



Desk Study to Assess Environmentally Friendly, Climate-Smart and Gender-Sensitive Mining Practices for Critical Transition Minerals in the SADC Region

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Executive summary

This report aims to map, analyse, and evaluate policies, approaches, and concepts for environmentally friendly and climate-smart raw material extraction and processing in the SADC region. Furthermore, the report furthermore aims to develop actionable recommendations for the German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety, and Consumer Protection (BMUV) to support sustainable mining in selected SADC Member States.

While mining critical transition minerals often generates adverse environmental and climate impacts, they are also driving the transition towards more sustainable energy production and consumption. Clean energy technologies, renewable energy-compatible grid infrastructure, and e-mobility are the main drivers of increasing demand for 'transition minerals' over the period until 2050. Many of these transition minerals are also 'critical', which means that they are scarce, and/or production or processing is dominated by a limited number of countries. SADC Member States have deposits of many of said critical transition minerals and are world leaders in the extraction of some of them. Therefore, the scope of the study is on these critical transition minerals, which are mined or processed in significant amounts in SADC Member States – or 'SADC Critical Transition Minerals'. The scope of this study encompasses twelve 'SADC Transition Minerals': Chromium, cobalt, copper, graphite, lithium, manganese, nickel, PGMs, RREs, tantalum, titanium, and zinc.

The mining sector accounts for about 10 % of SADC's GDP, 25 % of regional exports, about 7 % of direct employment and 20 % of national government revenues. The dependence on the sector varies markedly across SADC Member States.¹ South Africa and the DRC are global mining powerhouses, leading the global production of cobalt and tantalum (DRC) and PGMs, chromium, manganese, and titanium (South Africa). Zambia and Zimbabwe are traditional resource-rich mining countries with significant deposits of copper (ZAM), PGMs, and lithium (ZIM). The analysis shows that the rising demand for critical transition minerals in the SADC region has led increased exploration and mining activities. Especially projects looking into lithium, graphite, copper, cobalt, nickel and partially even REEs have been launched in most countries, with varying foci. In Botswana and Namibia, nickel and copper from the Kalahari Copper Belt may see a push in the future due to the high global demand from the energy transition. Zimbabwe and Namibia have the largest lithium deposits in Africa and are developing them. Namibia is also rich in zinc and recently announced a significant find of rare earth elements (REEs) in North-central Namibia. Mozambique and Madagascar are rich in natural graphite and are massively expanding their output. However, the region's minerals remain largely exported unprocessed in their raw form or lightly processed commodities.²

Different mining and processing procedures entail different environmental, social, and governance (ESG) risks. For example, in cobalt mining child labour is a significant problem. Gold mining is often associated with mercury pollution in artisanal and small-scale mining (ASM) settings, as well as with smuggling and conflict financing. Large-scale open pit mining can lead to land degradation, air

¹ Afrodad (2022), [State of Mineral Resources Governance in SADC](#).

² Ibid.

pollution, and community conflicts. The scope of this study focuses on environmentally friendly, climate-smart³ and gender-sensitive mining.

The analysis across transition minerals mined in the SADC region shows that the highest environmental hazard potential applies to cobalt, copper, nickel, PGMs, and REEs, as assessed by the German Federal Environment Agency (*Umweltbundesamt*). Across the board, the highest risk factors are paragenesis with heavy metals and radioactive substances, as well as high cumulative energy demand along the value chain – mostly during processing (which most likely happens in China). Similarly, as assessed by a programme under the Responsible Minerals Initiative, of these critical transition minerals, copper, cobalt, and tantalum are associated with the most ESG risks. Across all risk categories, “pollution” is the most prevalent risk, as a “high” or “very high” risk is associated with mining more than half of the critical transition minerals.

According to the World Bank’s climate-smart mining approach, working towards climate smart mining requires to take into account the following four building blocks: 1) decarbonisation: reducing emissions through the use of renewable energy and exploring technologies for removing emissions through carbon sinks and sequestration, 2) enhancing resilience through establishing nature-based solutions and through investments in human, social and physical capital, 3) ensuring circularity through recycling critical minerals and re-purposing materials and re-using resources, and 4) seizing market opportunities by de-risking investments for critical minerals and improving geological and commodity data access. These building blocks need to be embedded in strong governance and adequate regulatory frameworks, citizen engagement, gender-sensitivity and will only be achieved by ongoing technological innovation. Working towards climate-smart mining is a shared responsibility for governments and companies (and citizens).

Gender equality is clearly a challenge for the mining industry. In mining companies and mining-affected communities, women are most often at a disadvantage compared to their male counterparts. Often, the gender bias is not even addressed. Also, many voluntary sustainability standards do not specifically address gender issues. While the topic is gaining massively in attention, there is still very little empirical evidence of the scope and scale of gender inequalities in and around mining projects.

There is no common framework or standard that conclusively defines what constitutes sustainable mining in general, and environmentally friendly, climate-smart and gender-sensitive mining specifically. Moreover, there is no common or globally accepted approach to track, monitor, enforce or otherwise effectively curtail adverse impacts from mining. Currently, the most effective drivers for addressing environmental, climate, and gender-related risks are national regulations regarding environmental impact assessments and enforcement of related environmental and climate-related laws and regulations - which in the SADC region are rather weak – as well as corporate sustainability efforts, which are often driven by market, client and investor demands for ‘cleaner’ mineral supply chains. Often, EIA regulations do not specify the methods and tools that should be used in quantifying environmental impacts nor do authorities usually assess a company’s compliance with environmental and social standards. This is usually done at the discretion of a mining company.

³ The [Climate-Smart Mining Initiative](#) is an initiative by the World Bank which provides a conceptual underpinning for the World Bank’s support to resource-rich developing countries. When referring to ‘climate-smart mining’ in this report, it is in loose reference to the building blocks of the concept and does not specifically refer to the World Bank initiative, nor does it infer that mining ultimately can be ‘climate-smart’.

A new corpus of legislation, including the EU Corporate Sustainability Due Diligence Directive, the EU Battery Regulation and the EU Critical Raw Materials Act are likely to transform the landscape of sustainability due diligence, as they introduce comprehensive due diligence and reporting requirements on environmental topics and climate change. As a response to increasing legislative requirements by importers, and concerns from governments, investors, and civil society, the mining sector is continuously developing corporate policies and engaging in sustainability initiatives, standards, and mineral certification schemes to address these risks.

Regional initiatives, such as the Africa Mining Vision, the SADC Mining Protocol, and the new African Mineral and Energy Resources Classification and Management System (AMREC) so far have not yet turned out to be effective drivers for preventing and mitigating negative environmental, climate, and gender impacts from mining in the SADC region.

Eight countries were selected for in-depth review of their mineral sector and value chains, governance and environmental, climate and gender equality incidents: Botswana, DRC, Madagascar, Mozambique, Namibia, South Africa, Zambia, and Zimbabwe. In-depth country profiles are provided in Annex 1.

The analysis shows that a variety of environmental incidents and conflicts have occurred in SADC focus countries in the recent past, including heavy metal and acid contamination of waterways, encroachment of mine sites into protected areas, significant biodiversity loss attributed to mining projects, mining in high-water stress areas, among others.

The assessment points out that except for Botswana and Namibia, environmental governance is weak in the SADC focus countries. One of the key reasons is that enforcement of environmental laws, including regarding environmental impact assessments, land use permits, deforestation permits, hazardous and toxic waste treatment permits, emission control – if they exist – is weak.

1. Mineral scope of the study

Clean energy technologies, renewable energy-compatible grid infrastructure, and e-mobility are the main drivers of increasing demand for 'transition minerals' over the period until 2050. Many of these transition minerals are also 'critical', which means that they are scarce, and/or production or processing is dominated by a limited number of countries. SADC Member States have deposits of many of said critical transition minerals and are world leaders in the extraction of some of them (see Chapter 1.3). Therefore, the scope of the study is on these critical transition minerals, which are mined or processed in significant amounts in SADC Member States – or 'SADC Critical Transition Minerals'.

1.1. Transition minerals

Building solar photovoltaic panels, onshore and offshore wind parks, and producing electric vehicles require more minerals than conventional sources of energy and mobility. For example, a typical electric vehicle (EV) requires six times the amount of minerals as required by an internal combustion engine. An onshore wind park requires nine times more mineral resources than a gas-fired power plant to produce the same amount of energy.⁴

There is no finite number or definition of 'transition minerals'. The International Energy Agency (IEA) listed in their pre-eminent report from 2021: Aluminum, chromium, molybdenum, silicon, zinc. Chromium, cobalt, copper, graphite, lithium, manganese, nickel, PGMs, rare earth elements (REEs), titanium. zinc. REEs are critical to produce permanent magnets that are vital for wind turbines, while nickel is crucial for building nacelles for these turbines. Silicon is essential for PV solar cells and electricity networks need a huge amount of copper and aluminum. In general, copper is a cornerstone for all electricity-related technologies. EV batteries (EVBs) and grid storage batteries utilize a large amount of these 'transition minerals', especially cobalt, graphite, lithium, manganese, nickel, and phosphorus. The demand will vary depending on which battery technology will ultimately prevail and can maximise battery performance, longevity, and energy density. Table 1 below provides an overview of energy transition technologies and their demand for some of the 'transition minerals'.

Clean energy technologies, grid infrastructure, and e-mobility are the main drivers of increasing demand for transition minerals. According to the International Energy Agency (IEA), the share of batteries in total global lithium demand is expected to rise from 45% in 2021 to almost 90% in 2030.⁵ Under this scenario, the total demand for lithium is expected to increase sevenfold between 2021 and 2030.⁶ For copper, the share going to renewable power generation, EVs, and power networks would rise from about 25% to 45%.⁷ For nickel, demand growth from EVs, power generation, and electrolyzers is likely to increase the share of transition technologies in total nickel demand to 60% by 2030, compared with only 10% today and less than 5% just a decade ago.⁸

Recycling has the potential to be a significant source of secondary supply. Mostly, recycling refers to the recycling of end-of-life products. Metals such as aluminium, iron, nickel and often copper have been able to achieve high rates of recycling for simple, bulk products or for industrial applications that are easier to collect. However, for newer technologies such as electronics, batteries and some alloys, recycling is much harder and technological advancement needs yet to arrive to recycle at cost and

⁴ International Energy Agency (2021), [The Role of Critical Minerals in Clean Energy Transitions](#).

⁵ Ibid.

⁶ Ibid.

⁷ Ibid.

⁸ Ibid.

scale. Recycling would not eliminate the need for continued investment in new supplies. However, the IEA estimates that by 2040, recycled quantities of copper, lithium, nickel, and cobalt from batteries could reduce primary supply requirements for these minerals by around 10%.

Table 1: Critical mineral demand for transition technologies



High demand



Medium demand

	Aluminum	Chromium	Cobalt	Copper	Lithium	Nickel	PGMs	REEs	Zinc
Solar PV	High demand			High demand					
Wind	Medium demand	Medium demand		High demand		Medium demand		High demand	High demand
Hydro	Medium demand	Medium demand		Medium demand					Medium demand
CSP	High demand	High demand		Medium demand		Medium demand			Medium demand
Bioenergy	Medium demand			High demand					Medium demand
Geothermal		High demand				High demand			
Nuclear		Medium demand		Medium demand		Medium demand			
Electricity grids	High demand			High demand					
EVs and grid storage	High demand		High demand	High demand	High demand	High demand		High demand	
Hydrogen	Medium demand					High demand	High demand	Medium demand	

Source: Adapted from International Energy Agency (2021), *The Role of Critical Minerals in Clean Energy Transitions*.

1.2. Critical raw materials

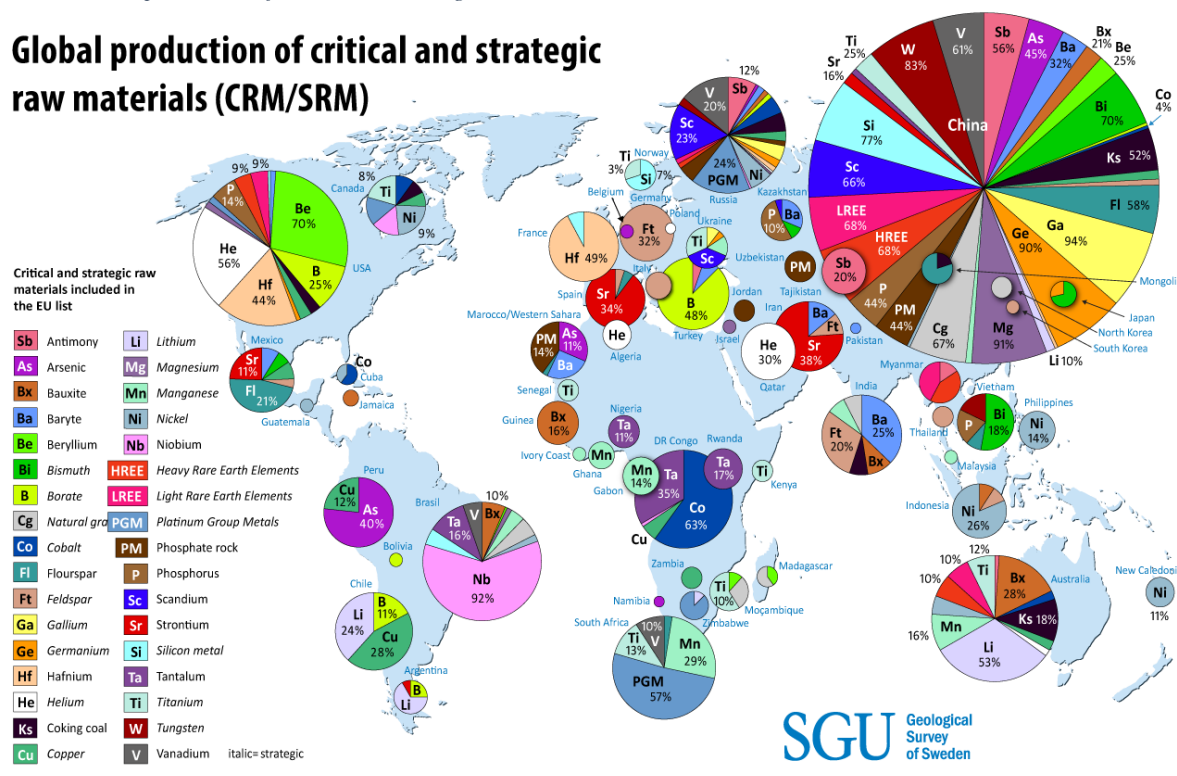
The growing demand for transition minerals faces supply chain bottlenecks for some of the transition minerals. The EU's list of critical raw materials for 2023 contains the following 34 commodities: aluminum/bauxite, antimony, arsenic, baryte, beryllium, bismuth, boron/borate, cobalt, coking coal, feldspar, fluorspar, gallium, germanium, hafnium, helium, heavy rare earth elements (HREE), lithium, light rare earth elements (LREE), magnesium, manganese, natural graphite, niobium, platinum group metals (PGM), phosphate rock, copper, phosphorus, scandium, silicon metal, strontium, tantalum, titanium, tungsten, vanadium, and nickel.

Many critical mineral production or processing capacities are currently concentrated in only a few countries (see Table 2 below). The dominance of China is substantive and likely to increase soon, considering current known expansion plans by China.⁹ China itself has an annual mining production of more than 50 % of global production for 14 out of the 34 critical raw materials, as defined by the EU. This includes minerals and metals such as: gold, natural graphite, tungsten, phosphorus, gallium, germanium, and many more. The largest dominance of China is in, rare earths, which are most important for the energy transition as permanent magnets. 60 % of world production is conducted in China, but China is also processing 87 % of REE's. When it comes to making permanent magnets, the share is even up to 94%. But China also imports and controls large shares of resources abroad. The largest dependency for China is on cobalt, as China practically doesn't have own resources, but currently refines two-thirds of the world's cobalt. On the other hand, the DRC is producing somewhere between 60-70 % of the world's cobalt, which gets exported as cobalt hydroxide to China. Chinese interests control 15 of the 19 industrial cobalt operations in the DRC.

The economic viability of developing mines and processing facilities in new destinations is increasing with growing demand. Even in Germany, entering lithium mining is being discussed.¹⁰ However, lead times for new mines are long and uncertain. According to the IEA, investment of around USD 360-450 billion would be needed mostly over the next three years to bridge the demand-supply gap.¹¹

Table 2: Global production of critical and strategic raw materials

Global production of critical and strategic raw materials (CRM/SRM)



Source 1: [Swedish Geological Survey](#)

⁹ International Energy Agency (2023), [Energy Technology Perspectives 2023](#).
¹⁰ MDR.de (2023), [So kann Lithium in Deutschland „abgebaut“ werden](#).
¹¹ International Energy Agency (2023), [Energy Technology Perspectives 2023](#).

1.3. 'SADC Critical Transition Minerals'

Figure 1 below provides an overview of critical transition minerals relevant to SADC Member States – the distribution of these minerals by SADC Member State will be discussed in the next Chapter.

For the above-described focus on critical energy transition minerals, the assessment has neither considered fossil energy sources such as oil, gas, and coal, nor diamonds, gemstones, and gold – despite the significant economic impact of the exploitation of these resources in several SADC Member States. Also, uranium mining is not considered in this report, despite the significance of the sector for Namibia and the DRC, which is further fuelled by the “nuclear renaissance”¹² in the US and supply crunches caused by the Russian invasion of Ukraine and the coup d'état in Niger.

Figure 2 below illustrates the overlap between critical raw materials, transition minerals, and minerals which are abundant in the SADC region – hence, 'SADC Critical Transition Minerals'. In total, the scope of this study encompasses twelve SADC Transition Minerals: Chromium, cobalt, copper, graphite, lithium, manganese, nickel, PGMs, RREs, tantalum, titanium, and zinc. Chromium, tantalum, and zinc are added to the list despite not fulfilling all criteria, as they either fall within the category of transition minerals (chromium and zinc) or are deemed critical raw materials (tantalum) and SADC Member States are world leaders in their production (South Africa, DRC).

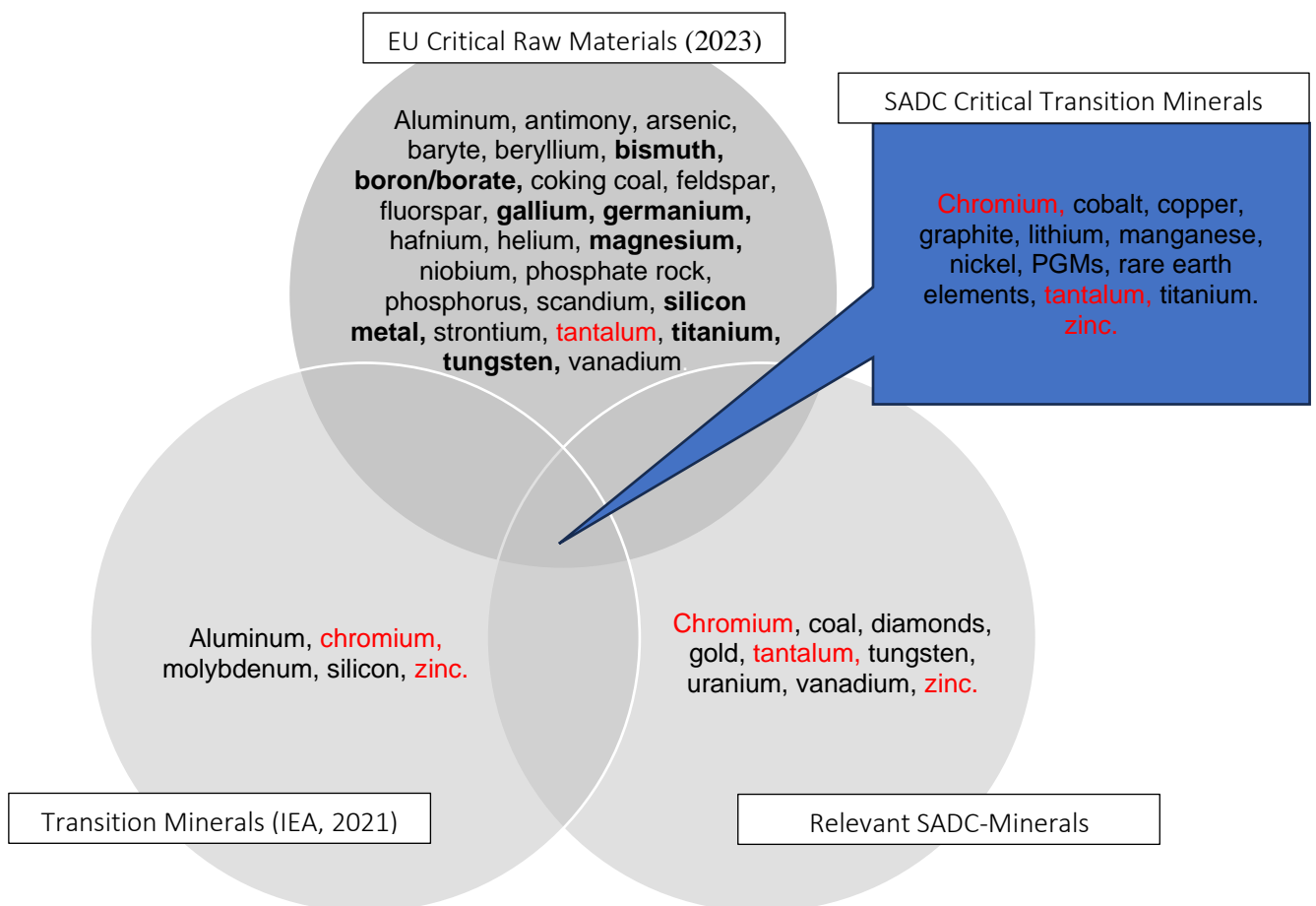


Figure 1: Selected SADC Critical Transition Minerals

¹² The Economist, [America aims for nuclear-power renaissance](#), 25 June 2023.

Table 2 below provides an overview of the primary applications in transition technologies of the selected SADC Critical Transition Minerals. It also highlights criticality bottlenecks as well as their relevance to SADC Member States.

Table 3: SADC Critical Transition Mineral profiles¹³

	Use in Transition Technologies	Criticality and SADC Relevance
Chromium	95% of chromium is used in the production of stainless steel and nonferrous alloys. Chromium is used to produce specialized steel for wind, solar, hydro, geothermal, and nuclear energy generation.	Chromite ore deposits are highly concentrated in South Africa and Kazakhstan, which combined hold over 95% of the world's reserves. South Africa accounts for more than 60% of exports of chromium. China is the largest importer of chromium.
Cobalt	Around 50% of cobalt produced worldwide is used in battery chemicals. Cobalt is also used as a superalloy in gas turbine engines and has significant applications in cutting tools, catalysts, and magnets.	The DRC is responsible for some 70% global production of cobalt. 70% of cobalt mines in the DRC are owned by Chinese companies and supply exclusively to Chinese refineries. China is responsible for app. 50-70% of processing. 98% of current cobalt production comes as by-product from copper (60%) and nickel (38%) mines.
Copper	Copper is widely used in electrical wiring and conductors, including as a component of generators, motors, and transformers in renewable energy plants and in rechargeable batteries found in electric vehicles and energy storage systems.	Chile is the biggest producer of mined copper, followed by Peru, China, DRC, and the US, while China is the largest copper refining country.
Graphite	The dominant application of graphite is in refractories for steelmaking. Future demand for graphite is likely to be driven by electric vehicle manufacturers. Graphite accounts for 90% of the anode materials used in lithium-ion batteries. Natural graphite can also be used for large-scale fuel cells, solar cells, and nuclear reactors.	China is the largest graphite producer, accounting for over 60% of global graphite production in 2020.
Lithium	Over 70% of lithium is used in batteries, including rechargeable batteries for mobile phones, laptops, digital cameras, energy storage systems, and electric vehicles.	Australia is by far the largest current producer, but the 'lithium triangle' of Chile, Bolivia, and Argentina contains the bulk of the world's known reserves. China is responsible for app. 50-70% of processing. The lithium boom has led to an expansion of lithium production in Zimbabwe and exploration in DRC and Namibia.
Manganese	Currently, by far the largest application of manganese is in steelmaking, but	Manganese is the fourth-most used metal in the world by tonnage, after iron,

¹³ Compiled from International Energy Agency (2021), [The Role of Critical Minerals in Clean Energy Transitions](#) and <https://www.material-insights.org>.

	manganese offers a low-cost solution for producing lithium-ion battery technology.	aluminium, and copper. South Africa is the leading producer of manganese and holds almost 40% of global reserves. Manganese refining takes place almost entirely in China.
Nickel	Currently, more than two-thirds of global nickel production is used to produce stainless steel. Two of the most used types of batteries, Nickel Cobalt Aluminium (NCA) and Nickel Manganese Cobalt (NMC), typically use 80% and 33% nickel respectively. Most Li-ion batteries now rely on nickel.	China is responsible for approximately 35% of nickel refining and controls nickel processing in Indonesia, which is the largest producing country by far (>50%).
PGM	Two-thirds of global palladium consumption is linked to the automotive industry, primarily in catalytic converters.	Palladium is approximately 30 times rarer than gold. It is often produced as a by-product of the refining processes of ores of copper, nickel, zinc, and other PGMs. Economic sanctions against palladium refined in Russia have been enforced by the EU, the WTO, and the London Platinum and Palladium Market.
Rare Earth Elements	REEs are used for their properties of magnetism, chemical catalysis, and luminescence, and have many applications including in solar panels, wind turbines, smartphones, and laptops.	China is responsible for approximately 60% of global production of REEs and 90% of REE processing.
Tantalum	Tantalum is used to produce capacitors which are used in almost all electronic products, ranging from smartphones to medical electronics, and from electronic systems in cars to wind turbines producing electricity.	Tantalum is a relatively rare metal that typically occurs together with niobium in its ores, which is predominantly sourced from DRC and neighbouring countries.
Titanium	Titanium alloys play a major role in components manufacture in the aerospace, maritime, and automotive industries.	China is the world's leading producer of titanium-containing mineral concentrates, accounting for 36% of global production from ilmenite and rutile, followed by Mozambique (13%) and South Africa (10%).
Zinc	Zinc is a base metal that is primarily used to galvanise steel, as its anti-corrosion properties increasing the durability of products. Zinc protects the steel from rust and corrosion, increasing the product's durability.	China is the world's leading producer of zinc, followed by Australia. In SADC, Namibia has zinc deposits.

2. Global approaches and initiatives for environmentally friendly, climate-smart and gender-sensitive mining

The mining industry has played a pivotal role in global development, providing essential resources for economies and societies. However, traditional mining practices have often come at a steep environmental cost, contributing significantly to greenhouse gas emissions and ecological challenges. This Chapter explores the key ESG risks of mining SADC Critical Transition Minerals and discusses key global approaches to avoiding, mitigating, or restoring negative environmental, climate and gender-related impacts from mining.

2.1. Key environmental, climate, and gender-based risks of mining 'SADC Critical Transition Minerals'

Different mining and processing procedures entail different environmental, social, and governance (ESG) risks. For example, in cobalt mining child labour is a significant problem. Gold mining is often associated with mercury pollution in artisanal and small-scale mining (ASM) settings, as well as with smuggling and conflict financing. Large-scale open pit mining can lead to land degradation, air pollution, and community conflicts. Mineral processing often requires significant amounts of energy and/or water.

There are abundant approaches, initiatives, standards, and certification schemes that define and categorize sustainability risks associated with mining (as discussed in Section 2.3.). To provide a simple, yet well-founded, overview of sustainability risks associated with the mining and processing of SADC Critical Transition Minerals.

Table 3 below provides an overview of the selected SADC Critical Transition Minerals in SADC Member States and identifies the key sustainability risks as assessed by the consulting company *TDI Sustainability* for the Material Insights Platform which is operated by the Responsible Minerals Initiative.¹⁴ The Material Insights Platform is well-recognized in the mining industry and among downstream customers. Material Insights uses a proprietary approach to rate the importance of supply chain sustainability issues based on information contained in publicly available reports. Table 3 below only lists risks assessed to be “high” (yellow) or “very high” (red).

Table 3 illustrates that copper, cobalt, and tantalum are associated with the most ESG risks. Across all risk categories, “pollution” is the most prevalent risk, as a “high” or “very high” risk is associated with mining more than half of the critical transition minerals.

¹⁴ <https://www.material-insights.org/material/>

Table 4: Core ESG Risks associated with SADC Critical Transition Minerals based on rating by TDI Sustainability / Material Insights

“High” or “very high” ESG risk rating ¹⁵		Chromium	Cobalt	Copper	Graphite	Lithium	Manganese	Nickel	PGM	REE	Tantalum	Titanium	Zinc
SADC Countries		South Africa	DRC, Zambia	South Africa	Mozambique	Zimbabwe, DRC, Namibia	South Africa	Madagascar, Botswana, Tanzania, Zambia	South Africa, Zimbabwe	South Africa, Malawi, Madagascar	DRC, Mozambique	South Africa, Mozambique, Madagascar	Namibia
Environment	Deforestation												
	Degraded/Fragmented Landscape		⬆️	⬆️				⬆️		⬆️			
	Negative Biodiversity and Conservation Impact		⬆️	⬆️				⬆️					
	Pollution	⬆️	⬆️	⬆️			⬆️	⬆️		⬆️			⬆️
	Release of Radiation									⬆️			
	Tailings Breaches												
Social	Child Labour		⬆️	⬆️							⬆️		
	Community Rights Violations		⬆️	⬆️							⬆️		
	Company-Community Conflicts		⬆️	⬆️		⬆️						⬆️	⬆️
	Disease Prevalence in Affected Areas												

¹⁵ The assessment was done by TDI Sustainability for the [Material Insights Platform](#) operated by the Responsible Minerals initiative.

	Forced Labor		←							←		
	Indigenous Peoples Rights		←	←		←			←			
	Labour Rights		←									
	Negative Perception of Corporate Citizenship			←								
	OHS		↑	←						←		
	Violence and Conflict	←	↑	←						↑		
Governance	Corruption		↑	↑						←		
	Illicit Financial Flows											
	Non-payment of taxes		←							↑		












































However, sustainable raw material extraction and processing in the narrower scope of this study focuses on environmentally friendly, climate-smart¹⁶ and gender-sensitive mining and processing.

There is already a whole body of work that has outlined and categorized the environmental and climate risks of mining. A research project of the German Federal Environment Agency (*Umweltbundesamt*), the *ÖkoRess II* project, assessed the environmental hazard potentials of mining for about 50 minerals. The assessment criteria included geological issues, such as the likelihood for 1) acid mine drainage (AMD), 2) paragenesis with heavy metals, and 3) radioactive contamination; location-based issues, such as 4) potential hazards from floods, landslides, earthquakes, and storms, 5) high water-stress or low water availability, 6) vicinity to protected areas; and contextual issues, such as the scale of net global 7) material and 8) energy flows from mining to refining, as well as the 9) quality of environmental governance in the main producing countries of the respective mineral (measured by the Environmental Performance Index, EPI).

Table 5 below provides an overview of the criticality rating, that is, the environmental hazard potential as assessed by the German Federal Environment Agency, of SADC Critical Transition Minerals. The analysis shows that the highest environmental hazard potential applies to cobalt, copper, nickel, PGMs, and REEs. Across the board, the highest risk factors are paragenesis with heavy metals and radioactive substances, as well as high cumulative energy demand along the value chain – mostly during processing (which most likely happens in China).

¹⁶ The [Climate-Smart Mining Initiative](#) is an initiative by the World Bank which provides a conceptual underpinning for the World Bank's support to resource-rich developing countries. When referring to 'climate-smart mining' in this report, it is in loose reference to the building blocks of the concept and does not specifically refer to the World Bank initiative, nor does it infer that mining ultimately can be 'climate-smart'.

