et al. (2017)
		Environmental management system	Babi et al. (2016)
		Management systems	Nyakuwanika et al. (2021), Babi et al. (2016)
	Compliance with laws		
		Payment of taxes and royalties	Phiri et al. (2019)
		Fines for environmental non-compliance	Arthur et al. (2017)
		Fines for non-observation of legal standards	Arthur et al. (2017)
Stakeholders			
	Cooperation		Buddu and Scheepers (2022)
		Contribution to public policy formulation	Arthur et al. (2017)
		Cooperation with artisanal miners	Yakovleva and Vazquez-Brust (2018)
	Engagement		
		Information exchange	Labuschagne et al. (2015), Phiri et al. (2019), Mària et al. (2012), Andrews and Essah (2020)
		Local community	Nyakuwanika et al. (2021), Phiri et al. (2019), Moomen (2017), Mària et al. (2012), Andrews and Essah (2020)
		Local government	Nyakuwanika et al. (2021), Mària et al. (2012)
		Media	Nyakuwanika et al. (2021)
		NGOs	Nyakuwanika et al. (2021)