Table 5: Table 5: Key environmental risks of SADC Critical Transition Minerals (Source: own table, based on ÖkoRess II report)

Environmental Criticality (as assessed by OEKORESS)	Chromium <i>South Africa</i>	Cobalt <i>DRC, Zambia</i>	Copper <i>South Africa</i>	Graphite <i>Mozambique</i>	Lithium <i>Zimbabwe, DRC, Namibia</i>	Manganese <i>South Africa</i>	Nickel <i>Madagascar, Botswana, Tanzania, Zambia</i>	PGM <i>South Africa, Zimbabwe</i>	REE <i>South Africa, Malawi, Madagascar</i>	Tantalum <i>DRC, Mozambique</i>	Titanium <i>South Africa, Mozambique, Madagascar</i>	Zinc <i>Namibia</i>
Criticality Rating (Environmental Hazard Potential)	 Medium	 High	 High	 Low	 Medium	 Medium	 High	 High	 Medium-High	 Low-Medium	 Medium	
Acid mine drainage												
Paragenesis with heavy metals												
Paragenesis with radioactive substances												
Use of auxiliary substances												
Accident hazards due to natural disasters												
Water Stress Index (WSI)												
Designated protected areas												
High Cumulative Energy Demand												

Climate-smart mining

While most sustainability standards include requirements or indicators regarding reducing emissions and energy efficiency, there is often a lack of guidance as to how to achieve it.

The [Climate-Smart Mining Initiative](#) is an initiative by the World Bank which provides a conceptual underpinning for the World Bank's support to resource-rich developing countries to benefit from the increasing demand for minerals and metals, while ensuring the mining sector is managed in a way that minimizes the environmental and climate footprint.

Table 2 below shows the building blocks of the climate smart mining approach. Working towards climate smart mining requires to consider the following four building blocks:

- Decarbonisation: reducing emissions using renewable energy (at mine and processing sites) and exploring technologies for removing emissions through carbon sinks and sequestration
- Resilience: enhancing resilience through establishing nature-based solutions and through investments in human, social and physical capital
- Circular economy: ensure circularity through recycling critical minerals and re-purposing materials and re-using resources
- Market opportunities: seizing market opportunities by de-risking investments for critical minerals and improving geological and commodity data access

These building blocks need to be embedded in strong governance and adequate regulatory frameworks, citizen engagement, gender-sensitivity and will only be achieved by ongoing technological innovation. Working towards climate-smart mining is a shared responsibility for governments and companies (and citizens).

The World Bank approach is a loose concept rather than a framework that provides benchmarks, or sets standards, nor does it serve as an M&E framework. When referring to 'climate-smart mining' in this report, it is in loose reference to these building blocks and does not specifically refer to the World Bank initiative, nor does it infer that mining ultimately can be 'climate-smart'.

Table 6: The World Bank's climate-smart mining approach

Citizen Engagement			
Gender			
Decarbonization	Resilience	Circular Economy	Market Opportunities
Reduce Emissions through Renewable Energy and Energy Efficiency	Nature based solutions	Recycle Critical Minerals	De-risk investments for critical minerals
Remove Emissions through Carbon Sinks and Sequestration	Enhanced resilience through investments in human, social and physical capital	Repurpose materials and re-use resources	Improve geological and commodity data access
Strong governance and adequate regulatory framework			
Innovation			

It is worth taking a closer look at two of the building blocks, as they are sometimes overlooked: circularity and gender.

Circularity

The climate-smart mining approach refers to the recycling of transition minerals as a key component of circular mineral supply chains. However, as mineral value chains for the energy transition are global and tend to lead to end-use in Europe, North America and Asia, most SADC countries are out of the loop of the circular energy transition economy. That means, that currently minerals are extracted in SADC countries, and the processed, manufactured and sold to end use in EVs or energy generation elsewhere. The circular re-use and recycling loops then are taking place between end-use, manufacturing, and processing companies, mostly located in East Asia, the USA and in the EU.

However, the second dimension is also relevant for SADC countries. More recently, emerging technologies such as direct lithium extraction, or enhanced metal recovery from waste streams (e.g., mining residues, slag, sludges, and tailings) or low-grade ores are being exploited in the SADC region. Better treatment of waste streams can also reduce the risk of hazardous materials entering the environment.¹⁷ For example, Rainbow Rare Earths uses sulphuric acid, a key reagent for the project, from a waste stream at the copper operation next to Phalaborwa, South Africa. By using this sulphuric acid, Rainbow can recycle a by-product, as well as reduce the carbon footprint which would be associated with reagent transportation, due to the proximity to the project. Technologies that help reduce water use or energy consumption can also bring additional environmental and operational benefits.

¹⁷ International Energy Agency (2021), [The Role of Critical Minerals in Clean Energy Transitions](#).

Gender

Gender equality is clearly a challenge for the mining industry. In mining companies and mining-affected communities, women are most often at a disadvantage compared to their male counterparts. Often, the gender bias is not even addressed. Also, many voluntary sustainability standards do not specifically address gender issues. Trajectories of gender-related risks from mining include:

- Companies' gender-biased policies and practices, such as recruitment processes that discriminate against female candidates. For example, only 5% of board seats in the top 500 global mining companies are held by women and women comprise only 10% of the mining labor force globally (data from 2014).¹⁸
- Social or environmental impact assessments that consult only with formal community organisations may miss the perspectives and concerns of women, if they are underrepresented in these groups.
- Land compensation payments that exclude women.
- Gender-based violence, rising sex-work, and prevalence of sexually transmitted diseases in mining communities.

While the topic is gaining massively in attention, there is still very little empirical evidence of the scope and scale of gender inequalities in and around mining projects.

One of the few representative reports on this subject is the 2020 Responsible Mining Index. The Report, an evidence-based assessment of 38 large-scale mining companies' – many of them active in the SADC region - policies and practices on economic, environmental, social and governance (EESG) matters, covers gender as a transversal issue that touches on many different aspects of company actions. According to the report, the "overall gender-related results of the companies were very weak, showing very limited actions to address gender in mining-affected communities and within their governance bodies, leadership and workforce".¹⁹

2.2. Key global approaches to avoiding, mitigating, or restoring negative environmental, climate and gender-related impacts from mining

There is no common framework or standard that conclusively defines what constitutes sustainable mining in general, and environmentally friendly, climate-smart and gender-sensitive mining specifically. Moreover, there is no common or globally accepted approach to track, monitor, enforce or otherwise effectively curtail adverse impacts from mining. Currently, the most effective drivers for addressing environmental, climate, and gender-related risks are national legislations on environmental impact assessments and enforcement of related environmental and climate-related laws and regulations - which in the SADC region are rather weak, see analysis in Chapter 3 – as well as corporate sustainability efforts, which are often driven by market, client and investor demands for 'cleaner' mineral supply chains.

¹⁸ International Finance Corporation (2018), [Integrating Gender in Mining Operations](#).

¹⁹ Responsible Mining Foundation (2022), [Gender inequality runs deep in mining](#).

Consequently, achieving environmentally friendly, climate-smart and gender-sensitive mining must encompass a comprehensive set of approaches, which may encompass a combination of the following aspects:

- **Regulatory frameworks:** Comprehensive and consistent domestic regulatory frameworks are essential to ensure that environmentally friendly, climate-smart and gender-sensitive mining practices are not only encouraged but also enforced and that all mining companies engage on a level playing field. At the international level, there are global frameworks and norms, but also legislation by the European Union and other economic blocks, that influence domestic mining practices and legal frameworks in production countries.
- **Harmonising and implementing (voluntary) mining industry sustainability standards and supply chain due diligence requirements:** Voluntary standards and certification schemes can define industry benchmarks provide orientation for companies on best practices and serve as a basis for stakeholder engagement with local communities, clients, and investors. Clarity on benchmarks and expectations can drive industry-wide adoption. Supply chain due diligence initiatives can serve as a platform for collective action in the industry to encourage environmentally friendly and climate-smart mining practices and share due diligence costs along the supply chain.
- **Corporate sustainability practices and technological innovations:** Ultimately, companies bear sole responsibility to abide by the production country's laws and to obtain a social license to operate. Integrating renewable energy sources and emission reduction technologies demands significant technological advancements, including data-driven solutions. Continued research and development are crucial to identifying and implementing effective solutions. At the global level, good practices are collected and disseminated by industry associations, think tanks/academia, or companies themselves through corporate sustainability reporting.
- **Economic considerations:** Initial investments in renewable energy infrastructure and emission reduction technologies may be financially daunting. Governments and industries can collaborate to provide incentives and support for the adoption of these practices.

2.2.1. Global frameworks, EU regulation, and due diligence requirements

A growing corpus of legislation builds on core international norms that have been endorsed by governments, stakeholders, and businesses alike, such as the International Bill of Human Rights – comprised of the Universal Declaration of Human Rights and the International Covenant on Economic Social and Cultural Rights and the International Covenant on Civil and Political Rights (both 1966) – the ILO Core Conventions, the OECD Guidelines for Multinational Enterprises, the United Nations Guiding Principles on Business and Human Rights and the United Nations Guiding Principles on Business and Human Rights.

Especially the latter laid the groundwork for creating legislation which looked at adverse impacts of multinational corporations' global value chains, including within their supply chains and business relationships. With the launch of the "OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas" (the "OECD Due Diligence Guidance"), which aimed to break the nexus between conflict and resource extraction and transportation in the Democratic Republic of Congo and adjoining countries, a five-step due diligence framework was established, which now serves as the global benchmark for supply chain due diligence. The OECD Due Diligence Guidance also inspired the first domestic laws creating mandatory due diligence or due

diligence reporting requirements, such as Section 1502 of the U.S Dodd-Frank Wall Street Reform and Consumer Protection Act of 2012 and the [EU Conflict Minerals Regulation](#) (entry into force: June 2017). Several African countries, including the Democratic Republic of Congo and Rwanda, have passed laws requiring companies to check their supply chains. Another set of pioneering legislation focused more narrowly on forced labour and human trafficking in global supply chains, including the California Transparency in Supply Chains Act of 2010, the UK Modern Slavery Act of 2015, and the Australia Modern Slavery Act of 2018.

More recent legislative initiatives adopt a more holistic topical approach to corporate sustainability and supply chain due diligence by integrating the previous focus on human rights, conflict, and governance with expectations regarding environmental and climate impacts, also in coherence with the OECD Due Diligence Guidance for Responsible Business Conduct, which also includes environmental risks.

The European Union (EU) is a frontrunner in this regard. Contributing to the European Green Deal and the EU's climate goals, the EU has recently embarked on several directives and regulations in furtherance of these goals. The draft [Corporate Sustainability Due Diligence Directive](#), CSDDD (currently in EU Trilogue), the [EU Battery Regulation](#) (entry into force: 17 August 2023), the [Corporate Sustainability Reporting Directive](#), CSRD (entry into force: 5 January 2023) and associated [European Sustainability Reporting Standards](#), ESRS (Adopted: 31 July 2023), as well as the [EU Taxonomy Regulation](#), provides an important framework for enforcing environmentally friendly and climate-smart raw material supply chains, including in SADC countries.

The EU CSDDD and the EU Battery Regulation are likely to transform the landscape of sustainability due diligence, as they introduce comprehensive due diligence and reporting requirements on environmental topics and climate change. The environmental and climate norms covered by the CSDDD are far-reaching and include references to international norms such as the Convention on Biological Diversity, the Minamata Convention on Mercury, Stockholm Convention on Persistent Organic Pollutants, and many others. It is still subject to negotiation how far down the value chain these norms can be enforced.

The EU Battery Regulation includes substantial targets for the recycling and reuse of battery materials, as well as new due diligence and disclosure requirements for environmental issues and the carbon footprint. The Regulation also requires battery producers to issue a unique battery passport for each industrial and EV battery placed on the EU internal market which shall include basic manufacturing data, information on the carbon footprint as well as other sustainability data.

To go even further, in March 2023, the EU Commission proposed an [EU Critical Raw Materials Act](#) (EU-CRMA), which includes a [package of measures](#) to ensure a sustainable supply of critical raw materials to the EU. Beyond fostering the availability of critical raw materials, the EU is committed to strengthening the ecological footprint of minerals entering the Union market. The package of measures of the draft EU-CRMA includes trade-related instruments and partnerships with crucial supplier countries for critical raw materials. For example, the EU has entered the discussion to establish a partnership on sustainable raw material value chains with the Democratic Republic of the Congo. This partnership aims to support a better alignment on high environmental, social, and governance standards throughout raw material value chains, including through a harmonized legal framework and increased traceability, to underpin sustainable and inclusive economic growth, the creation of added value in the production in the country, and domestic revenue mobilisation. Such

partnerships have the potential to improve the environmental and carbon footprint of raw material extraction and processing in some SADC countries.²⁰

Also, the demand side for transition minerals is affected by EU action. The EU adopted the REPowerEU Plan of Action in May 2022 (EC, 2022). The initiative sets ambitious targets and details specific actions for boosting the deployment of renewables, mainly wind power and solar photovoltaic (PV), hydrogen production, heat pumps for heating and cooling, and batteries for energy storage and the decarbonisation of the transport sector, which all will increase the demand for transition minerals.²¹

Also, a few EU Member States have already introduced domestic legislation for supply chain due diligence, while others are in the process of legislating or considering action. In France and Germany, supply chain due diligence laws are already in effect. Corresponding supply chain laws have also been tabled in Austria, Belgium, the Netherlands, and Spain. Outside of the EU, the UK, Norway, and Switzerland have passed laws regarding supply chain due diligence.

Addressing gender-based risks is not a prominent topic in the aforementioned global approaches and frameworks.

2.2.2. Voluntary sustainability standards and due diligence initiatives

Before the 2010's, ESG requirements and standards were mostly devolved from investor or stock exchange regulator's reporting requirements. The Global Reporting Initiative provided a standard template for mining. Standards from lending institutions and development banks, such as the [Equator Principles](#) and the [IFC Performance Standards on Environmental and Social Sustainability](#) for World Bank financed projects were the main source for guidance on sustainability performance. However, especially in weak governance environments mining companies remained largely unchecked regarding their environmental and social performance.

As a response to increasing legislative requirements by importers, and concerns from governments, investors, and civil society, the mining sector is continuously developing corporate policies and engaging in sustainability initiatives, standards, and mineral certification schemes to address these risks. Globally, such voluntary standards, initiatives, and certification schemes are abundant in the mining sector. They vary by stakeholder composition, scope, targeted regions, mineral commodities, or business sectors along the supply chain. They have gained importance in terms of membership, global spread as well and the types of mineral commodities covered.

Several organisations have attempted to provide an overview of the global landscape of sustainability standards and initiatives. In 2018, the Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IGF) published the *State of Sustainability Initiatives: Standards and the Extractive Economy*²², identifying 158 different sustainability standards and initiatives relevant for the mining sector and assessing in-depth 15 of those standards and initiatives. In 2022, the German *Bundesanstalt für Geowissenschaften und Rohstoffe* (BGR) published a *Comparative Overview on Sustainability Schemes for Mineral Resources*.²³ The GIZ Sector Programme Extractives for Development has commissioned an *Encyclopedia on Sustainability Standards and Initiatives in the*

²⁰ European Commission (2023), [Factsheet on European Critical Raw Materials Act](#).

²¹ European Commission (2023), [Strategic Foresight Study 2022](#).

²² International Institute for Sustainable Development (2018), [State of Sustainability Initiatives Review](#).

²³ BGR (2022), [Sustainability Standard Systems for Mineral Resources – A Comparative Overview](#).

Mining Sector which analyses 40 different standards and serves as a directory for stakeholders to help them get a first and easily digestible overview of relevant standards and initiatives in the mining sector.

It can be argued that the most important comprehensive standards and recommendations for the mining sector are those set forth by industry initiatives, such as the International Council for Minerals and Metals (ICMM), the Responsible Minerals Initiative (RMI), and the Initiative for Responsible Mining Assurance (IRMA), among others. There are also several minerals-specific initiatives and standards, including for cobalt²⁴, aluminum²⁵, tin/ tantalum²⁶, a joint standard for copper, nickel, lead, zinc, and molybdenum²⁷; several different standards for gold.

2.2.3. Industry good practices and technology innovations

At the global level, good practices are collected and disseminated by industry associations, think tanks/academia, or companies themselves through corporate sustainability reporting.

The International Council for Minerals and Metals (ICMM), whose members account for one-third of the global mining industry, publishes [case studies](#) and position papers on a variety of sustainability topics on its website. ICMM Membership includes at least 12 leading mining companies with operations in SADC countries. In addition, the Minerals Council of South Africa, and the Mining Industry Associations of Southern Africa (MIASA) are ICMM Members. Their goal is to work collaboratively with associations and other stakeholders to enhance the contribution of mining and metals to sustainable development.

Also, [mineral-specific industry associations](#) – such as the International Lithium Association, International Copper Association, Cobalt Institute, Nickel Institute, International Tin Association, International Molybdenum Association, and International Manganese Institute – can be sources for best practices regarding sustainability. A collaboration between the associations would be useful to harmonise industry standards and best practices. In some cases, associations have embarked on closer cooperation, for example for the development of the [Joint Due Diligence Standard for Copper, Nickel, Lead, and Zinc](#).

In line with its emphasis on encouraging continuous improvement and learning, the Responsible Mining Index (RMI) of the Responsible Mining Foundation – now discontinued by the funders – was a good source for identifying innovative approaches. The RMI was a benchmarking exercise of the 40 largest mining companies and 250 of their mine sites against a set of sustainability indicators. At least 13 of the assessed companies were also active in the SADC region. Potential leading practices were identified by RMI analysts during the assessment, and companies were invited to provide information on any of their activities or processes they considered to be leading practices. For example, in its [2022 Report](#), identified leading practices in *Environmental Responsibility* included the innovative use of a legacy mine site to provide water for local farmers, public disclosure of environmental incidents, and inclusion of Scope 3 emissions in greenhouse gases reporting.

²⁴ The [Cobalt Refiner Supply Chain Due Diligence Standard](#) by RMI and RCI and the [Cobalt Industry Responsible Assessment Framework \(CIRAF\)](#) of the Cobalt Institute.

²⁵ The [Aluminium Stewardship Initiative](#).

²⁶ Responsible Minerals Initiative (2017), *Responsible Minerals Assurance Process, Tin and Tantalum Standard*.

²⁷ [The Copper Mark \(2022\), Joint Due Diligence Standard for Copper, Lead, Molybdenum, Nickel and Zinc](#).

However, the overall assessment of corporate performance regarding Environmental Responsibility was rather bleak:

(...) company results in Environmental Responsibility tend to be stronger for showing commitments than actions or performance monitoring (effectiveness). In this case, most companies have made formalised commitments to manage their environmental impacts systematically. Aside from these commitments, the strongest result is on the disclosure of information on the location and safety of tailings storage facilities. In general, companies showed little evidence of tracking and reviewing their performance on managing issues such as water consumption and water quality, biodiversity, greenhouse gases and energy consumption.²⁸

As, ultimately, companies bear sole responsibility to abide by the production country's laws and to obtain a social license to operate, the best source for identifying best practices are verified company sustainability reports. In Section 3.3.3., some industry best practices and technology innovations regarding environmentally friendly and climate-smart mining in SADC Focus Countries are identified.

3. Assessment of the status quo of environmentally friendly and climate-smart mining in the SADC Region

3.1. Regional perspective: UN, AU, and SADC mining policies and strategies

The mining sector accounts for about 10 % of SADC's GDP, 25 % of regional exports, about 7 % of direct employment and 20 % of national government revenues. The dependence on the sector varies markedly across SADC Member States.²⁹

In 2009, the African Union adopted the [African Mining Vision \(AMV\)](#) to provide policy coherence for the sustainable development of its natural resources. The AMV has the vision for integrating mining better into development policies at local, national, and regional levels. That means thinking about how mining can contribute better to local development by making sure workers and communities see real benefits from large-scale industrial mining and that their environment is protected. Most Mining Codes or sectoral policies in the SADC region refer to the AMV.

Despite the AMV being a non-binding framework, member states are encouraged to adopt it into national laws and policies. So far, 24 out of 54 countries have started implementation of AMV. According to AFRODAD, only Lesotho has fully domesticated and used AMV to prepare her Country Mining Vision (CMV). However, the reportedly AMV has enabled several governments to renegotiate mining contracts such as the DRC, Tanzania, and Zambia. The fiscal and revenue management pillar is noted to be the most highly implemented aspect of the AMV.³⁰ With regard to environmental, climate, and gender equality protection, the AMV has not (yet?) shown to be an effective framework.

Already in 2000, the SADC Protocol on Mining entered into force. The Protocol contains the following ambitious provisions regarding sustainability³¹:

²⁸ Responsible Mining Foundation (2023), [RMI Report 2022](#).

²⁹ Afrodad (2022), [State of Mineral Resources Governance in SADC](#).

³⁰ [Ibid.](#)

³¹ SADC (2020), [Unpacking the SADC Mining Protocol](#).

- Member States shall seek to harmonize national and regional policies, strategies, and programs related to the development and exploitation of mineral resources.
- Member States recognize that a thriving mining sector can contribute to economic development, poverty alleviation, and improvement of the standard and quality of life throughout the Region.
- Member States undertake to jointly develop and observe internationally accepted standards of health, mining safety, and environmental protection.
- As a way of ensuring sustainable environmental protection, Member States have agreed to promote sustainable development by ensuring a balance between mineral development and environmental protection.
- Member States are encouraged to set up a regional approach in conducting environment impact assessments (EIA), especially about shared systems and cross-border environmental effects.
- Member States agreed to collaborate in the development of programs to train environmental scientists in fields related to the mining sector and to undertake to share information on environmental protection and rehabilitation.

However, there is scant evidence that the Protocol is being implemented, at least regarding the last three commitments. According to AFRODAD, there has been a “chameleon and piecemeal” approach in terms of implementing the SADC protocol on mining.³² This has led to slow improvements in the mineral governance reform. In fact, there is almost no information available at all on the status of the implementation of the SADC protocol on mining.

In March 2022, at the 5th UN Environment Assembly in Nairobi, a resolution on the **Environmental Aspects of Minerals and Metals Management** (UNEP/EA.5/Res.12) was adopted. The resolution requests the convening of intergovernmental regional consultations, followed by a global intergovernmental meeting, to develop proposals to enhance the environmental sustainability of minerals and metals along their full life cycle. The latest Meeting of the African Group of States provided interesting recommendations and identified potential areas of cooperation:³³

- The rising trend of consumer and investor interest in mineral and metal sourcing, and schemes focussing on traceability of minerals in end-use products, such as batteries, were discussed. It was considered to support the furtherance of a due diligence scheme, including for environmental sustainability, that could be applied to minerals and metals if centralized international administration could be provided. The OECD’s Due Diligence Guide to Responsible Business Conduct could serve as a blueprint or inspiration. An OECD Handbook on Environmental Due Diligence in Mineral Supply Chains is currently being developed by an OECD Working Group under the leadership of the German Federal Agency for the Environment.³⁴
- It was agreed by the delegates that tailings management, and environmental risks arising from tailings, should be a priority issue in the African region. Tailings facilities and plans for site restoration are typically poorly covered during the mine licensing process. Lack of clear division of responsibility and coordination between different government agencies was also identified as an issue in some African countries that affects tailings management. Such factors could lead to poor land use decisions, and governments being led with tailings liabilities after mine closure.³⁵

³² Afrodad (2022), *State of Mineral Resources Governance in SADC*.

³³ UNEP (2023), *Implementing UNEA Resolution 5/12 ‘Environmental Aspects of Minerals and Metals Management’*.

³⁴ OECD (2023), *Handbook on Environmental Due Diligence in Mineral Supply Chains*.

³⁵ UNEP (2023), *Implementing UNEA Resolution 5/12 ‘Environmental Aspects of Minerals and Metals Management’*.

- In response, the Global Industry Standard on Tailings Management could be implemented at the national level, including through strengthened legislation.
- The idea was raised of ‘hazard-mapping’, globally, to identify where tailings storage facilities are located and to highlight their relative risk profiles and chemical composition.
- African States would also welcome harmonisation of policies at regional and sub-regional levels.

UNECA and AU through the newly established Africa Mineral Development Centre (AMDC) with support from UNECE have developed an African Mineral and Energy Resources Classification and Management System (AMREC) based on the UN Framework Classification for (Mineral) Resources (UNFC).³⁶ The UNFC is a universal standard that considers all the necessary processes for holistic development of the minerals sector enabling it to deliver both significant process efficiencies and socio-economic gains. African countries have committed to implementation under the Africa Mining Vision and have established an African Union - African Minerals and Energy Resources Classification and Management System-Pan African Resource Code (AU-AMREC-PARC). The AMREC may also become a reference tool for mineral supply chain due diligence, which can inform actors along the supply chain and help European importers comply with the new EU Regulations and Directives, in particular it is likely to be used in the context of the Critical Raw Materials Act.

What is special about the UNFC/AMREC Framework is that economic assessment of a project must be accompanied with environmental and social aspects of a project’s life cycle, balanced against the SDGs.³⁷ However, the framework does not specify any environmental and social standards that projects need to fulfil, and refers vaguely to other standards, such as the Responsible Mining Index Framework 2020.³⁸ Typically, the UNFC would rely on the company conducting an EIA.

All in all, there are no powerful drivers at regional level at the moment to prevent and mitigate negative environmental, climate, and gender impacts from mining in the SADC region.

3.2. Distribution of ‘SADC Transition Minerals’ by country

The sixteen Member States have significantly different profiles of SADC Critical Transition Minerals in the scope of this report (see Table 6 below). This analysis is based on data from the U.S. Geological Survey (USGS)³⁹ and from mineral-specific organisations. South Africa and the DRC are global mining powerhouses, leading the global production of cobalt and tantalum (DRC) and PGMs, chromium, manganese, and titanium (South Africa). Furthermore, South Africa is the third-largest producer of vanadium and the fourth-largest producer of fluorspar and has a significant rare earth elements project. In the DRC, large deposits of lithium have been discovered and are being developed. Zambia and Zimbabwe are traditional resource-rich mining countries with significant deposits of copper (ZAM), PGMs, and lithium (ZIM). The Government of Zimbabwe claims the country will meet 20 % of the world’s total demand for lithium when it fully exploits its known lithium resources, and four major

³⁶ UNECE (n/a), [UNFC and Minerals](#).

³⁷ UNECE (2021), [Supplementary Specifications for the Application of the United Nations Framework Classification for Resources to Minerals](#)

³⁸ Development and operation (prospecting, exploration, mine production, processing, sales-access to market, rehabilitation) are environmentally-socially-economically viable on the basis of current conditions and realistic assumptions of future conditions. All necessary conditions have been met (including relevant permitting and contracts) or there are reasonable expectations that all necessary conditions will be met within a reasonable timeframe and there are no impediments to the delivery of the product to the user or market. Environmental- socio-economic viability is not affected by short-term adverse conditions provided that longer-term forecasts remain positive.

³⁹ The USGS Commodity Summary is the most comprehensive database of statistics for more than 90 individual minerals and materials.

lithium projects are currently under development.⁴⁰ Angola, Botswana, Lesotho's and Namibia's histories are intrinsically linked to diamonds, which are not in the scope of this report.⁴¹ However, because of its rising economic viability, several companies engage in nickel and copper exploration projects in the Kalahari Desert in Botswana and Namibia. Namibia is also rich in zinc and recently announced a significant find of rare earth elements (REEs) in North-central Namibia. Also, Madagascar is exploiting REEs and has deposits of cobalt, graphite, and nickel. Mozambique is ranked the second-largest graphite producer in the world and third largest producer of titanium. Tanzania is exploiting small deposits of nickel, copper, cobalt, nickel, and graphite. Malawi is not a major mining country, but rare earth element and niobium projects are planned for the near future. Four countries do not engage in significant mining activities of in-scope materials (Eswatini, Mauritius, Comoros, Seychelles).

Based on the size of the mining sector in the country, relevance for global raw material supply chains, and others, the following eight countries were selected for in-depth review: Botswana, DRC, Madagascar, Mozambique, Namibia, South Africa, Zambia, and Zimbabwe (see next Section).

⁴⁰ US International Trade Administration (2022), [Zimbabwe – Country Commercial Guide – Mining and Minerals](#).

⁴¹ Other out-of-scope commodities with significant importance to the economies of these countries include uranium (Namibia) and oil/gas (Angola).

1
Ranking of country in terms of annual production volume of the respective mineral

Table 7: Key raw materials (Production data in metric tons, source: USGS Commodity Summaries 2022)

Country	Cobalt	Copper	Chromium	Graphite	Lithium	Manganese	Nickel	PGM	REE	Tantalum	Titanium	Zinc	Others
Angola													Diamonds 3 19% / world
Botswana		Exploration					Small deposits						Diamonds 4 11,3% / world
Comoros													No substantive mining activities
DR Congo	1 120,000 mt (71% / world)	3 1,800 mt (8,6% / world)			Large lithium deposits have been discovered (3,000,000 mt reserves).					1 700 mt (33% / world)			Diamonds 6 4,1% / world Tin 7 5,3% / world Gold 16 th largest 3.3% / world
Eswatini													No substantive mining activities
Lesotho													Diamonds 9 0,8% / world
Madagascar	3 2,500 mt (1.5% / world)			5 22,000 mt (2.2% / world)			>10 th largest 60,000 mt (2.2% / world)		6 3,200 mt (1.1% / world)		9 310 mt (3.7% / world)		Mica 3 9.7% / world

Malawi										Kangankunde project planned. ⁴²			Exploitation of coal, uranium, and iron ore.
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Country	Cobalt	Copper	Chromium	Graphite	Lithium	Manganese	Nickel	PGM	REE	Tantalum	Titanium	Zinc	Others
Mauritius													No substantive mining activities
Mozambique				3 30,000 mt (3.0% / world)						8 th largest producer globally 2021: 43 mt (2,0% / world)	3 970 mt (11.5% / world)		
Namibia	Exploration	Small deposits			Development (50,000 mt reserves).	Small deposits.			In 2022, significant find of REEs.			Significant Zinc deposits.	Diamonds 7 2,5% / world Uranium oxide 4
Seychelles													No substantive mining activities
South Africa			1 18,000 mt (43.9% / world)			1 7,400 mt (37% / world)		Platinum 1 130,000 mt (72% / world) Palladium 1 80,000 mt (40% / world)	Small deposits		2 1,000 mt (11.9% / world)		Diamonds 5 11% / world Gold 10 3.8% / world Vanadium 3 8.3% / world Fluorspar 4

⁴² US International Trade Administration (2022), [Malawi – Country Commercial Guide – Mining and Minerals](#).

													4.9%/ world)
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Country	Cobalt	Copper	Chromium	Graphite	Lithium	Manganese	Nickel	PGM	REE	Tantalum	Titanium	Zinc	Others
Tanzania	Small deposits	Small deposits		150mt (0.01% / world)			Small deposits.						Diamonds 14 th largest 0.2% / world Gold 21 st largest 1.5% / world
Zambia	Small deposits	7 830 mt (4% / world)				Small deposits	Small deposits.						Uranium, gold, coal mining deposits are prospected.
Zimbabwe					6 1,200 mt (1.2% / world). Largest lithium deposits in Africa.			Platinum 3 15,000 mt (8.3% / world) Palladium 5 13,000 mt (6.5% / world)					Diamonds 10 0,4% / world Gold 19 th largest 1.5% / world In addition, chromium and coal are mined.

3.3. Country profile summaries

3.3.1. Top 40 'SADC Transition Mineral' mining companies and mines

Table 8 below provides an overview of the 40 most relevant large-scale mining companies and their most important assets (mines) regarding critical transition minerals in the eight SADC focus countries. The list also includes junior companies which are still in the exploration or construction phase, as some of them will play a major role in expanding capacities for the growing demand of critical transition minerals. A more in-depth profile of the companies and mines can be found in the country profiles in Annex I

Table 8: Top 40 mining companies and mines in eight SADC focus countries

Company	Mineral	Country of Origin	Namibia	Zambia	Mozambique	South Africa	Botswana	DRC	Madagascar	Zimbabwe
African Rainbow Mining	PGM, Nickel, Manganese, Iron Ore, Chromium	South Africa				2 PGM mines (Modikwa, Two Rivers 54%) 2 manganese mines (Black Rock, Nchawning) 1 Nickel and chromium mine (Nkomati) (50 %) 1 iron ore mine (Beeshoek)				
Andrada (previously AfriTin Mining Ltd.)	Lithium, Tin, Tantalum	South Africa	Uis, Lithium Ridge, Spodmene, Brandberg West							
AMG Graphite	Graphite	Germany			GK Ancuabe Graphite Mine S.A					
Anglo American	PGM (AmPlats), Diamonds (DeBeers), Manganese, Iron Ore	UK	Diamonds (NamDeb, DebMarine)			7 PGM mines (Mogalakwena, Tumela, Dishaba, Modikwa, Mototolo, Bokoni, Twickenham) 2 Samancor Manganese Ltd. mines (Wessles, Mamatwan) 2 Kumba Iron Ore mines (Sishen, Thabazimbi) Diamonds (Venetia)	Diamonds (Debswana: Jwaneng, Orapa, Letlhakane and Damtshaa Mines)			Unki (PGM)
AngloGold Ashanti	Gold	South Africa						Kibali (45 %)		

Company	Mineral	Country of Origin	Namibia	Zambia	Mozambique	South Africa	Botswana	DRC	Madagascar	Zimbabwe
AVZ International	Lithium, Tin	Australia						Manono (65 %, Lithium)		
Barrick Gold	Copper, Gold	Canada		Lumwana (100 %)						
China Molybdenum	Copper, Cobalt	China						Tenke Fungurume, Kisanfu		
China Non-Ferrous Metals Corp	Copper	China		NFC Africa Mining, CNMC Luanshya				Somidez: Deziwa		
EMR Capital Resources	Copper	Cayman Islands, Australia, Hongkong		Lubambe						
ERG	Copper, Cobalt	Kazakhstan		Chambishi (Cobalt-Copper)				Frontier, Mukondo Mountain Mine		
Exxaro Resources	Zinc, Lead, Silver, Copper, (and major coal deposits in South Africa)	South Africa				Gamsberg, Black Mountain (24,4 % each)				
First Quantum Minerals	Copper, Gold, Nickel	Australia		Kansanshi (Copper-Gold, 80%), Sentinel (Copper, 100%), Enterprise (Nickel, 100%)						
Gécamines	Copper, Cobalt	DRC						Many		

Glencore	Copper, Chromium, Vanadium, PGM	Switzerland				Boshoek, Helena, Magareng (Chromium, 80 %), Rhovan, Thornccliffe (Vanadium), Borwa/Mototolo (PGM, 38 %), several smelters		KCC MUMI (Copper, cobalt)		
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Company	Mineral	Country of Origin	Namibia	Zambia	Mozambique	South Africa	Botswana	DRC	Madagascar	Zimbabwe
Haiyu Mozambique Mining	Graphite	China			Balama					
Harmony Gold	Gold	South Africa				9 underground gold mines in the Witwatersrand Basin (Doornkop, Joel, Masimong, Moab Khotsong, Mponeng, Target 1, Tshepong, Kusasaletu), 1 open-pit				
Impala Platinum (Implats)	PGM	South Africa				Marula (73 %), Two Rivers (46%), Rustenburg (96 %), Amandelbult				
International Resources Ltd.	Iron Ore	China				Mapochs				
Ivanhoe	Copper, zinc, PGM, nickel	Canada				Platreef PGM-Nickel Mine (64 %)		Kamoa-Kakula (39.6 %) Kipushi (Zinc, 64 %) Western Foreland exploration		
Jinchuan	Copper	China						Ruashi, Kisenda, Lubembe		
Kenmare Resources	Titanium	Ireland			Kenmare Moma Mining: Moma					
Khoemacau Copper Mining	Copper	Botswana				Khoemacau				
MMG	Copper	China						Kinsevere		

Norilsk Nickel	Chromium	Russia				1 Nickel and chromium mine (Nkomati) (50 %)				
Northam Platinum	PGM	South Africa				Eland, Zondereinde, Booysendal, Bafokeng				
Palabora Mining	Copper	South Africa				Palabora				
Premium Nickel Resources Ltd.	Nickel, Copper, Cobalt	Canada					Selebi-Phikwe, Selkirk			
Rainbow Rare Earths	Rare Earth Elements	Guernsey				Phalaborwa				
Rio Tinto	Iron Ore, Titanium, Zircon	UK				Richard's Bay Minerals (74 %, Zircon, Iron Ore)				QIT Madagascar Minerals: Fort Dauphin
Royal Bafokeng Platinum	PGM	South Africa				Bafokeng				
Sandfire	Copper	Australia					Motheo			
Sibanye-Stillwater	PGM, Gold	South Africa				4 PGM mines (Rustenburg, Marikana, Kroondal, Platinum Mile) 5 gold mines (Driefontein, Kloof, Beatrix, Cooke, DRD Gold)				Mimosa (PGM)
South32	Aluminium	Australia			Mozal (Processing)	Hotazel Manganese Mines: Mamatwan, Wessels (Kalahari Manganese Fields)				
Sumitomo	Nickel	Japan								Ambatovy
Trevali Mining Corporation	Zinc	Canada	Rosh Pinah							
Tshipi é Ntle Manganese Mining	Manganese	South Africa				Tshipi Borwa (Kalahari Manganese Fields)				
Syrah Resources	Graphite	Australia			Twigg Exploration & Mining Lda: Balama					

Vedanta Resources	Zinc, Lead, Silver, Copper	India	Skorpion	Konkola (80 %), Nchanga (Copper-Cobalt)		Gamsberg, Black Mountain (69,6 % each)				
ZCCM ICH	Mainly Copper, Cobalt	Zambia		23 mines, Mopani						
Zhejiang Huayou Cobalt	Copper, Cobalt	China						Kolwezi, Luiswishi (Copper-Cobalt)		
Zijin Mining	Copper, Cobalt, Lithium, Gold, Zinc, Silver, PGM	China				Garatau (74 %) - (PGM)		COMMUS Kolwezi (72 %), Kamoakakula (45 %, Copper); Manono (15 %, Lithium)		

4. Key observations

Economic contribution. According to the World Bank, all eight countries are highly dependent on mining, measured by the share of GDP, share of government budget, and export revenues. Botswana's mining industry contributed 16,7 % to the national GDP (2022/Q2).⁴³ In 2020, diamonds accounted for roughly 87 % of export revenues and about 35 % of Government revenues.⁴⁴ The Democratic Republic of Congo (DRC) is one of the richest countries in terms of natural resources in Africa. The DRC's mining industry is the key sector of the economy and contributes 13,5 % to the national GDP, 99,3 % of export revenues, 46 % of government revenues (2019).⁴⁵ Madagascar's mining industry contributed 4,6 % to the national GDP, 27 % of export revenues, 4,4 % of government revenues (2018).⁴⁶ Mozambique's mining industry contributed 6,9 % to the national GDP and 7 % of government revenues (2019). In 2019, extractive companies contributed approximately USD 250 million in taxes, fees, and royalties to the government budget, mostly from natural gas and coal. The Namibian mining industry is the key sector of the economy and contributed 12,2% to the national GDP (2022).⁴⁷ According to the Bank of Namibia forecast, the mining sector is expected to grow by another 10,9 % in 2023. In 2022, mining companies contributed approximately EUR 214 million in taxes, royalties, and export levies to the government budget.⁴⁸ The South African mining industry contributed 8,7% to the national GDP (2021).⁴⁹ In 2022, mining companies contributed approximately EUR 355 million in taxes to the government budget.⁵⁰ Zambia's mining industry contributed 10% to the national GDP, 77 % of export revenues, 39 % of government revenues.⁵¹ Zimbabwe's mining industry contributed 12 % to the national GDP.⁵²

Employment data is harder to come by. The large-scale mining (LSM) industry in the DRC directly employed around 163,237 people (24,8 % of formal employment), most of them Congolese nationals (data for 2019).⁵³ In Zambia, direct employment in the mining sector made up 2% of total employment (2021). As of 2022, the mining industry in South Africa directly employed around 475,000 people.⁵⁴

Companies/mines. Of the private companies invested in the SADC region, most are foreign-controlled companies. While most mining companies are headquartered in South Africa (13 companies), they also invest and operate mines in other SADC countries. Eight mining companies are from China, five from Australia, and four from Canada. Only two companies on the list are non-South African locals, from Botswana. One mining company from Germany is active in the SADC region (AMG Graphite).

Gold mining companies were considered in the analysis as well, as they often also mine other minerals (such as copper). Furthermore, Anglo American's De Beers operations are also listed here, as they have major implications for the economies of Namibia and Botswana and as Anglo American's operations are of crucial importance to SADC.

⁴³ Statistics Botswana (2022), *GDP Second Quarter of 2022*.

⁴⁴ EU (2020), *Botswana - Multi-Annual Indicative Programme 2021 – 2027*.

⁴⁵ EITI (2023), *DRC Country Page*.

⁴⁶ EITI (2023), *Madagascar Country Page*.

⁴⁷ Namibia Chamber of Mines, *2022 Annual Review*.

⁴⁸ *Ibid.*

⁴⁹ Minerals Council South Africa (2023), *Facts and Figures Pocketbook 2022*.

⁵⁰ *Ibid.*

⁵¹ EITI (2023), *Zambia Country Page*.

⁵² US International Trade Administration (2022), *Zimbabwe – Country Commercial Guide – Mining and Minerals*.

⁵³ US Geological Survey (2022), *Minerals Yearbook – DRC*.

⁵⁴ Minerals Council South Africa (2023), *Facts and Figures Pocketbook 2022*.

The analysis shows that many projects are operated by joint ventures. Companies may choose this approach to hedge their investments.

State-owned enterprises. In many cases, joint ventures are concluded with state-owned or state-controlled firms. In the DRC, Gécamines is a prominent partner in many mining operations in the Eastern DRC. In Zambia, most projects include a minority share of ZCCM-IH. Also, in Namibia and Botswana, the government is invested in the diamond industry together with De Beers (Anglo-American), as it is the main revenue source for the government. However, the absence of robust accountability systems in most state-owned mining enterprises has resulted in mismanagement and the failure to generate revenues to steer economic development of SADC resource rich countries. For example, the Auditor General Report of 2018 noted how the Zimbabwe Mining Development Corporation (ZMDC) failed to recognize its interests in joint ventures and associates in its separate financial statements at cost or at fair value.⁵⁵ Also, DRC’s Gécamines has historically been mismanaged whereby revenues estimated at USD 262 million have been collected annually since 2009, allegedly, without those revenues being directed to the public treasury. The governance performance of SOEs is measured by the Resource Governance Index (RGI). The last RGI concluded a weak state of SOE governance in the SADC region, citing also ZMDC and Gécamines, as well as Botswana’s Debswana, all scoring below 50 on the index. On the other hand, Zambia Consolidated Copper Mines Investment Holdings (ZCCM-IH) and South Africa’s African Exploration Mining and Finance Corporation ranked above 65%.

Value chains. The region’s minerals remain largely exported unprocessed in their raw form or lightly processed commodities.⁵⁶ However, countries are experimenting with export bans for unprocessed minerals, a practice which has been dubbed ‘resource nationalism’. Countries such as the DRC, Zimbabwe, and Zambia have – at least temporarily – instituted bans on exporting raw copper and cobalt (DRC, Zambia) and lithium and other ores (Zimbabwe). However, these bans have largely stalled due to operators’ inability or unwillingness to develop local processing facilities.

ASM. The analysis shows that the ASM sector is a significant livelihood for large parts of the population in the DRC and Zimbabwe. Also, in Madagascar, Mozambique, and Zambia, the ASM sector is sizeable and significant. For the most part, ASM is taking place in precious materials, such as gold, diamonds, and gemstones. These have significant environmental impacts, as in ASM gold mining the use of mercury is still prevalent and digging for diamonds can destabilize established or abandoned diamond mines with a potential for hazardous underground mine or tailings collapses. However, gold and diamond mining are out of the scope of this report. In Zambia and the DRC, ASM is also prevalent in copper, cobalt, tin, tantalum, and tungsten mining. These practices are associated with risks regarding occupational health and safety, child labour, labour rights, and conflict financing.

Table 9: ASM sector in Focus Countries

Country	Botswana	DRC	Madagascar	Mozambique	Namibia	South Africa	Zambia	Zimbabwe
People in ASM, estimated	15.000	2.000.000	700.000	660.000	20.000	30.000	500.000	1.000.000
ASM sectors	Gold	Gold, diamonds, 3T, cobalt, copper	Gold, gemstones	Gold, gemstones, tantalum,	Gold, gemstones, diamonds	Gold	Gold, gemstones, 3T, copper	Gold, gemstones, diamonds

⁵⁵ Afrodad (2022), *State of Mineral Resources Governance in SADC*.

⁵⁶ *Ibid.*

				construction materials				
Data for	2018	2018	2021	2022	2018	2018	2017	2018

Source: Compiled from <http://artisanalmining.org>

Energy transition trends. The analysis shows that the rising demand for critical transition minerals in the SADC region has led increased exploration and mining activities. Especially projects looking into lithium, graphite, copper, cobalt, nickel and partially even REEs have been launched in most countries, with varying foci. In Botswana and Namibia, nickel and copper from the Kalahari Copper Belt may see a push in the future due to the high global demand from the energy transition. Zimbabwe and Namibia have the largest lithium deposits in Africa and are developing them. Although Zimbabwe has been mining lithium since 1950 through Bikita Lithium Minerals (BLM), in recent years, Zimbabwe has experienced an increased interest in lithium mining activities which has seen an influx of investors and projects. To date there are now around seven different lithium exploration and mining projects at different development stages. Chinese companies (e.g., Zhejiang Huayou Cobalt and Sinomine Resource Group) are currently acquiring lithium mining rights in the biggest lithium companies in the country.

Mozambique and Madagascar are rich in natural graphite and are massively expanding their output. As of 2021, there were nine graphite exploration projects ongoing in Madagascar in addition to several existing mines, for example the Molo mine operated by Canadian firm NextSource. NextSource also is developing a battery anode factory in Mauritius to supply cell manufacturers and OEMs with an anode solution using feedstock and value-added processing ‘independent of the Chinese supply chain’.⁵⁷ Another company, Twigg, is exporting its graphite to a newly built processing plant in Louisiana under the U.S. Minerals Security Partnership (MSP) supported by the U.S. government.⁵⁸

The DRC is the global leading producer of cobalt and tantalum and – together with Zambia – is eager to upgrade the Congolese value chain for battery materials and develop own refining and battery cell manufacturing capacities with the help of foreign investors as well as from the EU and the US, which themselves are trying to loosen China’s grip on Congolese transition minerals. In 2022, the two countries established the Zambia-DRC Battery Council, which is composed of the two Heads of State, the Deputy Secretary General and Executive Secretary of the United Nations Economic Commission for Africa (UNECA) and the President of Africa Export-Import Bank (Afrexim Bank). For the undertaking, they also want to identify an implementation site, such as a Special Economic Zone (SEZ), potentially in Kipushi, in the Haut-Katanga region or in Ndola in the Zambian Copperbelt.⁵⁹ Research and development of the battery precursor and the battery required for subsequent mass production and sale is supported by the University of Zambia and the Copperbelt University. Also, the German Steinbeis Global Institute Tübingen (the company behind the Green Hydrogen Africa Initiative) and the University of Lubumbashi are involved in the geological investigations.⁶⁰ Currently, a plant with 40 GW production capacity is planned in the Kiswishi Special Economic Zone (SEZ). For this, Lubumbashi University, Zambia University, Copperbelt University and Steinbeis University have built a development partnership.⁶¹ In December 2022, the United States, Zambia, and the DRC signed

⁵⁷ Nextsource Materials Website, [Superflake](#).

⁵⁸ AllAfrica (2022), [Mozambique: Mozambican Graphite Has a Place in the U.S.-China Battle](#).

⁵⁹ CSIS (2023), [The U.S.-Zambia-DRC Agreement on EV Batteries Production: What Comes Next?](#)

⁶⁰ Zambian Ministry of Commerce and Trade (2022), [Redefining Zambia’s Industrialization Path](#).

⁶¹ DSE Technology Website, [Battery](#).

an MoU “Concerning Support for the Development of a Value Chain in the Electric Vehicle Battery Sector”, with the aim to facilitate the development of an integrated value chain to produce electric vehicle (EV) batteries in the DRC and Zambia.⁶²

Mining sector regulation. There is a wide variety of topics that should be covered by a robust and comprehensive legal framework for mineral development and environmental and climate protection. Elements of environmental and climate laws and regulations should encompass requirements for comprehensive Environmental and Social Impact Assessments (ESIA) before awarding mining licenses and during operations; regulations regarding emissions control (air, water, soil) and a system to regularly control emissions; provisions regarding the decommissioning of mines and site-rehabilitation, including establishing a system for financial guarantees; laws for the protection of forest habitat/peatlands and a process for awarding deforestation licenses; regulations for tailings management, freshwater use; and legislation regarding carbon pricing (tax, trading scheme, etc.).

The following comparative tables provide a useful overview of the comprehensiveness and strength of mineral and environmental governance in the SADC Focus Countries. Table 8 below provides a non-exhaustive overview of mining codes and environmental protection laws in the eight SADC Focus Countries, compiled from the Africa Mining Law Atlas (AMLA) and other sources.⁶³

Table 10: Mining Codes and Environmental Protection Laws in SADC Focus Countries

Country	Botswana	DRC	Madagascar	Mozambique
Primary Legislation	Mines and Minerals Amendment Act 2007 Mining Law 1999	Code Minier 2002 Décret Portant Règlement Minier 2003	Madagascar Loi sur les Grands Investissements dans le Secteur Minier Modifié 2005	Regulamento da Lei de Minas
Environmental Regulation	Environmental Assessment Act 2011	Loi Relative a la Conservation de la Nature 2014 Loi Portant Principes Fondamentaux relatifs à la Protection de l’Environnement 2011 Loi Relative a l’Eau 2015	Loi Portant Charte de l’Environnement Malgasy Actualisée 2015 Arrêté interministeriel portant suspension de l’octroi de permis minier et de permis forestier dans les zones reserves comme sites de conservation 2004	Regulamento Ambiental para a Actividade Mineira 2004 Regulamento sobre o Processo de Auditoria Ambiental 2011 Lei de Aguas 1991 Resolução sobre a Política de Responsabilidade Social Empresarial no Sector da Industria Extractive 2014
Country	Namibia	South Africa	Zambia	Zimbabwe
Primary Legislation	Minerals Prospecting and Mining Amendment Act 2008 Minerals Act 1992	Mineral and Petroleum Resources Development Act 2008	Mines and Minerals Development Act 2016 + Amendments of 2018 and 2020	Mining Law 1961 Mines and Minerals Declaration of Minerals 1990

































⁶² [MEMORANDUM OF UNDERSTANDING Among the the UNITED STATES OF AMERICA, THE DEMOCRATIC REPUBLIC OF THE CONGO, And the THE REPUBLIC OF ZAMBIA Concerning SUPPORT FOR THE DEVELOPMENT OF A VALUE CHAIN IN THE ELECTRIC VEHICLE BATTERY SECTOR.](#)

⁶³ The Africa Mining Law Atlas (AMLA) platform is a free online one-stop resource for African mining legislation that provides all 53 existing mining Law codes of the continent in an easily readable and searchable format, as well as all major primary legislation and related regulations regarding the mining sector.

	Diamonds Act 1999 Mine Safety Regulations 1997	Mining Law 2002 Precious Metals Act 2005 Amendments to the Mineral and Petroleum Resources Development Regulations 2004, 2020 Mining Titles Registration Amendment Act 2003		Mining Health and Safety Regulations 1995 Mining Management and Safety Regulations 1990 Base Minerals Export Control Act
Environmental Regulation	Environmental Management Act 2007 Reservation of Land from Prospecting and Mining Operations 2013 Withdrawal of Reservation of Land from Prospecting and Mining Operations in Respect of Nuclear Fuel Minerals 2016 Forest Act 2001	Environmental Impact Assessment Regulations 2014 National Environmental Management Laws Amendment Act 2022 Carbon Tax Act 2019 National Water Act 1998 Mine Community Resettlement Guidelines 2022 Disaster Management Act 2002 Mine Health and Safety Act 1996 Codes of Good Practice for the South African Minerals Industry	Environmental Management Act 2011 Forests Act 2015 Zambia Wildlife Act 2015 Water Resources Management Act 2011 Ionizing Radiation Protection Act 2011	Environmental Management Act (Chapter 20:27) Water Act 1998

In addition, the Climate Policy Database tracks policies with an explicit climate change mitigation objective, such as greenhouse gas emissions reduction strategies; energy policies, that help to decarbonize the energy supply and/or reduce energy demand; and policies that aim to introduce low-emissions practices and technologies to non-energy sectors, such as agriculture and land use. The comprehensiveness of the laws is then ranked from very poor to very good. According to the database, the policy base in the eight focus countries is very poor except for South Africa (see Table 9).

Table 11: Climate Policy Database Scores for SADC Focus Countries

Country/ Policy Coverage	Botswana	DRC	Madagascar	Mozambique	Namibia	South Africa	Zambia	Zimbabwe
General Climate Policy Coverage	 Very Poor	 Very Poor	 Poor	 Poor	 Poor	 Good	 Fair	 Poor
Electricity and Heat	 Very Poor	 Very Poor	 Very Poor	 Very Poor	 Very Poor	 Very Good	 Very Poor	 Very Poor
Industry	 Very Poor	 Very Poor	 Very Poor	 Very Poor	 Very Poor	 Good	 Very Poor	 Very Poor
Agriculture and Forestry	 Very Poor	 Poor	 Very Poor	 Very Poor	 Very Poor	 Poor	 Poor	 Very Poor

A full review of the mining code and legal framework relating to environmental and climate policies in all focus countries and the enforcement effectiveness thereof was not within the scope of this study. However, a good proxy for the strength of environmental governance in a country is the Environmental Performance Index (EPI). The EPI provides very high territorial coverage (180 countries) and is based on a selection of 24 performance indicators in ten thematic categories covering ecosystem vitality, ecological health, and GHG emissions performance. The EPI is also used by the German Federal Agency for the Environment (*Umweltbundesamt*) for the Ökores II assessments. Table 11 below provides an overview of the EPI scores for the SADC Focus Countries.

The assessment points out that except for Botswana and Namibia, environmental governance is weak in the SADC Focus Countries. While Botswana and Namibia have improved significantly over the last decade, Zambia, Madagascar, Zimbabwe, and DRC have even regressed. While most countries score well on the ecosystem vitality dimension, almost all countries score weak on the environmental health dimension, which also includes indicators regarding solid waste and heavy metals and therefore directly relates to the mining industry. Regarding climate change policies and performance, the scores vary vastly between countries.

Table 12: Environmental Performance Index (EPI) Scores for SADC Focus Countries

Country	Botswana	DRC	Madagascar	Mozambique	Namibia	South Africa	Zambia	Zimbabwe
Environmental Performance Index 2022 (Scale 0-100)	54	36.9	28	31.7	50.9	37.2	38.4	46.2
Rank 2022 (out of 180 countries)	35	119	167	144	44	116	106	69
Change since 2012	+8.2	-0.2	-5.4	+0.6	+16.4	+10.1	-6.9	-0.7
Ecosystem Vitality ⁶⁴	61.4	46.1	29.5	44.5	51.3	44.2	58.2	61.7
Environmental Health ⁶⁵	21.3	21.1	24.4	28.3	24.2	28.1	21.2	21.9
Climate Change Policy Objective ⁶⁶	63.1	35.1	28.4	19.3	64.6	34.1	25.6	41.9

One of the key reasons is that enforcement of environmental laws, including regarding environmental impact assessments, land use permits, deforestation permits, hazardous and toxic waste treatment permits, emission control – if they exist – is weak. Corruption is a major factor for this. The ranking of SADC focus countries in the Corruption Perception Index published by Transparency International is as follows: 1. Botswana (35th out of 198 countries), 2. Namibia (59/198), 3. South Africa (72/198), 4. Zambia (116/198), 5. Mozambique and Madagascar (142/198) 7. Zimbabwe (157/196) and 8. DRC (166/198). In this context, the prospects for creating effective environmental and climate governance are dire.⁶⁷

In some cases, the efficacy of the legal framework for mining and environmental and climate management is undermined by a largely unregulated and informal, not illegal, artisanal, and small-scale mining (ASM) sector.

4.1.1. Environmental, climate and gender-related performance

The negative environmental, climate, and gender impact of mining critical transition minerals in the SADC region is significant. As the region encompasses such a diverse range of minerals, geographies and geologies, the cumulative effects cannot easily be cumulated. This would require further reach to calculate the cumulative effects on carbon emissions, net biodiversity loss, deforestation, pollution impacts, water conflicts, etc. However, Table 12 below provides an overview of the scope of environmental and climate related impacts from mining and lists incidents and figures from the SADC country profiles.

⁶⁴ This dimension includes indicators regarding biodiversity, ecosystem services, fisheries, acidification, and water resources.

⁶⁵ This dimension includes indicators regarding air quality, sanitation drinking water, heavy metals, and waste management.

⁶⁶ This dimension includes indicators of GHG emissions, including CO2 growth rate, CH4 growth rate, N2o growth rate, GHG per capita, and others.

⁶⁷ Transparency International (2023), [Corruption Perceptions Index 2022](#).

Table 13: Negative environmental, climate, and gender impacts from mining in SADC countries

Risk category	Explanation
Climate change	<p>Significant greenhouse gas (GHG) emissions arise from mining and processing activities. Direct emissions, also called Scope 1 emissions, include CO₂ from waste rocks, emissions from fuel used in mining and refining operations, and GHGs from acid neutralisation, mineral beneficiation, extraction, and waste streams (e.g., tailings). Indirect emissions are either associated with the generation of purchased energy (e.g., electricity, steam, and heat) (Scope 2) or any other emissions that occur in the product’s value chain (Scope 3). Overall, Scope 3 emissions are the largest source of GHG emissions from the mining sector, representing well over two-thirds of the total, which is why many companies are taking steps to curb these emissions by partnering with end users, such as the steel industry.⁶⁸</p> <p>For example, emissions from producing the average tonne of lithium carbonate and Class 1 nickel are three and ten times higher, respectively, than those from producing a tonne of steel.⁶⁹ The higher emissions relate to the fact that most energy transition minerals have a lower metallic concentration in the ore. Lower-grade ores require more energy to extract the valuable fraction.</p> <p>Processing techniques also have a significant impact on the carbon footprint of the final product. For example, emissions for producing battery-grade Class 1 nickel range from roughly 10 tCO₂-eq/tonne from sulfidic nickel ore, to almost 17 tCO₂-eq/tonne from lateritic nickel ore through High-Pressure Acid Leaching (HPAL), the predominant method for making battery grade nickel in Indonesia, the largest supplier of battery grade nickel globally. What further aggravates the carbon footprint is the dependence on China for processing most transition minerals, where coal plays a dominant role in the power mix.</p> <ul style="list-style-type: none"> ● South Africa will enter a USD 8,5 billion ‘Just Energy Transition Partnership (JETP)’ with the EU, US, France, Germany, UK and other partners. After two years of negotiations, South Africa’s implementation plan for the Just Energy Transition Partnership (JETP) will be made public at the UN COP28 Climate Summit in Dubai in November 2023 and may serve as a blueprint for climate finance and phasing out fossil fuels in developing economies. ● Several countries have established a carbon trading scheme or carbon tax, including Zimbabwe and South Africa. ● Many companies are engaged in reducing their GHG footprint by investing in renewable energy and resource efficient technologies (see Chapter 3.3.4.) ● However, a major contribution to carbon emission in SADC countries is from land-use change to make way for new mining projects.
Solid waste and tailings breaches	<p>Tailings breaches refer to the failure of a tailings storage facility (TSF), resulting in the potential for harm to humans or the environment. Closed and abandoned tailings represent one of the most important sources of heavy metal pollution in places where mining activities occur or have occurred.</p> <p>Mineral extraction is the largest global waste producer, particularly from copper, zinc, bauxite, and nickel mining.⁷⁰ Annually, producing the world’s 18-20 billion tonnes of minerals requires the generation of 80-90 billion tonnes of waste rock and 8 billion tonnes of tailings.⁷¹ It is estimated that there are approximately 18.000 TSFs worldwide, of which approximately 3.500 are currently active.⁷² Based on available data examining the hazard potential of TSFs, an apparent 43-50% of all existing tailings contain “high hazard potential”. Nine “very serious” and five “serious” failures have already occurred globally in the decade 2015 to 2024.</p>

⁶⁸ International Energy Agency (2023), [Energy Technology Perspectives 2023](#).

⁶⁹ Ibid.

⁷⁰ UNEP (2020), [Mineral Resource Governance in the 21st Century: Gearing extractive industries towards sustainable development](#).

⁷¹ [State of World Mine Tailings Portfolio 2020](#)

⁷² Church of England (2023), [Tailings Database and Portal](#).

	<p>A specific problem is the use of deep-sea tailings disposal techniques through which tailings are disposed directly into rivers or the sea. While there may be safe ways to dispose of and store tailings waste underwater, e.g., storage in underwater canyons, in practice, many companies just dump the waste into the water. This may lead to further heavy metal and acidic pollution and the resulting negative impacts on biodiversity, fisheries, tourism, etc. There are many initiatives underway to ban this practice in most countries.</p> <ul style="list-style-type: none"> • There are, however, no major incidents of tailings breaches reported in the SADC region in the recent past and deep-sea tailings disposal is also not known of in the SADC focus countries.
<p>Water, air, and soil pollution</p>	<p>There are many ways that mining operations contribute to water, air, and soil pollution and can have hugely negative impacts on local communities, wildlife, aquatic life, biodiversity, and ecosystems, including food chains and livelihoods (e.g., negative impact on fisheries, tourism, agriculture).</p> <p>The most detrimental form of pollution is the contamination with hazardous substances, radiation, or heavy metals. Minerals that occur predominantly in sulfidic ores (such as copper, nickel, zinc, iron ore, aluminium, etc.) pose a higher environmental hazard potential than raw materials that occur predominantly in oxide sedimentary ores. Acid mine drainage (AMD) is a significant environmental problem that occurs when sulphide minerals in rocks and ores are exposed to air and water during mining operations or natural weathering processes and are released as acidic and metal-rich waters into the surrounding environment. Also, toxic effluent waters from processing that are not properly treated or retained can directly contaminate surface waters and affect ecosystems, biodiversity, and human health.</p> <ul style="list-style-type: none"> • According to news reports, the water downstream of Rio Tinto’s QMM mine in Madagascar contains high concentrations of uranium and lead, potentially endangering residents who depend on a nearby lake and river for drinking water. A study commissioned by southern Madagascar-focused British environmental charity The Andrew Lees Trust found that concentrations of uranium were 350 times higher downstream of the QMM mine than upstream of it, and that lead concentrations were 9.8 times higher.⁷³ • Legacy mining pollution in Zambia is the result of many decades of unsustainable mining operations and inadequate rehabilitation or closure of mining sites. Lead poisoning has affected the residents of Kabwe, the capital of Zambia’s Central Province with a population of over 200,000 residents since decades.⁷⁴ • The Witwatersrand Basin, a major mining region in Gauteng province, the most urban, industrial, and most densely populated province in South Africa, has been particularly affected by Acid Mine Drainage due to its 120-year history of gold mining activities. According to the Environmental Justice Platform, millions of people are affected by the water and soil pollution and elevated levels of heavy metals. <p>A further risk is the prevalence of artisanal and small-scale mining (ASM) in many countries in the SADC region. ASM operators often evade regulatory mechanisms that govern large-scale mining, including environmental impact assessment and permitting processes. ASM can cause significant destruction to land, crops, and forests – as well as pollution of the water sources, water table, soil, and food chain, with site rehabilitation rarely achieved. ASM miners are often unaware of the adverse environmental impacts they cause but may be willing to change if informed and given alternatives.⁷⁵</p>

⁷³Andrew Lees Trust (2020), [Water Briefing: An introduction to water contamination and environmental governance issues surrounding Rio Tinto’s QMM mine in southern Madagascar](#).

⁷⁴ World Bank (2020), [Zambia Mining and Environmental Remediation and Improvement Project](#).

⁷⁵ UNEP (2023), *Implementing UNEA Resolution 5/12 ‘Environmental Aspects of Minerals and Metals Management’*.

<p>Water stress and freshwater competition</p>	<p>Several environmental problems associated with mining stem from contamination and competition about surface water and groundwater. Copper and lithium are particularly vulnerable to water stress given their enormous water requirements. Over 50% of today's lithium and copper production is concentrated in areas with high water stress levels. According to UNEP, it has been estimated that 1.600 litres of water are used to obtain 19kg of copper.⁷⁶</p> <ul style="list-style-type: none"> • Most of the mines in Namibia are in water- stressed areas, and these are increasingly facing competition from different users, presenting challenges to the security of supply. According to the Namibia water statistics, the mining industry is the fourth highest water consumer after Irrigation, livestock, tourism, etc. Though other sectors consume more water, the primary concern with water used in mining is that, in most cases, it cannot be recycled for human consumption.⁷⁷
<p>Deforestation, biodiversity loss and conservation impact</p>	<p>The conversion of formerly forest habitats for mining, processing, and tailings storage facilities can negatively impact the biodiversity of the habitat, lead to a higher carbon footprint through land use change, and otherwise negatively affect the natural habitat and local community. What further aggravates the situation is that deforestation in the context of mining is often associated with illegal activity, corruption, or weak legal frameworks or enforcement thereof (e.g., no or poor environmental impact assessment before the award of mining license and deforestation permit).</p> <p>Impacts on biodiversity and ecosystems can be particularly high where mining activities are in protected areas and other areas of high biodiversity value and sensitivity. According to the World Resources Forum, resource extraction and processing are responsible for over 80% of biodiversity loss. It is estimated that globally, there are 1.604 mining operations within Key Biodiversity Areas and 2.075 in Protected Areas.⁷⁸</p> <p>Many standards now require that projects achieve “no net loss” of biodiversity in areas of natural habitat and a net gain in areas of critical habitat through adoption of the mitigation hierarchy.</p> <p>In the SADC focus countries, several adverse impacts regarding mining-related biodiversity loss or illegal deforestation have been recorded.</p> <ul style="list-style-type: none"> • The SADC region is a biodiversity hotspot. For example, Madagascar is a biodiversity-rich country with high levels of endemism (most of the plant and animal species occur nowhere else on Earth).⁷⁹ Almost 40% of Botswana’s territory is under conservation or in protected areas. • Mining has been an important driver of biodiversity loss, in countries with established mining sectors (such as Zambia, South Africa and Zimbabwe) and in new mining explorations, such as in Mozambique, and Madagascar. For example, in Zimbabwe, the impact on biodiversity has been reported from diamond mining in Chimanimani National Reserve.⁸⁰ • Zambia reports one negative impact of the discharge of effluents from Copperbelt mines into river systems to contribute to a reduction in the diversity of butterflies, dragonflies and other invertebrates.⁸¹ • Chromium and nickel-cobalt mining projects in the southeast of Madagascar have been responsible for the deforestation of 2500 ha forest.⁸² • RioTinto’s QMM project is located in one of the most ecologically diverse regions of Madagascar. According to the EJ Atlas, the most important direct negative biodiversity impact resulting from QMMs activities is the loss of coastal forest habitat at Mandena,

⁷⁶ UNEP (2020), [Mineral Resource Governance in the 21st Century](#).

⁷⁷ Namibia University of Science and Technology (2022), [Review of Mine Water Management Practices in Namibia](#).

⁷⁸ Ibid.

⁷⁹ EITI (2023), [Madagascar Country Page](#).

⁸⁰ African Centre for Biodiversity in the Regional Network for Equity in Health in East and Southern Africa (2020), [Trends in extraction of biodiversity and genetic resources in east and southern Africa](#).

⁸¹ Ibid.

⁸² Ibid.

Petriky and Sainte Luce. Approximately 1,665 ha was expected to be lost to dredging.⁸³ In 2019, it was reported that QMM had trespassed into a “sensitive zone,” violating national law and raising the possibility that radionuclide-enriched tailings could enter a lake that local people use for drinking water.⁸⁴

In the absence of effective government enforcement of environmental regulation – in many countries, the mining projects themselves must be crucial drivers for improving performance. Table 12 below provides an overview of the implementation status of the major mining companies operating in the SADC region in ICMM, IRMA, and their scores in the Environmental Responsibility dimension of the Responsible Mining Index. The RMI data show that - except for Anglo-American - all companies are performing poorly.

Table 14: Sustainability standard implementation status of major mining companies

Company	Mineral	Country of Origin	RMI Score for Environmental Responsibility (0-6), data for 2020	ICMM Member	IRMA Independent assessment of mine	IRMA self-assessment of mine ⁸⁵
Anglo-American	PGM (AmPlats), Diamonds (DeBeers), Manganese, Iron Ore	UK	3,50	yes	Sishen & Kolomela (Iron Ore), Amandelbult & Mototolo, Unki (PGM)	Mogalakwena
AngloGold Ashanti	Gold	South Africa	2,74	yes		
Barrick Gold	Copper, Gold	Canada	2,68	yes		
Gold Fields	Gold	South Africa	2,55	yes		
Glencore	Copper, Chromium, Vanadium, PGM	Switzerland	2,23	yes		
Rio Tinto	Iron Ore, Titanium, Zircon	UK	2,17	yes		
Vedanta Resources	Zinc, lead, silver, copper	India	1,75	no		
MMG	Copper	China	1,73	yes		
Sibanye-Stillwater	PGM, Gold	South Africa	1,32	yes		Rustenburg
First Quantum Minerals	Copper, Gold, Nickel	Australia	1,18	no		

⁸³ Environmental Justice Atlas (2023), [Rio Tinto/QMM Ilmenite mine Madagascar](#).

⁸⁴ [Ibid.](#)

⁸⁵ IRMA self-assessments can also be done confidentially. It is important to note that claims of achievement in IRMA can only be made after a mine has undergone an independent assessment by an IRMA-approved audit firm.

Exxaro Resources	Zinc, lead, silver, copper, (and major coal deposits in South Africa)	South Africa	1,03	no		
ERG	Copper, Cobalt	Kazakhstan	0,75	no		
Zijin Mining	Copper, Cobalt, Lithium, Gold, Zinc, Silver, PGM	China	0,67	no		
Africa Rainbow Minerals	PGM, Nickel, Manganese, Iron Ore, Chromium	South Africa		yes		
South 32	Aluminium	Australia		yes		
Sumitomo	Nickel	Japan		yes		
Northam Platinum	PGM	South Africa		no		Booyseindal, Eland, Zondereinde
Syrah Resources	Graphite	Australia		no		Balamala

4.1.2. Industry good practices and technology innovations

Companies are implementing many different measures to safeguard the environment, reduce GHG emissions and promote gender equality. The key to successful environmental, climate-smart and gender-sensitive management of mining projects is to have sound systems of corporate environmental and climate governance and gender mainstreaming policies with specific targets and senior management also being responsible for achieving these targets, including linking remuneration with good performance.

In many instances, good corporate environmental and climate governance relates to complying with the law, especially regarding avoiding pollution, (illegal) deforestation, and protecting biodiversity.

Some of the most innovative good practices and technology innovations that companies are implementing relate to climate-smart mining, as companies often can also achieve cost reductions through these measures. Table 13 below provides a snapshot overview of companies' claims about good practices and innovations. However, these are claims by the respective company and are not verified by the authors of this report nor are they monitored by governments or other institutions. However, companies often have their sustainability reports audited by third parties or are required to report truthfully by stock exchange regulators.

Table 15: Industry commitments and best practices

Dimension	Best Practice
<p>Corporate Environmental Governance</p>	<p>Anglo-American pledges to achieve “a healthy environment, carbon neutral operations that use less fresh water and deliver net positive biodiversity outcomes in all their operations by 2030”. Anglo-American presents twice-yearly sustainability performance updates, including concerning decarbonisation, net positive biodiversity, and progress towards assuring all operations against recognised responsible mining standards.</p> <p>AngloGold Ashanti discloses in its annual report the environmental incidents that have occurred during the year, including descriptions of the nature and severity of the incidents and the corrective actions taken. The company also reports site-disaggregated data on the number of its environmental incidents.</p> <p>Gold Fields has established an environmental incident classification system, using a scale from Level 1 (most minor) to Level 5 (most severe), and set a target of zero for Level 3 to 5 environmental incidents. The company has not had any Level 4 or Level 5 incidents in the last ten years and includes in its annual reporting data the numbers of Level 2 or Level 3 incidents.</p> <p>Barrick Gold publishes environmental data for all the company's mine sites in one Excel file. This includes several water-related variables (quantities of water withdrawal and water discharge, and intensity of water consumption) as well as data on, for example, employment, health and safety, waste, energy consumption, and greenhouse gas emissions.</p> <p>Anglo-American includes two climate-change-related targets in the remuneration plan for the company's senior executives. These targets relate to the improvement in energy use and reduction in greenhouse gas emissions.</p> <p>AngloGold Ashanti also has systematic measures to hold board directors and senior managers accountable for responsible business conduct on ESG issues.</p>
<p>GHG Emissions and Energy Efficiency</p>	<p>Most companies have set clear targets for GHG reductions until 2030 or earlier and have committed to net zero emissions by 2050 or earlier. However, only a few have clearly outlined strategies for how to achieve the commitments – at least publicly.</p> <p>Anglo-American, First Quantum, and Sibanye-Stillwater disclose their Scope 3 emissions data, i.e. all indirect emissions (excluding those from the generation of purchased energy) that occur in the value chain, including both upstream and downstream emissions. Although companies that report to the CDP (previously Carbon Disclosure Project) have been required to disclose their Scope 3 emissions since 2018, only some of them do this.</p> <p>Zijin Mining pledges to implement carbon reduction technologies such as hydrogen, electrification, new energy, and heat pumps to achieve a year-on-year reduction in GHG emissions. Their installed capacity of clean energy reached 167,48 MW, with 257,46 GWh of power generated.</p> <p>Vedanta Resources is installing 2,5 GW round-the-clock renewable energy capacity (in global operations).</p> <p>In Southern Africa, Anglo American has partnered with EDF Renewables to develop 3,5 GW of clean generation capacity, which is expected to meet Anglo American’s operational power requirements and support the resilience of local electricity supply systems.</p> <p>Kenmare Moma Titanium operations in MOZ are powered using hydro-generated electricity transmitted to the location by a company-owned, 170km-long, 110kV overhead transmission line. In addition, a Rotary Uninterruptible Power Supply (RUPS) project was commissioned in 2022 and will avoid the continuous use of diesel generators during the stormy season.</p>

	<p>Syrah Resources is implementing initiatives to lower carbon footprint including a hybrid solar and battery system at Balama.</p> <p>AVZ International intends to replace Diesel usage which contributes up to 50% to project GHG emissions with biofuels or an alternative energy source, including the use of hydrogen electrolysis for powering Fuel Cell Electric Vehicles (FCEVs).</p> <p>Debswana pledges to improve energy efficiency, decarbonising petrol and diesel, introduction of hydrogen to replace diesel, and focus on renewable energy such as solar and wind – in line with Anglo American’s corporate strategy.</p> <p>PNRB nickel pledged to use less power, introduce green energy production and use fewer internal combustion engines in pursuit of reducing the carbon footprint. In addition, the company intends to use less water and be more efficient in its use by recycling.</p> <p>Anglo-American introduced technologies that more precisely detect the desired metals or minerals, delivering greater than 30% reductions in the use of water, energy, and capital intensity, and producing less waste in the process. This includes techniques such as coarse particle recovery, bulk sorting, and ultrafine recovery.</p> <p>Rainbow Rare Earths is investigating the optimal ways of treating and reusing 700.000m³ of acid water as part of its overall water management strategy. Water neutralisation test work has confirmed the ability to treat the existing water from the stacks for reuse in a closed circuit, reducing legacy issues and overall water usage.</p> <p>AVZ International and Zijin Mining are committed to investigating the use and application of carbon capture sequestration technology.</p>
Tailings	<p>Several ICMM Members are implementing the Global Industry Standard on Tailings Management, issued by the International Council on Minerals and Metals (ICMM), the UN Environmental Programme (UNEP), and the Principles for Responsible Investment (PRI), which comprises six topic areas, 15 Principles and 77 auditable Requirements.</p> <p>Rainbow Rare Earths uses sulphuric acid, a key reagent for the Project, from a waste stream at the copper operation next to Phalaborwa. By using this sulphuric acid, Rainbow can recycle a by-product, as well as reduce the carbon footprint which would be associated with reagent transportation, due to the proximity to the Project.</p>

5. Recommendations for Action for the BMUV

In this section, potential topics and themes for future cooperation to support environmentally friendly, climate-smart and gender sensitive mining are identified. Each topic is linked with potential key partners at national, regional, and international level. Considering the scope of this report, a wide range of ideas can be floated, which would need much further appraisal, if deemed interesting.

Key criteria for suggesting topics for 'flagship initiatives' are:

- The flagship project should address a specific challenge for environmentally friendly, climate-smart, and gender sensitive mining in the SADC region which has been identified in this report.
- The flagship project should focus on a challenge that has a regional dimension and may involve both, national and regional actors to leverage the impact and create potential for upscaling.
- The flagship should address challenges at the mine-site level. Any initiative that does not reach down to the mine-site level will not make a difference in SADC countries.
- The flagship should address a challenge that is within the scope, mandate and competence of BMUV funded projects

Flagship 1 - Promoting environmental and climate governance across SADC

<p>Identified challenges</p>	<ul style="list-style-type: none"> • As the analysis has shown, the major environmental and climate impacts from mining SADC Critical Transition Minerals are pollution and the carbon footprint. While not many major "incidents" have occurred, the overall environmental and climate footprint of mining in the SADC region is huge. A key issue is water pollution from sulfuric acid and heavy metal leaching. But also, negative environmental impacts, including from deforestation, biodiversity loss, land degradation, and water scarcity loom large. • All countries have a minimum legal framework to regulate the mining industry (mining codes) and regarding some aspects of environmental governance. However, the coverage of environmental laws is across the board not sufficient. According to the Climate Policy Database, the policy base in the eight focus countries is very poor except for South Africa. In addition, the enforcement of laws remains a crucial concern. • The assessment of the Environmental Performance Index (EPI) points out that except for Botswana and Namibia, environmental governance is weak in the SADC focus countries. While Botswana and Namibia have improved significantly over the last decade, Zambia, Madagascar, Zimbabwe, DRC have even regressed. • Representatives of the African Group of States in the UN Environmental Assembly have expressed the view that international support and instruments could be helpful, „not only to guide national laws from a
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	technical point of view, but also to enable pushback against improper interests seeking to influence national regimes.” ⁸⁶
Suggested topic/theme	<ul style="list-style-type: none"> • BMUV could engage with selected partner countries in reviewing the legal regimes, including the efficacy of its enforcement, regarding environmental governance in the mining sector. • Offer capacity development measures to strengthen environmental governance and law enforcement in selected SADC Member States. • At regional level, the flagship project could support the SADC Secretariat in establishing a peer review mechanism for environmental governance in line with the SADC Mining Protocol. • A topical focus could be on the comprehensiveness of regulation on environmental impact assessments throughout the life cycle of the project; regulation on environmental and climate data information disclosure; enforcement of emissions standards; compliance with environmental permitting process (for land use, deforestation, hazardous substances, etc.).
Potential partners	<ul style="list-style-type: none"> • SADC Secretariat (SADC Mining Protocol) • National SADC Coordination Committees • National environmental protection agencies • UBA, BGR, OECD

Flagship 2 – Promote environmental due diligence among SADC Member States

Identified challenges	<ul style="list-style-type: none"> • There is no common or globally accepted approach to track, monitor, enforce or otherwise effectively curtail adverse impacts from mining. Currently, the most effective drivers for addressing environmental, climate, and gender-related risks are national regulations regarding environmental impact assessments and enforcement of related environmental and climate-related laws and regulations - which in the SADC region are rather weak
Suggested topic/theme	<ul style="list-style-type: none"> • The flagship project could support the furtherance of due diligence schemes, including for environmental sustainability, that could be applied to minerals and metals. The OECD’s Due Diligence Guide to Responsible Business Conduct and the OECD Handbook on Environmental Due Diligence in Mineral Supply Chains which has been developed by an OECD Working Group under the leadership of the German Federal Agency for the Environment could serve as a blueprint.⁸⁷ • The flagship could also support the compliance of mining companies with sustainability standards, such as the IRMA Standard, which can then also serve as a basis for the UNFC classification. The IRMA standard is also widely

⁸⁶ UNEP (2023), [Implementing UNEA Resolution 5/12 ‘Environmental Aspects of Minerals and Metals Management’](#).

⁸⁷ OECD (2023), [Handbook on Environmental Due Diligence in Mineral Supply Chains](#).

	<p>accepted, especially in the automotive industry, and could serve as an important standard for supply chain due diligence of automotive and energy companies for complying with EU regulations and directives.</p>
Potential partners	<ul style="list-style-type: none"> • The flagship project could work with the SADC Secretariat, the SADC Business Council, selected governments, mining companies, and civil society to convene business roundtables to discuss the implementation of said sustainability standards and due diligence schemes in the SADC region. • In this context, the African Mineral and Energy Resources Classification and Management System (AMREC) based on the UN Framework Classification for (Mineral) Resources (UNFC) may also become an important reference tool and standard for mineral supply chain due diligence, which can inform actors along the supply chain and help European importers to comply with the emerging EU Regulations and Directives. The flagship project could involve the African Mineral Development Center in the collaboration with the SADC Secretariat. • The flagship project could engage with the SADC Secretariat, SADC Business Council, Member State governments and stakeholders from mining companies and civil society to share best practices for reducing the carbon footprint, avoiding environmental impacts and for improving energy efficiency at mine sites. The public-private dialogue should also address issues where mining companies and governments need to cooperate, for example regarding renewable energy purchasing agreements (unless on-site capacities are built), fair water distribution with local communities, and other issues. In most focus countries, the state has a minority share in major mining projects, and therefore is directly involved.

Flagship 3 – Mainstreaming global tailing standards and rehabilitation efforts across SADC

Identified challenges	<ul style="list-style-type: none"> • Tailings management and environmental risks arising from tailings should be a priority issue in the SADC region. Tailings facilities and plans for site restoration are typically poorly covered during the mine licensing process. Lack of clear division of responsibility and coordination between different government agencies is affecting effective tailings management.
Suggested topic/theme	<ul style="list-style-type: none"> • The flagship project could work with the SADC Secretariat and selected Member States to stimulate the implementation of international safety standards for tailings, such as the ICMM Global Industry Standard on Tailings Management, including through strengthened legislation. All ICMM members committed to implement the Standard. All tailings facilities operated by ICMM members with 'extreme' or 'very high' potential consequences shall conform with the Standard by 5 August 2023 and all others by 5 August 2025. • A hazard-map at regional or global level, to identify where tailings storage facilities are located and to highlight their relative risk profiles and chemical

	<p>composition, could be established. The Global Tailings Portal is an interesting reference initiative in this regard.</p> <ul style="list-style-type: none"> • Furthermore, BMUV could work with competent authorities, tailings management facility (TMF) operators and other stakeholders in SADC Member States to use the UNECE Online Toolkit and Training for Strengthening Mine Tailings Safety. • The rehabilitation of closed mining sites and clean-up of legacy pollution is another topic in which the flagship project might engage in. In many regions, soil and water pollution from heavy metals continues to negatively impact many local communities. While the clean-up is largely a legal matter between states and companies, flagship project can engage in strengthening the systems for incorporating financial guarantees for site rehabilitation into ESIA's and license award practices.
<p>Potential partners</p>	<ul style="list-style-type: none"> • SADC Secretariat • ICMM • Competent member state authorities, • Tailings management facility (TMF) operators • Environmental CSOs

6. Annex I: Country Profiles

6.1. Botswana

Profile

Minerals. According to the U.S. Geological Survey, Botswana is the second largest producers of diamonds with 23,7 % of global production in 2022.⁸⁸ Other mined minerals include nickel-copper and gold as well as mineral resources out-of-scope of this report – such as coal, soda ash, semi-precious stones, and coal-bed methane.

The Ministry of Energy is also encouraging further investment and exploitation of non-diamond minerals to diversify the minerals sector from its dependence on the diamond industry. Botswana has untapped uranium reserves that companies and the government are seeking to exploit.⁸⁹ The demand for uranium in Europe and Asia is set to increase, as industrialised nations scramble for sources of decarbonised electricity.

Economic contribution. Botswana's mining industry is a key sector of the economy and contributes 16.7% to the national GDP (2022/Q2).⁹⁰ In 2020, diamonds accounted for roughly 87% of export revenues and about 35% of Government revenues.⁹¹

Value chain. The Government of Botswana has also invested heavily in diamond processing. There are currently 16 diamond cutting companies - the strategy of the government is to increase the number to 24 companies. Also, De Beers relocated its diamond sorting and sales facility from the United Kingdom to Botswana.⁹²

State-owned enterprises. The Okavango Diamond Company (ODC) Botswana's state-owned diamond trading company already sells up to 15% of Debswana's diamond production. The government wants to renegotiate the output share deal with De Beers and has furthermore invested in the downstream diamond market by obtaining a 24 % stake in Belgium's HB Antwerp, a diamond trading, cutting and polishing start-up company.⁹³

ASM. In Botswana, there are relatively few ASM operators (app. 20.000), predominantly in the gold sector.

Energy transition trends. Nickel and copper from the Kalahari Copper Belt may see a push in the future due to the high global demand from the energy transition.

Legal framework

Botswana's sound investment climate, low tax rates and political stability create favourable conditions for mining investments. However, the mining industry is tightly regulated.

The relevant legislation includes, but is not limited to:

⁸⁸ US Geological Survey (2023), [Mineral Commodity Summaries 2023](#).

⁸⁹ US International Trade Administration (2022), [Botswana – Country Commercial Guide – Mining and Minerals](#).

⁹⁰ Statistics Botswana (2022), [GDP Second Quarter of 2022](#).

⁹¹ EU (2020), [Multi-Annual Indicative Programme 2021-27 with Botswana](#).

⁹² US International Trade Administration (2022), [Botswana – Country Commercial Guide – Mining and Minerals](#).

⁹³ Africa Confidential (2023), [What is behind Masisi's gem deal?](#)

- [Botswana Minerals Policy 2022](#)
- Mines and Minerals Act
- Mines, Quarries, Works and Machinery Act
- Diamond Cutting Act
- Environmental Assessment Act
- Botswana Energy Regulatory Authority Act
- Mineral Rights in Tribal Territories Act
- Waste Management Act

The Ministry of Energy and Minerals oversees the enforcement of the mining code. The Department of Environmental Affairs (DEA) is responsible for the implementation of environmental laws in Botswana. The DEA has the power to impose penalties for non-compliance with the EA Act.

An application for a mining licence will not be granted without a valid environmental authorisation. An environmental impact assessment before and an environmental management plan (EMP) and an annual Environmental Impact Statement (EIS) during operation are required, including consultations with interested and affected parties.

Currently, there is no legislation focused on climate change and related to mining primarily, however the National Development Plan lays out goals relating to climate change, which may also affect the mining industry.

A new legislation enabling uranium to be mined without contravening Botswana's nuclear non-proliferation legislation is reportedly underway.⁹⁴

Key ESG Risk Areas

According to a report by the Imperial College London, the primary environmental concerns associated with diamond mining are water and energy conservation, optimising resource usage and waste management, biodiversity, and closure management:⁹⁵

- The diamond mining industry involves water intensive processes for liberating diamonds from the rock. The most significant potentially polluting process is the crushing of the kimberlite ore during which dust is generated.
- Disturbance of the land is the most lasting and visible environmental impact of diamond mining.
- The carbon emissions of diamond mining are highly dependent on location. Cold climates such as Siberia or Northern Canada have larger carbon emission impacts than e.g., in Botswana.

Being endowed with unique ecosystems and rich biodiversity, Botswana is a strong promoter of conservation. Almost 40% of its territory is under conservation or in protected areas.

Trade Flows

⁹⁴ Africa Intelligence (2022), [Gaborone delights investors with new uranium mining legislation](#).

⁹⁵ Imperial College of London Consultants (2020), [Environmental Impacts of Mined Diamonds](#).

The EU is the second biggest trading partner for Botswana with the total trade volume of EUR 1.427 billion (2020). Botswana exports to the EU worth 980 million in 2020 are almost exclusively diamonds.⁹⁶ The emerging copper, nickel and uranium industry will become of interest for European companies.

⁹⁶ [EU \(2020\), Multi-Annual Indicative Programme 2021-27 with Botswana.](#)

Companies

Table 16: Largest mining companies in Botswana

Parent organisation	Mineral	Mining project	Environmental and climate commitments	Environmental and climate conflicts ⁹⁷
Sandfire Resources (Australia)	Copper	<p>Sandfire’s copper operations in Botswana and Namibia are owned by Australian mining and exploration company Sandfire Resources.</p> <p>Activities include the development and construction of the Motheo Copper Mine and a comprehensive exploration program across the Kalahari Copper Belt in Botswana and Namibia. The Motheo operations were officially opened in August 2023.</p>	<p>Climate</p> <p>A commitment to an interim company-wide renewable energy electricity target of 50% by 2030. Company-wide net zero 2050 target covering Scope 1 and 2 emissions for all sites under operational control.</p> <p>Environment</p> <p>Comprehensive environmental policy published. A4 Biodiversity Baseline Study completed for Motheo Copper Mine.</p> <p>Sustainability Report 2022</p>	n/a
Premium Nickel Resources Ltd. (Canada)	Nickel, copper, cobalt	<p>Premium Nickel Resources Botswana (PNRB) redeveloped the Selebi Mines in Selebi-Phikwe. PNRB is a subsidiary of Canada-based Premium Nickel Resources Ltd.</p>	<p>The Selebi-Phikwe mine was previously blamed for air, land and water pollution around the town.⁹⁸</p> <p>The re-development of Selebi nickel, copper/cobalt mine must minimise the impact on the environment by using less resources in comparison</p>	<p>A 2016 study by Moagi Letshwenyo of the Department of Biological Sciences at the University of Botswana investigated environmental pollution due to mining activities at the Selebi-Phikwe</p>

⁹⁷ This category is informed by cases which a) are listed on the [Transition Minerals Tracker](#), published by Business and Human Rights Resource Centre, which lists incidents, complaints, and grievances associated with the mining of transition minerals; b) are reported by the Environmental Justice Atlas; c) are addressed by the company itself in its sustainability reporting; or d) turn up in a simple Google search on the respective project.

⁹⁸ Business Weekly (2022), [Mining industry charts greener path](#).

		<i>The company operates the Selebi and Selkirk nickel-copper mines</i>	<p>with the past operations. The company pledged to use less power and introduce green energy production and use fewer internal combustion engines in pursuit of reducing the carbon footprint. In addition, the company intends to use less water and be more efficient in its use by recycling.</p> <p>The company has a very brief Sustainable Development Policy.</p>	<p>mine – which is currently being redeveloped by PNRB Resources. The study found that heavy metal and sulphur were deposited into the soil. High concentrations of copper and nickel were also found in soil and plants around the mine.⁹⁹</p>
Global Natural Resources Investments, GNRI	Copper, silver	<p>Khoemacau Copper Mining is wholly owned by private company Cuprous Capital Ltd, which in turn is owned 88.1% by Cupric Canyon Capital LP, a company majority owned by Global Natural Resources Investments (GNRI) and 11.9% by Resource Capital Fund VII LP. The current operations, which produced first concentrate in June 2021, is expected to deliver more than 155,000t of copper concentrate 1.6m ounces of silver metal in concentrate annually.</p>	<p>Khoemacau Copper Mining has developed an ESG standard with principles aligned to international best practise, for example, IFC, World Bank, ICMM and Equator Principles.</p> <p>Environment</p> <p>The company claims that their Environmental Management Plans are monitored continuously by an onsite team.</p> <p>Climate</p> <p>Khoemacau completed a prefeasibility study for a 45MW solar project which demonstrates commercial and technical viability for a 30% penetration solar PV plant.</p>	n/a

⁹⁹ Letshwenyo, Moagi. (2016), Sulphur and heavy metals contents in soils and *Grewia bicolor* leaves around the Selebi Pikwe Cu-Ni mine (BCL), Botswana. *Journal of Environmental Chemistry and Ecotoxicology*.

<p>Anglo American Group PLC</p>	<p>Diamonds</p>	<p>Anglo American Group PLC is the major player in Botswana through its subsidiary De Beers. The Debswana Diamond Company Ltd. (Debswana) was established in 1969 and is one of the world's foremost diamond producers by value and volume. Debswana is an equal partnership between the Government of the Republic of Botswana (GRB) and the De Beers Group. Debswana is a major part of the national economy of Botswana and makes a significant contribution to country's gross domestic product, foreign exchange earnings and government revenue. It is one of the largest private sector employers, with more than 5,000 employees and 6,000 contractors working at its operations.</p> <p>The company operates four diamond mines: Jwaneng, Orapa, Letlhakane and Damtshaa Mines. Jwaneng is the flagship operation with the highest output by far.</p>	<p>Climate</p> <p>Debswana’s vision is to focus on four key areas – energy efficiency, decarbonising petrol and diesel, introduction of hydrogen to replace diesel, and focus on renewable energy such as solar and wind – in line with AngloAmerican’s corporate strategy.</p> <p>The company pledged to offset the CO2 footprint of mining a Botswanamark™ diamond through wood burning Zama Zama stove initiative in the Okavango Delta. The stove produces 4 carbon credits per annum. It uses small sticks and twigs as fuel, rather than logs, so trees do not need to be chopped down. Using the wood stove as a means of cooking is a more sustainable practice that uses no fossil fuels.</p> <p>Environment</p> <p>Wildlife conservation is a cornerstone of Debswana and the company has established two game parks around its two principal mines to preserve wildlife. These parks supposedly provide a vital sanctuary</p>	
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			for wildlife in areas where wildlife has otherwise been forced out through encroachment, cattle-farming and poaching. The combined sizes of the parks are 29,885 ha.	
Lucara Diamond Corp. (Canada)	Diamonds	Lucara Diamond Corp is a Canadian diamond mining company with a producing mine and exploration licenses in Botswana. Its 100% owned Karowe mine is one of the world's foremost producers of large, high quality, Type IIA diamonds in excess of 10.8 carats.	Sustainability Report 2022	n/a
Hawks Mining Company	Gold	Hawks Mining Company is a citizen-controlled company, which operates the only operational gold mine in Botswana. Previous top managers of the project bought the company from Galante Gold in 2022	n/a	n/a
A-CAP Energy	Uranium	A-CAP Energy is developing the Letlhakane Uranium Project, which is one of the world's largest undeveloped uranium deposits. A-Cap remains committed to developing the Letlhakane Uranium Project, with the support of key stakeholders, as the first uranium mine in Botswana. A further increase in the uranium price will make it more likely that the project goes operational.	n/a	n/a

Analysis of potential political, private sector and civil society partner organisations

Table 15 below displays other relevant stakeholders in the Botswana mining industry.

Table 17: Relevant mining stakeholders in Botswana

Potential partner	Analysis of organisation
Ministry of Mineral Resources, Green Technology and Energy Security (MMGE)	The Department of Mines' mandate is to ensure that mineral resources are prospected, developed and exploited in a sustainable manner, to enhance socio-economic, financial and other benefits to Botswana arising from the exploitation of mineral resources and to monitors compliance with all the relevant legislation pertaining to prospecting and mining activities.
The Department of Environmental Affairs (DEA)	The DEA is responsible for the implementation of environmental laws in Botswana.
The Botswana Geoscience Institute (BGI)	The BGI was established to undertake research in the field of geosciences and provide specialised geoscientific services, be a custodian of geoscience information, promote the search for and exploration of any mineral in Botswana and to act as an advisory body in respect to of geosciences and geohazards.
The Botswana Chamber of Mines' (BCM)	The BCM is an organisation established to serve the interests of the mining and exploration companies together with associated industries. The mining industry remains the main driver of economic activity in the country and is forecasted to sustain the economy further into the future. BCM's role is to serve the interests of the mining industry in the country and to influence policy decisions and strategic intents within the government, non-governmental organisations and related bodies.
Kimberley Process Civil Society Coalition	Kimberley Process Civil Society Coalition is the umbrella organisation that acts as an observer of the Kimberley Process on behalf of civil society (but has no members from Botswana).
Conservation International	Since 1987, Conservation International has worked to spotlight and secure the critical benefits that nature provides to humanity with offices in more than two dozen countries and a worldwide network of thousands of partners.
Botswana Watch	Botswana Watch is involved in several anti-corruption projects and activities geared towards addressing the issue of corruption and raising awareness on the social ills in Botswana.
Botswana Council for Non-Governmental Organisations	BOCONGO is a platform on which BW CSOs are listed.

6.2. Democratic Republic of Congo

Profile

Minerals. According to the U.S. Geological Survey, the DRC is by far the largest producer of cobalt in the world, with 68.4 % of global production in 2022 and of tantalum with 43 % of global production. The DRC is also the third largest producer of copper with 10 % of global production (tied with second ranked Peru in terms of volume), the fifth largest producer of tin with 6.5 % of global production, the sixth largest producer of diamonds, and the 16th largest producer of gold. In addition, silver, uranium, lead, zinc, cadmium, and manganese are also exploited in the DRC. Lithium mining does not yet take place, but large deposits have been discovered and are being developed by AVZ Minerals Ltd., Critical Resources Ltd., and Tantalex Resources Corp.

In terms of volume and value, the copper industry is the most significant mineral resource being mined in the DRC. The country hosts some of the highest quality copper reserves globally, with some of the mines estimated to contain grades above 3 %, significantly higher than the global average of 0.6 - 0.8 %. With 31 million metric tonnes of copper (3.4 % of known global reserves) and 5 million metric tonnes of cobalt (48 % of known global reserves), the DRC hosts some of the largest known reserves of these minerals. It is estimated though, that the DRC has further large untapped reserves of copper which need further exploration.

Economic contribution. The Democratic Republic of Congo (DRC) is one of the richest countries in terms of natural resources in Africa. The DRC's mining industry is the key sector of the economy and contributes 13.5 % to the national GDP, 99.3 % of export revenues, 46.0 % of government revenues and 24.8 % of employment (2019).¹⁰⁰ The large-scale mining (LSM) industry in the DRC directly employed around 163,237 people, most of them Congolese nationals (data for 2019).¹⁰¹ Over 200 mining companies participate in the EITI multi-stakeholder initiative in the DRC and report on their tax payments to the government.

Mines. According to the EITI Report 2021, 3,219 mining, exploration, and processing licenses were active in 2019.¹⁰² The government publishes a [directory](#) of all operators and cooperatives in the Congolese mining sector.

Value chain. DRC is working towards upgrading their value chain, especially with regards to the battery materials cobalt and lithium.

State-owned enterprises. Gécamines is a state-controlled mining and commodity trading company based in Lubumbashi. Gécamines holds shares of between 5% and 40% in numerous cobalt and copper mining operations. This makes it one of the largest mining companies in Africa, and the biggest in the DRC. Various other SOEs also have stakes in mining projects.

ASM. An estimated 5000,000 to 2 million people are directly working in the ASM sector in the DRC.¹⁰³ The International Peace Information Service (IPIS) - based in Belgium - has mapped around 2,861 ASM sites in eastern DRC since 2009, collecting primary data about artisanal and small-scale mining.¹⁰⁴ IPIS estimates that roughly 393,000 workers to work in ASM mines in the Eastern DRC. On the IPIS Open

¹⁰⁰ EITI (2023), [DRC Country Page](#).

¹⁰¹ US Geological Survey (2022), [Minerals Yearbook – DRC](#).

¹⁰² https://eiti.org/sites/default/files/attachments/rapport_assoupli_itie_rdc_2018_2019_1er_semestre_2020_adopte.pdf

¹⁰³ Delve (2023), [Global Platform for Artisanal & Small Scale Mining Data, DRC Data](#).

¹⁰⁴ IPIS Research (2022), [Analysis of the interactive map of artisanal mining areas in eastern Democratic Republic of Congo –2022 update](#).

Data Dashboard live data can be obtained on ASM in the DRC.¹⁰⁵ It is further estimated that more than 80 % of diamonds are mined by ASM, contrary to the SADC peers, where LSM is controlling the diamond industry. Also, ASM gold mining plays a significant role. Even copper and cobalt are mined by ASM operators around Kolwezi, Likasi and Lubumbashi despite a highly developed industrial large-scale mining sector (LSM). The share of cobalt that is mined by ASM operators is estimated to be somewhere between 15-30 %. A significant number of LSM companies' source from ASM, and this cobalt is blended with their production. Most of cobalt artisanal mining takes place in private concessions where the LSM is actively operating.¹⁰⁶ In the case of cobalt, child labour has been demonstrated to be prevalent in ASM-mined cobalt.

Energy transition trends. Many of the minerals mined in the DRC are crucial for the use in EV batteries and in technologies relevant for the energy transition, such as wind turbines, hydrogen turbines, etc. Many of those minerals mined in DRC are on the EU Critical Raw Materials (CRM) list. Critical Raw Materials are of high economic importance for the EU and have a high risk of supply disruption. The CRM list contains 34 minerals, of which 16 are considered of strategic importance. As the DRC is the global leading producer of cobalt and tantalum, it is of particular interest for the EU to engage in partnerships for the sustainable development of these sectors in the DRC and securing access to these minerals. Cobalt is a crucial element for Lithium-Ion batteries. Tantalum is mainly used as a capacitor in electronic components, automobiles, and aerospace.

President Hichilema of Zambia and President Tshisekedi Tshilombo of the DRC launched a Joint Initiative (JI) between Zambia and the Democratic Republic of Congo (DRC) on the establishment of a value chain in the electric battery and clean energy sector in 2021. In April 2022, Zambia and the DRC, through respective Ministers responsible for Industry, Finance and Mines signed a Cooperation Agreement (CA) between the two countries. The purpose of the CA is to provide a framework for bilateral cooperation in areas of common interest necessary for the establishment of the battery value chain. Two key areas of cooperation are outlined in the CA: the establishment of a common governance framework - the Zambia-DRC Battery Council, which is composed of the two Heads of State, the Deputy Secretary General and Executive Secretary of the United Nations Economic Commission for Africa (UNECA) and the President of Africa Export-Import Bank (Afrexim Bank); and the identification of an implementation site, such as a Special Economic Zone (SEZ), potentially in Kipushi, in the Haut-Katanga region or in Ndola in the Zambian Copperbelt.¹⁰⁷

Research and development of the battery precursor and the battery required for subsequent mass production and sale is supported by the University of Zambia and the Copperbelt University. Also, the German Steinbeis Global Institute Tübingen (the company behind the Green Hydrogen Africa Initiative) and the University of Lubumbashi are involved in the geological investigations.¹⁰⁸ Currently, a plant with 40 GW production capacity is planned in the Kiswishi Special Economic Zone (SEZ). For this, Lubumbashi University, Zambia University, Copperbelt University and Steinbeis University have built a development partnership.¹⁰⁹

In December 2022, the United States, Zambia, and the DRC signed an MoU "Concerning Support for the Development of a Value Chain in the Electric Vehicle Battery Sector", with the aim to facilitate the

¹⁰⁵ IPIS Research (2023), [Artisanal mining in DR Congo - IPIS Open Data Dashboard](#)

¹⁰⁶ Delve (2023), [Global Platform for Artisanal & Small Scale Mining Data, DRC Data](#).

¹⁰⁷ [Ministerial Statement by the Zambian Minister of Commerce, Trade and Industry on the Zambia-DRC Joint Initiative to establish a value chain in the electric battery and clean energy sector.](#)

¹⁰⁸ Zambian Ministry of Commerce and Trade (2022), [Redefining Zambia's Industrialization Path](#).

¹⁰⁹ DSE Technology Website, [Battery](#).

development of an integrated value chain to produce electric vehicle (EV) batteries in the DRC and Zambia.¹¹⁰

The copper and cobalt industry has largely been taken over by Chinese investment. 15 out of 19 cobalt mines are controlled by Chinese companies.¹¹¹ China controls close to 80 percent of the copper and cobalt production and, worldwide, processes 73 percent of the world's cobalt. However, the government of the DRC retains a minority share in most projects through Gécamines and other state-controlled entities. Cobalt is almost exclusively being exported to China. Therefore, the US Government is pushing the DRC to revise previous Chinese deals, especially the so-called Sicominex contracts signed under Joseph Kabila.¹¹²

Legal framework

The most important laws and regulations which regulate the mining sector are:

- 2002 Mining Code
- 2003 Mining Regulation
- 2016 National Mining Policy
- 2018 Mining Code

Under Congolese law, mining law is governed by Law n° 007/2002 of July 11, 2002 related to the Mining Code (“Mining Code”), as amended and supplemented by Law n° 18/001 of March 9, 2018; as well as Decree n° 2003/038 of March 26, 2003 related to Mining Regulations (“Mining Regulations”), as amended and supplemented by Decree n° 18/024 of June 8, 2018 and special n° of June 12, 2018. The 2018 Mining Code increased royalties on cobalt, copper, and gold to 3,5 %, introduced a windfall profits tax and increased the government’s non-dilutable share in mining projects from 5 % to 10 %.

The mining industry is administered mainly by the ministries in charge of Mines, Environment and Finance. However, at the sectoral level, the mining industry is administered by the governors of the provinces, the Head of the Provincial Divisions of Mines and Technical Services, and specialised organisations (the Technical Unit for Mining Coordination and Planning (“CTCPM”), the Centre for Evaluation, Expertise and Certification of precious mineral substances (“CEEC”), the Service of Assistance and Supervision of Artisanal and Small-scale Mining (“SAEMAPE”)

Most artisanal mining continues to take place illegally or is tolerated. The cooperation or a more in-depth engagement of LSM companies and ASM operators is therefore disincentivized, which makes the situation worse for ASM operators.¹¹³

Overall, mining governance in the DRC is exceedingly weak and the state does not control significant areas in which mining takes place. The Eastern DRC is riddled with conflict for the past three decades which emerged partially as a consequence of the genocide in Rwanda. To date, the conflict has “atomized” and hundreds of armed groups are present in the Eastern DRC and control and extort territories and to varying degrees mine sites in the area. Around 2009/2010, the notion of “conflict minerals” was coined in association with gold, tin, tungsten and tantalum (3TGs) originating from the

¹¹⁰ [MoU among the the USA, the DRC and Zambia Concerning support for the Development of a value chain in the EV battery sector.](#)

¹¹¹ New York Times (2021), [A Power Struggle Over Cobalt Rattles the Clean Energy Revolution.](#)

¹¹² CSIS (2023), [The U.S.-Zambia-DRC Agreement on EV Batteries Production: What Comes Next?](#)

¹¹³ BGR (2021), [Mining Conditions and Trading Networks in Artisanal Copper-Cobalt Supply Chains in the Democratic Republic of the Congo.](#)

DRC and adjoining countries which led to the development of the OECD Due Diligence Guidance for Responsible Mineral Supply Chains from Conflict-affected and High-risk Areas and subsequent legislation in the US (Dodd Frank Act), the EU (Conflict Minerals Regulation) and other jurisdiction, including in the International Conference of the Great Lakes Region (ICGLR), which established due diligence and reporting requirements for companies which had 3TG minerals in their supply chains.

Key ESG Risk Areas

The ESG risks from copper, cobalt, gold, and tantalum mining rated as 'high' or 'very high' by TDI Sustainability on the Material Insights Platform include:

- Deforestation (high for gold)
- Degraded/Fragmented Landscape (high for copper, cobalt, and gold)
- Negative Biodiversity and Conservation Impact (very high from gold – because of the deforestation and water pollution from mercury use, and high for copper and cobalt)
- Pollution (very high for copper, cobalt, and gold)

There are various other high or very high social and governance risks related to copper, cobalt, gold, and tantalum mining, in particular child labour, community rights violations, violence and conflict, as well as corruption.

Violence and Conflict

Between September 2021 and March 2022, IPIS has visited 450 mining sites in eastern DRC, mostly gold mines. Of the mines visited by IPIS, twenty-seven percent of workers worked in mines where the Congolese Army (FARDC) extorts profit, mostly by illegal taxation. Still, progress has been made over the past decade. ASM is no longer financing large-scale open conflict to the same extent as it did in the beginning of the century. Particularly in the 3T (Tin, Tantalum and Tungsten) sector progress has been made.¹¹⁴

Child Labour

IPIS estimates that children under fifteen represent 3% of workers at sites visited. They predominantly work in open-pit mines, as opposed to underground, and are often employed to wash or treat mineral ores. In 17 gold mines, children use mercury to treat gold ores.¹¹⁵

Overall, there have been countless incidents in the DRC over the past decades relating to various ESG issues from corruption, conflict, extortion, human rights abuses, child labour, mercury poisoning, acid leaching, illegal logging, deforestation, infringement into protected areas (e.g. Virunga National Park), biodiversity loss, etc.

There are several devoted resources which track incidents regarding mining in the DRC, including the following:

Human Rights Incidents

¹¹⁴ <https://ipisresearch.be/publication/analysis-of-the-interactive-map-of-artisanal-mining-areas-in-eastern-democratic-republic-of-congo/>

¹¹⁵ https://ipisresearch.be/wp-content/uploads/2022/12/20221129_ILRG_IPIS_AnalysisMapASM.pdf

- The Business and Human Rights Resource Centre publishes the Transition Minerals Tracker which lists incidents, complaints, and grievances associated with the mining of transition minerals. The database currently lists 55 entries for the DRC.
- Child Labour in the cobalt supply chain has been widely publicized and is subject to various initiatives of international organisations and industry initiatives.

Conflict Incidents

- The conflict in the Eastern DRC and other parts of the country is a major factor in the country and the resurgence of violence in the Eastern DRC is making the lives in mining communities even more dangerous.
- IPIS publishes an up to date Conflict Map for the Eastern DRC

Environmental Incidents

- The Environmental Justice Atlas currently lists 17 cases of environmental incidents in the DRC

Specific ASM-related ESG risks

Artisanal mining comes with numerous health and safety risks, including among others: ¹¹⁶

- Pollution of drinking water, accidents and the use of mercury in gold recovery processing. When it is poorly managed, ASM gold contributes to polluting rivers and other sources of water for local communities.
- Respiratory illnesses due to their exposure to mineralized ore bodies
- Lack of basic safety equipment and measures
- Lack structural support and ventilation systems in underground pits
- Flooding
- Child labor, especially in the Copperbelt near residential areas

¹¹⁶ <https://delvedatabase.org/uploads/resources/Delve-Country-Profile-DRC.pdf>

Companies

Table 18: Largest mining companies in the DRC

Parent organisation	Mineral	Mining project	Environmental and climate commitments and performance ¹¹⁷	Environmental and climate conflicts ¹¹⁸
Générale des Carrières et des Mines, Gécamines (DRC)	Copper, cobalt	Gécamines is a state-controlled mining and commodity trading company based in Lubumbashi. Gécamines holds shares of between 5% and 40% in numerous cobalt and copper mining operations. This makes it one of the largest mining companies in Africa, and the biggest in the DRC. Gécamines has a stake the world's greatest deposit of cobalt and some of the world's largest deposits of copper.	Gécamines makes only very vague claims about environmental sustainability .	Conflicts listed below in individual projects.
Entreprise Générale du Cobalt's (EGC)	Cobalt	The EGC is owned by the state of the DRC and holds the monopoly for the purchase, treatment, transformation, sale, and export of cobalt extracted by artisanal miners or artisanal mining companies in the DRC. The DRC Agency for Regulation and Control of the Strategic Mineral Substance Markets (ARECOMS) has regulatory oversight of EGC.	EGC's Responsible (Cobalt) Sourcing Standard is intended to align with and respect DRC law as well as standards as deployed by ARECOMS, the Department of Assistance and Supervision of Small-Scale Mining (SAEMAPE) and the Center of Expertise, Evaluation and Certification (CEEC).	n/a
Glencore (Switzerland)	Copper, cobalt	Currently, Glencore employs 8.700 people directly and 7.650 contractors.	KCC has its own sustainability policy . The company claims to implement a comprehensive environmental	The Swiss resource giant has a long and complicated history in the DRC, including allegations of corruption in

¹¹⁷ This category is informed mostly by company websites and their sustainability reports. Good practices may, however, also be derived from reports from the Responsible Mining Index.

¹¹⁸ This category is informed by cases which a) are listed on the [Transition Minerals Tracker](#), published by Business and Human Rights Resource Centre, which lists incidents, complaints, and grievances associated with the mining of transition minerals; b) are reported by the Environmental Justice Atlas; c) are addressed by the company itself in its sustainability reporting; or d) turn up in a simple Google search on the respective project.

		<p>Kamoto Copper Company, KCC (Gécamines 20 %, SIMCO 5 %) – KCC claims to be the world’s single largest producer of cobalt. Located in Kolwezi, in the province of Lualaba, the operation includes two open pit mines (KOV and Mashamba East), one underground mine (KTO), the Kamoto concentrator, and the Luilu refinery. KOV mine & Mashamba East together were the second largest copper mines in the DRC based on output in 2022.</p> <p>Mutanda Mine S.A.R.L, MUMI is an integrated producer of copper and cobalt in the Democratic Republic of the Congo. Located 40km from Kolwezi in the Lualaba Province, it employs around 2,500 people. MUMI operates three open pit mines that provide the raw ore that feeds its copper and cobalt production facilities. In 2023, Glencore finalised the process of transferring 5 % of its shareholding in MUMI to the DRC government as required by the Mining Law and Regulations.</p>	<p>monitoring programme which covers surface water, groundwater, dust, air quality and noise. This monitoring, along with assessments of flora and fauna habitats, is carried out on a regular basis and at various locations in and around KCC's operations.</p>	<p>relation to its associations with Dan Gertler, including investigations by various governments including the US.</p> <p>6 allegations against Kamoto Copper Company on the Transition Minerals Tracker, mostly regarding human rights and working conditions.</p> <p>1 allegation against Mutanda Mine regarding unpaid taxes and fees.</p>
CMOC (China Molybdenum)	Copper, cobalt	<p>CMOC is the second largest cobalt producer and a leading copper producer in the world.</p> <p>Tenke Fungurume II, TFM (Gécamines 20 %, DRC Government 5 %) was the third largest copper mine in the DRC based on output in 2022, covering an area of over 1,500 square kilometers.</p>	<p>Vague commitments, but reference to IFC Performance Standards and ICMM.</p> <p>CMOC (2020), Environmental Policy</p>	<p>13 allegations against Tenke Fungurume on the Transition Minerals Tracker, mostly regarding human rights and working conditions.</p>

		<p>Kisanfu Mine (CATL 23,75 %, DRC Government 5 %) located in Lualaba Province in the DRC, is one of the world's largest, highest-grade undeveloped cobalt and copper projects. Kisanfu is located 33km southwest of CMOC's copper-cobalt operations at Tenke-Fungurume Mine (TFM). Kisanfu contains an estimated 3.1 million tonnes of cobalt metal as well as 6.2 million tonnes of copper. The Chinese company CATL, the largest EV battery maker in the world, has acquired a 23.75 % share for 137,5 million USD in 2021.</p>		
<p>MMG Ltd. (Australia/ Hongkong/ China)</p>	Copper	<p>Headquartered in Melbourne, Australia, MMG is a mid-tier, global producer of base metals including copper and zinc, operating across Australia, the Democratic Republic of the Congo and Peru. 67 % of shares are owned by the Chinese State-owned Assets Supervision and Administration Commission.</p> <p>Kinsevere Mine is one of the most important copper mines in the world located in the Haut-Katanga province about 30 km from Lubumbashi. The mine was acquired by MMG in 2012 and has been in operation since 2007. A leasehold agreement is in place with Gécamines. Kinsevere delivers a production capacity of 40,000-48,000 tonnes of copper cathode per annum (2022: 49,070 tonnes). More than half of Kinsevere's senior management are Congolese and nearly all the 800 full time positions are filled by local</p>	<p>MMG Commitments aligned with the ICMM's Mining Principles and the eight ICMM Position Statements.</p> <p>In 2022 MMG Kinsevere contributed nearly USD 5.8 million to fund critical social investment and infrastructure projects in local communities.</p> <p>Environment</p> <p>Kinsevere's dewatering program is managing increasing water volumes with water either used onsite or released after appropriate quality testing.</p> <p>MMG Kinsevere's Cahier des Charges program is maintaining and increasing community access to fresh</p>	n/a

		<p>DRC people. Kinsevere also creates over 3,000 jobs for contractors and communities at peak.</p>	<p>water with the provision of village solar- powered water pumps.</p> <p>MMG Kinsevere committed to planting over 60,000 trees across its mining lease and nearby villages in 2023.</p> <p>Climate</p> <p>2050 net zero goal, and an interim target of a 40% reduction in Scope 1 and 2 emissions by 2030, from a 2020 baseline.</p> <p>Gender</p> <p>MMG Kinsevere supports local education initiatives, particularly those benefiting young girls. In the first scholarship program year, 10 girls completed the national state exams with a 99% pass rate, followed by another 41 students, including 17 girls.</p> <p>MMG Sustainability Report 2022</p> <p>Updated Environmental and Social Impact Assessment and Environmental Management Plan for Kinsevere Mine 2019</p>	
Ivanhoe (Canada)	Copper, zinc	<p>Kamoa-Kakula Copper Complex (Ivanhoe 39.6 %, Zijin Mining Group 39.6 %, DRC Government 5 %) is located 25 kilometres west of Kolwezi. Kamoa-Kakula began</p>	<p>Climate</p> <p>Kamoa-Kakula is powered by clean, renewable hydro-generated electricity and, according to the</p>	<p>3 allegations against Kamoa-Kakula on the Transition Minerals Tracker, mostly regarding working conditions.</p>

		<p>producing copper concentrates in May 2021 and began commercial production on 1 July 2021. The planned expansion is projected to make Kamoia-Kakula the second largest copper complex globally.</p> <p>The Kipushi Project (Ivanhoe 68 %, Gécamines 32 %), in the DRC's province of Haut-Katanga is adjacent to the town of Kipushi and approximately 30 kilometres southwest of Lubumbashi. Kipushi is a historical mine in which copper, zinc, lead, and germanium have been mined since almost 100 years. Since 1993, the mine was on care and maintenance. In September 2022, the construction of a new processing plant started at the historic Kipushi mine. According to the plan, Kipushi will be the world's highest-grade zinc mine. In addition, Ivanhoe signed an MoU with the provincial government of Haut-Katanga to study options for upgrading the DRC-Zambia border crossing in the town of Kipushi for commercial imports and exports.</p>	<p>company, is projected to be “among the world’s lowest greenhouse gas emitters per unit of metal produced.” A 2020 independent audit by Hatch Ltd. Seems to confirm this.</p> <p>Ivanhoe has pledged to achieve net-zero operational greenhouse gas emissions (Scope 1 and 2) at the Kamoia-Kakula Copper Mine. Therefore, Kamoia-Kakula is expanding its use of hydroelectric power wheeled across state utility Société Nationale d’Electricité’s grid at the Kamoia-Kakula copper mine.¹¹⁹</p> <p>Environment</p> <p>Ivanhoe claims that Kakula mine “will have one of the most favourable environmental footprints of any tier-one copper mine worldwide.”</p>	<p>According to a report from Amnesty International on forced evictions in the DRC, while the company provided adequate housing, none of the resettlement houses were equipped with showers, running water or electricity in contrast to the revised Mining Regulations’ requirement that “[t]he new living environment...enable evictees to reach a standard of living <u>superior</u> to what they experienced in their original environment.</p>
<p>Eurasian Resource Group, ERG (Luxemburg/ Kazakhstan)</p>	<p>Copper, cobalt</p>	<p>ERG claims to have invested more than USD 9 billion in the DRC, generated more than USD 1.6 billion in taxes and royalties, and created around 10,000 jobs.¹²⁰</p> <p>Frontier Mine is a cornerstone of ERGA’s copper business, situated on the DRC-</p>	<p>ERG claims to comply with all national laws and internationally recognised responsible mining standards, including but not limited to, the UN Guiding Principles, the</p>	<p>Unlike conventional mining operations which extract primary ore, at Metalkol RTR legacy copper-cobalt tailings are reclaimed and reprocessed. Since the 1950s previous operators have been releasing these tailings into the</p>

¹¹⁹ Africa Energy (2023), *DR Congo: Ivanhoe advances hydropower supply to Kamoia-Kakula copper mine.*

¹²⁰ <https://www.ergafrica.com/wp-content/uploads/ERG-Website-statement-concerning-Amnesty-International-Report-September-2023.pdf>

		<p>Zambia border, 30km north of Ndola. Frontier Mine comprises an open-cast copper mine and processing facilities to produce copper sulphide concentrate. In 2019, it produced 84 254t copper contained in concentrate.</p> <p>Mukondo Mountain Mine / Boss Mining SPRL (30 % Gecamines) is located in the Southeastern Lualaba and Katanga provinces. In February 2019 Boss Mining was placed on care and maintenance. In November 2022, ERG restarted production at Boss Mining on a limited scale, through the processing of historical mined fines to produce copper cathodes and cobalt hydroxide.</p> <p>Metalkol Roan Tailings Reclamation (RTR) in the Kolwezi area of the DRC consists of two legacy tailings deposits hosting approximately 110 million tonnes of reserves. In 2021, Metalkol achieved its capacity, producing 20,718 tonnes of cobalt and 94,807 tonnes of copper.</p>	<p>OECD DDG Guidelines and IFC Performance Standards.¹²¹</p> <p>More information can be found in the ERG Clean Cobalt & Copper Framework, Environmental Impact Assessment and the Metalkol Performance Report.</p>	<p>environment (including the Musonoi River). Over decades this waste material has accumulated into one of the largest tailings deposits in the world and continues to cause water and dust pollution, negatively impacting local aquatic systems, ecological habitats and surrounding communities.</p> <p>According to a report from Amnesty International on forced evictions in the DRC, in February 2020, without any meaningful consultation or notice of eviction, a detachment of soldiers occupied the area while the fields of 21 farmers, growing crops on the fringes of the concession near the village of Tshamundenda, were bulldozed.</p>
China Railway Engineering Company (CREC)	Copper	<p>Sicomines (Synohydro 25.28 %, Gecamines 32 %, Zhejiang Huayou Cobalt 1 %) Dikulewe Mine was the largest copper mine in the DRC based on output in 2022</p>	n/a	<p>Sicomines is the most notorious example for Chinese ‘Resources for Infrastructure’ deals. Previous Chinese president Hu Jintao paved the way for Chinese mineral interests in the DRC in 2005 by hosting a reception for Congolese president,</p>

¹²¹ <https://www.ergafrica.com/wp-content/uploads/ERG-Website-statement-concerning-Amnesty-International-Report-September-2023.pdf>

				Joseph Kabila, at the Great Hall of the People in Beijing. This was followed by a USD 9 billion agreement under which China would secure the financing to fund hospitals, railways, roads, schools and electricity networks worth USD 6 billion in exchange for the Kolwezi based exploitation licenses, in which CREC would invest another 3 billion to develop the mining project. As ASPI reports, following a leak from Gabon-based bank BGF I which was run by Kabila’s brother, “Chinese interests ensured that USD 55 million was channelled to the personal interests of Kabila and his family as part of a massive bribery scheme”. ¹²²
Jinchuan Group (China)	Copper, cobalt	<p>Jinchuan International is China-based Jinchuan Group’s subsidiary for undertaking overseas mining and mineral resources operations. Jinchuan International currently operates three mines in the Central African Copperbelt, namely, the Ruashi copper and cobalt mine, and the Kinsenda copper mine in the DRC and the Chibuluma copper mine in Zambia.</p> <ul style="list-style-type: none"> • Ruashi Mine • Kinsenda Mine 	On the company website, there are only few very basic commitments towards environmental stewardship (at least in English).	A report by ACIDH, AFREWATCH and PremiCongo (“Mind the Gap” project) claims that communities nearby Ruashi mine in Luano, Kawama and Kalukuluku became “victims of expropriations and relocations, dispossessed of their fields, houses and plots of land without fair compensation. Crops in their fields are regularly destroyed by effluent overflowing from the tailings ponds, and houses have

¹²² Australian Strategic Policy Institute (2021), [How China wrested control of the Congo’s critical minerals](#).

		<ul style="list-style-type: none"> Lubembe (exploration) 		<p>been severely damaged by tremors caused by explosions in the mine.”</p> <p>The company claims that the allegations were either false, groundless, or already addressed by the courts.</p>
Zhejiang Huayou Cobalt (China)	Copper, cobalt	Congo Dongfang International Mining, CDM – Luiswishi Mine	<p>The company has made broad commitments on environmental stewardship and energy efficiency in their EHS policy. Furthermore, Huayou is engaging in developing recycling capacities and committed to:</p> <p>“Establishing a power battery recycling system, to regenerate and recycle the national scarce resources such as cobalt and nickel.”</p> <p>Environment, Health, and Safety Policy (2021)</p> <p>Corporate Social Responsibility Report 2021</p>	<p>Zhejiang Huayou Cobalt gained notoriety by being the principal culprit in the 2016 Amnesty International report This is what we die for, in which CDM was identified as principal buyer of ASM cobalt, which was almost surely mined with child labour.</p>
China Non-Ferrous Metal Mining Group, CNMC (China)	Copper	<p>Somidez (Gecamines 49 %) Deziwa Mine was opened in 2020 and is estimated to hold 4.6 million tonnes of copper and 420,000 tonnes of cobalt. It was the fifth largest copper mine in the DRC based on output in 2022. CNMC will operate Deziwa for nine years, with a possible two-year extension, before transferring it to Gécamines.¹²³</p>	<p>The Somidez website is only in Chinese.</p> <p>CNMC operates a Cobalt Recycling System Project in Lualaba. The construction of the project was</p>	<p>In a report, the UK-based NGO RAID alleges widespread exploitation of workers in industrial cobalt mines in the DRC (Somidez, Sicominex, Tenke Fungurume, KCC, and Metalkol) including very low pay, excessive working hours, degrading treatment, violence, discrimination, racism, unsafe working conditions, and a</p>

¹²³ Reuters (2020), [Congo opens Chinese-owned Deziwa copper and cobalt mine](#)

		Altogether, there are five enterprises funded by CNMC in the DRC, namely, Somidez Mining Company, HEAD LIMITED, Lualaba Copper Smelter SAS (copper concentrate smelting), Congo International Mining Corporation and Kambove Mining SAS. Since its entry into the DRC market in 2004, CNMC has invested a total of about USD 1.5 billion, constructed 3 mines, 5 hydrometallurgy plants and 1 pyrometallurgical plant.	completed at the third quarter of 2020.	disregard for basic health provisions. ¹²⁴
AngloGold Ashanti (South Africa) / Barrick Gold	Gold	Kibali Gold, Africa’s largest gold mine, is owned by Barrick in a joint venture with Johannesburg-headquartered AngloGold Ashanti and the Congolese parastatal Société Minière de Kilo-Moto (Sokimo).	Climate Barrick Gold plans to add solar PV capacity with battery energy storage at the Kibali gold mine, where its activities are now powered by off-grid hydroelectric power and diesel capacity.	
Zijin Mining (China)	Copper, cobalt	Compagnie Minière de Musonoie Global SAS (COMMUS) (Gecamines 28 %) – Kolwezi Copper Mine	According to the company , as one of the founding members of the China Alliance for Corporate Social Responsibility in Africa, COMMUS “actively fulfils its social responsibilities and strives for harmonious coexistence with its neighboring communities. It has contributed significantly to the communities by funding the construction of infrastructure such as	

¹²⁴ RAID (2021), [The Road to Ruin? Electric vehicles and workers’ rights abuses at Congo’s industrial cobalt mines.](#)

			municipal water-supply facilities and road drainage systems.”	
Tantalex Lithium Resources	Lithium	<p>Manono lithium tailings project. Tantalex Lithium is aiming to produce lithium from historical tin mining tailings in the area. The project covers 105 million mt over 11 dumps, containing Lithium, Tin and Tantalum. The company has made a USD 5 million off-take deal with Glencore for spodumene concentrate - or high-purity lithium ore - that will be produced at the Tantalex's Manono tailings project in the Congo.</p> <p>TiTan tin and tantalum alluvial project. Production scheduled to commence in 2023.</p>	<p>Project not operational yet.</p> <p>Environmental policies</p>	Project not operational yet.

Analysis of potential political, private sector and civil society partner organisations

Table 19 below displays other relevant stakeholders in the Congolese mining industry.

Table 19: Relevant mining stakeholders in the DRC

Potential partner	Analysis of organisation
DRC National Ministry of Mines	The role of the Ministry of Mines in the executive branch is to promote the economic development and the creation of riches, the social development and the improvement of the environment. The Ministry of Mines also has a variety of other functions such as production, commercialization and exportation of mined products from the DRC.
Chambre des Mines	The Chamber of Mines brings together all companies operating in the mining sector in DRC. The chamber supports the interests of mostly large-scale mining companies.

Service d'Assistance et d'Encadrement des Mines Artisanales et de Petit Échelle (SAEMAPE)	SAEMAPE provides technical support to artisanal miners and cooperatives at the level of the mine. SAEMAPE however, lacks the human, financial and material resources to fully support artisanal miners in improving their working conditions, productivity, and formalisation.
Cellule Technique de Coordination et de Planification Minière (CTCPM)	CTCPM collects data on ASM for statistical purposes and is in charge of developing technical solutions to increase productivity and safety within the sector.
DRC EITI Secretariat	The Extractive Industries Transparency Initiative (EITI) is a coalition of donors, mining companies, resource-rich countries, civil society organisations and investors. The main objective of the EITI is to disclose what gas, oil and mining companies pay to the government and what the government receives from these extractive companies as revenue. The purpose of disclosing this information is to promote transparency and accountability in the use of our natural resources.
Générale des Coopératives Minières du Sud-Kivu (GÉCOMISKI)	Gècominski is an association of cooperatives in South Kivu that focuses on mining activities, lobbying for the interests of artisanal miners as well as training and information on the principles and laws related to artisanal mining in DRC.
Fédération des Coopératives Minières du Katanga (FECOMIKAT)	FECOMIKAT is bringing together all cooperatives active in the Haut-Katanga province in the 3Ts and Copper/Cobalt sectors.
Fédération des Entreprises du Congo (FEC)	The FEC is both the chamber of commerce and industry and the main employers' organization in the Democratic Republic of Congo. The FEC is already collaborating with GIZ projects in the DRC and with CSR Europe.

6.3. Madagascar

Profile

Minerals. Madagascar has extensive deposits of minerals and produces nickel, chromium, cobalt, zircon and ilmenite. Its lateritic nickel mining, run by the mining company Ambatovy, ranks among the largest in the world. The country's share of world production of mined and refined cobalt amounted to about 3% each, and mined nickel and zircon, 2% each.¹²⁵

UK-based mining company has increased ten times its annual production of graphite in Madagascar over the last three years.¹²⁶

Economic contribution. In 2018, Madagascar's mining sector accounted for 4.6 % of GDP, 4.4 % of total government revenues, 28 % of total exports, and 1.8 % of total direct employment.¹²⁷

Mines. The issuance of new licenses in the mining sector has been suspended by the government for several years. The list of licensees is available on the [website](#) of the cadastre office.

State-owned enterprises. State-owned Kraomita Malagasy SA (KRAOMA) operates the country's only chromite-mining operation.

ASM. More than 500,000 additional workers were estimated to be employed in artisanal mining in Madagascar, including at least 45,000 in gold mining. Other artisanal miners produced gemstones, mica, and salt. There is no significant ASM in the mining of critical transition minerals.

Value chain. The country mostly exports unrefined ores, thereby not capturing a significant value added of the mineral value chain.

Energy transition trends. Graphite mining is rapidly growing in Madagascar, as the country's graphite deposits are known to be of extremely high quality. As of 2021, there were nine graphite exploration projects ongoing in Madagascar. The wider Atsimo-Adrefana region is rich in graphite flake deposits and is already home to one of Madagascar's biggest graphite mines, the Molo mine operated by Canadian firm NextSource. NextSource also is developing a battery anode factory in Mauritius to supply cell manufacturers and OEMs with a complete and proven anode solution using feedstock and value-added processing 'independent of the Chinese supply chain'.¹²⁸

Legal framework

Madagascar's extractive industry is mainly regulated by the [Mining Code](#) as well as the respective application decrees (Law No. 99-022 of August 19, 1999, as amended by Law No. 2005-021 of October 17, 2005, and Decree No. 2006-910 of December 19, 2006). They determine the rights of subsoil use, how to obtain them, and rights and obligations of the engaged parties and government authorities. Other laws on environment, labor and land also contain provisions on extractive sector management. The [Law on Large Scale Mining Investments in Madagascar](#) establishes a special regime – including tax provisions – for mining investments

¹²⁵ <https://pubs.usgs.gov/myb/vol3/2017-18/myb3-2017-18-madagascar.pdf>

¹²⁶ <https://www.ejatl.org/conflict/graphite-mining-in-ambohitsy-haut-madagascar>

¹²⁷ EITI (2023), [Madagascar Country Page](#).

¹²⁸ Nextsource Materials Website, [Superflake](#).

amounting to more than USD 12.7 million. Ambatovy is currently the only company to be subject to this law.¹²⁹

The Mining Code is currently being overhauled. The strengthening of the role of the state and decentralised local authorities in the governance of the sector, the redefinition of mining permit regimes and the reorganisation of the gold regime are among the strategic orientations of the new Mining Code, according to the Ministry of Mines and Strategic Resources.¹³⁰

Key ESG Risk Areas

Madagascar is a biodiversity-rich country with high levels of endemism (most of the plant and animal species occur nowhere else on Earth).¹³¹ The major risk from mining is water pollution and related biodiversity loss, as well as deforestation and related land use change.

The other main environmental risk from the mining sector in Madagascar is the growing number of small-scale operators operating in the informal sector, especially in the gold sector, which often is associated with using mercury.

Trade Flows

In 2017, Madagascar's total exports were valued at USD 2.82 billion, of which minerals accounted for at least 27 %. Nickel accounted for 13 % of the value of total exports; cobalt 6 %; gold, 3 %; and ilmenite and rutile, a total of 2.7 %.

¹²⁹ EITI (2023), [Madagascar Country Page](#).

¹³⁰ <https://jumelages-partenariats.com/en/actualites.php?n=16632>

¹³¹ EITI (2023), [Madagascar Country Page](#).

Companies

Table 20: Largest mining companies in Madagascar

Parent organisation	Mineral	Mining project	Environmental and climate commitments	Environmental and climate conflicts ¹³²
<p>Sumitomo Corp. (Japan)</p> <p>Korea Mine Rehabilitation and Mineral Resources Corporation (Korea)</p>	Nickel, cobalt	<p>Ambatovy Minerals is a large-tonnage, long-life nickel and cobalt mining enterprise in Madagascar. With a volume of USD 8 billion, Ambatovy is the largest-ever foreign investment in the country and one of the biggest in sub-Saharan Africa and the Indian Ocean region.</p> <p>The project is in operation since 2011. This includes an open-pit mine sites and a mill in Ambatovy near Moramanga, a hydro-metallurgical smelter in Tanandava about 10 kms from Toamasina, and a 220 km pipeline that moves the slurry to the smelter. The concentrated cobalt, nickel is mostly shipped to Asian markets from the harbour.</p> <p>The operation employs 3,671 direct employees. Production volumes were 35,737 tonnes of nickel and 3,428 tonnes of cobalt and 117,077 tonnes of ammonium sulphate.</p>	<p>Climate.</p> <p>The company is only in the beginning of developing decarbonisation and offsetting opportunities and the development of new Greenhouse Gas (GHG) calculation and reporting tools.</p> <p>Environment.</p> <p>Ambatovy claims to adhere to stringent environmental standards including the Equator Principles, the World Bank Group’s IFC Performance Standards, and the principles of the Business and Biodiversity Offsets Program (BBOP). Ambatovy’s Environmental Management Plan (EMP) provides the framework for monitoring and mitigating all issues identified during the <u>Environmental and Social Impact Assessment (ESIA)</u>.</p> <p>According to the company, an independent scientific study carried</p>	<p>Ambatovy’s Mine is located within a species-rich region of Madagascar at the southern end of the remaining Eastern Forest Corridor. Madagascar is also one of the world’s poorest countries, in which local people are highly dependent on natural resources for their livelihood.</p> <p>The processing is done with sulphuric acids - some of which are toxic. The toxic tailings from the process are stored in perpetuity near the process plant.</p>

¹³² This category is informed by cases which a) are listed on the [Transition Minerals Tracker](#), published by Business and Human Rights Resource Centre, which lists incidents, complaints, and grievances associated with the mining of transition minerals; b) are reported by the Environmental Justice Atlas; c) are addressed by the company itself in its sustainability reporting; or d) turn up in a simple Google search on the respective project.

			<p>out by Bangor University in the UK released in 2022 suggests that Ambatovy is well on track to achieving the goal of No Net Loss (NNL) of priority habitat and may have already achieved NNL of forest by the end of 2021.</p> <p>More information can be found in the Sustainability Report.</p>	
Rio Tinto	Titanium (Ilmenite, zircon and rutile)	<p>QIT Madagascar Minerals (80 % Rio Tinto, Government of Madagascar 20 %) mines ilmenite, rutile, and zircon at Mandena in Southeastern Madagascar. In 2017, QMM produced 403,500 t of ilmenite and 27,800 t of zircon. The operation includes the deep-water Port d’Ehoala, where the raw material is shipped to the Rio Tinto Iron and Titanium.</p> <p>Quebec Operations plant in Canada and processed into titanium dioxide. The project employs 2,000 people (98% Malagasy). Since 2005, QMM has reportedly invested over US \$1 billion in Madagascar.</p>	<p>Climate.</p> <p>In December 2021, along with CrossBoundary Energy, QIT began the construction of a renewable energy plant (solar and wind) that will provide 20 MW to the QMM operation. The solar plant is nearing completion, and the wind power facility will be completed in early 2024. Upon completion, the project will provide 60% of QMM's annual power needs and supply clean power to Fort Dauphin and surrounding communities.</p> <p>Environment.</p> <p>QIT pledged to reduce the environmental footprint in Madagascar, focused on emissions reduction, waste and water</p>	<p>QMM is located in one of the most ecologically diverse regions of Madagascar.</p> <p>According to the EJ Atlas, the most important direct negative biodiversity impact resulting from QMMs activities is the loss of coastal forest habitat at Mandena, Petriky and Sainte Luce. Approximately 1,665 ha was expected to be lost to dredging.¹³⁴</p> <p>In 2019, it was reported that QMM had trespassed into a “sensitive zone,” violating national law and raising the possibility that radionuclide-enriched tailings could enter a lake that local people use for drinking water.¹³⁵</p>

¹³⁴ <https://www.ejatl.org/conflict/rio-tinto-qmm-ilmenite-mine-madagascar>

¹³⁵ <https://www.ejatl.org/conflict/rio-tinto-qmm-ilmenite-mine-madagascar>

			<p>management, carbon sequestration, ecological restoration and reforestation.</p> <p>Facing allegations over leaks, QMM announced that it will soon release an independent report, which provides an independent assessment of radiation levels around the mine over a period of five-season cycles, taken between 2019 and 2022. According to the company, the analysis concluded that over the five cycles, there were no measurable impacts to human beings or the environment via vectors such as water, food, dust, or soil.¹³³</p> <p>Biodiversity. QIT claims to have avoided mining part of the deposit (8%), which is located in biodiverse areas of coastal forest. QIT has established several partnerships with Asity (a Malagasy NGO), Birdlife International, International Union for the Conservation of Nature and Missouri Botanical Garden (MBG) to support the implementation of the Biodiversity Action Plan (BAP). Rio</p>	<p>According to news reports, the water downstream of the Rio Tinto mine contains high concentrations of uranium and lead, potentially endangering local residents who depend on a nearby lake and river for drinking water. A study commissioned by southern Madagascar-focused British environmental charity The Andrew Lees Trust found that concentrations of uranium were 350 times higher downstream of the QIT-Madagascar Minerals (QMM) mine than upstream of it, and that lead concentrations were 9.8 times higher.¹³⁶</p> <p>Over the environmental concerns and other community related conflicts, a violent protest involving armed protesters emerged in June 2023. The conflict is still ongoing.</p>
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¹³³ <https://www.riotinto.com/-/media/content/documents/operations/qmm/rt-qmm-statement-lusud-protests.pdf>

¹³⁶ Andrew Lees Trust, 2020. Water Briefing: An introduction to water contamination and environmental governance issues surrounding Rio Tinto's QMM mine in southern Madagascar. http://www.andrewleestrust.org/docs/ALT_UK_WATER_BRIEFING_ON_QMM_2020.pdf

			<p>Tinto/QIT also signed an agreement with IUCN to serve as our facilitator and coordinator of the Biodiversity and Natural Resources Management Committee (BNRMC).</p> <p>More information can be found in the Sustainability Report 2022.</p>	
Etablissement Gallois	Graphite	<p>The natural flake graphite mine of Etablissements Gallois S.A. is located in the northeast of Madagascar, in the province of Tamatave,. The mining operation was created in 1901 and has never stopped producing over the past 120 years. In 2016, the mine was taken over by a new operator who made significant investments to replace outdated production equipment. Annual production increased from less than 5,000 tonnes to 60,000 tons in 2017. The average carbon content of the ore is around 10%, which is quite rare in the world. The Gallois mine covers 280 square kilometers.</p>		
Base Resources (Australia)	Titanium (Ilmenite, zircon and rutile)	<p>Base Toliara is developing a titanium project in Madagascar to produce ilmenite, zircon and rutile. The project is located at Ranobe, 45 km north of the town of Toliara in Southwest Madagascar.</p>	<p>Base Toliara has some unspecific commitments regarding their ESG impact but does not publish any specific data on policies or performance.</p>	<p>According to the Environmental Justice Atlas, the project received criticism for displacing people, burying tombs, overconsuming water, causing pollution in Ranobe, one of the most valuable protected areas in the Madagascar and has among the highest endemism of plants and animals anywhere in Madagascar.</p>

				<p>According to the EJ Atlas, the conservation community was pressured to reduce the size of the protected area to make way for more mining concessions, with potential negative impacts on biodiversity and to the intact state of the forest-marine ecosystem. A petition was signed by 13 organisations against the Tolaria Project.</p> <p>Also, the project is said to consuming approximately 30,000 liters of water per minute during its operations, creating water use conflicts with the local communities.</p>
Greenwings Resources (Australia)	Graphite, Lithium	<p>Graphmada Graphite Mine. 20 months production of all commercial graphite concentrates to specification and sold into all major markets. Currently on care and maintenance pending expansion.</p> <p>Millie’s Reward Lithium Project. Virgin discovery of potentially high-grade pegmatite-hosted lithium</p> <p>Greenwings Resources has entered into a strategic partnership with Chinese EV producer NIO Inc. (Joint Venture and Off-take agreement for battery materials).</p>	Greenwings Resources does not provide any significant information on its ESG policies and performance.	
NextSource (Australia)	Graphite	Molo Graphite mine , located in the Province of Toliara, Southern Madagascar, one of the	Phase 1 is powered by a solar-hybrid power plant (solar + battery energy storage) that is expected to reduce	

		world's largest and highest quality graphite deposits.	CO2 emissions by over 11,300 tonnes/year. See more information about the company's sustainability commitments .	
Tirupati Graphite	Graphite	Sahamamy and Vatomina mines	Environmental commitments	
Kraomita Malagasy (Madagascar)	Chromium	KRAOMA produces high-grade chromite from the Bemanevika Mine in Betsiboka Region. In 2017, the company produced 208,100 metric tonnes.		
Mainland (China)	Titanium (Ilmenite, zircon and rutile)	Since 2010, the Chinese company Mainland Mining Ltd., is exploring ilmenite and zircon.		Allegedly, there was no public consultation, nor an environmental and social impact assessment. Many environmental problems and social conflicts were observed in their sites since 2010: water pollution, fish decreasing, disappearance of bees, deforestation, radioactivity, loss of biodiversity, etc. Therefore, local communities, activists and civil society groups, especially the Collectif TANY and the Malagasy environmental civil society organisation ALLIANCE VOAHARY GASY asked to Malagasy government to stop this project. ¹³⁷

¹³⁷ <https://www.ejatl.org/conflict/mainland-mine-analanjirofo-madagascar>

<p>Envion (Australia)</p>	<p>Graphite</p>	<p>Maniry Graphite Project. Evion has been exploring graphite mining opportunities in the Maniry commune in the Atsimo-Andrefana region of Southern Madagascar. During the project’s first stage (2024-27) expected graphite production is set at 30,000 tonnes per year and 60,000 tonnes during the second stage. The project is planned to be operational in 2024.</p> <p>Evion signed a take-off agreement for 25,000 tonnes annually with German graphite supplier Luxcarbon GmbH. Luxcarbon is amongst Germany’s top suppliers of graphite to vehicle producers such as Volkswagen, Mercedes, and Ford.</p>		<p>While villagers are struggling to find drinking water, Evion has dug deep wells around the village for company use, fenced off to locals. Evion Group received an exploitation permit of 40 years for the Maniry area. Paradoxically, the Maniry project will run mostly on diesel, while it is meant to contribute to the clean energy transition.</p> <p>Villagers are concerned with these plans as they break with earlier agreements on leaving their ancestral tombs untouched.</p>
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Analysis of potential political, private sector and civil society partner organisations

Table 21: Relevant mining stakeholders in Madagascar

Potential partner	Analysis of organisation
<p>Ministry of Mines and Strategic Resources</p>	<p>The extractive industry is regulated by the Ministry of Mines and Strategic Resources, which develops state policies in the mining sector and ensures compliance with these policies.</p>
<p>Chamber of Mines</p>	<p>The CMM is the point of contact for the Administration for any questions concerning the industrial mining sector. Its motto is to encourage, promote and protect mining investments in Madagascar while developing good professional business ethics in the sector. The CMM was created to allow stakeholders in the mining sector to speak with one voice.</p>
<p>EITI Secretariat Madagascar</p>	<p>The EITI Secretariat is responsible for the implementation of the EITI in Madagascar.</p>

Platform of Civil Society Organizations on Extractive Industries (OSCIE)	<p>The Platform includes civil society members such as WWF, ALLIANCE VOAHARY GASY, EITI Madagascar, and others.</p>
Collectif TANY	
Andrew Lees Trust	<p>The Andrew Lees Trust (ALT UK) was set up in 1995 following the tragic death of the environmentalist Andrew Lees, whilst filming the imperilled forests of the southeast coast of Madagascar. It began by helping to launch The Centre Ecologique Libanona (CEL), an environmental training centre in Tolagnaro (Ft Dauphin) to provide learning opportunities for Malagasy researchers and development professionals. It went on to deliver a local field programme in food security, natural resource management, and non-formal education via media across the southern arc, working with more than 60 local partners and service providers, local media (radio) and over 3000 communities.</p>
Blue Ventures	<p>Blue Ventures is a social enterprise that collaborates with local communities to develop transformative approaches to favor and maintain the marine conservation community locally.</p>

6.4. Mozambique

Profile

Minerals. According to the U.S. Geological Survey, Mozambique is ranked the second largest graphite producer in the world with 13 % of global production in 2022, third largest producer of titanium with 11.5 % of global production and the third largest producer of beryllium. Furthermore, Mozambique is the eighth largest producer of tantalum with 2 % of global production. Significant investments have also been made in heavy sands deposits by Kenmare Resources, BHP Group Limited and Rio Tinto.

Economic contribution. Mozambique's mining industry is a key sector of the economy and contributed 6,9 % to the national GDP and 7 % of government revenues (2019). In 2019, extractive companies contributed approximately USD 250 million in taxes, fees and royalties to the government budget, mostly from natural gas and coal.¹³⁸

Mines. According to the EITI Report, 2,051 mining, prospecting, and mineral trading licenses were active in 2020. The government (INAMI) publishes an online mining cadaster which includes a map of all license holders and concessions ([Mapa Portal do Cadastro Mineiro de Moçambique](#)). 22 mining companies participate in the EITI process in Mozambique.

Value chain. Apart from South 32's aluminum smelter most ores are exported unprocessed.

State-owned enterprises. There are no major SOEs involved in transition mineral mining in Mozambique.

ASM. ASM is a major economic factor in Mozambique. Reportedly, 660,000 ASM operators are active in Mozambique, predominantly in the gold, gemstones, tantalum, and construction materials sector.

Energy transition trends. Concerning transition minerals and critical raw materials, graphite, copper, tantalum, titanium, beryllium are the most relevant minerals in Mozambique.¹³⁹ Graphite is a major component of EV batteries and beryllium is used in the defense and aerospace industries. Especially the graphite sector is expanding rapidly (output more than doubled from 2021 to 2022).

Twigg is exporting its graphite to a newly built processing plant in Louisiana under the U.S. Minerals Security Partnership (MSP) supported by the U.S. government.¹⁴⁰

Legal framework

- Mozambique's mining sector is governed by the Mining Law while its oil and gas sector is governed by the Petroleum Law.
- Decree No. 26/2004 contains Environmental Regulations for Mining Activities.

Key ESG Risk Areas

According to the analyses of UBA, Material Insights and Drive Sustainability, graphite mining is not associated with particular ESG risks.

¹³⁸ <https://eiti.org/countries/mozambique>

¹³⁹ https://eiti.org/sites/default/files/2023-01/ITIE%20Moçambique_10o%20Relatório_ENG_1.pdf

¹⁴⁰ <https://allafrica.com/stories/202210100167.html>

Tantalum and titanium (ilmenite and zircon) mining is of medium environmental criticality. In particular, there is a risk of contamination from surface and stormwater, contamination of groundwater, as well as the destruction of biodiversity owing to the mining activities.

Also, community-company conflicts are likely if local communities do not benefit from the mining activities or if land disputes occur.¹⁴¹ The increasing graphite exploration activities are also a potential source of conflict.

Major environmental incidents are related to the coal and gas industries in Mozambique.

Mozambique is grappling with an insurgency in parts of the gas-rich province of Cabo Delgado. By mid-February 2021, more than three years after the insurgency began, 798 incidents of conflict had been recorded in Cabo Delgado, resulting in almost 4,000 fatalities and 600,000 refugees.¹⁴²

Trade Flows

The main export products relating to critical and transition minerals are the titanium ores ilmenite (MZN 150 million – app. EUR 2.1 million) and zircon (MZN 54 million) as well as graphite (MZN 16 million) to the world.¹⁴³

¹⁴¹ <https://www.aciafrica.org/news/8109/uncontrolled-mining-in-mozambique-could-fire-up-violence-catholic-peace-entity>

¹⁴² https://eiti.org/sites/default/files/2023-01/ITIE%20Moçambique_10o%20Relatório_ENG_1.pdf

¹⁴³ https://eiti.org/sites/default/files/2023-01/ITIE%20Moçambique_10o%20Relatório_ENG_1.pdf

Companies

Table 22: Largest mining companies in Mozambique

Parent organisation	Mineral	Mining project	Environmental and climate commitments	Environmental and climate conflicts ¹⁴⁴
AMG Graphite	Graphite	GK Ancuabe Graphite Mine S.A. (Graphite) is operated by AMG Graphite. AMG Graphite – headquartered in Germany – is a leading global supplier of high-purity natural graphite with its own mines and vertically integrated production facilities. At the Mozambique site, graphite is mined in open pits, floated and screened. The Ancuabe mine and processing plant in the Cabo Delgado province of northern Mozambique began operating in 2016.	AMG Graphite is committed to reducing carbon emissions. The reported Scope 1 and Scope 2 greenhouse gas (GHG) emissions for FY20 were 436,639 mt CO ₂ -e (for AMG Critical Materials).	
Kenmare	Titanium (Ilmenite, zircon and rutile)	Kenmare Moma Mining Ltd. (Titanium) operates the Moma Titanium Minerals Mine. The Moma Mine contains deposits of heavy minerals which include the titanium minerals ilmenite and rutile, as well as the silicate mineral zirconium. ¹⁴⁵	Kenmare has a goal of reducing Scope 1 emission by 12% by 2024 (compared to 2021) and a stated Net Zero ambition by 2040. Kenmare Moma Titanium operations in MOZ are powered using hydro-generated electricity transmitted to the location by a company-owned, 170km-long, 110kV overhead transmission line. In addition, a Rotary Uninterruptible Power Supply (RUPS) project was commissioned in 2022 and will avoid	

¹⁴⁴ This category is informed by cases which a) are listed on the [Transition Minerals Tracker](#), published by Business and Human Rights Resource Centre, which lists incidents, complaints, and grievances associated with the mining of transition minerals; b) are reported by the Environmental Justice Atlas; c) are addressed by the company itself in its sustainability reporting; or d) turn up in a simple Google search on the respective project.

¹⁴⁵ <https://www.kenmareresources.com/our-business>

			the continuous use diesel generators during stormy season. Other environmental performance indicators include: 90 % of water reused and 191 hectares of land rehabilitated. ¹⁴⁶	
Haiyu Mozambique Mining, Co. Lda	Titanium (Ilmenite, zircon)	Haiyu Mozambique Mining, Co. Lda is dedicated to the exploration of Ilmenite and zirconium. ¹⁴⁷		
Twigg Exploration & Mining Lda	Graphite	Twigg Exploration & Mining Lda (Graphite) operates the Balama Graphite Operation in the province of Cabo Delgado in Mozambique with - allegedly - the largest graphite reserve globally. Operations started in 2018. Twigg is a wholly owned subsidiary of Syrah Resources Limited, which is listed on the Australian Stock Exchange. ¹⁴⁸	Twigg's carbon reduction measures included: completion of an independent Life Cycle Assessment (LCA) and implementing initiatives to lower carbon footprint further including a hybrid solar and battery system at Balama. The Management of the Balama Tailings Storage Facility ("TSF") is aligned with International Council on Mining and Metals' ("ICMM") new Global Industry Standard on Tailings Management, which includes robust safety, governance, water stewardship, stakeholder management and emergency preparedness.	

¹⁴⁶ <https://www.kenmareresources.com/our-business>

¹⁴⁷ <https://www.haiyumining.com>

¹⁴⁸ <https://www.twigg.co.mz>

South 32	Aluminium	Mozal Aluminium (South32) is a large aluminium smelter close to Maputo. The USD 2 billion investment was largest private investment in the country at the time (1998) and is operated by South32. ¹⁴⁹ Mozal Aluminium is the largest industrial employer in the country and a major emitter of CO2.	South32 (Mozal) has the medium-term target to halve operational GHG emissions (i.e., Scope 1 and 2) by 2035 from their FY21 baseline. ¹⁵⁰	
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Analysis of potential political, private sector and civil society partner organisations

Table 21 below displays other relevant stakeholders in the Mozambican mining industry.

Table 23: Relevant mining stakeholders in Mozambique

Potential partner	Analysis of organisation
Ministry of Mineral Resources and Energy (MIREME)	MIREME is the central body of the State apparatus that, in accordance with the principles, objectives and tasks defined by the Government, directs and ensures the execution of Government policy in geological research, exploration of mineral and energy resources, and in the development and expansion of infrastructures for the supply of electricity, natural gas and oil products.
National Mining Institute (INAMI)	INAMI is the institution with regulatory authority for the mineral sector. INAMI's responsibilities include: 1) propose development policies for the mining sector and monitor their implementation 2) analyse and approve projects and technical and economic studies for the opening of new mines as well as the rehabilitation and/or closure of mines, 3) granting of prospecting and research licenses, mining concessions and mineral water concessions, and 4) support ASM and minimise negative environmental and social impacts resulting from ASM.
<u>Mozambique Chamber of Mines (Câmara de Minas de Moçambique, CMM)</u>	CMM is a formal private sector organisation that aims to represent the entire mining sector in Mozambique. It was founded in 2012 by some large international mining companies, including the Kenmare Resources, ENRC and Grafite Kropfmühl groups.

¹⁴⁹ <https://www.south32.net/what-we-do/our-locations/southern-africa/mozal-aluminium>

¹⁵⁰ <https://www.south32.net/sustainability/climate-change>

6.5. Namibia

Profile

Minerals. According to the U.S. Geological Survey, Namibia is the fourth largest producer of uranium oxide and seventh largest producer of diamonds.¹⁵¹ The uranium sector is dominated by Chinese interests.¹⁵² Namibia has also relevant zinc deposits. Furthermore, Namibia produces manganese, copper, tin, graphite, and gold – but not in significant amounts (not listed by the USGS). Namibia has the potential to develop new mining projects for cobalt and lithium. In 2022, Namibia announced a significant find of REEs on a farm in north central Namibia.

Economic contribution. The Namibian mining industry is the key sector of the economy and contributed 12.2 % to the national GDP (2022).¹⁵³ According to the Bank of Namibia forecast, the mining sector is expected to grow by another 10.9 % in 2023. In 2022, mining companies contributed approximately EUR 214 million in taxes, royalties and export levies to the government budget.¹⁵⁴ Regarding the contribution to the GDP and to the government budget, diamonds and uranium are the most relevant extractive resources in Namibia by far. As of 2022, the mining industry in Namibia directly employed around 16,147 people.¹⁵⁵

Mines. As of January 2023, there were only five significant mines of in-scope minerals in Namibia.¹⁵⁶ This includes one zinc, one copper, one manganese, one graphite, one tin mine.¹⁵⁷

State-owned enterprises. There are no major SOEs in the mining sector, but the government owns major stakes in the diamond mining industry.

ASM. ASM is also widespread in Namibia, predominantly in the gold, gemstones and diamond sectors.

Value chain. The mining sector has not transformed significantly from extraction and export of minerals in their raw state to increased value addition. However, some value addition has been achieved in the processing of gold (ingots), diamonds (polishing and processing), copper (copper cathodes), and zinc (processing to 99.995% pure zinc).¹⁵⁸

State-owned enterprises. According to the National Planning Commission, the ownership of all mines combined is skewed more towards foreign (88,1 %) compared to Namibian companies (11,9 %) - despite the major stake of the government in the diamond industry. The current Minister of Mines has recently raised concern and suggested measures akin to ‘resource nationalism’, indicating that “the proposed state ownership should take the form where the state owns a minimum equity percentage in all mining companies and petroleum production, for which it does not have to pay”.¹⁵⁹

Energy transition trends. Companies in Namibia are exploring to develop new mining projects for cobalt and lithium, which are important transition minerals for Europe. For example, the global lithium exploration and development company **Lepidico Ltd.** is developing a lithium mine in western Namibia.¹⁶⁰

¹⁵¹ <https://pubs.usgs.gov/periodicals/mcs2023/mcs2023.pdf>

¹⁵² However, there are also some Non-Chinese controlled advanced exploration uranium projects that will contribute to a growing uranium sector in Namibia. These are Bannerman Energy’s Etango-8 Project and Reptile Uranium’s Tumas Project.

¹⁵³ Namibia Chamber of Mines, *2022 Annual Review*.

¹⁵⁴ *Ibid.*

¹⁵⁵ *Ibid.*

¹⁵⁶ *Ibid.*

¹⁵⁷ *Ibid.*

¹⁵⁸ <https://www.npc.gov.na/wp-content/uploads/2022/02/The-Impact-of-Mining-sector-to-the-Namibia-economy-FINAL.pdf>

¹⁵⁹ <https://www.reuters.com/world/africa/namibia-considers-taking-stakes-resource-companies-bloomberg-news-2023-05-30/>

¹⁶⁰ <https://www.trade.gov/country-commercial-guides/namibia-mining-and-minerals>

In cooperation with German investors, Namibia has commissioned Sub-Saharan Africa's largest green hydrogen production project. The plan is to build wind farms and photovoltaic plants with a total capacity of seven GW to produce green ammonia, a hydrogen derivative which can be transported more easily.¹⁶¹

Legal framework

Namibia is one of the few countries incorporating environmental sustainability in her constitution. Article 95 emphasizes the importance of environmental protection.¹⁶² The Namibian government enacted several laws and policies to manage mining operations and mitigate its adverse impact on the environment, people and wildlife, including the following:

The [Minerals Act 1992](#) provides the framework and procedures for licensing, administration and the ownership of minerals. In addition, the Act requires mining companies to provide detailed studies on the potential impact of the operations to the surrounding environment, how to mitigate them and rehabilitations plans after the closure of the mine.¹⁶³ The Minerals Act is currently being revised. The most contentious aspects, according to the Chamber of Mines, of the draft Act are proposals to increase the upper royalty rate limit from 5% to 10% for base and precious metals, nuclear fuel minerals, and industrial minerals, and the introduction of a windfall tax.

The [Diamonds Act 1999](#) came into effect in April 2000 to provide control measures in respect of possession, the purchase and sale, processing and the import and export of rough diamonds in Namibia.

The [Environmental Management Act 2007](#) is aimed at the maintenance of ecosystems, ecological processes, utilisation of living natural resources and provides measures against dumping or recycling of foreign nuclear and toxic wastes on Namibian territory. By law, before mining takes place, an Environmental Impact Assessment (EIA) study is carried out to prevent, mitigate, control and repair environmental and social impacts that come from mining activities. In Namibia, mining activities cannot commence until an environmental clearance certificate from the Ministry of Environment and Tourism is issued based on the Environmental Management Act. The Environmental Management Act is administered by the Ministry of Environment and Tourism (MET).

The Namibian government has also implemented various policies and regulations to promote sustainable water use and conservation in the mining sector. For instance, the government has established a national water policy that outlines the principles and guidelines for managing and using water resources. For example, mining companies are required to obtain water use licenses and comply with strict water quality standards. The Water Resources Management Act No. 11 of 2013 was enacted to ensure that the water resources of Namibia are managed, developed, used, conserved, and protected in a manner consistent with, or conducive to, the fundamental principles set out in the Act.

New health and safety regulations are expected to be approved in 2023, replacing an outdated Ordinance from 1968.

¹⁶¹ <https://www.cleanenergywire.org/news/namibia-launches-10-billion-dollar-hydrogen-project-german-participation>

¹⁶² https://www.uni-potsdam.de/fileadmin/projects/geo/Avatar/Bilder_Norra/6_WAMINA_NUST_Mine_Water_Management_Practices_in_Namibia.pdf

¹⁶³ <https://www.npc.gov.na/wp-content/uploads/2022/02/The-Impact-of-Mining-sector-to-the-Namibia-economy-FINAL.pdf>

Key ESG Risk Areas

Mining companies in Namibia face a variety of ESG risks in the conduct of their mining activities. Notwithstanding the positive contribution of the mining sector to socio-economic development, however, there are also negative aspects such as environmental degradation, emissions of chemicals which lead to contamination of the area, noise pollution and underground vibrations as a result of blasting, exploitation of workers and exposure to diseases i.e. asthma and cancer.¹⁶⁴

Namibia is one of the driest countries in Sub-Saharan Africa and most vulnerable to climate change. Water is a vital input for all mining operations, including closure—water is used for several functions in mining, such as processing, mineral conveyance, dust suppression, etc. Most of the mines in Namibia are located in water-stressed areas, and these are increasingly facing competition from different users, presenting challenges to the security of supply. According to the Namibia water statistics, the mining industry is the fourth highest water consumer after Irrigation, livestock, tourism, etc. Though other sectors consume more water, the primary concern with water used in mining is that, in most cases, it cannot be recycled for human consumption. The mining sector has felt water constraints acutely, to the point of building the first desalination plant by the Orano mine in the Erongo region. Nonetheless, Namibia is one of the countries that could face an especially significant increase in water stress by 2040.¹⁶⁵

Environmental risks are the highest risks for creating adverse impacts from mining in Namibia. In particular, uranium mining poses significant environmental risks. In Namibia, where uranium mining is a significant industry, several environmental risks associated with uranium mining operations can be identified:

- **Radioactive Contamination:** Uranium ore contains radioactive elements, such as uranium-238 and uranium-235, as well as decay products like radium and radon. During mining and processing, these radioactive substances can be released into the environment, posing a risk of contamination to soil, water, and air.
- **Water Pollution:** Uranium mining often involves the use of large quantities of water for extraction, processing, and waste management. If not properly managed, the release of contaminated water or wastewater from mining operations can contaminate nearby water sources, including rivers, lakes, and groundwater. This can have severe consequences for aquatic ecosystems and local communities that rely on these water sources.
- **Tailings and Waste Management:** Uranium mining generates large volumes of waste materials, including tailings (processed ore residue) and other mine wastes. These materials can contain radioactive elements and other harmful substances. Inadequate management and containment of these waste materials can lead to the leaching of contaminants into the environment, resulting in potential soil and water pollution.
- **Dust and Air Quality:** Mining operations, including the excavation and transport of uranium ore, can generate dust that contains radioactive particles. If not properly controlled, this dust can be released into the air and pose a risk to workers, nearby communities, and ecosystems. Inhalation of radioactive particles can increase the risk of respiratory and other health issues.

¹⁶⁴ <https://www.npc.gov.na/wp-content/uploads/2022/02/The-Impact-of-Mining-sector-to-the-Namibia-economy-FINAL.pdf>

¹⁶⁵ https://www.uni-potsdam.de/fileadmin/projects/geo/Avatar/Bilder/Norra/6_WAMINA_NUST_Mine_Water_Management_Practices_in_Namibia.pdf

- Habitat Disruption: Uranium mining activities often require significant land clearing, which can lead to habitat destruction and fragmentation.

Another core environmental issue is the reluctance to rehabilitate abandoned mines.¹⁶⁶ The legislative framework is not sufficiently robust, including lacking requirements for financial assurances for mine closure, and non-compliance with existing statutes seems prevalent.¹⁶⁷

¹⁶⁶ <https://www.npc.gov.na/wp-content/uploads/2022/02/The-Impact-of-Mining-sector-to-the-Namibia-economy-FINAL.pdf>

¹⁶⁷ <https://www.npc.gov.na/wp-content/uploads/2022/02/The-Impact-of-Mining-sector-to-the-Namibia-economy-FINAL.pdf>

Companies

Table 24: Major mining companies and projects in Namibia

Parent organisation	Mineral	Mining project	Environmental and climate commitments	Environmental and climate conflicts ¹⁶⁸
Vedanta Resources (India)	Zinc	Skorpion Zinc mine. Due to geotechnical pit instabilities that posed a risk to mining activities and employees, both the Skorpion mine and refinery were placed under care and Maintenance since May 2020. ¹⁶⁹		n/a
AfriTin Mining Ltd.	Tin	AfriTin Mining Ltd. has redeveloped the historical Uis Tin Mine - formerly the world's largest hard-rock opencast tin mine.		n/a
Dundee Precious metal (Canada)	Copper	Tsumeb copper smelter. Dundee Precious Metals is not a mine as such but is rather involved in the processing of copper concentrates into copper blisters whereby most of the concentrates are sourced from Bulgaria, South America and small miners around Opuwo area.	Dundee completed the design to ecologically rehabilitate the Tailings Storage Facility in 2021 to prevent contamination of the ground water and curb soil-erosion and excessive dust. Dundee plans to install another air quality monitoring station in 2023 to increase the scope of air quality management.	The community of Tsumeb was exposed to sulphur dioxide emissions resulting from the copper smelting process. Sulphur dioxide is a known respiratory irritant. Emission levels declined significantly since commissioning of a Sulphuric Acid Plant in 2015. ¹⁷⁰

¹⁶⁸ This category is informed by cases which a) are listed on the [Transition Minerals Tracker](#), published by Business and Human Rights Resource Centre, which lists incidents, complaints, and grievances associated with the mining of transition minerals; b) are reported by the Environmental Justice Atlas; c) are addressed by the company itself in its sustainability reporting; or d) turn up in a simple Google search on the respective project.

¹⁶⁹ <https://vedanta-zincinternational.com/what-we-do/our-operations/skorpion-zinc/>

¹⁷⁰ <https://www.npc.gov.na/wp-content/uploads/2022/02/The-Impact-of-Mining-sector-to-the-Namibia-economy-FINAL.pdf>

Shaw River Manganese (Australia)	Manganese	Otjosondu mine.		
Lepidico Ltd.	Lithium	Exploration of Karibib Project		
Prospect Resources (Australia)	Lithium	Prospect completed its first phase of drilling at Omaruru in February 2023. The drilling program produced excellent results, including the discovery of a flat-lying, wide pegmatite system, mineralised with lithium	Only very vague commitments regarding environment and climate published on website. Prospect Resources, Code of Conduct	n/a
Celsius Resources (Australia)	Cobalt	Gecko Opuwo - 970,000 tonnes of contained copper anticipated and 259,000 tonnes of contained cobalt demonstrates potential.	n/a	n/a
Trevali Mining Corporation (Canada)	Zinc	Rosh Pinah mine . Unprocessed zinc concentrate from Rosh Pinah is transported to South Africa for milling and refining and sold into the international market (especially in Canada and China).	Trevali implemented dust suspension initiatives, a PM 2.5 monitoring in residential areas, improved awareness trainings on the risks of poor personal hygiene with regards to lead exposure to both employees and community members. ¹⁷¹	Dust from the tailings that contains lead blows over the town in the local community and may affect the health of the community.
Anglo American Group PLC	Diamonds	Anglo American Group PLC is a major player in the Namibian mining industry through their subsidiary De Beers . De Beers in engaged in the following operations in Namibia: NamDeb , a 50:50 joint venture between the Namibian government and De Beers, is the primary land-based diamond mining company in Namibia. NamDeb's	Namdeb reported no significant environmental incidents in 2022. Namdeb retained recertification to the international standard ISO 14001:2015. Environmental policies and procedures were reviewed to include among others, commitment on circular economy, carbon neutrality, water, and biodiversity	In May 2018, Namdeb Diamond Mining reported a breach in a seawater canal at its marine diamond mining operations. The incident resulted in the release of untreated water into the Atlantic Ocean, raising concerns about potential marine pollution.

¹⁷¹ <https://www.npc.gov.na/wp-content/uploads/2022/02/The-Impact-of-Mining-sector-to-the-Namibia-economy-FINAL.pdf>

		<p>Oranjemund mine employs roughly 2,100 people.</p> <p>Debmarine Namibia, also a 50:50 joint venture between the Namibian government and De Beers, handles offshore diamond mining.¹⁷² The growth in Namibia’s mining sector is primarily driven by increasing diamond output, which in 2022 mainly came from Debmarine’s new offshore mining vessel - the Benguela Gem - which was commissioned in March 2022.¹⁷³</p>	<p>stewardship. Namdeb established a Terrestrial Advisory Council (TSAC) comprising of national and regional academic experts who will advise on terrestrial biodiversity management programmes, enabling Namdeb to demonstrate restoration and rehabilitation criteria that is reputable and scientifically credible.¹⁷⁴</p>	
China General Nuclear Power Group (China)	Uranium	<p>The Swakop Husab Uranium mine is the world’s third largest open pit uranium mine, majority-owned and operated by China General Nuclear Power Group (90 %).</p>		<p>In December 2019, the Swakop Husab Uranium Mine reported a leakage of sulfuric acid from a tank. The incident occurred during the commissioning phase of the mine and resulted in the release of approximately 10,000 liters of acid, some of which entered the surrounding environment.</p>
China National Uranium Corporation Limited (China)	Uranium	<p>Rössing Uranium mine, the world’s fifth largest uranium mine, majority-owned and operated by the China National Uranium Corporation Limited (68 %).¹⁷⁵</p>		<p>In December 2013, a significant spill of a mixture containing liquid uranium occurred at the Rössing Uranium Mine. The incident resulted in the contamination of a nearby tributary of the Khan River. The spill</p>

¹⁷² <https://www.trade.gov/country-commercial-guides/namibia-mining-and-minerals>

¹⁷³ <https://www.theassay.com/articles/investor-insight/the-resurgence-of-the-namibian-mining-sector/>

¹⁷⁴ <https://chamberofmines.org.na/wp-content/uploads/2023/04/2022-Chamber-of-Mines-Annual-Review.pdf>

¹⁷⁵ <https://www.trade.gov/country-commercial-guides/namibia-mining-and-minerals>

				was attributed to a failure in the mine's leachate system.
Paladin Energy China National Nuclear Corporation (China)	Uranium	The Langer Heinrich mine, Namibia's third uranium operation, is a joint venture between Paladin Energy (75%) and China National Nuclear Corporation (25%) . The mine was placed on care and maintenance in 2018. Paladin Energy is currently preparing this mine for a restart of operations in 2024 due to increased global demand.		In December 2016, the Langer Heinrich Uranium Mine reported a sulfuric acid spill. The incident was caused by a faulty pipe, resulting in the release of approximately 100,000 liters of sulfuric acid. The acid flowed into the Kahn River, leading to concerns about the potential impact on the ecosystem.
QKR (UK) Epangelo (Namibia)	Gold	The Navachab gold mine is owned and operated by UK-based QKR (92,5 %) and Namibian Epangelo (7,5 %) . Navachab mine is an open pit mine, producing gold bullion which is exported to South Africa.		
B2Gold (Canada)	Gold	The Canadian mining company B2Gold operates the Otjikoto Mine . The project is USD 400 million investment and began operations in 2014. In 2019, the mine employed about 1,168 staff.	B2Gold published a Climate Strategy Report in February 2022 describing climate risk management and water risk management. Two external audits were conducted at Otjikoto, which found the mine to be compliant with the legislation and all environmental requirements. The review and update of the Otjikoto Mine Closure and rehabilitation Plan was initiated in 2022.	

Table 25: Relevant mining stakeholders in Namibia

Potential partner	Analysis of organisation
Ministry of Mines and Energy	The Ministry of Mines and Energy carries prime responsibility for regulating the extractive industries, including the collection of royalties, and ensuring that safety; health and environmental standards are consistent with the relevant State and Commonwealth legislation, regulations, and policies.
Ministry of Environment and Tourism	Ministry of Environment and Tourism administers the Environmental Management Act. The Ministry of Environment and Tourism and Forestry (MEFT) was established in 1990 and is responsible for safeguarding Namibia's environmental resources. Since then, the MEFT has implemented far-reaching policy and legislative reforms in the environmental sphere in an attempt to alleviate many of the constraints that the environment places upon people and vice versa.
Chamber of Mines	The Chamber of Mines is a member-based organisation that is responsible for the stewardship of mining, exploration and associated activities for the benefit of all stakeholders. Members operate 25 mines in Namibia with 15,246 people directly employed. The Namibian Chamber of Mines has taken leadership in the green hydrogen efforts in Namibia, with participation in the <i>Private Sector Green Hydrogen Task Force</i> as deputy Chair.

6.6. South Africa

Profile

Minerals. According to the U.S. Geological Survey, South Africa is the largest producers of platinum group minerals (PGMs), which include platinum (72% of global production), palladium (42% of global production) and rhodium, ruthenium, iridium. South Africa is also the largest producer of manganese (37% of global production), and of chromium (43.9% of global production). Furthermore, South Africa is the second largest producer of titanium, the third largest producer of vanadium und the fourth largest producer of flourspar, the fifth largest producer of diamonds, and the tenth largest producer of gold.

Economic contribution. The South African mining industry is a key sector of the economy and contributes 8.7% to the national GDP (2021).¹⁷⁶ In 2022, mining companies contributed approximately EUR 355 million in taxes to the government budget.¹⁷⁷ Regarding the contribution to the GDP and to the government budget, coal, PGMs, iron ore, gold, and manganese ores are the most relevant minerals by far. As of 2022, the mining industry in South Africa directly employed around 475,000 people.¹⁷⁸

Mines. As of January 2023, there were at least 547 mines in South Africa.¹⁷⁹ This includes 134 coal mines, 96 PGM mines, 89 gold mines, 48 diamond mines, 27 copper mines, and 18 manganese mines, as well as others.¹⁸⁰

Mining areas are often concentrated in geological basins. The Bushveld Complex contains approximately 90% of the world's known PGM reserves. In addition to the PGMs, extensive deposits of iron, tin, chromium, titanium, vanadium, copper, nickel and cobalt also occur in the Bushveld Complex. The Bushveld Complex extends approximately 450 km east to west and 250 km north to south, spanning parts of the Limpopo, Northwest, Gauteng and Mpumalanga provinces.¹⁸¹ The Kalahari Basin, in the country's Northern Cape, is home to 80 percent of the world's manganese ore body.¹⁸² The Witwatersrand Basin is one of the foremost gold areas in the world.

Value chain. South Africa's mining industry is very diversified and integrated and captures many stages of the different mineral value chains.

State-owned enterprises. There are no major SOEs in the mining sector.

ASM. ASM is also widespread in South Africa, predominantly in the gold and diamond sectors.

Energy transition trends. Many of the minerals mined in South Africa are crucial for the use in EV batteries and in technologies relevant for the energy transition, such as wind turbines, hydrogen turbines, etc. Many of those minerals mined in South Africa are on the EU Critical Raw Materials (CRM) list. Critical Raw Materials are of high economic importance for the EU and have a high risk of supply disruption. The CRM list contains 34 minerals, of which 16 are considered of strategic importance. South Africa is a significant producer of three out of the 16 strategic critical raw materials, including for manganese (37 %), platinum (72 %), palladium (40 %) and titanium (12 %).

¹⁷⁶ <https://www.mineralscouncil.org.za/industry-news/publications/facts-and-figures>

¹⁷⁷ <https://www.mineralscouncil.org.za/industry-news/publications/facts-and-figures>

¹⁷⁸ <https://www.mineralscouncil.org.za/industry-news/publications/facts-and-figures>

¹⁷⁹ <https://projectsiq.co.za/mines-in-south-africa.htm>

¹⁸⁰ <https://projectsiq.co.za/mines-in-south-africa.htm>

¹⁸¹ <https://www.bafokengplatinum.co.za/brpm-joint-venture.php>

¹⁸² <https://www.south32.net/what-we-do/our-locations>

As South Africa is the global leading PGM producer, it is of particular interest for the EU to engage in partnerships for the sustainable development of the PGM sector in South Africa. PGMs are used for auto catalyst converters, computer hard disks, mobile phones, aircraft turbines, etc.

South Africa will enter into a USD 8,5 billion 'Just Energy Transition Partnership (JETP)' with the EU, US, France, Germany, UK and other partners. After two years of negotiations, South Africa's implementation plan for the Just Energy Transition Partnership (JETP) will be made public at the UN COP28 Climate Summit in Dubai in November 2023 and may serve as a blueprint for climate finance and phasing out fossil fuels in developing economies.

Legal framework

The most important law governing the mining sector in South Africa is the Mineral and Petroleum Resources Development Act (MPRDA) 2002. Other important legislation includes the Mine Health and Safety Act 1996, the Mining Titles Registration Act 1967, the Mineral and Petroleum Resources Royalty Act 2008, the Precious Metals Act 2005, the Diamonds Act 1986, the National Environmental Management Act (NEMA) 1998 and the National Water Act 1998.¹⁸³

The Department of Mineral Resources and Energy ensures the execution of the provisions of the MPRDA, through processing applications, issuing or granting rights and permits, approving environmental management programmes (EMPs), monitoring performance, undertaking corrective actions and issuing closure. The Department is also responsible for reporting on the performance of the "environmental right" in terms of South Africa's Constitution to the South African Human Rights Commission on an annual basis.

The legal framework is on paper very robust. To obtain a prospecting or mining right, an applicant must perform either a basic assessment or an environmental impact assessment and obtain an environmental authorisation that incorporates an environmental management plan or programme. Under NEMA, the holder of a mining permit must provide acceptable financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts. However, enforcement of the laws and actual performance of companies often lags behind the legal standard.

Key ESG Risk Areas

As South Africa's mining industry is so diverse, all ESG risks potentially apply to mining and processing operations in South Africa. As the global leading producer of PGMs and Vanadium, as well as a leading gold producer, special attention is drawn to those minerals. PGMs, vanadium and gold all have a high environmental criticality, as phenomena such as acid mine drainage (AMD), paragenesis with radioactive substances, the disturbance of designated protected areas and a high cumulative energy demand are associated with the extraction and processing of these ores.

- 49 employees lost their lives in mining incidents in 2022, compared to 74 in 2021. This is an improvement considering that between 1984 and 2005, more than 11 000 mine workers died in South Africa, but overall, fatalities on mine-sites remain high.¹⁸⁴

¹⁸³ <https://www.lexology.com/library/detail.aspx?g=d6227301-0bfa-49cd-aeb2-3578f3c59820>

¹⁸⁴ <https://www.dmr.gov.za/mine-health-and-safety/mine-accidents-and-disasters>

- In 2021, a decrease of occupational diseases (e.g. silicosis, pulmonary TB) reported by mines, from 2,013 cases in 2020 to 1,924 cases was recorded. Six South African gold producers (Harmony Gold, Gold Fields, African Rainbow Minerals, Sibanye-Stillwater, AngloGold Ashanti and Anglo American South Africa) agreed a 5 billion rand (\$400 million) class action settlement in 2018 with law firms representing thousands of miners who contracted the fatal lung diseases silicosis, an incurable disease caused by inhaling silica dust from gold-bearing rocks, and tuberculosis.¹⁸⁵
- Marikana Massacre (2012): In August 2012, during a strike by mine workers at Lonmin's Marikana platinum mine in Northwest province, clashes between striking miners, police, and security personnel resulted in the deaths of 44 miners. The incident drew attention to issues of worker safety, living conditions, and the social and environmental impacts of mining in the region.

Acid Mine Drainage (AMD) is a long-standing environmental issue associated with mining in South Africa. It occurs when water comes into contact with sulphur-bearing minerals, resulting in the formation of acidic water that can contaminate rivers and groundwater.

As a major coal and iron ore/steel producing country carbon footprint issues are of major relevance as well. However, the coal industry is not in scope of this report. According to the Boston Consulting Group, South Africa ranks in the top 20 of most carbon-intensive global economies on an emissions-per-GDP basis.¹⁸⁶

Environmental Incidents

- Over 247,000 hectares of land degraded by gold mining in South Africa
- In September 2022, an abandoned diamond mine near Jagersfontein in the Free State collapsed and killed three people and caused serious environmental damage through contaminated flood water.¹⁸⁷ According to Human Rights Watch, more than 2,300 high-risk abandoned coal mines pose a grave ecological risk to local communities, polluting critical water sources and arable land.¹⁸⁸ Companies are not acting on their legal duties and the government fails to enforce it.
- The Witwatersrand Basin, a major mining region in Gauteng province, the most urban, industrial and most densely populated province in South Africa, has been particularly affected by Acid Mine Drainage due to its 120-year history of gold mining activities. According to the Environmental Justice Platform, millions of people are affected by the water and soil pollution and elevated levels of heavy metals. In particular many informal communities have made their homes on contaminated land and feed their animals and crops with contaminated water. The mining companies have allegedly left the area and ceased to pump out the corrosive water.¹⁸⁹
- Gold One Mine Spillage: In August 2014, a spillage of untreated water and slurry occurred at the Gold One Modder East Operation near Springs in Gauteng province. The incident resulted in the release of contaminated water into nearby wetlands, potentially impacting local ecosystems.

Emissions

- Indirect electricity-use-related emissions (Scope 2) make up the bulk (app. 77 %) of total Scope 1 and Scope 2 emissions in the mining sector, according to the BCG Report. This is driven by the

¹⁸⁵ <https://www.reuters.com/article/us-safrica-mining-silicosis-%20idUSKBN141B9>

¹⁸⁶ <https://www.bcg.com/publications/2022/how-south-african-mining-can-address-climate-change-challenges>

¹⁸⁷ <https://www.farmersweekly.co.za/agri-news/south-africa/farms-under-threat-after-jagersfontein-mining-disaster/>

¹⁸⁸ <https://www.hrw.org/news/2022/07/05/interview-how-south-africas-abandoned-mines-prey-local-communities>

¹⁸⁹ <https://www.ejatlus.org/conflict/acid-mine-drainage-south-africa>

high carbon-intensity of grid electricity and the prevalence of very deep underground mines which results in relatively high electricity demand by miners.¹⁹⁰

- As extended electricity cuts and loadshedding persist, coal-fired generating plants suffer frequent breakdowns, including in many industrial mines. For example, Amplats's refined PGM output is likely to fall by 5% in 2023.¹⁹¹

¹⁹⁰ <https://www.bcg.com/publications/2022/how-south-african-mining-can-address-climate-change-challenges>

¹⁹¹ <https://www.reuters.com/world/africa/amplats-annual-profit-down-38-after-delayed-smelter-rebuild-2023-02-20/>

Companies

Table 26: Largest mining companies in South Africa

Parent organisation	Mineral	Mining project	Environmental and climate commitments	Environmental and climate conflicts ¹⁹²
Anglo American Group PLC	Diamonds, PGM, Manganese, Iron Ore	<p>Anglo American Platinum Ltd. (Amplats) is the world's largest primary producer of PGMs and one of the largest producers of diamonds by value (through the 85% stake in the De Beers Group). Kumba Iron Ore, another subsidiary, is the fifth largest iron-ore producer in the world and the largest in Africa. The company has operations in South Africa, Zimbabwe, Botswana, and Zambia. AngloAmerican is listed on the London Stock Exchange (LSE) and Johannesburg Stock Exchange (JSE).</p> <p>SA portfolio:</p> <ul style="list-style-type: none"> • PGM mines (Mogalakwena, Tumela, Dishaba, Modikwa, Mototolo, Bokoni, Twickenham) • Samancor Manganese Ltd. • Kumba Iron Ore (Sishen, Thabazimbi) 	<p>Anglo American's Future Smart Mining™ approach is committed to have a net positive ESG impact. The company pledges to achieve “a healthy environment, carbon neutral operations that use less fresh water and deliver net positive biodiversity outcomes in all their operations by 2030”.</p> <p>One pillar to achieve these goals is technological innovation. Anglo American introduced technologies that more precisely target the desired metals or minerals, delivering greater than 30% reductions in the use of water, energy and capital intensity, and producing less waste in the process. This includes techniques such as coarse particle recovery, bulk sorting and ultrafine recovery.</p> <p>In Southern Africa, AngloAmerican has partnered with EDF Renewables</p>	

¹⁹² This category is informed by cases which a) are listed on the [Transition Minerals Tracker](#), published by Business and Human Rights Resource Centre, which lists incidents, complaints, and grievances associated with the mining of transition minerals; b) are reported by the Environmental Justice Atlas; c) are addressed by the company itself in its sustainability reporting; or d) turn up in a simple Google search on the respective project.

			to develop 3-5 GW of clean generation capacity, which is expected to meet Anglo American's operational power requirements and support the resilience of local electricity supply systems.	
Impala Platinum	PGM	<p>Impala Platinum is the world's largest primary producer of platinum. It is headquartered in Johannesburg, South Africa, and operates mines in South Africa and in the DRC. It also has several exploration projects in Botswana and Zimbabwe. <i>SA portfolio:</i></p> <ul style="list-style-type: none"> • 4 PGM mines (Marula, Two Rivers, Rustenburg, Amandelbult) 		
Sibanye-Stillwater	PGM, Gold	<p>Sibanye-Stillwater is the largest primary producer of gold in South Africa, and one of the largest primary silver producers in the world. It also has significant platinum and uranium operations. The company is headquartered in South Africa. Sibanye-Stillwater is listed on the New York Stock Exchange and Johannesburg Stock Exchange.</p> <p><i>SA portfolio:</i></p> <ul style="list-style-type: none"> • 5 PGM mines (Rustenburg, Marikana, Kroondal, Platinum Mile, Mimosa) • 5 gold mines (Driefontein, Kloof, Beatrix, Cooke, DRD Gold) 		

<p>Royal Bafokeng Platinum</p>	<p>PGM</p>	<p>Royal Bafokeng Platinum is one of the largest platinum producers in the world. The mine is located close to the city of Rustenburg in Northwest Province, about 100km from Johannesburg, and employs over 2,000 people.</p>		
<p>Northam Platinum</p>	<p>PGM</p>	<p>Northam Platinum is the fifth biggest platinum producer in the world, accounting for 9% of global platinum output. It is also one of the largest producers of PGMs, with a 15.9% share of global PGM production. It is listed on the JSE.</p> <p><i>SA portfolio:</i></p> <ul style="list-style-type: none"> • 3 underground mines (Elandsrand, Western Deep Levels and Bafokeng) • 2 open-cast mines (La Coipa and Nkomazi) 		
<p>African Rainbow Mining</p>	<p>Manganese, Chromium, PGMs, Nickel</p>	<p>African Rainbow Mining is a leading South African mining and minerals company headquartered in Johannesburg with operations in South Africa and Malaysia. ARM mines and beneficiates iron ore, manganese, chromium, PGMs, nickel and coal and owns a 12% stake in Harmony Gold Mining Company.</p> <p><i>SA portfolio:</i></p> <ul style="list-style-type: none"> • 2 PGM mines (Modikwa, Two Rivers) • Nkomati nickel and chromium mine 		

		<ul style="list-style-type: none"> • <i>Black Rock manganese mine</i> • <i>Beeshoek Iron Ore mine</i> 		
Gold Fields	Gold	<p>Gold Fields is headquartered in Johannesburg, South Africa. Founded in 1888, it is the world's third-largest primary producer of gold and one of the largest producers of PGMs. Gold Fields is listed on the JSE, LSE and NYSE. It also has operations in Ghana.</p> <p><i>SA portfolio:</i></p> <ul style="list-style-type: none"> • <i>South Deep Gold mine</i> • <i>Numerous other small-scale assets in South Africa</i> 		
Harmony Gold	Gold	<p>Harmony Gold is the largest listed gold producer in South Africa and is headquartered in Johannesburg, South Africa. The group also owns or has interests in several exploration projects in South Africa, Mali and Ghana. It also produces silver, lead, zinc, and copper.</p> <p><i>SA portfolio:</i></p> <ul style="list-style-type: none"> • 9 underground gold mines in the Witwatersrand Basin • 1 open-pit gold mine 		

Analysis of potential political, private sector and civil society partner organisations

Table 25 below displays other relevant stakeholders in the South African mining industry.

Table 27: Relevant mining stakeholders in South Africa

Potential partner	Analysis of organisation
Department of Mineral Resources and Energy	In May 2019, President Cyril Ramaphosa announced the merger of the Department of Mineral Resources and the Department of Energy into one department, as the Department of Mineral resources and Energy (DMRE). The existence of the Department of Mineral Resources and Energy is premised on its vision of becoming a leader in the transformation of South Africa’s economic growth agenda through the sustainable development of the mining and energy sectors.
Minerals Council South Africa	The Minerals Council is a mining industry employers’ organisation that supports and promotes the South African mining industry. The Minerals Council serves its 78 member companies and promotes their interests by providing strategic support and advisory input. All Members of the Minerals Council South Africa (Minerals Council) shall automatically, upon accepting membership of the Minerals Council, become subject to this Membership Compact, as a condition of Minerals Council Membership. The Membership Compact (Compact) is a mandatory code of ethical business conduct to which members of the Minerals Council subscribe.
Southern Africa Resource Watch (SARW)	SARW was founded in 2007 and operated as a project within the Open Society Initiative for Southern Africa (OSISA). Its location and operations were primarily in SADC, well known as the world’s richest region in terms of extractive resources. Currently SARW’s mandate is to monitor corporate state conduct in the extraction and beneficiation of natural resources in Southern Africa and assesses to what extent these activities uplift the economic conditions of the region’s communities. SARW advocates and promotes human rights and environmental protection in resource extraction activities by monitoring corporate and state conduct in a peaceful and collaborative manner.
Good Governance Africa	GGA is a research and advocacy non-profit organisation with centers across Africa focused on improving governance across the continent.
Federation for a Sustainable Development	FSE is widely recognised as a prominent environmental activist group in the mining industry. FSE’s work includes political participation in national and international fora on mining related issues, research projects, government committees and task teams, environmental awareness campaigns, empowerment of mining-affected communities, skills development and capacitating communities.

Earthlife Africa

Earthlife Africa is a non-profit organisation, founded in Johannesburg, in 1988, that seeks a better life for all people without exploiting other people or degrading their environment. The Johannesburg branch's largest campaign is the Sustainable Energy and Climate Change Project.

6.7. Zambia

Profile

Minerals. According to the U.S. Geological Survey, Zambia possesses one of the world's highest-grade deposits of copper and is ranked the seventh largest copper producer in the world 4 % of global production in 2021. Over 220,000 hectares of land occupied by Copper Mine dumps in Zambia. In addition, Zambia is home to small, exploitable deposits of cobalt, nickel, and manganese and Zambia produces about 20 percent of the world's emeralds.¹⁹³ Uranium, gold, coal mining deposits are being prospected.

Economic contribution. Zambia's mining industry is a key sector of the economy and contributes 10 % to the national GDP, 77 % of export revenues, 39 % of government revenues and 2 % of employment (2021).¹⁹⁴ In 2021, mining companies contributed approximately ZMW 36,442 million in taxes, fees and royalties to the government budget. Regarding the contribution to the GDP and to the government budget, copper the most relevant mineral by far. As of 2021, the mining industry in Zambia directly employed around 66,478 people.¹⁹⁵

Mines. According to the EITI Report 2021, 4,303 mining, exploration, and processing licenses were active in 2021, including 604 artisanal mining rights.¹⁹⁶ All active exploration, mining, and processing licenses are disclosed on a public [mining cadastre platform](#). Many of the country's large copper mining and processing operations are located on the Copperbelt and North-Western provinces. The other eight provinces of the country also house mining companies for copper, cobalt, gemstones, and other minerals.

Value chain. Zambia tried to ban the export of unprocessed copper ore.

State-owned enterprises. The Government of Zambia retains minority interests in most of the large copper projects through its holding company known as Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM-IH). In Mopani Mines, the government's shares increased to 100% after buying out Glencore.¹⁹⁷

ASM. The artisanal and small-scale mining sector is widespread in Zambia and faces many challenges. A recent census of development minerals in Zambia, conducted by the Ministry of Mines and Mineral Development (MMMD) and the EU Development Minerals Programme, revealed that of the 109 mining plots visited in 10 provinces of the country, approximately 75% held legal licenses. A vast majority of the ASM were unaware that their activities required a licence.

Energy transition trends. President Hichilema of Zambia and President Tshisekedi Tshilombo of the DRC launched a Joint Initiative (JI) between Zambia and the Democratic Republic of Congo (DRC) on the establishment of a value chain in the electric battery and clean energy sector in 2021. In April 2022, Zambia and the DRC, through respective Ministers responsible for Industry, Finance and Mines signed a Cooperation Agreement (CA) between the two countries. The purpose of the CA is to provide a framework for bilateral cooperation in areas of common interest necessary for the establishment of the battery value chain. Two key areas of cooperation are outlined in the CA: the establishment of a common governance framework - the Zambia-DRC Battery Council, which is composed of the two Heads of State, the Deputy Secretary General and Executive Secretary of the United Nations

¹⁹³ <https://www.trade.gov/country-commercial-guides/zambia-mining-and-minerals-0>

¹⁹⁴ <https://zambiaeiti.org/mineral-value-chain/revenues/>

¹⁹⁵ <https://zambiaeiti.org/wp-content/uploads/2023/05/2021-ZEITI-Report.pdf>

¹⁹⁶ <https://zambiaeiti.org/wp-content/uploads/2023/05/2021-ZEITI-Report.pdf>

¹⁹⁷ <https://zambiaeiti.org/wp-content/uploads/2023/05/2021-ZEITI-Report.pdf>

Economic Commission for Africa (UNECA) and the President of Africa Export-Import Bank (Afrexim Bank); and the identification of an implementation site, such as a Special Economic Zone (SEZ), potentially in Kipushi, in the Haut-Katanga region or in Ndola in the Zambian Copperbelt.¹⁹⁸

Research and development of the battery precursor and the battery required for subsequent mass production and sale is supported by the University of Zambia and the Copperbelt University. Also, the German Steinbeis Global Institute Tübingen (the company behind the Green Hydrogen Africa Initiative) and the University of Lubumbashi are involved in the geological investigations.¹⁹⁹ Currently, a plant with 40 GW production capacity is planned in the Kiswishi Special Economic Zone (SEZ). For this, Lubumbashi University, Zambia University, Copperbelt University and Steinbeis University have built a development partnership.²⁰⁰

The Chinese company CNMC has pledged to support value addition in Zambia and announced setting up a copper cable manufacturing plant and plans to utilise hydropower for further production to work on Electric Vehicles (EV) batteries using materials in Zambia.²⁰¹

Legal framework

The mining sector is governed and regulated by the Mines and Minerals Development Act No. 11 of 2015, which covers types of mining rights, acquisition of mining rights, rights/obligations conferred on the mining right holder, transferability of mining rights, safety, health, and environment requirements, and provides for the environmental protection fund, mineral royalties, fees and charges, and export of minerals.²⁰²

Mining companies are required to pay deposits into an Environmental Protection Fund (EPF). The EPF aims to provide assurance to the director of Mines Safety Department that the company executes environmental and social impact statements and provides protection to the Government against risk of having the obligation to undertake the rehabilitation of mining areas where the mining license holder fails to do so. The contributions to the Fund are dependent on the environmental audits on the mining firms that are enforced by the Director of Mine Safety. The audits are conducted to ascertain the extent of the environmental liability caused by the mining activity of each mine.

Moving beyond 2023, the government of Zambia seems to be committed to making climate change and environmental issues a priority. The current plan, for the years 2022 to 2026, has a stand-alone "environmental sustainability" pillar for the first time ever.

Key ESG Risk Areas

There are numerous perceived ESG issues associated with the copper supply chain, such as air and water pollution, and company-community conflict. The ESG risks from copper mining rated „very high“ by TDI Sustainability on the Material Insights Platform include:

- Negative Biodiversity and Conservation Impact

¹⁹⁸ https://www.parliament.gov.zm/sites/default/files/images/publication_docs/Ministerial%20Statement%20-%20On%20Zambia-Congo%20DR%20Joint%20Initiative%20on%20Electric%20Battery.pdf

¹⁹⁹ <https://www.mcti.gov.zm/zbpuip/?p=2641>

²⁰⁰ <https://dse-technology.com/battery/>

²⁰¹ <http://mines.org.zm/cnmc-to-invest-us1-3bn/>

²⁰² <https://www.trade.gov/country-commercial-guides/zambia-mining-and-minerals-0>

- Pollution
- Child Labour
- Community Rights Violations
- Company/Community Conflicts
- Corruption

The forest sector contributes about 5.2% to the nation's GDP and provides formal and informal employment to about 1.1 million people. The forest sector is, however, the greatest contributor to greenhouse gas emissions and is under increasing pressure from deforestation, with an annual deforestation rate of 149,876 hectares. Zambia is ranked among the countries with the highest deforestation in the world.²⁰³

Legacy mining pollution in Zambia is the result of many decades of unsustainable mining operations and inadequate rehabilitation or closure of mining sites. Lead poisoning has affected the residents of Kabwe, the capital of Zambia's Central Province with a population of over 200,000 residents since decades.²⁰⁴ A legal class action case is being prepared against Anglo American South Africa Ltd on behalf of Zambian communities living in the vicinity of the Kabwe lead mine who are suffering from lead poisoning. The mine is situated in close proximity to villages comprising around 230,000 residents. Tens of thousands of Kabwe residents are estimated to have developed high blood lead levels, mainly through ingestion of dust contaminated by emissions from the mine smelter and waste dumps.²⁰⁵ More than one third of the population of Kabwe, Zambia— over 76,000 people—live in lead-contaminated townships. Studies estimate that half of the children in these areas have elevated blood lead levels that warrant medical treatment.²⁰⁶

In December 2016, the Zambian Government began a 5-year World Bank-funded Mining and Environmental Remediation and Improvement Project (ZMERIP) in critically polluted mining areas. The project specifically targeted the communities living in Chingola, Kabwe, Kitwe and Mufulira municipalities, including lead exposure in Kabwe municipality. However, the project did reportedly not succeed in addressing the full scale of the contamination and did not address the source of the contamination, the mine's waste dumps.²⁰⁷

Trade Flows

Overall, Zambia exported copper worth USD 8,3 billion, gold worth USD 209 million and cobalt worth USD 5 million in 2021. In 2022, the EU imported base metals worth app. EUR 350 million from Zambia.²⁰⁸ However, Zambian copper is likely to enter the Union market as (semi-)manufactured products via Asia.

²⁰³ <https://allafrica.com/stories/202303010536.html>

²⁰⁴ <https://www.worldbank.org/en/news/factsheet/2020/12/17/zambia-mining-and-environmental-remediation-and-improvement-project>

²⁰⁵ <https://www.leighday.co.uk/news/news/2019-news/zambian-lead-poisoning-victims-prepare-to-launch-class-action-against-anglo-american-south-africa/>

²⁰⁶ <https://www.hrw.org/report/2019/08/23/we-have-be-worried/impact-lead-contamination-childrens-rights-kabwe-zambia>

²⁰⁷ <https://spcommreports.ohchr.org/TMResultsBase/DownloadPublicCommunicationFile?gId=26405>

²⁰⁸ https://webgate.ec.europa.eu/isdb_results/factsheets/country/details_zambia_en.pdf

Companies

Table 28: Largest mining companies in Zambia

Parent organisation	Mineral	Mining project	Environmental and climate commitments	Environmental and climate conflicts ²⁰⁹
ZCCM-IH	Copper, others	ZCCM Investment Holdings (ZCCM-IH) is the state-controlled mining company. It is owned by the Industrial Development Corporation (IDC) of Zambia (60%), the Government of Zambia (17%) and the National Pension Scheme Authority (15%). ZCCM-IH holds stakes in at least 23 significant mining operations in Zambia , including all the major projects listed below and fully owns Mopani Copper Mines , which was the seventh largest copper mine in Zambia in 2021 (45,312 mt)	In February 2023, Mopani hosted its very first Women in Mining Forum and Exhibition to provide 'Capacity support to female-led local SMEs'. This will be followed by the establishment of a nuanced Supplier Development Programme to stimulate sustained growth of selected Women in Business to enhance their access to Mopani's supply chain.	In October 2020, Anglo American was accused of being responsible for the lead poisoning. Lawyers claim that the lead originated from the smelter, ore processing, and tailings dumps of the Kabwe mine in Zambia, which Anglo American South Africa had managed before the mine was nationalized in 1974. Anglo American denies these allegations and has accused its successor ZCCM-IH , which operated the mine after its nationalisation in 1974. The class action certification hearing was held in February 2023 at the High Court of South Africa's Johannesburg branch. ²¹⁰
First Quantum	Copper, gold	FQM Trident's Sentinel mine (prev. Kalumbila Minerals) was the largest copper producer in 2021 (232,687 mt). The open pit copper mine (USD 2.1 billion		

²⁰⁹ This category is informed by cases which a) are listed on the [Transition Minerals Tracker](#), published by Business and Human Rights Resource Centre, which lists incidents, complaints, and grievances associated with the mining of transition minerals; b) are reported by the Environmental Justice Atlas; c) are addressed by the company itself in its sustainability reporting; or d) turn up in a simple Google search on the respective project.

²¹⁰ <https://www.aljazeera.com/news/2023/1/20/mining-giant-turned-blind-eye-to-lead-poisoning-in-zambia>

		<p>investment) was the largest infrastructure investment since the Kariba Dam was constructed in 1959. The operation employs more than 6,000 workers. In 2010, First Quantum acquired the controlling interest in the prospecting license which included the Kalumbila copper deposit (now Sentinel) and the Kawako nickel deposit (now Enterprise.) The combined project was renamed Trident after the acquisition. Constructed over four years from 2012, Sentinel represents US\$2.1 billion of investment.</p> <p>Kansanshi Mining copper-gold mine in 2021 was the second largest copper mine in Zambia (2021: 201,185 mt) and largest gold mine (3,485 ounces). Kansanshi Mine is probably one of the oldest mines in Africa, with direct copper smelting dating back to the 4th Century. The company is 20% owned by ZCCM-IH, with the balance owned by First Quantum Minerals Limited. Kanshani employs more than 13,000 people.</p>		
Barrick Gold	Copper	<p>Lumwana Mining Company is the third largest copper mine in Zambia based on output and value (2021: 108,790). The Lumwana copper mine is a conventional open pit (truck and shovel) operation. It's located about 100 kilometers west of Solwezi in Zambia's Copperbelt — one of</p>		

		the most prospective copper regions in the world.		
China Non-Ferrous Metals Corporation (NFC Africa Mining)	Copper	<p>Chambishi Copper Mine was the fourth largest copper mine in Zambia in 2021 (62,346 mt)</p> <p>CNMC Luanshya was the sixth largest copper mine in Zambia in 2021 (57,784 mt)</p> <p>The Chairman of CNMC announced in October 2023 to invest further USD 1.3 billion in Luanshya and Chambishi Copper Mines²¹¹</p>	The company website does not provide information on ESG commitments or performance (at least not in English).	
Jinchuan	Copper	Chibuluma Mine began production of copper concentrate in 1955. The Majority stake in Chibuluma passed to Jinchuan in 2011 after Jinchuan successfully acquired Meterox Limited. Jinchuan International currently operates three mines in the Central African Copperbelt, namely, the Ruashi copper and cobalt mine, and the Kinsenda copper mine in the DRC and the Chibuluma copper mine in Zambia.		
Vedanta Resources, KCM (India)	Copper	<p>Konkola Copper Mines was the fifth largest copper mine in Zambia in 2021 (58,947 mt).</p> <p>Nchanga mines are situated in the Zambian Copperbelt, in the vicinity of the town of Chingola</p>		Konkola Copper Mines has allegedly been polluting the main water source of surrounding villages in Chingola, in Zambia’s Copperbelt Province for nearly two decades by spilling sulphuric acid and other toxic chemicals. Toxins from the mine were reportedly killing off

²¹¹ <http://mines.org.zm/cnmc-to-invest-us1-3bn/>

				crops, livestock and the vegetation surrounding the river, destroying the livelihoods of local people who depended on farming and fishing to support their families. A legal action, brought by more than 2,500 Zambian villagers, including 643 children, against Konkola Copper Mines and Vedanta, has settled out of court in May 2021. ²¹²
EMR Capital Resources	Copper	Lubambe Copper Mines was the eight largest copper mine in Zambia in 2021 (18,373 mt). It is located in Chililabombwe District of the Copperbelt Province in Zambia and commenced operations in 2012.		
Eurasian Resources Group, ERG (Kazakhstan) ZCCM-IH (Zambia)	Copper, cobalt	Chambishi Metals (ERG 90 %, ZCC-IH 10 %) is involved in the mining, refining and tolling of cobalt and copper. The Chambishi plant is the only plant in Zambia producing cobalt metal and is one of the largest cobalt metal producers in the world.		
Prospect Resources	Rare Earths	Kesya Rare Earths Project (51 %) consists of a highly prospective, intrusive carbonatite complex within a licence area of 1,053 hectares. <i>The maiden diamond drilling program at Kesya is anticipated to commence in Q3 2023.</i>	Only very vague commitments regarding environment and climate published on website. Prospect Resources, Code of Conduct	

²¹² <https://actionaid.org/news/2021/actionaid-zambia-mining-companies-must-not-be-allowed-pollute-impunity>

Analysis of potential political, private sector and civil society partner organisations

Table 27 below displays other relevant stakeholders in the Zambian mining industry.

Table 29: Relevant mining stakeholders in Zambia

Potential partner	Analysis of organisation
Zambia Ministry of Mines and Mineral Development	The Zambia Ministry of Mines and Mineral Development (MMMD) deals with mining rights, licenses, large scale mining in Zambia, gemstones mining, health and safety, environmental protection, and geologic services on analyses, royalties and charges.
Zambia Development Agency	The Zambia Development Agency is a quasi-government institution under the Ministry of Commerce, Trade and Industry, is Zambia's premier economic development Agency with a multifaceted mandate of promoting and facilitating trade, investment and enterprise development in the country.
Zambia Chamber of Mines	The Zambia Chamber of Mines is advancing the interests of its members, local communities, the country and its stakeholders whilst promoting sustainable and responsible mining.
Zambia EITI Secretariat.	Zambia EITI Secretariat. The Extractive Industries Transparency Initiative (EITI) is a coalition of donors, mining companies, resource-rich countries, Civil Society Organisations and investors. The main objective of the EITI is to disclose what gas, oil and mining companies pay to Government and what Government receives from these extractive companies as revenue. The purpose of disclosing this information is to promote transparency and accountability in the use of our natural resources. Zambia joined the EITI to maximize the benefits from the extractives industries sector. The increased benefits will in turn contribute to economic growth and development in the country.
Publish What You Pay Zambia	Publish What You Pay Zambia was established in 2009 and has played a key role in EITI implementation, participating in the national multi-stakeholder group, analysing EITI reports, working towards recommendations in the reports and helping draft Zambia's EITI bill. Beyond that, the coalition has played keen role in influencing the legislative and policy framework governing extractives by making use of evidence-based advocacy efforts.
Center for Environmental Justice	Center for Environmental Justice ²¹³ is a non-governmental organisation established in 2010 whose mandate is to create platforms and processes that promote environmental justice for most vulnerable people in society. CEJ fosters access to quality and accurate information on environmental protection, extractive industries, sustainable energy, climate change,

²¹³ <https://cejzambia.org>

	<p>water security and agriculture with the ultimate aim of enhancing accountability for better decision making and sustainable development as well as a support safe and adaptive environment as basic fundamental human rights.</p> <ul style="list-style-type: none"> • The CEJ is implementing a project “Strengthening Civil Society Voices for Climate Advocacy in Zambia” with support from the United Nations Democracy Fund. • With support from the Southern Africa Trust (SAT) is implementing the Voices for Climate Justice & Natural Resource Governance initiative. With a focus on natural resources, the project seeks to encourage dialogue and consultations to reduce conflicts in the management of natural resources in Zambia associated with policy and legal frameworks.
Environment Africa Zambia	Environment Africa Zambia is a Zambian NGO based in Kabwe, that was established to bridge the gap that existed in the environmental sector in order to raise environmental awareness and promote sustainable development. The strategic focus includes climate change, sustainable livelihoods, environmental governance and organisational strengthening.
Council of Churches in Zambia	Council of Churches in Zambia operates the Emergency & Development Programme which promotes good governance and environmental stewardship through awareness. raising, CSO capacity building, gender mainstreaming and economic empowerment. It also covers environmental and governance responses to Gender Justice.
Caritas Zambia	Caritas Zambia was established in 2001 and is a faith-based organisation dedicated to the promotion of integral human development through witnessing, animation, conscientisation and institutional strengthening. Caritas Zambia is – together with other NGOs, including EAZ and Human Rights Watch – involved in seeking judicial action in relation to the Kabwe lead poisoning scandal (see incidents below).

6.8. Zimbabwe

Profile

Minerals. Major minerals produced include gold, PGMs, diamonds, nickel, chrome, and lithium. Other relevant minerals that the country is endowed with but are not being produced include iron ore, tungsten, and graphite. Most key mineral subsectors recorded output growth compared to the previous year, with gold (18%), coal (29%), lithium (183%), diamonds (15%), and PGMs (5%).

Among the base metals exploited in Zimbabwe, nickel dominates in terms of value. There are also two operational nickel smelting and refining facilities. Nickel yields cobalt as a by-product.²¹⁴ Chrome ore, mostly along the Great Dyke, is categorised as world class, and considerable value adding takes place as the ore is processed into ferro-chrome alloys before export.

Economic contribution. Zambia's mining industry is a key sector of the economy and contributes 10 % to the national GDP, 77 % of export revenues, 39 % of government revenues and 2 % of employment (2021).²¹⁵ In 2021, mining companies contributed approximately ZMW 36,442 million in taxes, fees and royalties to the government budget. According to the National Development Strategy, the sector is expected to grow to a USD 12 billion industry by 2030. The sector accounted for approximately 38,000 formal jobs.²¹⁶

Mines. The mineral license cadastre is currently not publicly available. The Ministry of Mines and Mining Development is currently validating all title records. Existing title holders need to register on the Ministry of Mines and [Mining Development Cadastre Portal](#) in order to verify and validate that their records are correctly presented.

Value chain. Zimbabwe banned the export of chrome ore and intends to ban the export of raw lithium. The ban of base minerals export and the amendment of the Mines and Minerals Act which will recognise lithium as a strategic mineral. The implementation of an export tax on unbeneficiated PGMS was deferred pending finalisation of consultations with Government for a comprehensive beneficiation roadmap for PGMs.

State-owned enterprises. The state-owned mining company ZMDC has a number of running Joint Venture operations in base metals, including tin and tantalite Joint Ventures in Kamativi, copper Joint Ventures in Sanyati, Chinhoyi and Mhangura as well as a lead mining and processing Joint Venture.

ASM. There are over 500,000 ASM miners, predominantly in the gold sector.

Energy transition trends. Although Zimbabwe has been mining lithium since 1950 through Bikita Lithium Minerals (BLM), in recent years, Zimbabwe has experienced an increased interest in lithium mining activities which has seen an influx of investors and projects. To date there are now around seven different lithium exploration and mining projects at different development stages. Chinese companies (e.g., Zhejiang Huayou Cobalt and Sinomine Resource Group) are currently acquiring lithium mining rights in the biggest lithium companies in the country. Lithium output increased from 30,502 tons in 2021, to 86,225 in 2022. The growing global push towards electric vehicles (EVs) has seen significant capital injections in the Zimbabwe lithium space.

Legal framework

²¹⁴ <https://www.chamines.co.zw/home/BaseMinerals/>

²¹⁵ <https://zambiaeiti.org/mineral-value-chain/revenues/>

²¹⁶ <https://www.chamines.co.zw/assets/uploads/2023/application/3bb36313-f1fc-470d-81fe-dd628d9a2694.pdf>

The Mines and Minerals Act (Chapter 20:01) of 1961 is the main statute that regulates mining in Zimbabwe. It is supported by the Mining (General) Regulations.

The Environment Management Act (Chapter 20:27) of 2002 provides for the sustainable management of natural resources and protection of the environment; the prevention of pollution and environmental degradation; the preparation of a National Environment Plan and other plans for the management and protection of the environment. Sections 97 to 100 provides for mandatory environmental impact assessments (EIAs) for projects listed in the 1st Schedule. These projects include projects involving Forestry, Mining and Quarrying, and Infrastructure Development. However, change in land use is not subjected to mandatory EIAs.

According to the environmental NGO ZELA, the mining code outdated and pre-dates the Constitution of Zimbabwe (2013), which means it is 'not informed by rights-based principles and environmental management principles such as community participation, community engagement, sustainable development and Environmental Impact Assessments. It is also neither harmonised with the Environmental Management Act (Chapter 20:27) of 2002 nor reflects United Nations Environment Programme (UNEP) Principles on Sustainable Mining'.²¹⁷

However, the Government adopted a revised Mines and Minerals Act Amendment Bill in February 2023. The Bill seeks to simplify the mining titles system and the establish the mining cadastre registry that will be computerized. Furthermore, the Ministry of Mines released a revised working version of the comprehensive Mineral Development Policy in October 2022. The Policy is expected to be finalized before the end of 2023. The Ministry of Mines has also committed to finalize all outstanding Mineral Specific Policies in 2023, including for gold, PGMs, chromium, and lithium.

The National Development Strategy (NDS) 1 (2021 – 2025) acknowledges that there is 'weak governance' in the mining sector. According to ZELA, there is inadequate enforcement of environmental laws aimed at promoting meaningful community participation and consultations. This has resulted in limited social accountability on the part of mining companies and non-implementation of environmental rehabilitation programmes.

The Environmental Management Agency (EMA) offer access to the Environmental Impact Assessments (EIAs) of mining operations, including those of Chinese corporates, free of charge.²¹⁸ However, the EIA Regulations do not specify the methods and tools that should be use in quantifying impacts. This is usually done at the discretion of a mining company. In addition, EIAs do not assess the companies' compliance with environmental and social standards.

There are no regulations that stipulate minimum requirements for sustainability reporting, and mandatory disclosure of information by mining companies. However, since June 2019, the Zimbabwe Stock Exchange (ZSE) introduced new listing requirements enhancing transparency, disclosures and accountability in the governance of listed companies. It is mandatory for all companies listed on the ZSE to disclose environmental, social and governance (ESG) information as part of their sustainability reporting.

On 18 August 2023 the Zimbabwe Government, through the Minister responsible for Climate Change, adopted the Carbon Credits Trading (General) Regulations, thereby establishing a carbon trading scheme.

²¹⁷ <https://zela.org/download/model-policy-paper-on-community-engagement-on-human-rights-due-diligence-in-mining-and-renewable-energy-value-chains/>

²¹⁸ <https://zela.org/download/access-to-information-on-chinese-investments-contracts-in-zimbabwe-the-law-vs-practice/>

Zimbabwe is not a member of the EITI.

Key ESG Risk Areas

Zimbabwe has an active ASM industry that contributes significantly to the production of gold, chrome ore, tin, tantalite and semi-precious stones.

Zimbabwe faces an energy and power crisis, and the need to balance the transition from coal mining to clean energy.

Trade Flows

Mineral exports increased to USD 5.6 billion in 2022, compared to USD 5.1 billion in 2021. The mining industry remained less diversified with the top five minerals (Gold, PGMs, diamonds, chromium) contributed 86% of mineral exports in 2022, while the top 3 accounted for 82% in 2022.

Companies

Parent organisation	Mineral	Mining project	Environmental and climate commitments	Environmental and climate conflicts ²¹⁹
Zimbabwe Mining Development Corporation (ZMDC)	Tin, tantalum, copper, lead	The state-owned mining company ZMDC has a number of running Joint Venture operations in base metals, including tin and tantalite Joint Ventures in Kamativi, copper Joint Ventures in Sanyati, Chinhoyi and Mhangura as well as a lead mining and processing Joint Venture.	No detailed commitments ZMDC (2021), Annual Report 2020, Zimbabwe Mining Development Corporation (ZMDC).	n/a
China Mining Resources Group (China)	Lithium	Sinomine Zimbabwe Bikita Mining is a mining production enterprise acquired by in early 2022. The company is located in Bikita West District, Masvingo Province, Zimbabwe. The Bikita mine is the world's most important supply base for petalite. It is estimated that over 11 million tonnes of caesium-petalite resource exist at Bikita, making it the largest known such deposit in the world. The mining lease of Bikita Mining is about 15.3 square kilometers, and the estimated amount of lithium mineral resources is 65 million tons of ore. Bikita Mining has 1,000 employees and 1,200 contractors (80% are locals).	Bikita Minerals is currently constructing a 130km, 132/33 KVA powerline. The project is funded to the tune of USD 20 million, with an additional USD 2 million earmarked for rural electrification.	n/a

²¹⁹ This category is informed by cases which a) are listed on the [Transition Minerals Tracker](#), published by Business and Human Rights Resource Centre, which lists incidents, complaints, and grievances associated with the mining of transition minerals; b) are reported by the Environmental Justice Atlas; c) are addressed by the company itself in its sustainability reporting; or d) turn up in a simple Google search on the respective project.

Prospect Resources	Lithium	<p>Increased production of both spodumene and petalite is expected from Prospect Resources following completion of a Pilot Plant.</p> <ul style="list-style-type: none"> The Step Aside Lithium is located 35km from Harare. It comprises approximately 100 hectares of claim within the Harare Greenstone Belt. The Phase 3 drilling program is set to commence in mid-2023. 	<p>Only very vague commitments regarding environment and climate published on website.</p> <p>Prospect Resources, Code of Conduct</p>	n/a
Various lithium exploration projects	Lithium	<p>Lithium projects under development include</p> <ul style="list-style-type: none"> Acadia Lithium Zimbabwe Zulu Lithium Step Aside Sabi Star Zimbabwe Lithium <p>These projects are at various stages of development from resource evaluation to commissioning.</p>		n/a
Zimplats	PGM	<p>The three PGM operations of ZIMPLATS, Mimosa Mining Company and Unki Mines continued to operate at (near) full capacity utilisation in 2022.</p> <ul style="list-style-type: none"> Unki Mines Pvt Ltd. Mimosa Mining Company 		n/a
Karo Platinum (Pvt) Ltd	PGM	<p>Karo Resources officially commenced construction operations during 2022</p>		n/a

Bindura Nickel Corporation, BNC	Nickel	<p>There were production stoppages at the primary producer, Bindura Nickel Corporation totaling six months of 2022.</p> <p>Trojan Mine Shaft Re-deepening Project and the transition from a low volume, high grade to a high volume-low grade strategy is expected to boost high production.</p> <p>In the medium to long term, production is expected to increase with exploration works earmarked at Trojan Mine, Shangani Mine, the BSR facility, Hunters Road Project, Damba-Silwane as well as the Trojan Hill and Kingstone Hill Projects</p>		n/a
Zimbabwe Consolidated Diamond Company (Pvt) Ltd (ZCDC)	Diamond	<p>Three operations of ZCDC produced consistently during the year under review to produce at total of 4.8 million carats in 2022, compared to 4.2 million carats in 2021. ZCDC remains the dominant diamond producer contributing 85% to total production.</p> <ul style="list-style-type: none"> • Anjin • RZ Murowa <p>Other projects including RioZim Murowa Diamonds Expansion Projects and ZCDC/ALROSA joint venture</p>		n/a

Analysis of potential political, private sector and civil society partner organisations

Potential partner	Analysis of organisation
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<p>Ministry of Mines and Mining Development (MMMD)</p>	<p>MMMD administers the Mines and Minerals Act and is responsible for mining titles administration. MMMD has Provincial Offices in all the country's provinces for purposes of issuance and administration of mining titles, except in the metropolitan provinces of Harare and Bulawayo. The ministry operates three technical departments that provide technical services and inspectorate functions. These are the Geological Survey, the Mining Engineering Department, and the Department of Metallurgy.</p>
<p>Minerals Marketing Corporation of Zimbabwe (MMCZ)</p>	<p>MMCZ is responsible for marketing minerals in Zimbabwe.</p>
<p>Zimbabwe Gender Commission</p>	<p>The mission of ZGC is to protect and promote gender equality through Public Education, Research, Investigation and Monitoring in Zimbabwe.</p>
<p>Zimbabwe Environmental Law Association (ZELA)</p>	<p>ZELA is a public interest environmental law organisation based in Zimbabwe that seeks to promote environmental justice, sustainable and equitable use of natural resources. ZELA is working on developing a gender transformative programme focus across all the thematic areas it works on namely Land and Natural Resources, Mining and Extractives Industry, Climate Change and Energy, Responsible Investments and Business rights and Service Delivery governance.</p>
<p>Zimbabwe Coalition on Debt and Development</p>	<p>The Zimbabwe Coalition on Debt and Development (ZIMCODD) is a socio-economic justice coalition established in February 2000 to facilitate citizens' involvement in making public policy more pro-people and pro-poor. ZIMCODD views indebtedness, the unfair global trade regime and lack of democratic people-centred economic governance as root causes of the socio-economic crises in Zimbabwe and the world at large.</p>
<p>Zimbabwe Artisanal & Small-scale Mining Council (ZASMC)</p>	<p>Zimbabwe Artisanal and Small Scale for Sustainable Mining Council (ZASMC) is a registered trust that represents the artisanal and small scale miners (ASM). It seeks to bring ASM into the mainstream economy through lobbying, supporting, development and growth of ASM.</p>

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